

THE UNIVERSITY OF BRITISH COLUMBIA

FIFTY-FIFTH SESSION

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#### ACADEMIC YEAR

#### 1969

August		
1	Friday	Last day for submission of applications by students applying for admission to the University for the first time, or for reapplication by former students who do not have a valid Authorization to Register for the 1969-70 session, except to Faculties requiring an earlier application date.
		Supplemental examinations, August 1-8.
11	Monday	School of Architecture, First Year Workshop begins.
15	Friday	Faculty of Medicine, application forms available for the Session 1970-71.
25	Monday	Faculty of Forestry, Second Year students begin Field Work at the University Research Forest, Haney, B.C.; registration during the week of September 2.
26	Tuesday	Text-books available, University Book Store.
28	Thursday	Meeting of the Faculty of Medicine.
29	Friday	Meeting of new students from other countries, 9:00 a.m., Lasserre 102.
Septemb	er	
1	Monday	ACADEMIC YEAR 1969-70 begins.
		Labour Day. University closed.
2	Tuesday	Registration Week begins; registration procedure mailed to all students with Authorization to Register forms. Registration takes place daily 8:30 a.m. to 4:30 p.m.
		Fees due and payable on registration.
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		Programme for all new students, 9:00 a.m. Auditorium; programme continues throughout the week.  Faculty of Forestry, Third Year students register 8:30-12:00 noon in McM. 370; start of field trip

Note: Administration Offices are closed Saturdays.

2	Tuesday	Lectures begin:
	•	Faculty of Dentistry (all years).
		Faculty of Medicine (First and Second Years).
		School of Rehabilitation Medicine.
		Faculty of Agricultural Sciences, Field Trip, September 2-6, inclusive.
3	Wednesday	School of Librarianship, registration and introductory lectures.
		Faculty of Pharmaceutical Sciences, Second Year students register in Cunningham Building, Room 160.
		School of Social Work, registration.
4	Thursday	Faculty of Forestry, First Year students register in McM. 370.
		Faculty of Pharmaceutical Sciences, Third and Fourth Year students register in Cunningham Building, Room 160.
		School of Architecture, First Year students register.
5	Friday	Faculty of Forestry, Fourth Year students register in McM. 370.
		School of Architecture, First Year students register.
6	Saturday	Registration Week ends; registration procedures continue in some Faculties to 4:30 p.m.
		continue in bonic automates to and plans
7	Sunday	Assigned accommodation in residences available Sunday evening. Special arrangements for earlier registrants.
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8		Assigned accommodation in residences available Sunday evening. Special arrangements for earlier registrants.  Lectures begin most Faculties.  School of Architecture, Second and Third Year
8	Monday	Assigned accommodation in residences available Sunday evening. Special arrangements for earlier registrants.  Lectures begin most Faculties.  School of Architecture, Second and Third Year students register.
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8	Monday	Assigned accommodation in residences available Sunday evening. Special arrangements for earlier registrants.  Lectures begin most Faculties. School of Architecture, Second and Third Year students register.  Meeting of the Senate.  Last day for admission of late registrants, Faculty of Education.
8 10 12 19	Monday Wednesday Friday	Assigned accommodation in residences available Sunday evening. Special arrangements for earlier registrants.  Lectures begin most Faculties.  School of Architecture, Second and Third Year students register.  Meeting of the Senate.  Last day for admission of late registrants, Faculty of Education.  Last day for changes in Education courses.  Last day for changes in courses most Faculties; all changes must be reported to the Registrar's
8 10 12 19	Monday  Wednesday  Friday Friday  Monday	Assigned accommodation in residences available Sunday evening. Special arrangements for earlier registrants.  Lectures begin most Faculties.  School of Architecture, Second and Third Year students register.  Meeting of the Senate.  Last day for admission of late registrants, Faculty of Education.  Last day for changes in Education courses.  Last day for changes in courses most Faculties; all changes must be reported to the Registrar's Office by Monday, 22nd.  Faculty of Education school experience may be ar-

8 Wednesday Meeting of the Senate.

		bociety, 12.50-2.50 p.m.
13	Monday	Thanksgiving Day. University closed.
Novem	ber	
11	Tuesday	Remembrance Day. Service in Memorial Gymnasium, 10:45 a.m. University closed.
12	Wednesday	Meeting of the Senate.
27	Thursday	Meeting of the Faculty of Medicine.
28	Friday	School experiences completed for fall term.
Decemi	per	
8	Monday	Last day of lectures for those Faculties scheduling formal Christmas examinations.
10	Wednesday	Meeting of the Senate.
12	Friday	School of Librarianship last day of lectures, First Term.
19	Friday	First Term ends.
25	Thursday	Christmas Day. University closed December 25, 26.
31	Wednesday	Faculty of Medicine, last day for submission of applications for admission to the Winter Session 1970-71.
		1970
January	7	
1	Thursday	New Year's Day. University closed.
4	Sunday	Assigned accommodation in residences available Sunday evening.
5	Monday	Second Term begins, final instalment on fees due and payable; students are advised to mail fees to Accountant by this date. Undergraduate students not previously registered may not enrol for the first time at the beginning of the Second Term.
12	Monday	Faculty of Education, second cycle of school experience begins.

Meeting of the Senate.

9 Thursday

14 Wednesday

Annual Meeting of the Medical Undergraduate Society, 12:30-2:30 p.m.

Februar	у	
12	Thursday	Meeting of the Faculty of Medicine.
13	Friday	Last day for submission of applications from Faculty of Education students for graduate scholarships.
19	Thursday	Mid-term break most Faculties, February 19, 20, lectures and laboratories cancelled; Library and other facilities open.
25	Wednesday	Meeting of the Senate.
March		
2	Monday	Last day for application for April final examinations for Master's candidates.
6	Friday	Faculty of Education, second cycle of school experience ends.
25	Wednesday	Meeting of the Senate.
26	Thursday	Last day for applying to Faculty of Graduate Studies for an Ed.D. final examination.
27	Good Friday	University closed March 27, 30.
April		
3	Friday	Last day for applying to Faculty of Graduate Studies for a Ph.D. final examination.
		Last day for submission of Ed.D. thesis to candidates' committee for congregation.
9	Thursday	Last day of lectures, most Faculties, excluding among others, Dentistry, Law, Medicine. Last day for submission of graduating essays and theses, Bachelor degree programmes.
10	Friday	Sessional examinations begin, most Faculties, excluding among others, Dentistry, Law, Medicine.
13	Monday	School of Social Work, sessional examinations begin.
17	Friday	Last day for submission of Master's theses to Departments.
18	Saturday	Comprehensive examinations for M.Ed. candidates.
24	Friday	School of Social Work, last day of lectures and field instruction.
25	Saturday	Last day of lectures, First, Second, Third and Fourth Years, Medicine.
29	Wednesday	Meeting of the Senate.
		Faculty of Education post-sessional practice teaching period, April 29 - May 15.

30	Thursday	Sessional examinations end, most Faculties.
		Faculty of Applied Science, Field School begins.
		Accommodation in residences terminates.
		Faculty of Dentistry, last day for submission of applications for admission to Winter Session 1970 - 71.
		School of Architecture, last day for submission of applications for admission to Winter Session 1970 - 71.
May		
1	Friday	Last day for registration for Summer Session.
-	uy	Faculty of Medicine sessional examinations begin.
4	Monday	Faculty of Forestry, Third Year students begin Field Work at the University Research Forest, Haney, B.C.
18	Monday	Victoria Day. University closed.
19	Tuesday	Meeting of the Faculty of Medicine.
20	Wednesd <b>ay</b>	Meeting of the Senate.
26	Tuesday	Baccalaureate Service, 8:00 p.m.
29	Friday	Congregation, Memorial Gymnasium 2:15 p.m.
		Other Congregation dates, if necessary, to be announced.
T		
June	M 1	
15	Monday	School of Architecture, last day for submission of transcripts of record in support of applications for admission to First Year.
17	Wednesday	Meeting of the Senate.
30	Tuesday	Last day for submission of application forms for B.C. Government Scholarships.
July		
1	Wednesday	Dominion Day. University closed.
2	Thursday	Faculty of Law, last day for filing of applications for first admission.
6	Monday	Summer Session, lectures begin.
		Last day for submission of applications for supplemental examinations.
		Last day for submission of applications for the M.Ed. comprehensive examinations in August.
15	Wednesday	Last day for submission of applications for bursaries.

#### August

Last day for submission of application by students applying for admission to the University for the first time, except to Faculties requiring an earlier application date.

Last day by which students who have been accepted into the Faculty of Medicine and who have not previously attended the University of British Columbia must submit general application forms to the office of the Registrar.

Supplemental examination period August 3-10.

Saturday Comprehensive examinations for M.Ed. candidates.

Friday Summer Session ends.

Monday ACADEMIC YEAR ENDS.

Separate publications may be obtained from the Registrar's Office for the various Faculties and Schools. In addition, the following publications are available.

General Information bulletin.

Awards and Financial Assistance bulletin.

The Announcement of the Summer Session (available March or later).

Since the University calendars are published some months in advance of the Sessions to which they apply, the University reserves the right to make changes in fees or in course offerings as circumstances may require.

## The General Information bulletin provides information on the following topics:

Academic costume

Admission requirements

Alumni Association

Book Store

Classification of students

Coat-of-Arms of the University

Conduct of students

Constitution of the University

Correspondence courses

Degrees granted

Enrolment, 1968-69

Extension Department

Extra-Sessional classes

Fees

Gymnasia

Health Service

History of the University

Housing Accommodation for

students

Information Office

Library

Museums

Personnel and Labour Relations

Office

Registration procedures

Religious Council

Services Training Corps

Student Organization

Student Services Office

Summer Session

Theological colleges — affiliated

Traffic and Parking

# THE UNIVERSITY of BRITISH COLUMBIA

## Governing Bodies

## ADMINISTRATIVE STAFF EMERITUS STAFF STAFF OF MISCELLANEOUS DEPARTMENTS AND OFFICES INSTRUCTIONAL AND RESEARCH STAFF

(Listed alphabetically and by Faculties and Departments)

1969

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### The University of British Columbia

#### **VISITOR**

COLONEL THE HONOURABLE JOHN R. NICHOLSON, P.C., O.B.E., Q.C., LL.D. Lieutenant-Governor of the Province of British Columbia.

#### **CHANCELLOR**

ALLAN M. McGavin, C.D., Vancouver.

#### **PRESIDENT**

WALTER H. GAGE, M.A., LL.D.

#### **BOARD OF GOVERNORS**

Ex-Officio:

The Chancellor

The President

Elected by Senate:

RICHARD M. BIBBS, B.A.Sc., West Vancouver.

J. STUART KEATE, B.A., Vancouver.

DONOVAN F. MILLER, B.Com., S.M., Vancouver.

Appointed by the Lieutenant-Governor in Council:

ARTHUR FOUKS, Q.C., B.A., LL.B., Vancouver.

WALTER C. KOERNER, K. St. J., LL.D., Vancouver.

JOHN E. LIERSCH, B.A., B.A.Sc., M.F., Vancouver.

(Terms expire 1969)

#### SENATE

The Chancellor.

The President, Chairman.

The Deans.

The Registrar, Secretary.

Elected by the Faculties:

Agricultural Sciences: A. J. Renney, B.S.A., M.S., Ph.D.

Applied Science: W. D. FINN, B.E., M.Sc., Ph.D., M.Am.Soc.C.E., M.A.S.E.E.

Arts: M. W. Steinberg, MA., Ph.D.

Commerce and Business Administration: N. A. Hall, B.Com., M.B.A., D.B.A.

Dentistry: GILBERT J. PARFITT, F.D.S., R.C.S., M.R.C.S., L.R.C.P., D.M.D.

Education: J. R. McIntosh, B.A., M.Ed., Ph.D.

Forestry: J. H. G. SMITH, B.S.F., M.F., Ph.D.

Graduate Studies: H. Peter Oberlander, B.Arch., M.C.P., Ph.D. A.R.I.B.A., A.M.T.P.I., M.R.A.I.C., M.T.P.I.C.

Law: K. M. LYSYK, B.A., LL.B., B.C.L.

Medicine: W. A. Webber, M.D.

Pharmaceutical Sciences: F. A. Morrison, M.B.E., C.D., B.S.P., M.Sc., D.Pharm.

Science: G. H. N. Towers, M.Sc., Ph.D., F.L.S. Terms expire 1969

Elected by a joint meeting of the Faculties:

CYRIL S. BELSHAW, M.A., Ph.D.

S. Black, R.S.W., D.A., A.T.D.

M. Bloom, M.Sc., Ph.D.

C. B. BOURNE, B.A., LL.B.

FRITZ K. BOWERS, M.A., Mem.I.E.E.E.

S. D. Cavers, M.A.Sc., Ph.D., P.Eng., F.C.I.C.

JOHN D. CHAPMAN, M.A., Ph.D.

R. M. CLARK, B.A., B.Com., A.M., Ph.D.

D. H. COPP, B.A., M.D., Ph.D., F.R.S.C.

SYDNEY M. FRIEDMAN, B.A., M.D., C.M., M.Sc., Ph.D., F.R.S.C.

W. C. Gibson, B.A., M.Sc., D.Phil., M.D., C.M., F.A.C.P.

W. S. Hoar, B.A., M.A., Ph.D., D.Sc., F.R.S.C.

W. L. HOLLAND, M.A.

D. T. KENNY, M.A., Ph.D.

P. A. LARKIN, M.A., D.Phil.

C. A. McDowell, M.Sc., D.Sc., F.R.I.C., F.C.I.C., F.R.S.C.

I. McNairn, B.A.

JOHN M. NORRIS, M.A., Ph.D.

G. ROSENBLUTH, B.A., Ph.D.

Anthony D. Scott, B.Com., B.A., A.M., Ph.D.

R. W. Stewart, M.Sc., Ph.D.

H. V. Warren, B.A., B.A.Sc., B.Sc., D.Phil., A.I.M.M., F.G.S.A., F.R.S.C. SIDNEY H. ZBARSKY, B.A., M.A., Ph.D.

Terms expire 1969.

#### Appointed by the Lieutenant-Governor in Council:

JOHN R. MEREDITH, B.A., M.Ed., Victoria. Term expires 1970.

R. F. Sharp, B.A., D.Paed., Vancouver. Term expires 1970.

THE HON. HOWARD GREEN, P.C., Q.C., B.A., LL.D., Vancouver. Term expires 1969.

#### Elected by Convocation:

RICHARD M. BIBBS, B.A.Sc., West Vancouver.

D. M. Brousson, B.A.Sc., West Vancouver.

F. J. CAIRNIE, B.A., North Vancouver.

C. M. CAMPBELL, JR., B.A., B.A.Sc., Vancouver.

J. GUTHRIE, B.A., M.A., Prince George.

J. STUART KEATE, B.A., Vancouver.

Hugh L. Keenleyside, M.A., Ph.D., LL.D., Vancouver.

S. S. Lefeaux, B.A.Sc., Vancouver.

D. F. Manders, B.A., Lytton.

D. F. MILLER, B.Com., S.M., Vancouver.

THE HON. MR. JUSTICE J. A. MACDONALD, B.A., Graduate of Osgoode Hall, Vancouver.

Mrs. H. J. MacKay, B.A., Revelstoke.

J. V. Rogers, B.A.Sc., Trail.

Mrs. B. E. Wales, B.A., Vancouver.

D. R. WILLIAMS, B.A., LL.B., Duncan.

Terms expire 1969.

Representatives of the Board of Management, Alumni Association of the University:

D. A. Freeman, B.A., Vancouver.

K. MARTIN, B.Com., West Vancouver.

E. D. Sutcliffe, B.A.Sc., Vancouver.

Terms expire 1969.

Representatives of Affiliated Colleges:

Union College of British Columbia, (Theological), Vancouver, Rev. W. S. Taylor, M.A., B.D., Ph.D.

The Anglican Theological College of British Columbia, Vancouver, Rev. J. Blewett, B.A., B.D.

St. Mark's College (Theological), Rev. E. C. LEBEL, C.S.B., C.D., M.A., LL.D. Terms expire 1969.

University Librarian: B. STUART-STUBBS, B.A., B.L.S.

Elected by the students:

MARK C. WALDMAN (Term expires October 1969)

DONALD MUNTON (Term expires October 1971)

W. Ferguson (Term expires October 1971)

S. A. Rush (Term expires October 1970)

#### FACULTY COUNCIL

The President (Chairman), Deans (ex-officio), The Librarian (ex-officio) Registrar (Secretary).

Representatives of the Faculties: R. W. Collier, N. J. Divinsky, C. V. Fin-NEGAN, G. F. McGuigan, W. F. Willmott. Terms expire 1970.

#### CONVOCATION

The Chancellor, Chairman.

The Registrar, Secretary.

#### ADMINISTRATIVE STAFF

President—Walter H. Gage, M.A., LL.D. (Brit. Col.)

Deputy-President-William M. Armstrong, B.A.Sc. (Toronto), P.Eng., M.C.I.M.

- Deputy-President and Bursar—WILLIAM WHITE, C.G.A.
- Dean of Agricultural Sciences—Michael Shaw, M.Sc., Ph.D. (McGill), F.L.S., F.R.S.C.
- Dean of Applied Science—W. M. Armstrong, B.A.Sc. (Toronto), P.Eng., M.C.I.M. (to June 30, 1969)
- Dean of Arts—John H. Young, A.F.C., M.A. (Queen's), Ph.D. (Cantab.).

  Associate Dean—Douglas T. Kenny, M.A. (Brit. Col.), Ph.D. (Wash.).
- Dean of Commerce and Business Administration—PHILIP H. WHITE, M.Sc. (Est. Man.) (London), F.R.I.C.S.
  - Assistant Dean—Colin C. Gourlay, B.Com. (Brit. Col.), M.Com. (Toronto).
- Dean of Dentistry—S. WAH LEUNG, D.D.S., B.Sc. (McGill), Ph.D. (Rochester).
- Dean of Education—Neville V. Scarfe, B.A. (Hons.), M.A. (London).

  Associate Dean—C. E. Smith, B.Sc. (London), M.A., D.Paed. (Toronto),
  LL.D. (Man.), F.Brit.Psych.Soc.
- Dean of Forestry—Joseph A. F. Gardner, M.A. (Brit. Col.), Ph.D. (McGill), F.C.I.C.
- Dean of Graduate Studies—IAN McTaggart Cowan, B.A. (Brit. Col.), Ph.D. (California), F.R.S.C.
  Assistant Dean—B. M. Moyls, M.A. (Brit. Col.), Ph.D. (Harvard).
- Dean of Law—George F. Curtis, Q.C., LL.B. (Sask.), B.A., B.C.L. (Oxon.), LL.D. (Dalhousie, Sask.), D.C.L. (New Brunswick).
- Dean of Medicine—John F. McCreary, M.D. (Toronto), F.R.C.P. (C).

  Associate Dean—Donald C. Graham, M.D. (Toronto), F.R.C.P.(C).
- Dean of Pharmaceutical Sciences—Bernard E. Riedel, C.D., M.Sc. (Alta.), Ph.D. (Bio-Chem.) (Western Ontario).
- Dean of Science—Vladimir J. Okulitch, M.A.Sc. (Erit. Col.), Ph.D. (Mc-Gill), F.G.S.A., F.P.S., F.R.S.C.
  - Associate Dean—Robert F. Scagel, M.A. (Brit. Col.), Ph.D. (Calif.), F.R.S.C., F.L.S.
  - Assistant Deans—N. J. DIVINSKY, B.Sc. (Manitoba), M.Sc., Ph.D. (Chicago); K. B. HARVEY, B.A. (Toronto), D.Sc. (Laval).
- Office of the President-
  - Director of Academic Planning—ROBERT M. CLARK, B.A., B.Com. (Brit. Col.), A.M., Ph.D. (Harvard).
  - Director of Information Services—T. A. Myers.
  - Director of University Extension—Gordon R. Selman, B.A., M.A. (Brit. Col.).
  - Librarian—Basil Stuart-Stubbs, B.A. (Brit. Col.), B.L.S. (McGill).
  - Director of the Summer Session—WILFRED H. AULD, B.A. (Brit. Col.), Ed.M. (Oregon State).
    - Associate Directors—N. Watt, B.P.E. (Brit. Col.), M.S., Ed.D. (Oregon); John P. Blaney, B.Ed., M.Ed. (Brit. Col.).
  - Registrar—J. E. A. PARNALL, B.A., B.Ed. (Brit. Col.), M.A. (Toronto).

    Assistant Registrar—Kenneth G. Young, B.A., B.Com. (Alta.).
- Office of the Dean of Inter-Faculty and Student Affairs—
  - Dean of Women—Mrs. Helen McCrae, B.A. (Toronto), M.S.W. (Brit. Col.).

Director of University Health Service and Health Service Hospital— ARCHIBALD M. JOHNSON, M.D. (Western Ontario), F.R.C.P. (C).

Director of Ceremonies-Malcolm F. McGregor, M.A. (Brit. Col.). Ph.D. (Cincinnati), F.R.S.C.

Director of International House—John B. Thomas, B.A. (Toronto).

Director of Student Services—A. F. Shirran, M.A. (Brit. Col.).

Director of Residences—Leslie Rohringer, B.Arch. (Budapest).

#### Office of the Bursar—

Treasurer—Allen Baxter, B.Com. (Brit. Col.), C.A.

Director of Physical Plant-JAMES T. TURNER, B.Sc. (E.E.) Hons., B.Sc. (M.E.) Hons.; (Tri. State College, Indiana); P.Eng.

Assistant Director of Physical Plant (Design and Planning)-A. W. SLIPPER, M.R.A.I.C.

Consultant, Physical Plant (Operations and Maintenance)—L. J. BAYLY, B.A.Sc. (Brit. Col.).

Assistant Treasurer—H. M. Craven, C.G.A.

Chief Accountant—J. Lomax, A.I.A.C.

Accountant—P. D. G. Bullen, C.G.A.

Internal Auditor—J. B. Priestman, C.A.

Director of Personnel, Labour Relations and Ancillary Services—John F. McLean, D.S.O., C.D., B.A. (Brit. Col.).

Bookstore Manager and Postmaster—John A. Hunter.

Director of Food Services—Miss Ruth Blair, B.H.E. (Brit. Col.), M.S. (Cornell).

Purchasing Agent—H. A. LEMARQUAND.

Director of Data Processing Centre—JAMES W. POOLE.

#### **EMERITUS STAFF**

#### Chancellors

PHYLLIS G. Ross, C.B.E., M.A., LL.D. (Brit. Col.), (1967).

#### President

NORMAN A. M. MACKENZIE, C.M.G., M.M. and Bar, Q.C., B.A., LL.B. (Dalhousie), LL.M. (Harvard), LL.D. (Mount Allison, New Brunswick, Toronto, Ottawa, Bristol, Alberta, Glasgow, Dalhousie, St. Francis Xavier, McGill, Sydney, Rochester, Alaska, California, British Columbia), D.C.L. (Whitman, Saskatchewan), D.Sc.Soc. (Laval), D.Litt. (Memorial), Hon. Fellow, St. John's College, Cambridge, F.R.S.C. (1962).

#### Deans

F. M. CLEMENT, B.S.A. (Toronto), M.A. (Wisconsin), D.Sc. (Brit. Col.), F.A.I.C., Dean Emeritus of Agriculture (1949).

JOHN NORISON FINLAYSON, M.Sc. (McGill), LL.D. (Man.), D.Sc. (Laval and Brit. Col.), M.E.I.C., Mem. Am. Soc. C.E., Dean Emeritus of Applied Science (1950).

H. J. MacLeod, O.B.E., B.Sc. (McGill), M.Sc. (Alta.), A.M., Ph.D. (Harvard), D.Sc. (Brit. Col.), Fellow A.I.E.E., Dean Emeritus of Applied Science (1953).

HENRY F. ANGUS, B.A. (McGill), B.C.L., M.A. (Oxon.), LL.D. (McGill, Brit. Col.), F.R.S.C., Dean Emeritus of Graduate Studies (1956).

- MISS M. DOROTHY MAWDSLEY, B.A. (McGill), M.A. (Brit. Col.), Ph.D. (Chicago), Dean Emerita of Women (1959).
- E. D. MacPhee, M.M., M.A., B.Ed., M.Ed. (Edinburgh), C.A.(Hon.), LL.D. (Alta., Brit. Col.), Dean Emeritus of Commerce and Business Administration (1960).
- G. M. SHRUM, O.B.E., M.M., E.D., M.A., Ph.D. (Toronto), D.Sc. (Brit. Col.), F.R.S.C., Dean Emeritus of Graduate Studies (1961).
- S. N. F. CHANT, O.B.E., M.A. (Toronto), LL.D. (Brit. Col.), Dean Emeritus of Arts and Science (1964).
- F. H. Soward, B.A. (Toronto), B.Litt. (Oxon.), LL.D. (Carleton, Brit. Col.), F.R.S.C., Dean Emeritus of Graduate Studies (1964).
- B. A. Eagles, B.A. (Brit. Col.), M.A., Ph.D. (Toronto), F.C.I.C., F.A.I.C., F.R.S.C. Dean Emeritus of Agriculture (1967).
- A. W. MATTHEWS, B.Sc. (Pharm.), M.Sc. (Alta.), Ph.D. (Florida). Dean Emeritus of Pharmacy (1967).

#### Registrars

CHARLES B. WOOD, B.A. (Toronto), A.M. (Columbia) (1958).

#### Librarians

MISS ANNE M. SMITH, B.A. (Brit. Col.), B.S. in L.S. (Wash.), M.A. (Michigan), Assistant University Librarian Emerita (1965).

#### **Professors**

- J. M. Turnbull, B.A.Sc. (McGill), M.C.I.M., Professor Emeritus of Mining (1946).
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ALLAN, BARBARA M., Clinical Instructor (Neurology) Medicine.

ALLARDYCE, D. B., Assistant Professor, Surgery.

ALLDRITT, K., Associate Professor, English.

ALLEN, C. S., Clinical Assistant Professor, Surgery (Orthopaedics).

ALLEN, F. H., Post-doctoral Fellow Chemistry.

ALLEN, P., Clinical Assistant Professor, Surgery.

ALLISON, D. E., Assistant Professor, Education.

AMES, C., Associate Professor, Part-time, Dentistry.

AMES, M. M., Associate Professor, Anthropology.

ANASTASIOU, C. J., Associate Professor, Education.

ANDERSON, A. H., Visiting Assistant Professor, Commerce and Business Administration.

ANDERSON, C. P., Assistant Professor, Religious Studies.

Anderson, C. T., Assistant Professor, Mathematics.

ANDERSON, D. L., Assistant Professor, Civil Engineering.

ANDERSON, D. O., Professor and Head of the Department of Health Care and Epidemiology.

ANDERSON, ESTHER R., Instructor, Pharmacology.

Anderson, J. D., Associate Professor and Assistant to the Head, Civil Engineering.

ANDERSON, R. F. V., Assistant Professor, Mathematics.

Andison, H., Honorary Lecturer, Plant Science.

Andrews, J. C., Lecturer, Botany.

ANKENMAN, G. J., Clinical Instructor, Surgery (Urology).

ANITA, N. J., Research Associate, Zoology.

Anvari, M., Assistant Professor, Mathematics.

APPLEGARTH, D. A., Assistant Professor, Paediatrics.

Arbuckle, J. W. Jr., Clinical Instructor, Surgery (Urology).

ARCUS, MARGARET, Assistant Professor, Home Economics.

ARCUS, P. L., Assistant Professor, Agricultural Economics.

Argue, K. F., Professor, Education.

ARGYLE, P. E., Visiting Lecturer, Computer Science.

ARMITAGE, A., Assistant Professor, Social Work.

ARMSTRONG, W. M., Professor, Metallurgy, and Deputy President.

Arnold, C. R., Clinical Instructor, Medicine.

ARNOLD, M., Postdoctoral Fellow, Chemistry.

Arnold, W. J. D., Teaching Fellow, Paediatrics.

Ashley, L. F., Assistant Professor, Education.

Ashmore, P. G., Clinical Associate Professor, Surgery.

ASHWORTH, MARY, Lecturer, Education.

Assimakos, Jean, Part-time Lecturer, Social Work.

ATRENS, J., Assistant Professor, Law.

AUBKE, F., Assistant Professor, Chemistry.

AUCKLAND, N. L. D., Clinical Instructor, Medicine (Neurology).

AULD, E. G., Assistant Professor, Physics.

AULD, W. H., Professor, Education, and Director of the Summer Session.

AUMAN, J. R., Assistant Professor, Geophysics.

AURESPERG, NELLY, Associate Professor, Zoology.

AVAKUMOVIC, I., Professor, History.

AXEN, D. A., Assistant Professor, Physics.

AYER, FLORENCE M., Research Associate, Psychiatry.

BABICKI, B., Part-time Lecturer, Mechanical Engineering.

BACHOP, D. M., Clinical Instructor, Psychiatry.

BADGER, G. A., Clinical Instructor, Surgery (Otolaryngology).

BAGNALL, A. W., Associate Professor, Medicine.

BAILEY, A., Postdoctoral Fellow, Botany.

Bailey, G. M., Research Associate, Physics.

Bailey, Kathryn, Assistant Professor, Music (Piano).

BAILEY, T., Assistant Professor, Music (History).

BAIN, D. A., Assistant Professor, Education.

BAIRD, PATRICIA A., Instructor, Part-time, Paediatrics.

BAIRD, R. M., Clinical Instructor, Surgery.

BAK, J. M., Associate Professor, History.

BAKER, C., Research Associate, Metallurgy.

BAKER, H., Clinical Associate Professor, Paediatrics.

BAKER, VIVIAN, Teaching Fellow, Psychiatry.

BAKOGEORGE, A. P., Instructor, Physical Education and Recreation.

BALFOUR, J. A. Clinical Associate Professor, Surgery (Urology).

BALKIND, A. L., Assistant Professor, Fine Arts.

Balzarini, D. A., Assistant Professor, Physics.

Bandoni, R. J., Associate Professor, Botany, and Curator of Mycological Herbarium.

BANDY, J., Research Associate, Zoology.

BANKSON, D., Professor, Creative Writing.

BANNO, M. P., Clinical Instructor, Surgery (Otolaryngology).

BARCLAY, L., Assistant Professor, Education.

BARKER, AMY, Part-time Assistant, Education.

BARNARD, A. J., Professor, Physics.

Barnard, R. A., Assistant Director, Programme Administration, Continuing Medical Education.

BARNES, W. C., Assistant Professor, Geology.

BARRETT, A. A., Assistant Professor, Classics.

BARRIE, R., Professor, Physics.

BARTON, C., Part-time Assistant, Education.

BARTON, P. G., Assistant Professor, Law.

BARTROLI, T., Assistant Professor, Spanish.

BARY, B. M., Professor, Zoology, Oceanography.

Basaraba, N., Associate Professor, Part-time, Dentistry.

Basco, N., Associate Professor, Chemistry.

BATEMAN, ELLEN, Assistant Professor, Social Work.

BATES, T., Assistant Professor, Education.

BATHO, H. F., Honorary Lecturer, Physics.

BATTS, M. S., Professor, and Head of the Department of German.

BAUDOUIN, D., Associate Professor of French.

BAUMGART, ALICE J., Associate Professor, Nursing.

Beach, D. M., Associate Professor, English,

Beames, R. M., Assistant Professor, Animal Science.

Beamish, Katherine, Associate Professor, Assistant Curator of Vascular Plant Herbarium, Botany.

BEARDOW, F., Assistant Professor, Slavonic Studies.

BEAUMONT, R., Assistant Professor, German.

BECK, BRENDA E. F., Assistant Professor, Anthropology.

BECK, R. E., Clinical Instructor, Medicine.

Beddoes, M. P., Associate Professor, Electrical Engineering.

BEDER, D. S., Assistant Professor, Physics.

BEDFORD, C., Postdoctoral Teaching Fellow, Chemistry.

Bednar, V., Postdoctoral Fellow, Botany.

Beedle, A., Associate Professor and Chairman of the Division of Accounting, Commerce and Business Administration.

BEESLEY, M. E., Visiting Professor, Commerce and Business Administration.

Beer, C. T., Professor, Biochemistry.

Behler, E., Honorary Professor, German.

Belanger, Kathleen E., Research Associate, Child Health Programme.

Bell, A., Lecturer, English.

Bell, H. M., Instructor, Surgery (Orthopaedics).

Bell, H. R., Associate Professor, Civil Engineering.

Bell, J., Clinical Instructor, Pathology.

Bell, L. I., Part-time Lecturer, Social Work.

Belluce, L. P., Associate Professor, Mathematics.

Bellward, G. D., Assistant Professor, Pharmaceutical Sciences.

BELSHAW, BETTY J., Part-time Lecturer, English.

Belshaw, C. S., Professor and Head of the Department of Anthropology and Sociology.

Belyea, E. S. W., Associate Professor, Psychology.

Bendell, J. F., Associate Professor, Zoology.

BENDL, B. J., Clinical Instructor (Dermatology), Medicine.

Benson, K. I. G., Honorary Lecturer (Public Health Practice), Health Care and Epidemiology.

BENTALL, R. H., Research Associate, Metallurgy.

BERNARD, PRISCILLA, Lecturer, Psychiatry (Psychology).

BERNARD, R. F., Assistant Professor, Librarianship.

Berner, S. H., Assistant Professor, Law.

Berry, F. G., Senior Instructor, Electrical Engineering.

BERRY, J. C., Professor, Animal Science.

BERRY, K., Clinical Instructor, Paediatrics.

BERRY, MARION, Clinical Instructor, Surgery.

BERTRAM, F. E., Assistant Professor, Education.

Best, R. V., Associate Professor, Geology.

BEWLEY, LOIS M., Assistant Professor, Librarianship.

BHARGAVA, P. C., Postdoctoral Teaching Fellow, Physics.

BICHARD, J. W., Associate Professor, Physics.

BIE, W. F., Clinical Associate Professor, Obstetrics and Gynaecology.

BIELY, J., Research Professor, Poultry Science.

BINNING, B. C., Professor, Fine Arts.

BIRD, E. A., Associate Professor of French.

BIRD, GENEVIEVE C., Associate Professor, French.

BIRKBECK, J. A., Assistant Professor and Markle Scholar in Medical Science, Paediatrics.

BIRKETT, ALICE G., Associate Professor, Education.

BISALPUTRA, T., Associate Professor, Botany.

BISMANIS, J. E., Associate Professor, Medical Microbiology.

BLACK, S., Professor of Art, Education.

BLACK, T. A., Assistant Professor, Soil Science.

BLACKBURN, T. H., Assistant Professor, Microbiology.

BLAINE, E. R., Associate Professor, Commerce and Business Administration.

BLAIR, N. J., Clinical Instructor, Surgery (Otolaryngology).

BLAIR, RUTH, Associate Professor, Home Economics, and Director of Food Services.

BLANK, S. S., Associate Professor, Education.

BLOM, MARGARET A. H., Lecturer, English.

BLOM, T. E., Assistant Professor, English.

Bloom, M., Professor, Physics.

BLOOMBAUM, M. S., Professor, Sociology.

Bluman, G., Assistant Professor, Mathematics.

Bogoch, A., Clinical Assistant Professor, Medicine.

Вонм, В. A., Assistant Professor, Botany.

BOHN, E. V., Professor, Electrical Engineering.

BOLDT, W., Assistant Professor, Education.

BOLTON, L. R., Instructor, Commerce and Business Administration.

BOND, D. E., Assistant Professor, Economics.

BOND, ELIZABETH, Instructor, Economics.

Bongie, Elizabeth A. E., Instructor, Classics.

BONGIE, L. L., Professor and Head, Department of French.

BONHAM, G. H., Honorary Lecturer (Public Health Practice), Health Care and Epidemiology.

BOOTH, J., Teaching Fellow, Obstetrics and Gynaecology.

BORDEN, ALICE, Assistant Professor, Education.

BORDEN, C. E., Professor, Anthropology.

BOUGHEY, H. N., Assistant Professor, Sociology.

BOULDING, J. E., Clinical Assistant Professor, Psychiatry.

BOURNE, C. B., Professor, Law.

BOUYGUES, C. P., Visiting Assistant Professor, French.

Bowers, F., Assistant Professor, English.

Bowers, F. K., Professor, Electrical Engineering.

BOWMER, E. J., Clinical Associate Professor, Medical Microbiology.

BOXALL, E. A., Clinical Instructor, Medicine.

BOYCE, K. C., Clinical Instructor, Medicine.

BOYD, C. W., Assistant Professor, Forestry.

BOYD, J. D., Assistant Professor, Economics.

BOYD, R. W., Clinical Associate Professor (Radiology) Medicine.

BOYES, D. A., Clinical Instructor, Obstetrics and Gynaecology.

BOYLE, D. J., Postdoctoral Fellow, Physics.

BOYLES, SADIE M., Professor and Assistant Director, Secondary Education.

Bracher, Winifred J., Assistant Professor, Home Economics.

Bradley, Eleanor J., Assistant Professor, Social Work, Supervisor, Child Health Programme.

Bradley, P. G., Assistant Professor, Economics.

BRAGG, P. D., Assistant Professor, Biochemistry.

Branion, R. M. R., Assistant Professor, Chemical Engineering.

Branton, G. R., Postdoctoral Teaching Fellow, Chemistry.

Bratty, P. A. J., Clinical Instructor (Neurology), Medicine.

Brauner, C. J., Professor of Philosophy, Education.

BREAM, CAROL J., Part-time Lecturer, French.

Brearley, Anne, Assistant Professor, Librarianship.

Brearley, Katherine, Associate Professor and Senior Faculty Advisor, French.

Breckenridge, Audrey, Dietitian, Home Economics.

Bredin, Grace, Associate Professor Emerita, Education, and Supervisor of the Child Study Centre.

Bree, A., Associate Professor, Chemistry.

Breen, Harvey, Clinical Assistant Professor, Psychiatry.

Breeze, J. E., Honorary Lecturer, Electrical Engineering.

Brennan, Peg I., Instructor, English.

Bressler, D. W., Assistant Professor, Mathematics.

BRICKER, R., Assistant Professor, Music.

BRINK, V. C., Professor and Chairman of the Department of Plant Science.

Brion, C. E., Assistant Professor, Chemistry.

BROCKINGTON, J., Associate Professor and Head, Department of Theatre.

BROCKLEY, C. A., Professor, Mechanical Engineering.

Bronsdon, Madeline, Part-time Lecturer, Anthropology.

BROOKS, W. R. T., Part-time Assistant, Education.

Broom, E. F., Assistant Professor, Physical Education and Recreation.

BROSAMLER, G. A., Assistant Professor, Mathematics.

Brough, S., Assistant Professor, Education.

Brown, D., Instructor, Music (Voice).

Brown, D. G., Professor, Philosophy.

Brown, G. R., Teaching Assistant, Community and Regional Planning.

Brown, H. K., Lecturer, Dentistry.

Brown, I., Part-time Assistant, Education.

Brown, J. C., Assistant Professor, Physiology.

Brown, L. C., Associate Professor, Metallurgy.

Brown, L. E., Associate Professor, Education.

Brown, Margaret, Assistant Professor, Education.

Brown, S. R., Professor, Physical Education and Recreation.

Brown, T. H., Associate Professor, Pharmaceutical Sciences.

Brown, W. T., Assistant Professor, Psychiatry.

Browne, J. K., Clinical Instructor, Surgery (Orthopaedics).

Brummitt, J. R., Assistant Professor, Paediatrics; Director, Child Health Programme.

Brumwell, C. A., Clinical Instructor (Primary Health Care), Health Care and Epidemiology.

BRYANS, F. E., Professor and Head, Department of Obstetrics and Gynaecology.

BRYNER, C., Professor, Slavonic Studies.

BRYSON, B. F., Clinical Instructor, Psychiatry.

BUCK, H. W. L., Clinical Instructor, Medicine (Dermatology).

BUCKLAND, KIRSTINE, Instructor, Nursing.

Bui, A. T., Associate Professor, Mathematics.

Bullen, P. S., Associate Professor, Mathematics.

BULLOCK, M. H., Assistant Professor, Creative Writing.

Bures, D. J. C., Associate Professor, Mathematics.

Burgess, R. E., Professor, Physics.

Burke, B. E., Associate Professor, Commerce and Business Administration.

BURKE, MARGARET, Lecturer, Librarianship.

BURKHART, P. L., Lecturer, English.

Burling, R. W., Professor, Physics.

Burns, P. T., Assistant Professor, Law.

Burridge, K. O. L., Professor, Anthropology.

BURTON, A. F., Associate Professor, Biochemistry.

Burton, J. D., Clinical Instructor, Pathology.

Bunton, P., Assistant Professor, Social Psychiatry.

Bury, K. V., Assistant Professor, Mechanical Engineering.

Busza, A., Assistant Professor, English.

BUTT, D. Susan, Assistant Professor, Psychology.

BUTTERS, R. G., Assistant Professor, Metallurgy.

BUTTERWORTH, J., Assistant Professor, Commerce and Business, Administration.

BYLSMA, MARGARET, Lecturer, Chemistry.

Byrne, P. M., Assistant Professor, Civil Engineering.

CAIRNS, A. R. M., Assistant Professor, Medicine.

CAIRNS, H. A. C., Associate Professor, Political Science.

CALPRICE, J. R., Honorary Lecturer, Zoology.

CAMBON, K. G., Clinical Instructor, Surgery. (Consultant, Otolaryngologist; Paediatrics.)

CAMERON, D., Lecturer, Botany.

Cameron, D. M., Postdoctoral Fellow, Zoology.

CAMPANELLA, R. G., Assistant Professor, Civil Engineering.

CAMPBELL, J. J. R., Professor and Head, Department of Microbiology.

CAMPBELL, K. A., Clinical Instructor, Paediatrics.

CAMPBELL, MARGARET A., Assistant Professor, Nursing.

CAMPBELL, P. READ, Associate Professor, Education.

CANNON, G. H., Associate Professor, Education.

CAPELLE, PAULINE M. A., Assistant Professor, Nursing.

CAROLAN, J. F., Postdoctoral Fellow, Physics.

CARPENTER, C. W., Assistant Professor, Obstetrics and Gynaecology.

CARR, C., Assistant Professor, Law.

CARROLL, J. J., Clinical Instructor, Surgery (Anaesthesiology).

CARRUTHERS, B. M., Assistant Professor, Medicine.

CARTER, E. J., Assistant Professor, English.

CARTMEL, J. L., Instructor, Physical Education and Recreation.

CASHMORE, A., Clinical Instructor, Psychiatry (Child Psychiatry).

CASPERSON, D., Instructor, Education.

CATHCART, L. M., Clinical Instructor (Primary Health Care), Health Care and Epidemiology.

CAVERS, S. D., Professor, Chemical Engineering.

CAWSTON, H. ELIZABETH, Assistant Professor, Nursing.

CAWOOD, J. C., Instructor, Education.

CAYFORD, A. H., Assistant Professor, Mathematics.

CHADWICK, R., Part-time Assistant, Education.

CHAKLADER, A. C. D., Associate Professor, Metallurgy.

CHAMBERLAIN, H. B., Assistant Professor, Political Science.

CHAMBERLAIN, K., Part-time Assistant, Education.

CHAMBERS, B., Postdoctoral Teaching Fellow, Electrical Engineering.

CHAMBERS, H. L., Clinical Instructor, Surgery (Urology).

CHAN, GWENDOLYN F. Q., Research Associate, Medicine.

CHAN, K. K., Postdoctoral Teaching Fellow, Chemistry.

CHANG, B., Assistant Professor, Mathematics.

CHANG, F., Professor, Asian Studies.

CHANG, J., Clinical Assistant Professor, Surgery (Anaesthesiology).

CHANG, Y., Assistant Professor, Sociology.

CHAPMAN, A. R., Postdoctoral Fellow, Botany.

CHAPMAN, G. J., Honorary Lecturer in Marketing, Commerce and Business Administration.

CHAPMAN, J. D., Professor, and Head of the Department of Geography.

CHAPPELL, J., Instructor, Music (Theory and Oboe).

CHARLTON, W. J., Clinical Instructor, Surgery.

Chase, R. L. St. L., Assistant Professor, Geology.

Chase, W. H., Associate Professor, Pathology.

CHAVE, ESTELLE, Part-time Lecturer, Social Work.

CHECHIK, M. M., Instructor, Part-time, Dentistry (Restorative).

CHEN, F. M., Postdoctoral Fellow, Chemistry.

CHEN, H.-T., Assistant Professor, Asian Studies.

CHERRY, S., Associate Professor, Civil Engineering.

CHERUKAPELLE, N. D., Assistant Professor, Community and Regional Planning.

CHIN, O., Postdoctoral Fellow, Chemistry.

CHING, HILDA, Research Associate, Zoology.

CHINN, H. R., Research Associate, Electrical Engineering.

Chitty, D. H., Professor, Zoology.

CHIVERS, SUSAN, Part-time Lecturer, Zoology.

CHIVERS, T., Postdoctoral Teaching Fellow, Chemistry.

CHONG, D. P., Assistant Professor, Chemistry.

CHRISTENSEN, R. M., Clinical Assistant Professor, Surgery.

CHRISTIAN, R. R., Associate Professor, Mathematics.

CHRISTOPHERSON, E. F., Clinical Instructor, Medicine.

Chronister, G. M., Professor of Reading Education and Associate Director of Graduate Studies, Education.

Chud, B., Assistant Professor, Social Work.

CHUNG, MADELINE H., Clinical Instructor, Obstetrics and Gynaecology.

CHUNG, W. B., Associate Professor, Surgery.

CICCONE, STEFANIA, Assistant Professor, Italian.

CLAMAN, A. D., Assistant Professor, Obstetrics and Gynaecology.

CLARK, CAROLYN, Assistant Professor, Economics.

CLARK, C. W., Professor, Mathematics.

CLARK, D. J., Assistant Professor. Microbiology.

CLARK, KATHLEEN, Instructor, Nursing.

CLARK, R. J., Honorary Lecturer, Physics.

CLARK, R. M., Professor, Economics, and Director of Academic Planning.

CLARKE, B. R., Associate Professor, Education.

CLARKE, G. K. C., Assistant Professor, Geophysics.

CLARKE, H. MARGUERITE, Part-time Lecturer, English.

CLARKE, M. F., Honorary Lecturer, Plant Science.

CLARKE, R. P. A., Assistant Professor, Architecture.

CLAY, M. G., Clinical Instructor, Surgery.

CLINGMAN, A. E., Professor, Music Education.

CLUFF, J. W., Clinical Assistant Professor, Surgery (Neurosurgery).

COADY, C. J., Clinical Associate Professor, Pathology.

COCKROFT, W. H., Clinical Assistant Professor, Medical Microbiology.

COHEN, A., Clinical Instructor, Ophthalmology.

COHN, W., Associate Professor, Sociology.

COLBECK, MABEL L. M., Associate Professor Emeritus of English; Lecturer.

Cole, Kathleen, Associate Professor, Botany.

COLLIER, R. W., Assistant Professor, Community and Regional Planning.

COMIN, A. G., Assistant Professor, Hispanic and Italian Studies (Italian).

CONNOLLY, J. F., Clinical Instructor, Obstetrics and Gynaecology.

CONRY, JULIANNE L., Assistant Professor, Education.

CONRY, R. F., Assistant Professor, Education.

Constantinides, P., Professor, Pathology.

CONWAY, E., Visiting Professor, Botany. CONWAY, J. S., Associate Professor, History.

Cook, C. E., Clinical Instructor, Surgery (Orthopaedics).

COOMBES, J., Lecturer, Music.

COOMBS, J. R., Associate Professor, Education.

Coope, J. A. R., Associate Professor, Chemistry.

COOPE, MARIAN G. R., Assistant Professor, Hispanic and Italian Studies (Spanish).

COOPER, H. G., Clinical Instructor, Surgery (Urology).

COPLEY, R., Assistant Professor, Geography.

COPP, D. H., Professor and Head of the Department of Physiology.

CORBETT, W. J., Clinical Instructor, Health Care and Epidemiology.

Corey, Margaret J., Assistant Professor, Paediatrics (Medical Genetics).

CORTEEN, R. S., Assistant Professor, Psychology.

COTTINGHAM, MOLLIE, Associate Professor and Assistant Director of Student Teaching.

COULTHARD, T. L., Professor; and Chairman to June 30, 1969, Agricultural Engineering.

COUPE, R. L., Instructor, (Dermatology), Medicine.

COUPEY, SUSAN M., Research Assistant, Cancer Research Centre.

COURTEMANCHE, A. D., Clinical Instructor, Surgery.

COVAL, S. C., Associate Professor, Philosophy.

COVELL, H. M., Professor of Reading Education and Assistant Director of Elementary Education.

COVERNTON, C. C., Clinical Instructor, Medicine.

Cowan, I. M., Professor, Zoology, and Dean of the Faculty of Graduate Studies.

COWAN, R. J., Clinical Associate Professor, Surgery (Otolarynology).

Cox, A. E., Lecturer, Psychology.

Cox, A. R., Associate Professor, Medicine.

Cox, L., Assistant Professor, Mechanical Engineering.

Cox, Margaret, Research Fellow, Paediatrics.

Coy, P., Clinical Instructor, Surgery.

CRADDOCK, M. K., Associate Professor, Physics.

CRAGG, J. G., Associate Professor, Economics.

CRAGG, OLGA B., Instructor, French.

CRAGG, R. C., Professor, Fine Arts.

CRAIG, C. E., Assistant Professor, Part-time, Dentistry.

CRAIG, K. D., Assistant Professor, Psychology.

CRAIGIE, E. H., Honorary Lecturer, History of Medicine and Science.

CRAMER, C. F., Associate Professor, Physiology.

CRAMER, T. E., Assistant Professor, Mathematics.

CRANE, J. A., Associate Professor, Social Work.

CRAWFORD, G., Visiting Assistant Professor, Mathematics.

CRAWFORD, G. M., Clinical Instructor, Surgery (Therapeutic Radiology).

CRAWFORD-EAVES, LINDA, Lecturer, Psychiatry (Psychology).

CREECH, R., Lecturer, Music (Horn).

CREIGH, G., Associate Professor, English.

CRICHTON, ANNE O., Associate Professor, Health Care and Epidemiology.

CRICHTON, ERICA P., Clinical Assistant Professor, Microbiology.

CRICHTON, J. U., Assistant Professor, Paediatrics.

CROCKER, C., Lecturer, Music (Flute).

CROCKETT, D. J., Demonstrator, Psychiatry (Psychology).

Cronhelm, C. H., Clinical Instructor, Obstetrics and Gynaecology.

CROOKER, A. M., Professor, Physics.

CROOKS, M. J., Assistant Professor, Physics.

CROUCH, L. G. R., Professor and Acting Head of Department of Mineral Engineering.

Cullen, W. R., Associate Professor, Chemistry.

Culling, C. F. A., Senior Instructor, Pathology.

CURTIS, C. K., Assistant Professor, Education.

CURTIS, G. F., Professor and Dean of the Faculty of Law.

CURZON, F. L., Professor, Physics.

CZAYKOWSKI, B., Associate Professor, Slavonic Studies.

Dahlie, J., Assistant Professor, Education.

DAEM, CLARE, Instructor, Home Economics.

Dalby, F. W., Professor, Physics.

Daniels, L. B., Assistant Professor, Education.

Daniells, R., University Professor of English Language and Literature.

Danner, W. R., Professor, Geology.

Dantow, Shella C., Instructor and Hospital Pharmacist, Pharmaceutical Sciences.

DARRACH, M., Professor and Head of the Department of Biochemistry.

DAVID, CHARLOTTE, Professor, Education.

DAVIDSON, G. A., Clinical Professor, Psychiatry.

DAVIDSON, G. A. F., Teaching Fellow, Paediatrics.

Davies, A. C., Visiting Lecturer, Electrical Engineering.

Davies, K. J., Clinical Instructor, Psychiatry.

Davies, Lois, Clinical Instructor, Surgery (Anaesthesiology).

DAVIES, M. S., Assistant Professor, Electrical Engineering.

DAVIES, R. W., Postdoctoral Fellow, Zoology.

DAVIES, SANDRA J., Assistant Professor, Education.

Davis, H. C., Assistant Professor, Community and Regional Planning.

Davis, I., Lecturer and Real Estate Coordinator, Commerce and Business Administration.

DAVIS, T. W., Clinical Instructor, Medicine.

DAVY, J. G., Part-time Assistant, Education.

Day, G., Assistant Professor, Education.

DEAN, J., Assistant Professor, Paediatrics.

DE BRUYN, J., Associate Professor, English.

DE Coursey, R., Lecturer, Education.

DEGROOT, L. C., Clinical Instructor, Paediatrics.

Dehnel, P. A., Professor, Zoology.

DE JONG, B. P. J., Teaching Fellow, Paediatrics.

DE JONG, S. H., Professor, Civil Engineering.

DE KANT, R., Lecturer, Music.

DE LANNOY, J-L. M., Assistant Professor, Sociology.

DELAVAULT, R. E., Associate Professor, Geology.

DEMPSTER, J. R. H., Assistant Professor, Computer Science.

Denholm, D. A., Lecturer, Part-time, Pharmaceutical Sciences.

Denike, K. G., Assistant Professor, Geography.

Dennison, J. D., Assistant Professor, Education.

Derry, D., Professor, Mathematics.

DESAI, I. D., Assistant Professor, Home Economics.

DE SOBRINO, L., Associate Professor, Physics.

DE STEFANIS, GIUSEPPINA, Instructor, Italian.

DEVENYI, MARGARET, Lecturer, Chemistry.

DEVRIES, A. G., Assistant Professor, Psychology.

DE VRIES, J., Assistant Professor, Soil Science.

DEYELL, EDITH, Associate Professor, Education.

DICK, J., Clinical Instructor, Medicine.

DICK, M. W., Postdoctoral Fellow, Zoology.

DICKERSON, R. W. V., Lecturer, Law.

Dickinson, G., Part-time Assistant, Education.

DICKINSON, J. H., Clinical Instructor, Obstetrics and Gynaecology.

DIEWOLD, PATRICIA A., Lecturer, Psychiatry.

DIVINSKY, N. J., Professor, Mathematics, and Assistant Dean of the Faculty of Science.

Dixon, G. H., Professor, Biochemistry.

Dodd, W. A. H., Clinical Instructor, Medicine (Dermatology).

Dodds, W. A., Clinical Assistant Professor, Surgery (Anaesthesiology).

DOHENY, J. R., Assistant Professor, English.

Doll, W. A., Clinical Instructor, Surgery.

DOLMAN, C. E., Research Professor, Microbiology.

DOLMAN, CLARISSE L., Clinical Associate Professor, Pathology.

DOLPHIN, D. R., Lecturer, Commerce and Business Administration.

DOLPHIN, MAUDE I., Assistant Professor, Nursing.

DOMKE, CAROLINE P., Instructor, Nursing.

DONALDSON, D. J., Assistant Professor, Economics.

Donaldson, R. W., Assistant Professor, Electrical Engineering.

Donnelly, K. R., Assistant Professor, Anatomy.

DONOVAN, E. G., Clinical Instructor, Medicine (Radiology).

Dooling, P. J., Assistant Professor, Forestry.

DORLING, M. J., Assistant Professor, Agricultural Economics.

DOROTICH, D., Assistant Professor, Slavonic Studies.

Doughty, J. H., Clinical Instructor (Epidemiology and Biometry), Health Care and Epidemiology.

Douglas, J., Senior Instructor, Electrical Engineering.

Douglas, P., Assistant Professor, Music.

Douglas, R. R., Assistant Professor, Mathematics.

Dower, G. E., Associate Professor, Pharmacology.

Drance, S. M., Professor, Ophthalmology.

DRENT, R. H., Assistant Professor, Zoology. DRESS, A., Associate Professor, Mathematics.

DRINNAN, J. H., Honorary Lecturer, Electrical Engineering.

DRUMMOND, G. I., Professor, Pharmacology.

DRYER, THE HON. MR. JUSTICE V. L., Lecturer, Law.

DUFF, W., Associate Professor, Anthropology.

DUNCAN, D. W., Honorary Professor, Chemical Engineering.

DUNCAN, J. P., Professor and Head, Department of Mechanical Engineering.

DUNELL, B. A., Professor, Chemistry.

DUNLOP, C. R. B., Associate Professor, Law.

DUNN, H. G., Professor, Paediatrics.

DUNN, W. L., Associate Professor, Pathology.

DUNWORTH, A., Visiting Research Professor, Electrical Engineering.

DURBACH, E., Instructor, English.

Durrant, G., Professor, English; and Head of the Department to June 30, 1969.

Dusing, W. J., Assistant Professor, Classics.

DUTTON, G. G. S., Professor, Chemistry.

DWYER, MELVA J., Honorary Lecturer, Fine Arts.

Dybikowski, J. C., Assistant Professor, Philosophy.

DYCK, H., Assistant Professor, Education.

EAGLES, B., Dean Emeritus, Lecturer, Agriculture.

EATON. B. C., Assistant Professor, Economics.

EATON, G. W., Associate Professor, Plant Science.

Eccles, Sir John, Distinguished Visiting Professor in Neurophysiology.

Eddy, H. R., Assistant Professor, Law.

EDEN, J., Clinical Professor, Pathology.

Edinger, H. G., Assistant Professor, Classics.

EDWARDS, JOYCE D., Instructor, Paediatrics.

EDWARDS, MARY J., Instructor, English.

Efford, I., Associate Professor, Zoology.

EGOFF, SHEILA A., Associate Professor, Librarianship.

EHRET, C., Postdoctoral Fellow, Chemistry.

ELDER, A. JEAN, Assistant Professor, History.

ELDER, H., Professor and Director, School of Architecture.

ELDRIDGE, J. E., Assistant Professor, Physics.

ELIOT, C. W. J., Associate Professor, Classics.

ELKINS, D. J., Assistant Professor, Political Science.

ELLICKSON, P., Instructor, Zoology.

ELLIOT, A. J., Professor and Head, Department of Ophthalmology.

ELLIOT, G. R. F., Professor, Public Health Practice, Health Care and Epidemiology.

ELLIOTT, G. B., Clinical Associate Professor, Pathology.

ELLIOTT, M. RUTH, Lecturer, Part-time, Nursing.

ELLIS, H. M., Honorary Lecturer, Electrical Engineering.

ELLIS, P. G., Lecturer, English.

Ellis, R. M., Associate Professor, Geophysics.

ELLISON, LUCILLE, Clinical Instructor, Surgery (Therapeutic Radiology).

EMERY, C. L., Professor, Mineral Engineering.

ENDELMAN, A., Clinical Instructor, Medicine.

English, J. T., Assistant Professor, Law.

ENGLISH, R. A., Clinical Instructor, Pathology.

EPSTEIN, N., Professor, Chemical Engineering.

ERDMAN, K. L., Professor, Physics.

ERICKSON, A. C., Honorary Lecturer, Architecture.

ESDALE, W. L., Clinical Instructor, Surgery (Anaesthesiology).

EVANS, A. M., Clinical Assistant Professor, Surgery (Therapeutic Radiology).

Evans, D. L., Assistant Professor, English.

EVANS, G., Clinical Instructor, Paediatrics.

Evans, R. G., Assistant Professor, Economics.

EVELYN, K. A., Professor, Medicine (Director, G. F. Strong Laboratory for Medical Research).

Fahrni, B. M., Associate Professor, Medicine, and Director of the School of Rehabilitation Medicine.

FAHRNI, W. H., Clinical Instructor, Surgery (Orthopaedics)

FAIRLI, J., Postdoctoray Fellow, Chemistry.

Farish, J. R., Clinical Instructor, Surgery.

FARLEY, A. L., Associate Professor, Geography.

FARMER, J. B., Associate Professor, Chemistry.

FARSTAD, L., Honorary Lecturer, Soil Science.

FERGUSON, N. C., Instructor, Part-time, Dentistry (Restorative).

FIDLER, H. K., Clinical Professor, Pathology.

FIEDLER, E. G., Assistant Professor, Education.

FIELDS, D. B., Professor, Commerce and Business Administration.

FINLAY, D. G., Associate Professor, Social Work.

FINLAYSON, D. G., Honorary Lecturer, Plant Science.

FINLEY, G. E., Assistant Professor, Psychology.

FINN, W. D., Professor and Head, Department of Civil Engineering.

FINNEGAN, C. V., Professor, Zoology.

FISCHER, CHARLOTTE, Professor, Mathematics, to August 31, 1969.

FISHER, H. D., Professor, Zoology.

FISHER, MARIAN R., Part-time Assistant, Education.

FISHER, S. J., Instructor, Part-time, Dentistry (Oral Surgery).

FISHMAN, SHEROLD, Clinical Instructor, Medicine.

FITZPATRICK, R. E., Honorary Lecturer, Plant Science.

FLEMING, K. O., Clinical Instructor, Ophthalmology.

FLETCHER, W. K., Postdoctoral Research Fellow, Geology.

FLOWER, M., Visiting Lecturer, Computer Science.

Folejewski, Z., Professor, Slavonic Studies.

FORBES, J. D., Assistant Professor, Commerce and Business Administration.

Forbes, Nancy P., Special Lecturer, Nursing.

Forbes, W. D. M., Clinical Instructor, Surgery.

FORD, D. J., Assistant Professor, Economics.

FORD, D. K., Associate Professor, Medicine (Canadian Arthritis and Rheumatism Society Research).

FORD, DENISE R., Instructor, Economics.

FORD, P., Associate Professor, Zoology.

FORNATARO, J. V., Associate Professor, Social Work.

Forster, Mary, Assistant Professor, Education.

Forsyth, J. S., Professor and Head, Department of Chemical Engineering.

FORWARD, A. D., Clinical Instructor, Surgery.

Foschi, Martha S., Assistant Professor, Sociology.

FOSTER, M. I., Assistant Professor, Education.

FOSTER, M. S. H., Lecturer, Commerce and Business Administration.

FOSTER, R. E., Professor, Forestry.

FOULKS, J. G., Professor and Head, Department of Pharmacology.

FOURNIER, J. J. F., Assistant Professor, Mathematics.

Fox, J. E., Postdoctoral Fellow, Chemistry.

Francis, D. R., Assistant Professor, Librarianship.

Francis, D. W., Assistant Professor, Zoology.

Francis, G. H., Clinical Associate Professor, Surgery (Otolaryngology).

Francis, Margaret Rose, Assistant Professor, Nursing.

Francis, Mildred E., Assistant Professor (Epidemiology and Biometry), Health Care and Epidemiology.

Franklyn, Heather, Assistant Professor, French.

Franson, R. T., Assistant Professor, Law.

Franz, N. C., Professor, Forestry.

Fraser, C. W., Part-time Lecturer, Librarianship.

Fraser, G. C., Teaching Fellow, Surgery.

Fraser, Geraldine E., Instructor, Part-time, Dentistry (Public and Community Dental Health).

Fratkin, L. B., Clinical Instructor, Surgery.

Fredeman, W. E., Professor, English.

Freeman, M. I., Postdoctoral Fellow, Physics.

FREI, A., Assistant Professor, Mathematics.

FREY, E., Instructor, German.

FRIEDMAN, CONSTANCE L., Research Associate Professor, Anatomy.

FRIEDMAN, S. M., Professor and Head, Department of Anatomy.

FRIESEN, I. D., Assistant Professor, Education.

FRITIG. B., Postdoctoral Fellow, Botany.

FRIZ, C. T., Assistant Professor, Anatomy.

Fromson, I., Postdoctoral Fellow, Chemistry.

Frood, Nancy, Instructor, Nursing.

Frost, D. C., Associate Professor, Chemistry.

FROST, J. W., Clinical Instructor, Surgery.

Fujise, Y., Postdoctoral Fellow, Chemistry.

Fulton, J. B., Clinical Instructor, Surgery (Anaesthesiology).

FUNK, B. GLORIA, Teaching Fellow, Medical Microbiology.

Furness, Anne, Associate Professor, Social Work.

FÜRSTENWALD, MARIA, Assistant Professor, German.

FUTRELL, M. H., Professor and Head, Slavonic Studies.

Fyfe, C., Postdoctoral Teaching Fellow, Chemistry.

GAGE, W. H., President; Professor of Mathematics and Dean of Inter-Faculty and Student Affairs.

GAITANKAKIS, J. A., Lecturer, Architecture.

GAMBLE, F., Associate Professor, Music Education.

GARDNER, C. L., Assistant Professor, Chemistry.

GARDNER, C. W., Instructor, Part-time, Dentistry (Restorative).

GARDNER, D. V., Postdoctoral Teaching Fellow, Chemistry.

GARDNER, J. A. F., Professor and Dean of the Faculty of Forestry.

GARDNER, W. JOSEPHINE, Instructor, Part-time, Dentistry (Public and Community Dental Health).

GARLAND, MAUREEN, Research Assistant, Cancer Research Centre.

GARNER, F. O. R., Clinical Instructor, Medicine.

GARNETT, G., Assistant Professor, English.

GARRETT, F. D., Visiting Professor, Anatomy.

Garrow, D. G., Clinical Instructor, Medicine (Radiology).

Gartshore, I. S., Assistant Professor, Mechanical Engineering.

GATES, G. R., Associate Professor, Geography.

GAUTSCHI, E. H. M., Assistant Professor, Physical Education and Recreation.

GAYMAN, G. R., Clinical Associate Professor, Paediatrics.

GEARY, G., Lecturer, Music (Piano).

GEMEROY, HELEN M., Associate Professor and Assistant Director of Nursing.

Gerlach, E., Assistant Professor, Mathematics.

GERRY, M. C. L., Assistant Professor, Chemistry.

Gerson, W., Professor, Architecture.

GERWING, JULIA, Associate Professor, Microbiology.

Getz, L., Associate Professor, Law.

GHAED, M.-A., Clinical Assistant Professor, Psychiatry.

GIBBARD, D. C., Associate Professor, Music Education.

GIBBARD, J. E., Part-time Assistant, Education.

GIBBONS, A. K., Clinical Instructor, Surgery (Anaesthesiology).

GIBSON, BARBARA, Assistant Professor, Librarianship.

GIBSON, J. M. W., Clinical Instructor, Surgery (Therapeutic Radiology).

GIBSON, W. C., Professor and Head of the Department of History of Medicine and Science.

GIESE, RACHEL, Associate Professor, Italian.

GILBERT, J. H. V., Assistant Professor, Paediatrics.

GILBERT, N. E., Visiting Lecturer, Zoology.

GILBERT, W. H., Assistant Professor, Fine Arts.

GILLESPIE, D. C., Assistant Professor, Education.

GILLESPIE, H. S., Clinical Instructor, Surgery (Orthopaedics).

GILLILAND, R. C., Instructor, Social Work.

GILROY, MARION, Associate Professor, Librarianship.

GLASS, L. S., Clinical Instructor, Obstetrics and Gynaecology.

GNUP, F. T., Senior Instructor, Physical Education and Recreation.

GOFTON, J. P., Assistant Professor, Medicine.

Golay, H., Lecturer, Asian Studies.

Gold, A. V., Professor, Physics.

GOLDBERG, M., Assistant Professor, English.

GOLDBERG, M. A., Assistant Professor, Commerce and Business Administration.

Goldie, A., Visiting Professor, Mathematics.

GOLDIE, H. J., Honorary Lecturer, Electrical Engineering.

GOLDMAN, R., Assistant Professor, Asian Studies.

GOMEL, V., Clinical Instructor, Obstetrics and Gynaecology.

GOODELL, B. C., Professor, Forestry.

GOODEVE, A. M., Assistant Professor, Pharmeutical Sciences.

GOODEVV, LEONA R., Senior Instructor, Pharmaceutical Sciences.

GOODMAN, G. B., Clinical Instructor, Surgery (Therapeutic Radiology).

GOODWIN, H. G., Assistant Professor, Social Work.

GOODWIN, HELEN, Lecturer, Physical Education and Recreation.

GORDON, BONNIE, Assistant Professor, Physical Education and Recreation.

GORELIK, G., Assistant Professor, Commerce and Business Administration.

GORNALL, F. A., Assistant Professor, Education.

Gose, E. B., Professor, English.

Gose, Kathleen, Part-time Lecturer, English.

GOUDY, BARBARA, Research Assistant, Cancer Research Centre.

GOULD, M. C., Teaching Postdoctoral Fellow, Zoology.

GOULDSTONE, PENNY, Associate Professor, Education.

GOURLAY, C. C., Professor and Assistant Dean of the Faculty, Chairman of the Division of Policy and Administration, Commerce and Business Administration.

GOURLAY, R. H., Clinical Associate Professor, Surgery.

Gout, P. W., Research Assistant, Cancer Research Centre.

Gow, June I., Instructor, History.

Gower, J. A., Associate Professor, Geology.

Gower, J. F. R., Assistant Professor, Physics.

GRAHAM, D. C., Assistant Professor, Medicine; Associate Dean of the Faculty of Medicine.

GRAHAM, K., Professor, Forestry.

Granirer, E. E., Associate Professor, Mathematics.

GRANT, E. KATHLEEN, Instructor, English.

GRAVES, H. B., Clinical Associate Professor, Surgery (Anaesthesiology).

GRAY, E. J., Clinical Instructor, Surgery.

GRAY, E. W., Postdoctoral Fellow, Chemistry.

GRAY, G. A., Assistant Professor, Sociology.

GRAY, G. R., Clinical Instructor, Medicine.

GRAY, J., Assistant Professor, Education.

GRAY, J. P., Postdoctoral Teaching Fellow, Electrical Engineering.

GRAY, PATRICIA, Part-time Assistant, Education.

GRAY, R. F., Associate Professor, Education.

GRAYSTON, WINIFRED L., Instructor, Rehabilitation Medicine.

Green, Beverley R., Assistant Professor, Botany.

GREEN, DOROTHY M., Instructor, Nursing.

Green, Monica M., Honorary Lecturer in Public Health Nursing, Health Care and Epidemiology.

GREENING, KATHLEEN, Lecturer, Chemistry.

GREENWOOD, D. D., Associate Professor, Psychology.

GREENWOOD, H. J., Associate Professor, Geology.

Greenwood, Priscilla E., Assistant Professor, Mathematics.

GREGG, R. J., Professor, Linguistics.

GREIG, J. H., Clinical Instructor (Radiology), Medicine.

GRENBERG, B. L., Assistant Professor, English.

GRIER, HELEN, Part-time Assistant, Education.

GRIFFITHS, G. M., Professor, Physics.

GRIFFITHS, J. C., Clinical Instructor, Pathology.

GRILL, E. V., Assistant Professor, Oceanography.

Gronlund, Audrey F., Assistant Professor, Microbiology.

GROSSMAN, P., Lecturer, Part-time, Librarianship.

GROVER, F. J., Professor, French.

GROWE, G. H., Clinical Instructor, Medicine.

Gruendling, G. K., Postdoctoral Fellow, Botany.

GRUFT, A., Assistant Professor, Architecture.

Grzybowski, Betty J. Poland, Assistant Professor, Obstetrics and Gynae-cology.

GRZYBOWSKI, S., Associate Professor, Medicine (Respiratory Disease).

Guccione-Gush, Rosalia, Assistant Professor, Physics.

GUEST, D. T., Assistant Professor, Social Work.

GUNDRY, C. H., Clinical Assistant Professor, Psychiatry.

GUNN, A., Assistant Professor, Education.

GUNN, S. W. A., Honorary Lecturer, History of Medicine and Science.

Guri, Teresa, Part-time Lecturer, Spanish.

Gush, H. P., Professor, Physics.

GUSTAFSON, D. D., Assistant Professor, English.

GUSTON, P. A., Visiting Associate Professor French.

GUTHRIE, P. C. F., Associate Professor, Classics.

HACKING, I., Associate Professor, Philosophy.

HADDOCK, P. G., Professor, Forestry.

HADFIELD, J. R., N.C.I. Research Fellow, Cancer Research Fellow, Medicine.

HAGLER, R. A., Associate Professor, Librarianship.

HAHN, P., Research Associate, Paediatrics.

Hainsworth, G. B., Assistant Professor, Economics.

HALLDANE, Visiting Associate Professor, Architecture.

HALEY, D., Assistant Professor, Forestry.

HALL, E. R., Clinical Instructor, Surgery (Anaesthesiology).

HALL, L. D., Assistant Professor, Chemistry.

Hall, N. A., Professor and Chairman, Division of Industrial Administration, Commerce and Business Administration.

HALL, R. M., Clinical Instructor (Radiology), Medicine.

HALL, W. F., Associate Professor, English.

HALL, W. M., Clinical Instructor, Surgery (Anaesthesiology).

HALLIDAY, C., Part-time Assistant, Education.

HALLIDAY, J. E., Professor, Pharmaceutical Sciences.

HALLIDAY, R., Clinical Instructor, Psychiatry.

Hamilton, J., Lecturer, Music (String Bass).

Hamilton, J. R., Lecturer, Commerce and Business Administration.

Hamilton, R. M., Lecturer, Part-time, Librarianship.

Hamlin, F. R., Associate Professor, French.

HANCOCK, R. J., Clinical Instructor, Surgery.

HANDFORD, R. H., Honorary Lecturer, Plant Science.

Handschin, U., Postdoctoral Fellow, Chemistry.

HANLEY, F. W., Clinical Instructor, Psychiatry.

Hannam, A. G., Assistant Professor, Dentistry (Oral Biology).

HANRAHAN, T. J., Associate Professor, History.

HANSEN, SHIRLEY, Research Associate, Pharmacology.

HARBOURNE, D. A., Postdoctoral Teaching Fellow, Chemistry.

HARDIN, E. D., Clinical Instructor, Psychiatry.

HARDING, P. E., Lecturer, Classics.

HARDMAN, MARYA, Instructor, English.

HARDWICK, D., Associate Professor, Pathology.

HARDWICK, F. C., Professor, Education.

HARDWICK, W. G., Associate Professor, Geography.

HARDYMENT, A. F., Clinical Professor, Paediatrics.

HARE, R. D., Associate Professor, Psychology.

HARGER, J. R., Assistant Professor, Zoology.

HARLEY, C. K., Assistant Professor, Economics.

HARLOW, R., Associate Professor, and Head, Department of Creative Writing.

HARMON, T. R., Clinical Associate Professor, Pathology.

HARNETTY, P., Associate Professor, Asian Studies.

HARRINGTON, R. W., Clinical Instructor, Psychiatry.

HARRIS, C. K., Clinical Instructor, Pathology.

HARRIS, EMMA, Associate Professor, Education.

HARRIS, G. S., Clinical Instructor, Ophthalmology.

HARRISON, B., Professor, History.

HARRISON, L. G., Professor, Chemistry.

HARRISON, R. C., Professor and Head of the Department of Surgery.

HARROP, T. J., Assistant Professor and Head of the Department of Restorative Dentistry.

HARSHENIN, A. P., Assistant Professor, Slavonic Studies.

HART, J. A., Associate Professor, English.

HARTLEY, MARGO, Instructor, English.

HARTRICK, W. J., Associate Professor, Education.

HARVEY, K. B., Associate Professor, Chemistry; and Assistant Dean of the Faculty of Science.

HARWOOD, J. P., Demonstrator, Pharmacology.

HATCH, R. B., Assistant Professor, English.

HAUPTMANN, E. G., Associate Professor, Mechanical Engineering.

HAWTHORN, H. B., Professor, Anthropology and Sociology, Director of the Museum of Anthropology.

HAWTHORNE, H. M., Research Associate, Metallurgy.

HAY, J. E., Assistant Professor, Geography.

HAYWARD, L. D., Professor, Chemistry.

HAZELL, C. R., Assistant Professor, Mechanical Engineering.

HAZELL, SHIRLEY, Clinical Instructor, Paediatrics.

HEALY, S., Associate Professor, Education.

Heaver, T. D., Associate Professor and Acting Chairman, Division of Transportation, Commerce and Business Administration.

Hebden, H. Frances, Research Assistant, Cancer Research Centre.

Heizer, Sharon, Lecturer, English.

Helliwell, J. F., Associate Professor, Economics.

HEPPLER, L. J., Assistant Professor, Part-time, Dentistry.

HERBERT, R. G., Associate Professor, Law.

HERRING, F. G., Assistant Professor, Chemistry.

HERSTEIN, A., Clinical Assistant Professor, Obstetrics and Gynaecology.

HERTZMAN, V. O., Clinical Instructor, Medicine.

HESLOP, W. G., Professor, Civil Engineering.

HEWITT, G. B., Lecturer, Part-time, Pharmaceutical Sciences.

HEWSON, P. W., Postdoctoral Fellow, Physics.

Heywood, J. G., Assistant Professor, Mathematics.

Heywood, R. H., Associate Professor and Chairman of the Division of Teacher Education (Commercial), Commerce and Business Administration.

HIBBERT, JESSIE, Assistant Professor, Nursing.

HICKLING, M. A., Associate Professor, Law, to June 30, 1969.

HICKS, R. N., Instructor, Part-time, Dentistry (Orthodontics).

HILDEBRAND, H. D., Clinical Instructor, Surgery.

HILL, L. E., Associate Professor, History.

HILL, R. H., Instructor, Paediatrics.

HILLS, R. J., Professor, Education.

HINDMARCH, R. G., Associate Professor, Physical Education and Recreation.

HINGSTON, J., Clinical Assistant Professor, Paediatrics.

HINKE, J. A. M., Professor, Anatomy.

HIRT, N. B., Clinical Instructor, Psychiatry.

HOAR, W. S., Professor and Head of the Department of Zoology.

HOCHACHKA, P. W., Assistant Professor, Zoology.

Hodgson, A. J., Part-time Lecturer, Architecture.

Hoechsmann, K., Associate Professor, Mathematics.

HOFFMAN, S., Postdoctoral Fellow, Chemistry.

Hojvat, C. F., Postdoctoral Fellow, Physics.

HOLDAWAY, R. G. C., Assistant Professor, French.

HOLLAND, W. L., Professor, Asian Studies.

Holling, C. S., Professor, Zoology.

HOLLINRAKE, H. A., Lecturer, Law.

HOLLOWAY, J. B., Lecturer, Commerce and Business Administration.

HOLM, D. G., Assistant Professor, Zoology.

HOLMES, SYLVIA, Assistant Professor, Nursing.

Holsti, K. J., Associate Professor, Political Science.

Holst, O. R., Associate Professor, Political Science.

HOLUBITSKY, I. B., Assistant Professor, Surgery.

HOOD, MARGARET, R. Instructor, Rehabilitation Medicine.

HOOLEY, J. G., Professor, Chemistry.

HOOLEY, R. F., Professor, Civil Engineering.

Hopwood, Alison, Lecturer, English.

HOPWOOD, V. G., Associate Professor, English.

HORAN, J. D., Clinical Instructor, Medicine.

HORNBY, C. A., Associate Professor, Plant Science.

HOUGHAM, G. M., Professor and Director of the School of Social Work.

HOWARD, BETTY, Assistant Professor, Physics.

HOWARD, H. M., Professor, Mineral Engineering.

HOWARD, H. S., Instructor, Rehabilitation Medicine.

Howard, R., Assistant Professor, Physics.

Howes, J. F., Associate Professor, Asian Studies.

Howitz, T. A., Associate Professor, Education.

HRENNIKOFF, A., Research Professor, Civil Engineering.

Hsu, H. S., Postdoctoral Fellow, Chemistry.

HUBERMAN, D. S. M., Professor, Law.

HUDSON, J. B., Assistant Professor, Medical Microbiology.

HUDSON, P. W., Clinical Instructor, Surgery (Anaesthesiology).

HUDSON, W. JANE, Instructor, Rehabilitation Medicine.

HUENEMANN, R. W., Instructor, Economics.

Hughes, G. C., Associate Professor, Botany.

HUGHES, Maryanne R., Part-time Lecturer, Zoology.

HUGILL, JEAN T., Clinical Instructor, Surgery (Anaesthesiology).

HUIGE, G., Assistant Professor, Mathematics.

HULCOOP, J. F., Associate Professor, English.

HULTBERG, C., Associate Professor, Music (Composition and Theory).

HUMPHREYS, M. S., Assistant Professor, Psychology.

HUMPHRIES, C. W., Associate Professor, History.

HUNDERT, E. J., Assistant Professor, History.

HUNT, DAWN, Part-time Assistant, Education.

HUNTER, MARGARET J. G., Instructor, Rehabilitation Medicine.

HURLBURT, F. W. B., Clinical Associate Professor, Medicine.

HURT, E. B., Assistant Professor, Economics.

HUTTON, G. H., Clinical Assistant Professor, Psychiatry.

IBBOTT, J. W., Clinical Instructor, Medicine.

IIDA, S., Assistant Professor, Religious Studies.

Inglis, A. M., Clinical Instructor, Surgery (Orthopaedics).

INGRAM, G. D., Clinical Instructor, Obstetrics and Gynaecology.

INGRAM, R. W., Associate Professor, English.

INNES, S., Part-time Assistant, Education.

IQBAL, M., Associate Professor, Mechanical Engineering.

IRELAND, W. E., Honorary Lecturer, History of Medicine and Science.

IRVING, J. A., Clinical Associate Professor, Ophthalmology.

ISRAELS, S., Professor and Head of the Department of Paediatrics.

JACKSON, H., Assistant Professor, Philosophy.

Jackson, Mary, Assistant Professor, Zoology.

JACKSON, P. P., Clinical Instructor, Surgery.

JACOBSON, HELGA E., Assistant Professor, Anthropology.

JAHNKE, L. G., Associate Professor, Law.

JAMES, B. R., Assistant Professor, Chemistry.

JAMES, D. G. L., Professor, Chemistry.

JAMES, R. D., Professor and Head of the Department of Mathematics.

Jamieson, R. A., Assistant Professor, Electrical Engineering.

Jamieson, S. M., Professor, Economics.

JAN, J. E., Fellow in Paediatric Neurology, Paediatrics.

JEFFRIES, W. A., Instructor, Part-time, Dentistry (Oral Medicine).

JEFFREY, W. W., Associate Professor, Forestry.

JENKINS, L. C., Associate Professor, Surgery (Anaesthesiology).

JOBLING, R. G., Assistant Professor, Education.

JOHNSON, A. M., Clinical Instructor, Medicine.

JOHNSON, C., Part-time Assistant, Education.

JOHNSON, D. B., Research Associate, Metallurgy.

JOHNSON, F. H., Professor and Director, Elementary Education.

JOHNSON, G. D., Sessional Lecturer, Chemistry.

JOHNSON, G. J., Assistant Professor, Psychology.

JOHNSON, H. W., Teaching Fellow, Surgery (Urology).

JOHNSON, J. R., Assistant Professor, Physical Education and Recreation.

JOHNSON, R. C., Assistant Professor, English.

Johnson, R. N., Postdoctoral Fellow, Chemistry.

JOHNSON, R. R., Assistant Professor, Physics.

JOHNSTON, A. C., Clinical Instructor, Ophthalmology.

JOHNSTON, I. C., Lecturer, English.

JOHNSTON, MARGARET M., Clinical Instructor, Medicine (Dermatology).

JOHNSTONE, F. R. C., Professor, Surgery.

JOLY, A-M., Instructor, French.

JONEJA, JANICE, Honorary Assistant Professor, Dentistry (Oral Biology).

JONES, CAROLE N. S., Lecturer, Paediatrics.

JONES, D., Part-time Assistant, Education.

Jones, D. P., Clinical Assistant Professor, Medicine (Neurology).

JONES, G., Associate Professor, Physics.

JONES, HELEN A., Lecturer, English.

Jones, R., Professor, Education.

JONES, R. L., Post-Doctoral Fellow, Neurological Sciences, Psychiatry.

Joseleau, J. P., Postdoctoral Fellow, Chemistry.

JULL, J. W., Associate Professor, Physiology.

JUSTICE, WANDA, Part-time Assistant, Education.

JUTTE, CAROL, Lecturer (Piano), Music.

KABRIEL, B. J., Assistant Professor, Electrical Engineering.

KAEMPFFER, F. A., Professor, Physics.

Kalman, H. D., Lecturer, Fine Arts.

KANE, J., Professor, Mathematics, Zoology.

KAPLAN, S., Clinical Instructor, Psychiatry.

KASINSKY, H. E., Assistant Professor, Zoology.

Kassis, H. E., Associate Professor, Religious Studies.

Kato, Hilda, Lecturer, Asian Studies.

Kato, S., Professor, Asian Studies.

KATZ, J., Professor of Comparative Education.

KAVANAGH-GRAY, DORIS M. M., Clinical Instructor, Medicine.

Kealy, J. K., Assistant Professor, English.

Keeler, R., Associate Professor, Physiology.

Kelland, A. L., Instructor, Part-time, Dentistry (Oral Medicine).

Kelly, C., Part-time Lecturer, German.

Kelly, M. G., Assistant Professor, Economics.

Kelly, R. F., Associate Professor, Commerce and Business Administration.

KENDALL, D., Professor of Special Education.

Kendall, D. C., Assistant Professor, Part-time, Paediatrics.

Kennedy, H. K., Clinical Instructor (Public Health Practice), Health Care and Epidemiology.

Kennedy, J. M., Professor, Computer Science.

Kennedy, R. W., Associate Professor, Part-time, Forestry.

Kenny, D. T., Professor and Associate Dean of the Faculty of Arts.

KENT, D., Lecturer, Music (Horn and Tuba).

KERR, R. B., Professor and Head of the Department of Medicine.

Kerridge, J. H., Clinical Instructor, Medicine.

Kersey, L. R., Associate Professor, Electrical Engineering.

KERSHAW, C., Part-time Lecturer, French.

KESTER, H. A., Clinical Instructor, Surgery (Anaesthesiology).

Kettyls, G. D. M., Clinical Instructor, Microbiology (Medical).

Kew, J. E., Visiting Assistant Professor, Anthropology.

KHANNA, S. L., Assistant Professor, Dentistry (Restorative).

KHARADLY, M. M. Z., Professor, Electrical Engineering. KILBURN, D. G., Assistant Professor, Microbiology.

KILGALLIN, A. R., Assistant Professor, English.

KILGOUR, A. JEAN, Associate Professor, Education.

KIMMINS, J. P., Assistant Professor, Forestry.

KINCADE, G. F., Clinical Associate Professor, Medicine.

KING, FLORIS F., Associate Professor, Nursing.

KITTS, W. D., Professor, Chairman of the Department of Poultry Science.

KLANG, D. M., Assistant Professor, History.

KLIMAN, M. R., Clinical Instructor, Surgery.

KLINE, C. L., Clinical Assistant Professor, Psychiatry (Child Psychiatry).

Klohn, E. J., Honorary Lecturer, Civil Engineering.

KLONOFF, H., Associate Professor and Head of Division, Psychiatry (Psychology).

KNECHTEL, MARY E., Lecturer, English.

KNICKERBOCKER, W. J., Clinical Instructor, Medicine (Radiology).

KNIGHT, W. H., Assistant Professor, Law.

KNOX, R. E., Assistant Professor, Psychology.

KNUTSON, H. C., Associate Professor, French.

KNUTSON, SIMONE, Instructor, French.

Kobbervic, K. I., Associate Professor of Spanish and Italian.

Kong, G. P., Clinical Instructor, Surgery (Otolaryngology).

KOOPMANN, H., Visiting Associate Professor, German.

KOOPMAN, PEGGY R., Assistant Professor, Education.

KORCHINSKY, N. N., Instructor, Physical Education and Recreation.

KORNDER, L. D., Clinical Instructor (Public Health Practice), Health Care and Epidemiology.

Kosak, A., Associate Professor, Forestry.

Kovacs, G., Clinical Instructor, Psychiatry.

Kraintz, L., Professor, Dentistry (Oral Biology).

KRAJINA, V. J., Professor, Botany.

KRAYENHOFF, W. A., Assistant Professor, Education.

Krishnamurti, C. R., Assistant Professor, Agriculture.

Krisman, A., Clinical Instructor, Obstetrics and Gynaecology.

Krivel, H., Clinical Associate Professor, Paediatrics.

KROEKER, H., Instructor, Social Work.

KUBICEK, R. V., Assistant Professor, History.

Kucera, R. E., Associate Professor, Geology.

Kumar, N., Postdoctoral Fellow, Physics.

KUTNEY, J. P., Professor, Chemistry.

LAANEMAE, ERNA, Instructor, Social Work.

LABRIE, E. R., Assistant Professor, English.

LAHAY, W. D., Teaching Fellow, Pharmacology.

LAITHWAITE, A. B., Associate Professor, Physical Education and Recreation.

Lam, K. Y., Assistant Professor, Mathematics.

LANDAUER, E., Assistant Professor, Sociology.

Landsberger, M., Visiting Assistant Professor, Economics.

Lane, W. T., Lecturer, Part-time, Community and Regional Planning.

Langdon, F. C., Professor, Political Science.

Lanning, W., Associate Professor, Education.

Lapage, Alison M., Clinical Instructor, Phychiatry.

LAPONCE, JEAN A., Professor, Political Science.

Larkin, P. A., Professor and Director of the Institute of Fisheries; Acting Head, Department of Zoology, Sept. 1, 1969, to August 31, 1970.

Larsen, A. A., Clinical Instructor (Epidemiology and Biometry), Health Care and Epidemiology.

LARSON, D. L., Assistant Professor, Law.

LAU, M. P., Teaching Fellow, Psychiatry.

LAUENER, R. W., Assistant Professor, Part-time, Medicine.

LAVIN, J. A., Associate Professor, English.

LAVKULICH, L. M., Assistant Professor, Soil Science.

LAWRENCE, J. C., Assistant Professor, History.

Leach, Catherine S., Instructor, Slavonic Studies.

LEAR, C. S. C., Associate Professor and Head of the Department of Orthodontics, Dentistry.

Lear, Rosemary, Instructor, Dentistry (Restorative).

LEATHERLAND, J. F., Postdoctoral Fellow, Zoology.

Leblond, P. H., Assistant Professor, Physics.

LEDERMAN, J. J., Honorary Lecturer, Pathology.

LEDUC, R. J., Assistant Professor, Education.

LEDSOME, J. R., Associate Professor, Physiology.

LEE, K. C., Postdoctoral Fellow, Physics.

LEE, M., Professor, and Director of the School of Home Economics.

Lee, S. K., Instructor, Education.

Lee, S. S., Assistant Professor, Education.

LEE, W. E., Research Associate, Electrical Engineering.

LEES, J., Senior Instructor, Physics.

Lefevre, L. E., Visiting Assistant Professor, Mathematics.

Legzdins, P., Assistant Professor, Chemistry.

LEHMANN, E. C. H., Clinical Instructor, Surgery (Orthopaedics).

LEHMANN, F., Assistant Professor, History.

LEHMANN, P. O., Clinical Instructor, Surgery (Neurosurgery).

Leigh, R., Assistant Professor, Geography.

Leighton, K. M., Clinical Instructor, Surgery.

LEIMANIS, E., Professor, Mathematics.

LEITH, ANNA R., Lecturer, Part-time, Librarianship.

Leja, J., Professor, Mineral Engineering.

Lemire, F. W., Assistant Professor, Mathematics.

LEROUX, J. A., Clinical Instructor, Medicine.

LEUNG, F. Y. T., Research Fellow, Paediatrics.

LEUNG, S. W., Professor of Oral Biology, and Dean of the Faculty of Dentistry.

LEVIN, M. B., Assistant Professor, Political Science.

LEVITAN, S., Instructor, English.

Levy, E., Assistant Professor, Philosophy.

Lewis, A. G., Associate Professor, Zoology.

Lewis, H. V., Assistant Professor, Economics.

LEWIS, J. C., Lecturer, Part-time, Dentistry (Public and Community Dental Health).

Lewis, R. C., Instructor, Education,

LEYLAND, E. E., Clinical Instructor, Psychiatry.

Li, Снi, Professor, Asian Studies.

LIELMEZS, J., Assistant Professor, Chemical Engineering.

LILEY, N. R., Assistant Professor, Zoology,

LIN, W. C., Professor, Chemistry.

LIN, W. S., Postdoctoral Fellow, Chemistry.

LIND, L. O., Assistant Professor, Part-time, Dentistry (Restorative).

LINDSAY, R. K., Instructor, Part-time, Dentistry (Oral Surgery).

LINGER, K. R., Research Associate, Metallurgy.

LINK, A. E., Professor, Religious Studies.

LINNES, AUDREY, Instructor, Education.

LINQUIST, D., Instructor, Physics.

Lioy, F., Assistant Professor, Physiology.

LIPSEY, R. G., Visiting Professor, Economics.

LIPSON, S. L., Professor, Civil Engineering.

LIRENMAN, D. S., Assistant Professor, Paediatrics.

LITHERLAND, H. K., Clinical Instructor, Surgery.

LIVERMORE, H. V., Professor and Head of the Department of Hispanic and Italian Studies.

LIVESEY, ADELIA F., Instructor, English.

LIVESEY, D. L., Professor, Physics.

LIVINGSTONE, DOROTHY, Assistant Professor, Education.

LLOYD, A. J., Instructor, Social Work.

LOBAN, J., Assistant Professor, Music (Violin and Music History).

LOCKHART, H. B., Clinical Instructor, Surgery (Otolaryngology).

LOFFMARK, R. R., Professor, Commerce and Business Administration.

LOGAN, W. J. P., Senior Instructor, Education.

LONGLEY, J. D., Clinical Instructor, Medicine (Radiology).

Louis, W. J., Assistant Professor, Theatre.

Low, M. D., Assistant Professor, (Neurology), Surgery.

Lowe, L. E., Assistant Professor, Soil Science.

LOWRY, R. B., Assistant Professor, Paediatrics (Medical Genetics).

Lucas, A. R., Assistant Professor, Law.

LUFT, E., Associate Professor, Mathematics.

LUITJENS, J., Lecturer, Botany.

LUKE, C. M., Research Associate, Metallurgy.

LUND, J. A. H., Professor, Metallurgy.

Lundsberger, M., Visiting Assistant Professor, Economics.

Lusztig, P. A., Associate Professor and Chairman, Finance Division, Commerce and Business Administration.

Lysyk, K. M., Professor, Law.

LYTTLE, I., Part-time Assistant, Education.

MAAS, H. S., Visiting Professor, Social Work.

MACAREE, D., Assistant Professor, English.

MACERA, P., Visiting Associate Professor, Hispanic and Italian Studies.

Macskasy, E., Associate Professor, Mathematics.

Mahabir, W. J., Instructor, Psychiatry.

Mahoney, R. A., Honorary Lecturer, Commerce and Business Administration.

Majima, H., Associate Professor, Mineral Engineering.

Majone, G., Associate Professor, Commerce and Business Administration.

Makepeace, R., Instructor and Acting Head, Division of Social Psychiatry.

MAKITA, T., Visiting Assistant Professor, Chemistry.

Mamiya, M., Visiting Professor, Mineral Engineering.

Mann, K. C., Professor, Physics.

Mann, R. C., Part-time Lecturer, Architecture.

Manzalaoui, M. A., Professor, English.

Mao, J. C. T., Professor, Commerce and Business Administration.

MARANDA, P., Associate Professor, Anthropology.

MARCH, BERYL E., Associate Professor, Poultry Science.

Marcos, Ophelia H. O., Research Fellow, Paediatrics.

Marcus, A. M., Assistant Professor, Psychiatry.

Margetts, E. L., Professor, Psychiatry.

Marko, J., Assistant Professor, Physics.

MARKS, S. E., Assistant Professor Education.

MARLATT, G. A., Assistant Professor, Psychiatry (Psychology).

Marner, P., Part-time Assistant, Education.

Marquis, G. W., Professor and Head of the Department of Music.

MARRIAGE, A. J. H., Associate Professor, Sociology.

Marsh, L. C., Professor, Education.

Marshall, R. H., Clinical Instructor, Surgery.

MARTENIUK, R. G., Assistant Professor, Physical Education and Recreation.

MARTIN, H., Instructor, German.

MARTIN, P. W., Assistant Professor, Physics.

MARZAC, NICOLE A. D., Assistant Professor, French.

Marzari, F. O., Assistant Professor, History.

MASHAL, J., Clinical Instructor, Paediatrics.

MATHER, D., Lecturer, Part-time, Librarianship.

MATHESON, D., Clinical Instructor, Surgery (Anaesthesiology).

MATHEWS, W. H., Cominco Professor and Head of the Department of Geology.

MATHIESON, W. D., Lecturer, Commerce and Business Administration.

MATHUR, K. B., Visiting Associate Professor, Chemical Engineering.

MATRICK, L. E., Clinical Instructor, Psychiatry.

MATTE, E. J., Assistant Professor, French.

MATTESSICH, R. V., Professor, Commerce and Business Administration.

MATTHEWS, P. W., Associate Professor, Physics.

MAXWELL, J. D., Assistant Professor, Commerce and Business Administration.

MAXWELL, J. D., Assistant Professor, Health Care and Epidemiology.

MAYBEE, T. K., Clinical Instructor, Medicine.

MAYERS, DOROTHY F., Instructor, Part-time, Dentistry (Public and Community Dental Health).

MAYNE, B. H., Assistant Professor, English.

Mayo, G., Postdoctoral Fellow, Botany.

Mayo, J., Postdoctoral Fellow, Botany.

MAZE, J. R., Assistant Professor, Botany.

Meagher, E. P., Assistant Professor, Geology.

Medveczky, L., Lecturer, German.

Meissner, M., Associate Professor, Sociology.

MELZAK, Z. A., Professor, Mathematics.

MENDELS, R. P., Assistant Professor, Economics.

MENON, B. C., Postdoctoral Fellow, Chemistry.

Merivale, Patricia, Associate Professor, English.

MERRIAM, R. F., Instructor, Education.

Messenger, W. E., Assistant Professor, English.

MEYER, J., Assistant Professor, Physics.

MEYER, R. E., Instructor, Part-time, Dentistry (Oral Surgery).

MEYERS, W. E., Assistant Professor, Mathematics.

MIDDLETON, W. E. K., Honorary Lecturer, History of Medicine and Science.

MILES, J. E., Assistant Professor, Psychiatry.

MILLAR, J. W., Clinical Assistant Professor, Obstetrics and Gynaecology.

MILLER, C. W., Associate Professor, English.

MILLER, H. S., Teaching Fellow, Surgery (Orthopaedics, Urology).

MILLER, J. R., Professor, and Head of the Division of Medical Genetics, Paediatrics.

MILLER, L. L., Assistant Professor, German.

MILLER, S., Clinical Associate Professor in Radiological Anatomy.

MILNE, R. S., Professor; and Head of the Department of Political Science to June 30, 1969.

MINAMIKAWA, T., Postdoctoral Fellow, Botany.

MINGHI, J., Associate Professor, Geography.

MINNES, J. F., Clinical Assistant Professor, Ophthalmology.

MIRHADY, F., Clinical Assistant Professor, Paediatrics.

MISRA, T. N., Postdoctoral Fellow, Chemistry.

MITAREWSKI, W. W., Clinical Instructor, Psychiatry (Child Psychiatry).

MITCHELL, A., Associate Professor, Metallurgy.

MITCHELL, A. G., Associate Professor, Pharmaceutical Science.

MITCHELL, C. L., Associate Professor, Commerce and Business Administration.

MITCHELL, FRANCES, Part-time Assistant, Education.

MITCHELL, H., Professor, History.

MITCHELL, J. C., Assistant Professor, Medicine (Dermatology).

MITCHELL, J. R., Assistant Professor, and Assistant Director of Student Teaching, Education.

MITCHELL, K. A. R., Assistant Professor, Chemistry.

MITCHELL, V. F., Associate Professor, Commerce and Business Administration.

MITTEN, L. G. Professor, Commerce and Business Administration.

MIYAKE, M., Assistant Professor, Physics.

Mobbs, Betty G., Research Assistant, Cancer Research Centre.

Mod, V. J., Professor, Mechanical Engineering.

Motr, J. G., Assistant Professor, Pharmaceutical Sciences.

Molaro, A. L., Clinical Instructor, Medicine.

Moloney, P. J., Instructor (Urology), Surgery.

Money, T., Associate Professor, Chemistry.

Montague, J. T., Professor, Economics; Director of the Institute of Industrial Relations.

Montgomery, Mitzi, Instructor, Social Work.

Montgomery, Patricia, Assistant Professor, Education.

MOOGK, HELEN E., Assistant Professor, Nursing.

Moore, A. D., Professor, Electrical Engineering.

Moore, A. M., Professor, Economics.

Moore, L. F., Assistant Professor, Commerce and Business Administration.

Moore, P. S., Clinical Instructor, Paediatrics.

Morehart, Mary, Associate Professor, Fine Arts.

Morfitt, G., Lecturer, Part-time, Commerce and Business Administration.

Morgan, G. C., Honorary Lecturer, Civil Engineering.

Morgan, R. W., Research Associate (Epidemiology and Biometry), Health Care and Epidemiology.

MORIARITY, M. V., Clinical Instructor, Medicine.

Morison, Joan D., Instructor, Nursing (Supervisor, Public Health Nursing, Child Health Programme).

MORNIN, J. E. W., Assistant Professor, German.

Morris, E., Part-time Assistant, Education.

Morris, R. B., Associate Professor, Music.

MORRISON, B. M., Associate Professor, Asian Studies.

Morrison, E., Professor, English, to June 30, 1969.

Morrison, F. A., Professor and Assistant Dean, Pharmaceutical Sciences.

Morrison, R. T., Associate Professor, Medicine.

Morse, P. W., Clinical Instructor, Medicine.

MORTON, J. W., Instructor, Medicine.

MORTON, K.S., Clinical Assistant Professor, Surgery (Orthopaedics).

Moscovich, B. B., Clinical Instructor, Medicine.

Mowat, D., Clinical Instructor, Medicine.

Mowshowitz, A., Assistant Professor, Computer Science.

Moyes, P. D., Clinical Instructor, Surgery (Neurosurgery).

MOYLS, B. N., Professor, Mathematics, and Acting Dean of the Faculty of Graduate Studies, September 1, 1969 to August 31, 1970.

MUENSTER, L., Assistant Professor, Chemistry.

Muir, J. F., Professor Emeritus and Lecturer, Civil Engineering.

Muir, R., Part-time Assistant, Education.

MULHOLLAND, MOYRA K., Instructor, Theatre.

MULLICK, D. B., Assistant Professor, Part-time, Forestry.

MULLINGER, MARGARET, Associate Professor, Paediatrics.

Mullins, P. M., Associate Professor, Physical Education and Recreation.

MULLINS, W. J., Associate Professor, Philosophy.

Munro, B. C., Associate Professor, Education.

Munro, D. D., Assistant Professor, Forestry.

Munro, G. R., Associate Professor, Economics.

Munro, J. H. A., Assistant Professor, History.

MUNROE, D. S., Associate Professor, Medicine.

Munroe, J. B., Clinical Instructor, Microbiology.

MUNROE, J. D., Clinical Instructor, Medical Microbiology.

MUNROE, J. P., Clinical Instructor, (Anaesthesiology), Surgery.

MURDOCH, D. C., Professor, Mathematics.

MURPHY, H. O., Assistant Dean of the Faculty of Medicine and Director, Division of Continuing Medical Education.

Murray, A. B., Clinical Assistant Professor, Paediatrics.

MURRAY, F. E., Honorary Professor, Chemical Engineering.

MURRAY, G. P., Assistant Professor, French.

Murray, J., Assistant Professor, Music.

Murray, J. W., Assistant Professor, Geology.

Musaph, F. W., Assistant Professor, Dentistry (Oral Medicine).

Muscrove, J. E., Clinical Instructor, Surgery.

Myers, G. S., Assistant Professor, Dentistry (Oral Biology).

Mysak, L. A., Assistant Professor, Mathematics.

MacBean, Valerie, Lecturer (Child Psychiatry), Psychiatry.

MacCarthy, H. R., Honorary Lecturer, Plant Science.

MACCARTHY, JESSIE G., Instructor, Epidemiology and Biometry.

McAllister, Clare N., Assistant Professor, Social Work.

McAllister, Irene L., Assistant Professor, Home Economics.

McAllister, Kathleen M., Instructor, Nursing.

McBride, Rose B., Instructor, French.

McCaffrey, F. W., Clinical Instructor, Surgery (Anaesthesiology).

McCallum, K. A., Instructor, Classics.

McCann, Elizabeth, K., Professor, and Acting Director of the School of Nursing.

McCausland, H. D., Honorary Lecturer, Animal Science and Poultry Science.

McClean, A. J., Professor, Law.

McClelland, P. R., Assistant Professor, Social Work.

McLennan, H., Professor, Physiology.

McClure, W. G., Honorary Lecturer, Continuing Medical Education.

McConkey, A. S., Clinical Assistant Professor, Surgery (Orthopaedics).

McConnell, Beverley, Instructor, Rehabilitation Medicine.

McConnell, J. A., Clinical Instructor, Surgery.

McConnell, Ruth, Associate Professor, Education.

McCormick, A. Q., Instructor, Ophthalmology.

McCoy, E. C., Honorary Lecturer, Continuing Medical Education.

McCrae, Helen, Professor, Social Work, and Dean of Women.

McCreary, J. F., Professor of Paediatrics and Dean of the Faculty of Medicine.

McCubbin, Frances A., Associate Professor, Social Work.

McCutcheon, W., Postdoctoral Fellow, Physics.

McDonagh, J. E., Clinical Instructor, Obstetrics and Gynaecology.

MacDonald, A. N., Assistant Professor, History.

MACDONALD, D. A., Clinical Instructor, Surgery (Urology).

McDonald, G., Honorary Lecturer, Pathology.

MacDonald, J. A., Assistant Professor, Social Work.

McDonald, J. A., Associate Professor, Spanish.

MACDONALD, J. A. S., Professor, Art Education.

MacDonald, J. L., Assistant Professor, Mathematics.

MACDONALD, J. S., Assistant Professor, Electrical Engineering.

MacDonald, W. C., Clinical Assistant Professor, Medicine.

McDonnell, C. E., Clinical Instructor, Medicine.

MACDOUGALL, BONNIE G., Assistant Professor, Anthropology and Linguistics.

MacDougall, D. J., Professor, Law.

MacDougall, G. M., Clinical Instructor, Psychiatry.

MacDougall, J. A., Clinical Associate Professor, Surgery.

MacDougall, R. D., Assistant Professor, Anthropology.

McDowell, C. A., Professor and Head, Department of Chemistry.

MacEwan, W. R., Clinical Instructor, Obstetrics and Gynaecology.

MacFadyen, D. J., Associate Professor and Head of the Division of Neurology.

MACFARLANE, D. E., Instructor, Part-time Dentistry (Oral Biology).

McFarlane, W. J. G., Clinical Instructor, Psychiatry.

McGann, D. C., Part-time Assistant, Education.

McGann, J. D., Assistant Professor, Education.

McGechaen, J., Professor of English, Education.

McGeer, Edith G., Research Associate, (Neurological Sciences), Psychiatry.

McGeer, P. L., Associate Professor and Head of the Division of Neurological Sciences, Psychiatry.

McGrath, M. A., Instructor, Social Work.

McGraw, R. W., Teaching Fellow, Surgery (Orthopaedics).

McGreer, D. E., Associate Professor, Chemistry.

McGregor, B. Louise, Instructor, Rehabilitation Medicine.

McGregor, M. F., Professor and Head, Department of Classics. McGuigan, G. F., Associate Professor, Economics.

McIlroy, H. M., Professor, Mechanical Engineering.

McIntosh, H. W., Professor, Medicine.

McIntosh, J. R., Professor and Director, Secondary Education.

McIntosh, Kathleen, Instructor, Nursing.

MacIntyre, J. M., Professor, Law.

Mackay, A. R., Assistant Professor, French.

MacKay, D. C. G., Associate Professor, Psychology.

Mackay, J. R., Professor, Geography.

Mackay, Vera A., Associate Professor, Education.

McKenzie, A. D. Clinical Professor, Surgery.

Mackenzie, C. J. G., Associate Professor, Division of Public Health Practice, Health Care and Epidemiology.

Mackenzie, Hilda M., Associate Professor, Education.

MACKENZIE, J. C., Clinical Instructor (Primary Health Care), Health Care and Epidemiology.

Mackenzie, K. C., Associate Professor, Law.

MacKenzie, N. A. M., President Emeritus, Honorary Professor of Public International Law.

McKie, T. D. M., Associate Professor, Education.

McKinlay, W. D., Clinical Instructor, Ophthalmology.

MacLachlan, R. G., Clinical Instructor, Orthopaedics.

Maclean, C. A., Clinical Instructor, Medicine.

MacLean, C. Dunella, Clinical Instructor, Paediatrics.

MacLean, D. M., Professor, and Head of Division of Microbiology (Medical).

McLean, H. E., Clinical Instructor, Paediatrics.

McLean, H. J., Associate Professor, Music.

MacLean, J. R., Clinical Associate Professor, Paediatrics.

McLennan, H., Professor, Physiology.

MacLennan, Jean M., Clinical Instructor, Paediatrics.

McLeod, D. L., Instructor, Physics.

McLeod, W. A., Clinical Instructor, Medicine.

McMillan, J. M., Associate Professor, Physics.

McNair, F. E., Clinical Instructor, Psychiatry.

McNairn, Ian, Associate Professor, Fine Arts.

McNaughton, R. H. F., Clinical Instructor, Obstetrics and Gynaecology.

McNeely, J. A., Associate Professor, German.

MacNiel, H. C., Teaching Fellow, Surgery (Orthopaedics, Urology).

McNeill, R. A. Associate Professor, Surgery (Otolaryngology).

McNiven, C., Lecturer, Part-time, Community and Regional Planning.

McPhail, J. D., Associate Professor, Zoology.

MacPherson, D. Joan, Part-time Assistant, Education.

MACPHERSON, E., Associate Professor, Education.

McPherson, G. D., Clinical Instructor, Surgery (Orthopaedics).

Macpherson, R. I., Clinical Instructor, Medicine (Radiology).

McQueen, R. J., Clinical Instructor, Psychiatry (Child Psychiatry).

McQuillan, I. W., Instructor, Dentistry (Oral Medicine).

McRae, Joyce, Assistant Professor, Education.

McTaggart, A. N., Assistant Professor, Psychiatry.

McTaggart, K. C., Professor, Geology.

McWhannel, J. D., Assistant Professor, Education.

McWhiney, G., Professor, History.

NAGATANI, K., Assistant Professor, Economics.

NAKAI, S., Assistant Professor, Food Science.

NAKATSU, K., Demonstrator, Pharmacology.

Nalevykin, Shirley, Assistant Professor, Education.

NANN, RICHARD, Assistant Professor, Social Work.

NASH, S. W., Professor, Mathematics.

NATHAN, N. D., Associate Professor, Civil Engineering.

Neher, P. A., Assistant Professor, Economics.

NEILL, J. W., Associate Professor, Plant Science.

Neilson, D. P., Assistant Professor, Commerce and Business Administration.

NELLES, DOLENA, Instructor, Nursing.

Nelles, H. V., Assistant Professor, History.

Nelson, A. J., Clinical Associate Professor, Industrial Medicine.

NEMSER, RUBY D., Assistant Professor, English.

NETTLETON, JOYCE, INSTRUCTOR, Home Economics.

NEVISON, MYRNE, Associate Professor, Education.

New, W. H., Assistant Professor, English.

NEWBY, F. S., Assistant Professor, English.

NEWMAN, R. L., Clinical Instructor, Psychiatry.

NEY, H. D. W., Lecturer, Commerce and Business Administration.

NEY, P. G., Clinical Instructor (Child Psychiatry), Psychiatry.

NEYLAN, MARGARET S. M., Assistant Professor, Nursing.

NIBLOCK, P. A., Honorary Lecturer, Electrical Engineering.

NICHOL, H., Associate Professor and Head of Child Psychiatry.

NICHOLLS, W., Professor and Head, Department of Religious Studies.

NICHOLLS, W. M., Associate Professor, Social Work.

NICKERSON, K. G., Clinical Assistant Professor, Obstetrics and Gynaecology.

NICOL, R. E. G., Assistant Professor, Commerce and Business Administration.

NIEDERAUER, D. J., Associate Professor, French.

NIEMI, J. A., Assistant Professor, Education.

NIEMI, MURIEL T., Assistant Professor, Education.

NIRMALADEVI, C., Assistant Professor, Community and Regional Planning.

NIXON, J. E., Clinical Instructor, Surgery (Anaesthesiology).

NOAKES, F., Professor and Head, Department of Electrical Engineering.

NOBLE, R. L., Professor, Physiology, and Director, Cancer Research Centre.

NODWELL, R., Professor, Physics.

NORDAN, H., Assistant Professor, Zoology.

NORRIS, J. M., Professor, History.

NORTH, MARGARET E. A., Assistant Professor, Geography.

NORTH, R., Assistant Professor, Geography.

Northcote, Heather C., Part-time Lecturer, Zoology.

Northcote, T. G., Associate Professor, Zoology.

NORTON, G. J., Clinical Instructor, Medicine (Radiology).

Nosanchuk, T., Assistant Professor, Sociology.

OBERG, S. M., Associate Professor, Commerce and Business Administration. OBERLANDER, H. J., Professor and Director of the School of Planning.

O'CONNOR, E., Part-time Assistant, Education.

O'DAY, R., Assistant Professor, Psychology.

ODIORNE, J. M., Associate Professor, Anatomy.

O'DONNELL, V. J., Professor, Biochemistry.

Ogawa, K., Assistant Professor, Asian Studies.

OGRYZLO, E. A., Associate Professor, Chemistry.

OHANJANIAN, A. H., Instructor, Slavonic Studies.

OHLMAN, H., Lecturer, Music (Clarinet).

O'KEEFE, M. J., Lecturer, Law.

OKULITCH, G. J., Honorary Lecturer, Animal Science.

OKULITCH, V. J., Professor of Paleontology, and Dean of the Faculty of Science.

OLACKE, F. A., Clinical Instructor, Medicine (Radiology).

OLDHAM, W. K., Assistant Professor, Civil Engineering.

Olivo, M. A., Postdoctoral Fellow, Physics.

OLDRIDGE, O. A., Associate Professor, Education.

OLLEY, P. J., Assistant Professor, Education.

OLSEN, HELEN M., Instructor, Nursing.

Olson, W. V., Instructor, Physics.

OMAR, H. M., Postdoctoral Fellow, Physics.

ONG, K. S., Postdoctoral Fellow, Chemistry.

ONLEY, T., Lecturer, Fine Arts.

OPECHOWSKI, W., Professor, Physics.

O'RIORDAN, ANN, Part-time Lecturer, Zoology.

ORMROD, D. P., Professor, Plant Science, to June 30, 1969.

ORMSBY, MARGARET A., Professor and Head, Department of History.

ORR, F. D., Assistant Professor Economics.

OSBORNE, J. A., Clinical Instructor, Medicine.

Osborne, R. F., Professor and Director of the School of Physical Education and Recreation.

OSLER, T. R., Clinical Instructor, Surgery.

OSMANSKI, C. P., Assistant Professor, Dentistry (Oral Biology).

OULTON, J. L., Clinical Instructor, Surgery (Anaesthesiology).

Ovenden, M. W., Professor, Geophysics.

OVENS, SHEILA, Part-time Lecturer, Theatre.

OVERALL, CECILY, Instructor, Education.

Overbeck, J., Visiting Assistant Professor, Economics.

OVERING, R. L. R., Associate Professor, Education.

Ozard, E. G., Professor of Art, Education.

PACHECO, A., Visiting Assistant Professor, Hispanic and Italian Studies.

PADDOCK, N. L., Professor, Chemistry.

PADWICK, P. H., Clinical Instructor, Paediatrics.

PAGE, G. G., Instructor, Physics.

Page, S. S., Assistant Professor, Mathematics.

PAIGE, B., Clinical Instructor, Medicine.

PAINE, R. J., Clinical Instructor, Ophthalmology.

PALATY, V., Visiting Associate Professor, Anatomy.

Papageorgis, D., Associate Professor, Psychology.

Parfitt, G. J., Professor and Head of the Department of Oral Medicine.

PARFITT, H. L., Assistant Professor, Psychiatry.

Paris, R. P., Clinical Instructor, Paediatrics, Psychiatry.

PARKER, B. LOUISE, Research Assistant, Cancer Research Centre.

Parker, E., Lecturer, Music (Piano).

PARKER, MARGARET, Lecturer, English.

PARKER, R. W., Research Associate, Zoology.

PARKES, C. O., Assistant Professor, Physiology.

Parkinson, G. V., Professor, Mechanical Engineering.

PARKINSON, R., Clinical Instructor, Psychiatry.

PARMINTER, A. V., Assistant Professor, Education.

PARMINTER, CONSTANCE, Part-time Assistant, Education.

PARNALL, J. E. A., Lecturer, Mathematics.

Parnell, J. L., Clinical Instructor, Medicine.

PASZNER, L., Research Associate, Forestry.

PATEL, HAWA, Instructor, Paediatrics.

PATEL, K. M., Lecturer, Botany.

PATERSON, I. S., Clinical Instructor, Surgery (Anaesthesiology).

Patterson, F. P., Associate Professor, Surgery (Orthopaedics).

PATTERSON, W. J., Clinical Instructor, Surgery (Otolaryngology).

PAVELICH, JOAN, Instructor, English.

PAVICH, M., Honorary Lecturer, Electrical Engineering.

Pearce, R. H., Honorary Associate Professor, Pathology.

Pearse, P. H., Associate Professor, Economics.

Pearson, J. A., Assistant Professor, Physiology.

Pech, S. Z., Associate Professor of History.

PECK, J. E. L., Professor and Head of the Department of Computer Science.

Peebles, A., Professor, Civil Engineering.

PENDAKUR, S., Associate Professor, Community and Regional Planning.

PENDAR, DIANE D. P., Instructor, Architecture.

Penner, P. G., Professor of English, Education.

Penney, Marian, Associate Professor, Physical Education and Recreation.

Pennington, G., Assistant Professor, Education.

Percheson, P. B., Clinical Instructor, Surgery (Anaesthesiology).

Peretz, D. I., Clinical Instructor, Medicine.

Perks, A. M., Associate Professor, Zoology.

Pernarowski, M., Associate Professor, Pharmaceutical Sciences.

Perry, Florence, Assistant Professor, Pharmacology.

PERRY, T. L., Professor, Pharmacology.

Person, C. O., Professor, Botany.

Peschken, B., Assistant Professor, German.

Peters, D. A. V., Research Associate, Psychiatry.

Peters, E., Professor, Metallurgy.

Peterson, R. G., Assistant Professor, Animal Science.

Petrie, Jean K., Lecturer, Geophysics

Petrusic, W. M., Assistant Professor, Psychology.

PHILLIPS, J. E., Associate Professor, Zoology.

PHILLIPS, J. E., Teaching Fellow, Psychiatry.

PHILLIPS, R. J., Senior Instructor and Athletic Director, Physical Education and Recreation.

PHINNEY, J. I., Clinical Instructor, Pathology.

PICKARD, G. L., Professor, Physics, Director of the Institute of Oceanography.

Piers, E., Assistant Professor, Chemistry.

Риото, A. E., Associate Professor, English.

PILTZ, H-K., Professor, Music (Music History and Viola).

PINCOCK, R. E., Associate Professor, Chemistry.

PINDER, K. L., Associate Professor, Chemical Engineering.

PINKERTON, A. C., Clinical Instructor, Medicine.

PINKUS, P., Associate Professor, English.

PIRIE, G. E., Assistant Professor, Paediatrics.

PISTORIUS, A. P., Assistant Professor, English.

PITERNICK, G., Associate Professor, Librarianship.

PITERS, J., Clinical Associate Professor, Paediatrics.

PLANT, RUTH, Part-time Assistant, Education.

PLENDERLEITH, I. H., Assistant Professor, Medicine.

PLUM, G. E., Assistant Professor, Psychology.

POKRANT, R. J., Assistant Professor, Sociology.

Polglase, W. J., Professor, Biochemistry.

Poling, G. W., Associate Professor, Mineral Engineering.

Polowy, Hannah, Part-time Assistant, Education.

POMFRET, J., Associate Professor, Physical Education and Recreation.

PONTIFEX, A. H., Clinical Assistant Professor, Medical Microbiology.

POOLE, J. C., Clinical Instructor, Surgery (Anaesthesiology).

POOLE, J. K., Clinical Instructor, Paediatrics.

POPPE, N., Assistant Professor, Slavonic Studies.

PORTER, G. B., Professor, Chemistry.

Posener, L. J., Clinical Instructor, Paediatrics.

Poser, K. S., Clinical Instructor, Medicine (Neurology).

Potashin, Reva, Assistant Professor, Psychology.

POUTT R. M., Assistant Professor, Education.

Powe, L. A., Assistant Professor, Law.

POWELL, D. L., Assistant Professor, English.

Powell, G. E., Assistant Professor, English.

POWELL, T. E., Clinical Instructor, Surgery.

POWRIE, W. D., Professor and Chairman of the Department of Food Science.

POYNTER, F. N. L., Honorary Lecturer, History of Medicine and Science.

PRANG, MARGARET E., Associate Professor, History.

PRATT-JOHNSON, J. A., Clinical Instructor, Ophthalmology.

PRENTICE, C. A., Assistant Professor, Commerce and Business Administration.

Prescott, J. R. V., Visiting Professor, Geography.

PRESTON, JOYCE E., Instructor, Social Work.

PRETIOUS, E. S., Professor, Civil Engineering.

PRICE, G. E., Instructor, Medicine.

PRICE, J. D. E., Associate Professor, Medicine.

PRICE, S., Visiting Assistant Professor, Education.

PRIMEAU, MARGUERITE A., Associate Professor, French.

Promissiow, S. D., Lecturer, Mathematics.

PRYCE, E., Part-time Assistant, Education.

PRYCE, M. H. L., Professor, Physics.

Pugh, D. L., Assistant Professor, Physical Education and Recreation.

Pulfrey, D. L., Post-doctoral Teaching Fellow, Electrical Engineering.

PULLEYBLANK, E. G., Professor, and Head of the Department of Asian Studies.

Pump, K. K., Clinical Instructor, Medicine.

Purdy, H. L., Lecturer, Commerce and Business Administration.

PURKIS, HELEN M. C., Assistant Professor, French.

QUALTROUGH, G. H., Research Associate, Electrical Engineering.

QUARTERMAIN, P. A., Associate Professor, English.

QUASTEL, J. H., Professor of Neurochemistry, Psychiatry; Honorary Professor of Biochemistry.

Quddus, Md. A., Teaching Postdoctoral Fellow, Chemical Engineering.

QUICK, M. C., Associate Professor, Civil Engineering.

RADCLIFFE, R., Clinical Assistant Professor, Anatomy.

RAE, J. D., Assistant Professor, Economics.

RAGHUNATHAN, P., Research Associate, Chemistry.

RALLY, C. R., Clinical Instructor, Medicine.

RALSTON, H. K., Instructor, History.

RALSTON, MARION V., Assistant Professor, Education.

RAMSAY, R. L., Associate Professor, Physical Education and Recreation.

RAMSEY, H., Assistant Professor, Mechanical Engineering.

RAND, E. N., Assistant Professor, Philosophy.

RANDALL, D. J., Associate Professor, Zoology.

RANDALL, H. S., Clinical Instructor, Surgery (Anaesthesiology).

RANDALL, J. D., Clinical Instructor, Surgery.

RANTA, L. E., Honorary Lecturer, Continuing Medical Education.

RAO, S. G., Research Associate, Electrical Engineering.

RASTALL, P., Associate Professor, Physics.

RATCLIFF, R. U., Professor and Chairman, Division of Urban Land Economics, Commerce and Business Administration.

RATNER, R. S., Assistant Professor, Sociology.

RAUDSEPP, V., Honorary Lecturer, Agricultural Engineering.

RAVETZ, T., Assistant Professor, Sociology.

RAYMOND, G. A., Assistant Professor, Psychology.

READ, F., Honorary Lecturer, Physical Education and Recreation.

READ, S. E., Professor Emeritus, English; Lecturer.

REBER, A. S., Assistant Professor, Psychology.

REBRIN, IRINA, Instructor, Slavonic Studies.

REDLICH, ALINE B., Instructor, Zoology.

REE, R., Professor, Mathematics. Rees-Davies, P., Clinical Instructor, Surgery.

Reeske, W. M., Assistant Professor, Physical Education and Recreation.

REEVE, C. E., Clincial Instructor, Medicine.

Reeves, L. W., Professor, Chemistry, to June 30, 1969.

Reid, C., Professor, Chemistry.

Reid, Irina M., Assistant Professor, Slavonic Studies.

Reid, J. A. G., Clinical Instructor, Medicine.

Reid, P. E., Assistant Professor, Pathology.

REITER, R., Assistant Professor, Computer Science.

REMNANT, P., Professor, Philosophy.

RENNEY, A. J., Professor, Plant Science.

RENNIE, C. S., Clinical Instructor, Medicine.

RESTREPO, R. A., Professor, Mathematics.

REUBART, D., Associate Professor, Music (Piano and Theory).

REUTLINGER, M., Assistant Professor, Law.

REVUTSKY, V., Associate Professor, Slavonic Studies.

REYBURN, RÉJEANNE, Instructor Home Economics.

RHODES, C. T., Associate Professor, Pharmaceutical Sciences.

RICHARDS, FRANCES M., Clinical Instructor, Psychiatry.

RICHARDS, J. F., Associate Professor, Biochemistry.

RICHARDS, J. F., Assistant Professor, Poultry Science.

RICHARDSON, A. S., Assistant Professor, Dentistry (Restorative).

RICHARDSON, J. I., Assistant Professor, Asian Studies.

RICHMOND, MARY L., Lecturer, Part-time Nursing.

RICHMOND, R. G., Honorary Lecturer, Psychiatry.

RICHMOND, W. O., Professor, Mechanical Engineering.

RIDDEHOUGH, G. B., Professor Emeritus, and Lecturer, Classics.

RIDDELL, R. C., Assistant Professor, Mathematics.

RIDINGTON, W. R., Assistant Professor, Anthropology.

RIEDEL, B. E., Professor, and Dean of the Faculty of Pharmaceutical Sciences.

RIESS, J., Postdoctoral Fellow, Chemistry.

RIGG, J. M., Clinical Instructor, Paediatrics.

RISEBROUGH, N. R., Assistant Professor, Metallurgy.

Rix, D. B., Assistant Professor, Pathology.

RIZER, DOROTHY, Associate Professor, Education.

ROBBINS, W., Professor, English.

ROBERTS, C. W., Associate Professor, Poultry Science.

ROBERTS, F. J., Clinical Assistant Professor, Microbiology (Medical).

ROBERTS, H., Visiting Professor, Education.

ROBERT, LILY, Instructor, Microbiology.

ROBERTSON, ANN-MARIE, Research Fellow, Paediatrics.

ROBERTSON, MARGARET J., Instructor, Rehabilitation Medicine.

ROBINS, R. E., Clinical Instructor, Surgery.

ROBBINS, W., Professor, English.

ROBINSON, BARBARA L., Assistant Professor, Microbiology.

ROBINSON, C. E. G., Clinical Instructor, Medicine.

ROBINSON, G. C., Professor, Paediatrics.

ROBINSON, H. S., Clinical Instructor, Medicine.

ROBINSON, J. L., Professor, Geography.

ROBINSON, MARGARET N. E., Assistant Professor and Supervisor, Programme of Dental Hygiene, Dentistry (Public and Community Dental Health).

ROBINSON, R. E., Associate Professor, Philosophy.

ROBSON, R. A. H., Professor, Sociology; Director, Small Groups Laboratory.

ROGATNICK, A., Professor, Architecture.

Rogers, D. C., Assistant Professor, Education.

Rogers, R., Assistant Professor, Music (Piano).

Rocers, W. T., Instructor. Education.

RONIMOIS, H. E., Professor, Slavonic Studies.

ROPER, E. C., Honorary Lecturer, Commerce and Business Administration.

Rose, M., Assistant Professor, Education.

Rose, T. F., Honorary Lecturer, History of Medicine and Science.

Roseblade, J. E., Visiting Associate Professor, Mathematics.

Rosenberg, Avis, R., Part-time Lecturer, Fine Arts.

Rosenberg, G., Assistant Professor, Fine Arts.

ROSENBERG, R. S., Assistant Professor, Computer Science.

ROSENBLATT, J., Clincial Instructor, Medicine.

ROSENBLUTH, G., Professor, Economics.

ROSENGARTEN, H. J., Assistant Professor, English.

ROSENTHAL, A., Professor, Chemistry.

Ross, I. S., Associate Professor, English.

Ross, J. E., Clinical Instructor, Obstetrics and Gynaecology.

Ross, J. V., Professor, Geology.

Ross, Maude, Part-time Lecturer, English.

ROTEM, Z., Professor, Mechanical Engineering.

ROTHSTEIN, S., Professor and Director of the School of Librarianship.

Rouse, G. E., Professor, Botany.

Rousseau, L. A., Assistant Professor, Education.

Rowan, R. I., Associate Professor, Philosophy.

Rowe, J. J. M., Postdoctoral Teaching Fellow, Chemistry.

Rowles, C. A., Professor and Chairman of the Department of Soil Science.

ROXBURGH, JEAN, Assistant Professor, Education.

ROYDHOUSE, R. H., Associate Professor Dentistry (Restorative).

Rubio-Delgado, I., Assistant Professor, Hispanic and Italian Studies.

RUEBEN, E. F. J., Clinical Instructor, Surgery (Otolaryngology).

RULE JANE, Par-time Lecturer, English.

Runeckles, V. C., Professor and Chairman, Plant Science.

RUNIKIS, J. O., Assistant Professor, Pharmacy.

RUPPENTHAL, K. M., Visiting Professor, Commerce and Business Administration.

Ruskin, V. W., Special Lecturer, Electrical Engineering.

Russell, J., Assistant Professor, Classics.

Russell, Marilyn, Assistant Professor, Physical Education.

Russell, R. D., Professor and Head of the Department of Geophysics.

Russell, S. O., Assistant Professor, Civil Engineering.

Ruus, E., Associate Professor, Civil Engineering.

Ruxton, G. R., Postdoctoral Fellow, Chemistry.

RYAN, J. E. B., Lecturer, Psychology.

RYAN, J. G., Assistant Professor, Part-time, Dentistry.

SABORIO, JANE, Part-time Lecturer, Hispanic and Italian Studies (Spanish).

SADA, K., Postdoctoral Fellow, Geology.

St. Clair, F. B., Assistant Professor, French.

St. Clair-Sobell, J. O., Professor, Slavonic Studies.

SAINT-JACQUES, B., Assistant Professor, Linguistics.

SALOMAN, M., Postdoctoral Fellow, Physics.

SALVADOR, HERMINIA S., Instructor, Obstetrics and Gynaecology.

Samis, C. S., Professor, Metallurgy.

SAMPSON, D. L. G., Assistant Professor, Psychology.

Sams, J. R., Associate Professor, Chemistry.

Sanders, H. D., Assistant Professor, Pharmacology.

Sanderson, I., Teaching Fellow, Anatomy.

Sandhu, K. S., Associate Professor, Geography.

SANDNESS, J. N., Assistant Professor, Plant Science.

SANDS, C. A., Clinical Instructor, Surgery (Anaesthesiology).

SANDY, G. N., Assistant Professor, Classics.

SANDY, J. T. M., Clinical Instructor, Surgery.

SARNDAL, C. E., Visiting Professor, Commerce and Business Administration.

SASTRI, N. V. S., Postdoctoral Fellow, Chemical Engineering.

SASTRY, M. D., Postdoctoral Fellow, Chemistry.

Saunders, Sandra, Lecturer, English.

SAVERY, AGNES G., Lecturer, English.

SAVERY, B., Professor; and Head of the Department of Philosophy to June 30, 1969.

SAWYER, J. E., Instructor, Music.

SAXTON, G. D., Clinical Associate Professor, Surgery (Thoracic Surgery).

SCAGEL, R. F., Professor of Botany and Associate Dean of the Faculty of Science.

SCARFE, N. V., Professor and Dean of the Faculty of Education.

Scarrow, H. G., Research Associate (Epidemiology and Biometry), Health Care and Epidemiology.

Scheffer, Bettle J., Lecturer, Part-time, Nursing.

Scheffer, G. L., Assistant Professor, Chemistry, Mathematics.

Schilder, Marie, Lecturer, Music (Voice).

SCHMITT, G. R., Lecturer on Insurance, Law.

SCHNUTE, J. T., Assistant Professor, Mathematics.

SCHOFER, R. C., Clinical Instructor, Surgery.

Schofield, W. B., Associate Professor, Botany, and Curator of Bryophyte Herbarium.

SCHRACK, Assistant Professor, Electrical Engineering.

Schrodt, Barbara, Assistant Professor, Physical Education and Recreation.

SCHULDT, PHYLLIS, Instructor, Music (Piano).

Schultz, M. H., Clinical Instructor, Surgery (Anaesthesiology).

Schutte, Shirley, Lecturer (Speech Therapy), Paediatrics.

Schwab, B., Assistant Professor, Commerce and Business Administration.

Schwahn, W., Associate Professor, Education.

Schwartz, C. J., Assistant Professor, Psychiatry.

SCHWEITZER, D. R., Assistant Professor, Sociology.

Schwerdtfeger, C. F., Associate Professor, Physics.

Scott, A. D., Professor, and Head of the Department of Economics to June 30, 1969.

Scott, G. H., Visiting Professor, Anatomy.

Scott, H., Clinical Instructor, Medicine.

Scudder, G. C. E., Associate Professor, Zoology.

Seaforth, C. E., Postdoctoral Fellow, Botany.

SEAL, W. R. F., Assistant Professor, Education, and Chairman of the Division of Industrial Education.

SEAMON, R., Assistant Professor, English.

SEARL, R. O., Instructor, Pharmaceutical Science.

Seeley, D. A. R., Assistant Professor, Computer Science.

Segal, S., Professor, Paediatrics.

SERAGLIA, M., Clinical Instructor, Medicine.

SETH, V. K., Assistant Professor, Dentistry (Oral Surgery).

SHADBOLT, DORIS K., Part-time Lecturer, Fine Arts.

SHAH, C. P., Assistant Professor, Paediatrics.

SHANNON, JULIA, Instructor, Nursing.

SHARMA, S. N., Postdoctoral Fellow, Physics.

SHAW, I., Assistant Professor, Education.

Shaw, M., Professor, and Dean of the Faculty of Agriculture.

Shaw, M. H., Clinical Instructor, Medicine.

SHEARER, R. A., Associate Professor, Economics.

SHELL, J., Assistant Professor, Music.

SHEPPARD, A. F., Assistant Professor, Law.

SHEPHERD, W. E., Clinical Associate Professor, Pathology.

SHERWOOD, J. M., Lecturer, Religious Studies.

Shukawa, M., Visiting Professor, Geology.

Shim, S. S., Assistant Professor, Surgery (Orthopaedics).

SHIMOKOSHI, K., Postdoctoral Fellow, Chemistry.

SHIRRAN, A. F., Lecturer, Psychology.

SHORE, HELEN L., Instructor, Nursing.

Shrum, G. M., Honorary Professor, Physics.

SHUCARD, A. R., Instructor, English.

SHULMAN, R., Assistant Professor, Psychiatry.

SHUMAN, B., Clinical Associate Professor, Paediatrics.

Shuter, W. L. H., Associate Professor, Physics.

SIBERT, J., Postdoctoral Fellow, Zoology.

SIDDALL, J. R., Honorary Demonstrator, Physiology.

SIDDON, T. E., Assistant Professor, Mechanical Engineering.

SIEFKEN, H., Postdoctoral Fellow, Physics.

SIEMENS, A. H., Associate Professor, Geography.

SIEMENS, L. G., Assistant Professor, English.

Sigal, C., Clinical Instructor, Medicine.

Sigaux, G., Visiting Lecturer, French.

SIGNORI, E., Professor and Acting Head of the Department of Psychology.

SIGURDSON, E. L., Assistant Professor, Electrical Engineering.

SIKORA, R. I., Part-time Assistant Professor, Philosophy.

SILLER, F., Assistant Professor, Commerce and Business Administration.

SILVERMAN, R. S., Assistant Professor, Mathematics.

SILVERS, R. J., Assistant Professor, Anthropology and Sociology (Sociology).

SIMMONS, P., Assistant Professor, Librarianship.

SIMPSON, D. G., Clinical Associate Professor, Ophthalmology.

SIMPSON, R. E., Clinical Instructor, Surgery (Anaesthesiology).

SIMPSON, W. W., Clinical Assistant Professor, Medicine, to June 30, 1969.

SINCLAIR, A. J., Associate Professor, Geology.

SINCLAIR, J. G., Assistant Professor, Pharmaceutical Sciences.

SINCLAIR, NORA R., Assistant Professor, Education.

SINEL, A. A., Assistant Professor, History.

SINEL, MARJORIE, Instructor, English.

SINGH, B., Postdoctoral Fellow, Botany.

Sion, M., Professor, Mathematics.

Skwarok, E. W., Demonstrator, Surgery (Neurosurgery).

SLADE, H. C., Associate Professor, and Director of the Division of Primary Health Care.

SLADE, K., Assistant Professor, Education.

SLADEN, J. G., Clinical Instructor, Surgery.

SLAKOV, R., Clinical Assistant Professor, Psychiatry.

SLATER, MARIE, Instructor, Education.

SLAWSON, W. F., Associate Professor, Geophysics.

SLAYMAKER, O., Assistant Professor, Geography.

SLEATH, G. E., Clinical Assistant Professor, Surgery (Anaesthesiology).

SLEATH, G. W., Clinical Assistant Professor, Surgery (Anaesthesiology).

SLIND, L. H., Professor, Music Education.

SLINN, S. P., Special Lecturer, Mechanical Engineering.

SLONECKER, C. E., Assistant Professor, Anatomy.

SLUTSKY, B. V., Assistant Professor, Law.

SMALL, L. W., Professor, Mathematics.

SMALL, R., Lecturer, Music (Bassoon).

Smiley, D. V., Professor, Political Science.

SMITH, A. C. L., Instructor, History.

SMITH, C. E., Professor and Associate Dean, Education.

SMITH, D. C., Associate Professor, Education.

SMITH, E. L., Clinical Instructor, Ophthalmology.

SMITH, G. A., Professor of Art Education.

SMITH, G. G., Clinical Instructor, Obstetrics and Gynaecology.

Sмітн, H. A., Clinical Instructor, Surgery (Urology).

SMITH, HOPE, Part-time Assistant, Education.

SMITH, J., Instructor, Education.

SMITH, J. C., Associate Professor, Law.

SMITH, J. E., Associate Professor, Mathematics.

SMITH, J. H., Clinical Assistant Professor, Industrial Medicine.

SMITH, J. H. G., Professor, Forestry.

Sмітн, J. S., Research Fellow, Paediatrics.

Sмггн, K., Lecturer, German.

Sмітн, M., Associate Professor, Biochemistry.

SMITH, M. J., Part-time Lecturer, Zoology.

SMITH, R. N., Professor, Education.

Sмітн, S. T., Assistant Professor, Zoology.

Smylle, D. E., Assistant Professor, Geophysics.

SNIDER, R. F., Associate Professor, Chemistry.

SNUKAL, R., Lecturer, English.

Sobel, E., Assistant Professor, Mathematics.

SOLECKI, J. J., Assistant Professor, Slavonic Studies.

Somero, G. N., Postdoctoral Fellow, Zoology.

SONTHOFF, HELEN W., Assistant Professor, English.

SOUDACK, A., Associate Professor, Electrical Engineering.

Soule, D. E., Professor, Theatre.

SOUTHARD, HAZEL M., Instructor, Rehabilitation Medicine.

Sparkes, J. W., Clinical Instructor, Surgery (Orthopaedics).

SPAULDING, H., Honorary Lecturer, History of Medicine and Science.

SPAULDING, J. G., Associate Professor, English.

Speier, M. R., Assistant Professor, Anthropology and Sociology (Sociology).

Spence, D. E., Assistant Professor, Physical Education and Recreation.

Spencer, R. A., Assistant Professor, Civil Engineering.

Spira, A. W., Assistant Professor, Anatomy.

SPITZER, R., Associate Professor, Pathology.

Spong, P., Assistant Professor, Psychiatry (Psychology).

Spouge, J. D., Professor, Dentistry (Oral Biology).

Spratley, R. D., Assistant Professor, Chemistry.

Sprintzl, M., Postdoctoral Fellow, Chemistry.

SPROUT, P. N., Honorary Lecturer, Soil Science.

SRIVASTA, S., Postdoctoral Fellow, Botany.

STAGER, J. K., Associate Professor, Geography, and Assistant Dean, Faculty of Graduate Studies.

STALEY, L. M., Associate Professor, Agricultural Mechanics.

STALKER, H. S., Clinical Instructor, Medicine.

STANKIEWICZ, MARKETA GOETZ, Associate Professor, German.

STANKIEWICZ, W. J., Professor, Political Science.

STANLEY, R. A., Clinical Instructor (Primary Health Care), Health Care and Epidemiology.

STANNARD, W., Lecturer, Music (Oboe).

STANSFIELD, H., Clinical Instructor, Medicine.

STANWOOD, P. G., Associate Professor, English.

STEBNICK, A. O., Clinical Instructor, Surgery.

STEELE, R., Assistant Professor, Education.

STEIMAN, I., Honorary Lecturer, History of Medicine and Science.

STEIN, H. L., Professor Emeritus, Lecturer, Education.

STEIN, JANET R., Associate Professor, Botany.

STEINBERG, M. W., Professor, English.

Stenberg, P. A., Assistant Professor, German.

Stenhouse, I. A., Postdoctoral Teaching Fellow, Chemistry.

Stephas, P., Assistant Professor, Physics.

STEPHENS, D. G., Associate Professor, English.

STEPHENSON, G. H., Clinical Assistant Professor, Psychiatry.

STEPHENSON, P. Susan, Instructor, Psychiatry (Child Psychiatry).

STEVENSON, JANIE, Assistant Professor, Education.

STEVENSON, S. W., Associate Professor, English.

STEWART, A. J., Clinical Assistant Professor, Ophthalmology.

STEWART, D., Lecturer, Music.

STEWART, J. F., Assistant Professor, English.

Stewart, J. P., Assistant Professor, Philosophy.

STEWART, R., Professor, Chemistry.

STEWART, R. W., Professor, Physics.

STEWART, W. D., Clinical Assistant Professor, Medicine (Dermatology).

STICH, H. F., Professor, Zoology.

STIMSON, J., Postdoctoral Fellow, Zoology.

STOCK, J. J., Associate Professor, Microbiology.

STOCKER, C. W., Assistant Professor, History.

STOCKHOLDER, F. E., Assistant Professor, English.

STOCKHOLDER, KATHERINE, Lecturer, English.

STOCKTON, W. H. S., Clinical Instructor, Paediatrics.

STOLAR, ELAINE, Assistant Professor, Social Work.

STOLLER, J. L., Research Fellow, Surgery.

STORDY, S. N., Clinical Instructor, Medicine.

STORM, T. F., Associate Professor, Psychology.

STORR, A., Assistant Professor, Chemistry.

STORR, JUDY, Research Assistant, Cancer Research Centre.

STRACHAN, C. C., Honorary Lecturer, Plant Science.

STRAKER, S. M., Assistant Professor, History.

STRASSMAN, K. G., Assistant Professor, Theatre.

STREET, MARGARET M., Associate Professor, Nursing.

STUART, D., Postdoctoral Fellow, Chemistry.

STUBBS, G. T., Assistant Professor, Education.

STURDY, J. A., Clinical Professor, Pathology.

STURROCK, F. L., Clinical Assistant Professor, Pathology.

STYRA, DOROTHY G., Instructor, Rehabilitation Medicine.

Subramanian, E., Postdoctoral Fellow, Chemistry.

Subba, P. V., Postdoctoral Fellow, Botany.

SUMMERS, E. G., Professor, Education.

SUMNER, M., Lecturer, Music (Piano).

Sun, B. C-H., Demonstrator, Forestry.

SUNG, S. C., Associate Professor of Neurochemistry, Psychiatry.

SUTHERLAND, G. N., Associate Professor, Education.

SUTHERLAND, J. W., Assistant Professor, Commerce and Business Administration.

SUTHERLAND, W. H., Clinical Associate Professor, Surgery.

SUTTER, M. C., Associate Professor, Pharmacology.

Suzuki, D., Associate Professor, Zoology.

Susuki, N., Visiting Associate Professor, Mathematics.

SWAN, E. P., Associate Professor, Part-time, Forestry.

SWAN, J., Assistant Professor, Music (Trumpet and Theory).

Swanson, C. A., Professor, Mathematics.

Swanson, D., Part-time Assistant, Education.

SWEENEY, V. P., Assistant Professor, Medicine (Neurology).

SWIDINSKY, R., Assistant Professor, Economics.

Swirles, J., Associate Professor, Commerce and Business Administration.

Syed, A., Clinical Instructor, Pathology.

SYEKLOCHA, DELFA, Assistant Professor, Microbiology.

SYKES, P. J., Assistant Professor, Physics.

Sylvester, Barbara J., Associate Professor, English.

Szasz, G., Assistant Professor, and Milbank Faculty Fellow, Health Care and Epidemiology.

SZIKLAI, O., Associate Professor, Forestry.

TADYCH, MARY, Assistant Professor, Social Work.

TAIT, R. M., Assistant Professor, Animal Science.

TALLMAN, ELLEN M., Lecturer, English.

TALLMAN, W., Associate Professor, English.

TALNEY, D., Assistant Professor, Music (Music History).

TAM, K. K., Postdoctoral Fellow, Physics.

TANAKA, R. P., Instructor, English.

TANTON, B. W., Clinical Assistant Professor, Otolaryngology.

TARR, H. L. A., Honorary Lecturer, Poultry Science.

TAYLOR, B. W., Part-time Assistant, Education.

TAYLOR, F. J. R., Assistant Professor, Botany.

TAYLOR, H. E., Professor and Head, Department of Pathology.

TAYLOR, I. E. P., Assistant Professor, Botany.

Taylor, J. A., Honorary Lecturer (Public Health Practice), Health Care and Epidemiology.

TAYLOR, J. MARY, Associate Professor, Zoology.

TAYLOR, L., Part-time Assistant, Education.

TAYLOR, P. A., Assistant Professor, English.

TAYLOR, R. L., Professor, and Director of the Botanical Garden.

Teasdale, J. Mavis, Associate Professor, Paediatrics.

Tecson, M. P., Clinical Instructor, Psychiatry.

TEES, R. C., Assistant Professor, Psychology.

TEGHTSOONIAN, E., Professor and Head of the Department of Metallurgy.

Teiser, D. S., Demonstrator, Pharmacology.

TENER, G. M., Professor, Biochemistry.

TENNANT, P. R., Assistant Professor, Political Science.

TERAO, A., Postdoctoral Fellow, Psychiatry.

TERMANSEN, P. E., Assistant Professor, Psychiatry.

TERRISS, K. G., Part-time Lecturer, Architecture.

THIRGOOD, J. V., Associate Professor, Forestry.

THOMAS, HILDA, Instructor, English.

THOMAS, I. Part-time Assistant, Education.

THOMAS, J. C., Clinical Associate Professor, Psychiatry.

THOMAS, J. P. W., Clinical Assistant Professor, Medicine. (Clinical Microscopy).

THOMAS, L. A. J., Associate Professor, Fine Arts.

THOMAS, M. A., Honorary Lecturer, Electrical Engineering.

THOMAS, W. D., Teaching Fellow, Obstetrics and Gynaecology.

THOMPSON, A. R., Professor, Law.

THOMPSON, D. W., Associate Professor, Chemical Engineering.

THOMPSON, G. B., Clinical Assistant Professor, Surgery (Neurosurgery).

THOMPSON, J., Postdoctoral Fellow, Chemistry.

THOMPSON, R., Postdoctoral Fellow, Physics. THOMPSON, R. C., Assistant Professor, Chemistry.

THOMPSON, W. J., Clinical Assistant Professor, Surgery (Orthopaedics).

THOMPSON, W. M., Professor, English.

THOMSON, F. B., Clinical Assistant Professor, Surgery.

THOMSON, MARNIE, Research Assistant, Cancer Research Centre.

THOMSON, MARY, Assistant Professor, Education.

THOMSON, R., Postdoctoral Fellow, Physics.

THORES, A. O., Research Fellow, Paediatrics.

THORHALLSSON, J., Postdoctoral Fellow, Chemistry.

THORSON, S. C., Instructor, Medicine.

THURSTON, H. A., Associate Professor, Mathematics.

Tick, Susan R., Instructor, Part-time, Dentistry (Public and Community Dental Health).

TICKNER, F., Associate Professor, Music.

TICKNER, MARY, Lecturer, Music.

TIERS, C. A., Assistant Professor, Architecture.

TILLEY, ANNE D., Assistant Professor, Education.

TINKER, M. H., Teaching Postdoctoral Fellow, Physics.

TISCHLER, B., Clinical Instructor, Paediatrics.

Tobe, A. D., Instructor, Medicine.

Todd, D., Part-time Lecturer, Classics.

Todd, E. C. E., Professor, Law.

Todd, R. B., Assistant Professor, Classics.

Toews, Lorette K., Part-time Lecturer, Psychiatry.

TOLMIE, M. M., Associate Professor, History.

Tomkins, G., Professor, Education.

TOMSICH, MARIA, Instructor, Hispanic and Italian Studies (Spanish).

Tong, Min-Min, Lecturer, Chemistry.

TONKIN, R. S., Clinical Instructor, Paediatrics.

Tonzetich, J., Associate Professor and M.R.C. Research Associate, Dentistry (Oral Biology).

TOTTY, R. N., Postdoctoral Fellow, Chemistry.

Tougas, G. R., Professor, French.

Towell, Molly E., Assistant Professor, Obstetrics and Gynaecology.

Towers, G. H. N., Professor and Head, Department of Botany.

Townsley, P. M., Associate Professor, Food Science.

TRACY, C. R., Professor, English.

TRANT, P., Instructor, Education.

TRAPP, W. G., Clinical Assistant Professor, Surgery (Thoracic Surgery).

Traynor, J. A., Clinical Instructor, Medicine.

TREDGER, E. M., Research Fellow, Paediatrics.

TREFFRY, C. J., Clinical Instructor, Paediatrics.

TREGUNNA, E. B., Assistant Professor, Botany.

TREMAINE, J., Honorary Lecturer, Microbiology.

TRITES, A. E. W., Clinical Associate Professor, Pathology.

TRODAHL, H. J., Postdoctoral Fellow, Physics.

TROMANS, D., Assistant Professor, Metallurgy.

TROTTER, J., Professor, Chemistry.

TROWSDALE, C., Associate Professor, Education.

Truax, C. W., Associate Professor and Director of Student Teaching, Education.

TRUEMAN, G. E., Clinical Instructor, Medicine (Radiology).

TSONG, P. E. W., Assistant Professor, Commerce and Business Administration.

Tuck, W. D. C., Lecturer, Law.

Turko, M., Clinical Assistant Professor, Obstetrics and Gynaecology.

TURNBULL, F. A., Clinical Instructor, Surgery (Neurosurgery).

TURNBULL, I. M., Assistant Professor, Surgery.

TURNER, ELSA S., Part-time Lecturer, Sociology.

TURNER, M. R., Instructor, Surgery.

TURNER, R., Assistant Professor, Sociology.

Turrell, B. G., Assistant Professor, Physics.

Turvey, S. E. C., Honorary Lecturer, History of Medicine and Science.

TYHURST, J. S., Professor and Head, Department of Psychiatry.

TYHURST, L., Clinical Associate Professor, Psychiatry.

TYLER, R., Instructor, History.

Tysoe, F. W., Clinical Assistant Professor, Obstetrics and Gynaecology.

UENOYAMA, K., Instructor, Ophthalmology.

UHLER, R. S., Assistant Professor, Economics.

ULRYCH, T. J., Associate Professor, Geophysics.

UNGER, R. W., Assistant Professor, History.

UPTON, L. F. S., Associate Professor, History.

UPTON, W. R., Honorary Lecturer, Dentistry (Public and Community Dental Health).

VAINES, ELEANORE R., Assistant Professor, Home Economics.

VALG, L., Assistant Professor, Forestry.

VALLE, F. P., Assistant Professor, Psychology.

VAN DER KAMP, B. J., Assistant Professor, Economics.

VANRY, S., Instructor Part-time, Dentistry (Oral Biology).

VanStone, W. E., Research Associate Zoology.

VARTSOS, J. A., Visiting Assistant Professor, Classics.

VASSAR, P. S., Professor, Pathology.

VAUGHAN, H., Assistant Professor, Mechanical Engineering.

VERNER, C., Professor of Adult Education.

VERTOGEN, G., Postdoctoral Fellow, Physics.

VEY, FLORENCE, Assistant Professor, Education.

VICKERS, D. H., Lecturer, Law.

VICKERSTAFF, JANICE M., Assistant Professor, Microbiology.

VINCE, D. J., Associate Professor, Paediatrics.

Vizsolyi, A., Research Associate, Metallurgy.

VOEGELE, H. R., Assistant Professor, Mathematics.

Vogt, E. W., Professor, Physics.

Volkoff, G. M., Professor and Head of the Department of Physics.

Volkoff, Olga, Lecturer, Microbiology.

VOSTERS, S. A., Assistant Professor, Hispanic and Italian Studies (Spanish).

VRBA, R., Associate Professor, Pharmacology.

VYAS, M. N., Instructor, Medicine.

WADA, J., Associate Professor, Psychiatry (Kinsmen Laboratory for Neurological Research).

Wadman, H. G., Clinical Instructor, Obstetrics and Gynaecology.

WAINMAN, A. W., Associate Professor, Slavonic Studies.

Walden, C. C., Honorary Professor, Microbiology, Chemical Engineering.

Waldie, A. C., Clinical Instructor (Primary Health Care), Health Care and Epidemiology.

WALKER, D. C., Associate Professor, Chemistry.

WALKER, J. E., Clinical Assistant Professor, Medicine.

WALLACE, A. W., Clinical Instructor (Primary Health Care), Health Care and Epidemiology.

WALLACE, I. H., Lecturer, Fine Arts.

WALLACE, M. D., Assistant Professor, Political Science.

FALLACE, W. J., Honorary Lecturer, Dentistry (Public and Community Dental Health).

Wallin, H., Assistant Professor, Education.

Walsh, G., Assistant Professor, Education.

Walsh, G. C., Clinical Instructor, Medicine.

Walsh, J., Clinical Instructor, Psychiatry.

Walters, C. J., Assistant Professor, Fisheries; Zoology.

Walters, L., Associate Professor, Education, and Acting Associate Director of Summer Session.

Walters, M. B., Clinical Instructor, Medicine.

Walton, R. C., Associate Professor, History.

WARDA, R. D. Research Associate, Metallurgy.

WARNER, D. M., Clinical Instructor, Ophthalmology.

WARNOCK, W., Postdoctoral Fellow, Chemistry.

WARREN, A. J., Clinical Assistant Professor, Psychiatry.

WARREN, H. V., Professor, Geology.

WARREN, I. H., Associate Professor, Metallurgy.

WARREN, J. B., Professor, Physics.

WARREN, J. B., Associate Professor and Chairman of the Division of Marketing, Commerce and Business Administration.

WARREN, R. A. J., Assistant Professor, Microbiology.

Washington, Dorothy, Assistant Professor, Education.

Wasow, B., Assistant Professor, Economics.

WATANABE, T., Associate Professor, Geophysics.

WATERMAN, J. T., Professor of Linguistics to July 1, 1969.

WATERMAN, M. J., Professor Part-time, Dentistry (Oral Medicine).

Watson, I., Part-time Assistant, Education.

Watson, Beth, Lecturer, Music (Voice).

WATSON, E. L., Associate Professor, Agricultural Engineering.

WATSON, W. J., Lecturer, Part-time, Librarianship.

WATT, J. G., Clinical Instructor, Orthopaedics,

WATT, N., Associate Professor, Education, Physical Education and Recreation, and Acting Director, Summer Session.

Weakland, Jean M., Assistant Professor, Education.

Webb, D. A., Clinical Instructor, Obstetrics and Gynaecology.

WEBB, E., Clinical Instructor, Surgery (Anaesthesiology).

WEBBER, W. A., Associate Professor, Anatomy.

WEBSTER, F. A., Associate Professor, Commerce and Business Administration.

Wedeking, G. A., Assistant Professor, Philosophy.

WEESE, S. A., Instructor, Theatre.

WEHRHAHN, C. F., Assistant Professor, Zoology.

WEICH, MARJORIE J., Instructor, Part-time, Dentistry (Public and Community Dental Health).

WEIDNER, H-G., Visiting Assistant Professor, Mathematics.

Weiler, L. S., Assistant Professor, Chemistry.

Weinberg, F., Professor, Metallurgy.

Weischedel, H., Postdoctoral Teaching Fellow, Electrical Engineering.

Weisgarber, E., Professor, Music (Composition and Theory).

Weld, C. B., Visiting Professor, Zoology.

Wellwood, R. W., Professor, Forestry.

Welsby, J. K., Visiting Assistant Professor, Commerce and Business Administration.

WESTERMARK, T. I., Associate Professor, Education.

Weston, Mavis, Part-time Assistant, Education.

WESTPHAL, W., Visting Assistant Professor, Physics.

WESTWICK, R., Associate Professor, Mathematics.

WINIATA, W., Assistant Professor, Commerce and Business Administration.

WHIELDON, GILL, Lecturer, French.

WHITE, B. L., Associate Professor, Physics.

WHITE, G. K., Assistant Professor, Mathematics.

WHITE, P. F., Part-time Lecturer, Theatre.

WHITE, P. H., Professor and Dean of the Faculty of Commerce and Business Administration.

WHITE, RUTH L., Assistant Professor, French.

WHITE, W. H., Professor, Geology.

WHITEHEAD, L. M., Assistant Professor, English.

WHITELAW, D. M., Professor, Medicine.

WHITELAW, J. W., Clinical Professor, Paediatrics.

WHITINGER, B. R., Associate Professor, Education.

WHITMAN, F. H., Assistant Professor, English.

WHITMAN, R. L., Clinical Instructor, Psychiatry.

WHITTAKER, J. V., Associate Professor, Mathematics.

WHITTLE, H. D., Professor, Physical Education and Recreation.

Wiesman, B., Associate Professor, Community and Regional Planning.

WIGFIELD, D. C., Postdoctoral Fellow, Chemistry.

Wigon, J. D., Associate Professor, English.

WILCOX, R. K., Assistant Professor, Theatre.

WILD, R., Assistant Professor, Education.

WILIMOVSKY, N. J., Professor, Zoology.

WILKES, HELEN, Assistant Professor, French.

WILKINSON, B., Visiting Professor, History.

WILKINSON, H. C., Associate Professor, Commerce and Business Administration.

WILL, H. J., Assistant Professor, Commerce and Business Administration.

WILL, P. K., Clinical Instructor, Paediatrics.

WILL, R. M., Associate Professor, Economics.

WILLEY, P. A., Lecturer, Physical Education and Recreation.

WILLIAMS, CAROL I., Assistant Professor, Education.

WILLIAMS, D. H., Professor and Head, Division of Dermatology; and Director of the Division of Continuing Education in Health Sciences.

WILLIAMS, D. Ll., Associate Professor, Physics.

WILLIAMS, D. M., Lecturer, Education.

WILLIAMS, JUNE F., Instructor, Dentistry (Restorative).

WILLIAMS, L. R., Clinical Assistant Professor, Surgery (Urology).

WILLMOTT, W. E., Associate Professor, Anthropology.

WILLONER, G., Honorary Lecturer, Electrical Engineering.

WILSON, A. B., Part-time Assistant, Education.

WILSON, E., Assistant Professor, Music (Cello and Music History).

WILSON, J. D., Assistant Professor, Education.

WILSON, J. R., Clinical Instructor, Psychiatry.

WILSON, J. W., Professor, Forestry.

WILSON, J. W., Clinical Instructor, Surgery.

WILSON, R., Clinical Associate Professor, Surgery.

WILSON, R. A., Clinical Professor, Paediatrics.

WILSON, R. G., Clinical Instructor (Primary Health Care), Health Care and Epidemiology.

WILSON, SHERIE, Lecturer, Music (Cello).

WILSON, W. M. G., Clinical Assistant Professor, Ophthalmology.

WILTON, M., Part-time Assistant, Education.

WINCH, G. C., Clinical Instructor, Opthalmology.

WINIATA, W., Assistant Professor, Commerce and Business Administration.

WINTER, G. R., Professor and Chairman, Agricultural Economics.

WINTER, J. H., Associate Professor, History.

WINTERBOURN, M. J., Postdoctoral Fellow, Zoology.

WISENTHAL, J., Assistant Professor, English.

WISNICKI, B. P., Professor, Architecture.

WISNICKI, CATHERINE, Lecturer, Architecture.

WOLFE, PATRICIA M., Assistant Professor, English. Wolforth, J. R., Assistant Professor, Education.

Wolochow, M., Clinical Instructor, Psychiatry.

Wong, E., Clinical Instructor, Psychiatry.

Wong, J. M. H., Demonstrator, Paediatrics.

Wong, R., Assistant Professor, Psychology.

Wood, Betty J., Clinical Assistant Professor, Paediatrics.

Wood, J. R., Assistant Professor, Political Science.

Wood, L. G., Clinical Instructor, Surgery (Urology).

WOOD, ROBERTA JO-ANN, Instructor, Nursing.

Wood, W. F. J., Assistant Professor, Commerce and Business Administration.

Wood, W. S., Clinical Assistant Professor, Medicine (Dermatology).

Wood, W. W., Assistant Professor, Architecture.

WOODCOCK, G., Lecturer, English.

WOODCOCK, T., Part-time Assistant, Education.

WOODLAND, A. D., Assistant Professor Economics.

WOODROW, JANICE E., Assistant Professor, Education.

Woodsworth, R. S., Clinical Instructor, Surgery (Anaesthesiology).

WOOLF, Frances M., Honorary Research Assistant, Psychiatry.

WOOLF, L. I., Associate Professor, and Acting Head of Division of Neurological Sciences, Psychiatry.

Worrall, J. G., Assistant Professor, Forestry.

WORT, D. J., Professor, Botany.

Worth, Ann J., Clinical Assistant Professor, Pathology.

Wright, D., Lecturer, English.

Wright, R. H., Honorary Research Professor, Psychiatry.

WRIGHT, VIRGINIA, Clinical Instructor, Pathology.

WRINKLE, ANNETTE, Lecturer, English.

YADAV, G., Instructor, Economics.

YARROW, A. R., Clinical Instructor, Psychiatry.

YASUI, R., Assistant Professor, Education.

YATES, J. M., Assistant Professor, Creative Writing.

YEO, D. J., Associate Professor and Head, Department of Public and Community Dental Health, Dentistry.

YEOMANS, W. E., Assistant Professor, English.

YEUNG, D. P., Teaching Fellow, Psychiatry.

Young, B., Postdoctoral Teaching Fellow, Chemistry.

Young, B. G., Clinical Instructor, Psychiatry.

Young, G. G., Instructor, Forestry.

Young, J. H., Professor, Economics and Dean of the Faculty of Arts.

Young, J. T., Associate Professor and Assistant to the Director of Secondary Education.

Young, L., Professor, Electrical Engineering.

Young, M. D., Associate Professor, Paediatrics.

Young, M. N., Technical Director and Instructor, Theatre.

Young, W. A., Clinical Instructor, Medicine.

Young, W. D., Assistant Professor, Political Science.

Yu, G., Clinical Instructor, Paediatrics.

Yu, Y-N, Professor, Electrical Engineering.

Yuille, J. C., Assistant Professor, Psychology.

Zacharias, N. C., Instructor, Pharmaceutical Sciences.

ZACHER, M. W., Assistant Professor, Political Science.

ZACK, D. T., Assistant Professor, Acting Head of the Department and Acting Clinic Director, Dentistry (Oral Surgery).

ZACK, J. J., Clinical Instructor (Primary Health Care), Health Care and Epidemiology.

Zanolli, Maria C., Instructor, Italian.

ZBARSKY, S. H., Professor, Biochemistry.

Zeldowicz, H., Clinical Associate Professor, Psychiatry.

Zeldowicz, L., Clinical Instructor, Medicine (Neurology).

ZIDEK, J. V., Assistant Professor, Mathematics.

ZIEMBA, W. T., Assistant Professor, Commerce and Business Administration.

ZILBER, J., Associate Professor, Creative Writing.

ZOLBROD, L. M., Assistant Professor, Asian Studies.

# GENERAL INFORMATION

THE UNIVERSITY OF BRITISH COLUMBIA

VANCOUVER 8 • BRITISH COLUMBIA CANADA

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#### THE UNIVERSITY OF BRITISH COLUMBIA

#### Historical Sketch

The creation of a university in British Columbia was first advocated in 1877. In 1890 an act of the Provincial Legislature established "The University of British Columbia" but the venture failed for a lack of a quorum at the first meeting of the Senate. In 1908 the earlier act was repealed and a new act established and incorporated the University. The University operated under this act and its amendments as the sole public university in the Province until 1963 at which time a new Universities Act was passed by the Legislature making provision for sister institutions.

The University opened in the autumn of 1915 in temporary quarters on part of the site of the General Hospital in Fairview. At the beginning of the Session 1925-26 the University commenced work on its permanent campus in Point Grey.

# The Constitution of the University

The University operates under the authority of the Universities Act of the Province of British Columbia (B.C.R.S. 1963, c52). Following are excerpts from the Act:

- "... there shall be continued or constituted and established in the Province universities called
  - (a) "The University of British Columbia";
  - (b) "University of Victoria";
  - (c) "Simon Fraser University".

"Each University shall consist of a Chancellor, a Convocation, a Board of Governors, a Senate, a Faculty Council, and the Faculties. Each University shall have in its own right and name the power to grant degrees established in accordance with the provisions of this Act."

"The Convocation of each University shall be composed of: the Chancellor, who shall be Chairman thereof; the President; the members of the Senate; all persons holding academic appointments within the University, whose names are added to the roll of the Convocation upon instructions of the President; all persons who have become graduates of the University; and all persons whose names are added to the roll of the Convocation by regulation of the Senate."

"There shall be a Board of Governors for each University. The Board shall consist of eleven members, comprising the Chancellor, the President, three members elected by the Senate from its own members, and six members appointed by the Lieutenant-Governor in Council."

"The Senate of each University shall be composed of (a) the Chancellor; (b) the President; (c) the Deans of Faculties and one member of each Faculty elected by the members of that Faculty; (d) such other Deans as may be determined by the Senate; (e) the Librarian; (f) one member to be elected by the governing body of each affiliated college of the University; (g) four members appointed by the Lieutenant-Governor in Council, only one of whom shall be an official of the Department of Education; (h) not less than six nor more than fifteen members, as determined by the Senate, to be elected by Convocation from the members thereof, who shall not be members of the Faculties; (i) one or more members, as determined by the Senate, to be elected by any society or group or organization in the Province which in the opinion of the Senate contributes in a significant way to the

economic or cultural welfare of the Province; and (j) a number of members, equal to the number provided in clauses (g), (h), and (i), to be elected by the Faculties either in joint meeting or in such manner as the Faculties in joint meeting may by regulation determine."

"Each University shall, so far as and to the full extent which its resources from time to time permit, provide (a) instruction in all branches of knowledge as may be recommended by the Senate; (b) facilities for the prosecution of original research in all branches of knowledge recommended by the Senate; (c) fellowships, scholarships, exhibitions, bursaries, prizes, rewards, and pecuniary and other aids to facilitate or encourage proficiency in the subjects taught in the University and also original research in all branches of knowledge; and (d) extra-collegiate and extra-university instruction and teaching and public lecturing as may be recommended by the Senate."

- (1) Each University shall be strictly non-sectarian in principle, and no religious creed or dogma shall be inculcated.
- (2) No religious test shall be required of any professor, teacher, lecturer, or student or servant of the University, and no religious observance, according to the forms of any particular religious denomination or otherwise, shall be imposed on them or any of them, but the Senate may make regulations touching the moral conduct of the students.

# Coat-of-Arms of the University

Argent three Bars wavy Azure issuant from the base of a demi Sun in splendour proper on a Chief of the second an open Book also proper edged strapped and buckled Or inscribed with the words "TUUM EST".

#### The Session

The academic year begins on the first day of September and ends on the last day of August. The winter session is divided into two terms—the first, September to December; the second, January to April. The summer session consists of seven weeks' instruction in July and August.

#### COURSES OF STUDY AND DEGREES

The University offers instruction in each of twelve faculties and eight schools. Graduate work is offered by the Faculty of Graduate Studies which, also includes School of Community and Regional Planning and the Institutes of Earth and Planetary Sciences, Fisheries, Oceanography, Industrial Relations.

The degrees offered are as follows:

Bachelor of Science in Agriculture (B.Sc., Agr.) Agricultural Sciences:

Master of Science (M.Sc.)

Master of Applied Science (M.A.Sc.)

Doctor of Philosophy (Ph.D.)

Bachelor of Applied Science (B.A.Sc.) Applied Science

Master of Applied Science (M.A.Sc.) (Engineering):

> Master of Science (M.Sc.) Doctor of Philosophy (Ph.D.)

Bachelor of Architecture (B.Arch.) Architecture:

Master of Architecture (M.Arch.)

Bachelor of Arts (B.A.) Arts:

Bachelor of Music (B.Mus.) Master of Music (M.Mus.) Master of Arts (M.A.) Doctor of Philosophy (Ph.D.)

Commerce and Business Bachelor of Commerce (B.Com.)

Master of Business Administration (M.B.A.) Administration:

Doctor of Philosophy

Community and Regional

Master of Arts (M.A.) Master of Science (M.Sc.) Planning

Dentistry: Doctor of Dental Medicine (D.M.D.)

Education: Bachelor of Education (Elementary) (B.Ed.)

Bachelor of Education (Secondary) (B.Ed.)

Master of Education (M.Ed.)

Master of Arts in Education (M.A.)

Doctor of Education (Ed.D.)

Bachelor of Science in Forestry (B.S.F.) Forestry:

Master of Forestry (M.F.) Master of Science (M.Sc.) Doctor of Philosophy (Ph.D.)

Bachelor of Home Economics (B.H.E.) Home Economics:

Bachelor of Laws (LL.B.) Law:

Master of Laws (LL.M.)

Bachelor of Library Science (B.L.S.) Librarianship:

Doctor of Medicine (M.D.) Medicine:

> Master of Science (M.Sc.) Doctor of Philosophy (Ph.D.)

Music:

see Arts

Nursing:

Bachelor of Science in Nursing (B.S.N.)

Master of Science in Nursing (M.S.N.)

Pharmaceutical Sciences

Bachelor of Science in Pharmacy (B.Sc.,

Pharm.)

Master of Science (M.Sc.) Doctor of Philosophy (Ph.D.)

Physical Education

Bachelor of Physical Education (B.P.E.)
Master of Physical Education (M.P.E.)

and Recreation:

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Rehabilitation Medicine:

Bachelor of Science in Rehabilitation (B.S.R.)

Science:

Bachelor of Science (B.Sc.)

Master of Science (M.Sc.)

Doctor of Philosophy (Ph.D.)

Master of Social Work (M.S.W.)

Social Work:

In addition to the above, courses are offered in the School of Nursing leading to diplomas in Public Health Nursing in Administration of Hospital Nursing Units and in Psychiatric Nursing; in the Faculty of Applied Science to a Diploma in Surveying and a Diploma in Administration for Engineers; in the Faculty of Education one-year teacher-training programmes, both Elementary and Secondary, are offered in addition to Diplomas in: Adult Education, Education of the Deaf, Counselling for Vocational Development, Education of the Mentally Retarded, Education of Children with Learning Disorders, Education of Young Children.

# Honorary Degrees

The degrees of Doctor of Laws (Honoris Causa), Doctor of Science (Honoris Causa) and Doctor of Letters (Honoris Causa) are the honorary degrees conferred from time to time by the Senate of the University upon persons who have achieved distinction in scholarship or public service.

#### Academic Dress

The undergraduate's gown is black in colour and of the ordinary stuff material, of ankle length, and with long sleeves and the yoke edged with khaki cord. The Master's gown is the same, without cord. The Ph.D. regalia consists of a gown, Cambridge style, of maroon silk material with front facings panel and sleeves of U.B.C. blue with gold piping; hood, Cambridge pattern, blue silk outside and gold lining; cap, Decanal bonnet, of maroon silk with gold cord and tassel.

# The colours for the various degrees are:

B.A.	University blue	B.P.E.	malachite green
B.A.Sc.	scarlet	B.S.A.	maize
B.Com.	light grey with black and	B.S.F.	brown with green cord
grey cord	grey cord	B.S.N.	scarlet with twisted cord of
B.Ed.	white with cord of Uni- versity blue		University blue and white
	turquoise	B.S.P.	dark green with cord of scarlet
B.L.S.	cadmium yellow	B.S.R.	scarlet and white twisted
B.Mus.	University blue with cord of alizarin crimson		cord on royal blue
	of alizarin crimson	M.S.W.	magenta

B.Sc. light blue LL.B. amethyst violet

B.Arch. scarlet with white cord M.D. scarlet and royal blue

D.M.D. lilac and red Ph.D. blue and gold

Ed.D. blue and gold, with blue, white and gold chevrons

The Master's hood is the same as the Bachelor's, lined with the distinctive colour. The M.B.A. hood conforms similarly to that of the B.Com. The hood for the honorary degree of LL.D. is of scarlet broadcloth lined with dark blue velvet; that for the D.Sc. is the same with dark purple lining; and for the D.Litt., the same with cream lining.

#### ACADEMIC PROGRAMMES

Individual faculty and school calendars are provided for applicants on request (see last page of this bulletin).

#### AGRICULTURAL SCIENCES

The Faculty of Agricultural Sciences offers a wide selection of courses emphasizing the basic and agricultural sciences, with the objective of developing an understanding of the applications of scientific principles to agriculture in students whose aptitudes and interests lie in the natural and social sciences and whose vocational objectives are directed towards scientific research, business and industry, secondary school teaching, or public and private service.

The work of the Faculty is concerned with primary agriculture as exemplified by an understanding of soil, by the growing, protecting, harvesting and marketing of crops and by the care, nutrition and management of animals. As it is also concerned with the processing and marketing of agricultural products, it trains students for industries such as dairying, meat-packing, fruit and vegetable processing, brewing and wine-making. Another facet of the work of the Faculty is the opportunity afforded students to specialize in basic sciences such as genetics, physiology, nutrition, and pathology, with application directed towards plants and animals, or in biochemistry and microbiology with emphasis on animals, plants and foods. Work is given in pedology and in the application of microbiology, chemistry, physics and mineralogy to soils. Complementary courses in agricultural economics relating to production, prices, marketing and public policy in agriculture are available to those whose challenge lies in the field of economics or rural sociology. A general course in agricultural engineering provides for specialization in agricultural mechanization.

In addition to well-equipped laboratories for research and teaching in various aspects of the basic agricultural sciences, and of the application of engineering and economics to agriculture, the Faculty also has available greenhouses and land as ancillary facilities for undergraduate and graduate studies in agronomy, horticulture, floriculture and plant protection; and supplementary resources for teaching and research with beef and dairy cattle, swine, sheep and poultry.

Undergraduate and graduate plans of study are offered in the following areas:

Agricultural Economics

Agricultural Economics and Commerce

Agricultural Engineering

Agricultural Microbiology

Agriculture and Teaching

Agriculture and Wild Life Management

Animal Science:

Genetics, Nutrition and

Physiology Dairy Science

Agricultural Entomology

Food Science

Plant Science:

Agronomy, Horticulture, Genetics, Nutrition and Plant Protection

Poultry Science:

Nutrition, Physiology, Genetics and Processing

Soil Science

Soil Chemistry

Soil Physics

Soil Genesis and Classification

Forested Soils

Soil and Water Conservation and Management

The general undergraduate course covers four academic years and leads to the degree of Bachelor of Science in Agriculture. The curriculum is sufficiently broad and flexible to meet specific needs. Students do not follow a prescribed programme of study but with the help of Faculty advisers, and within the broad requirements for the degree, select majors and electives which will best prepare them for their objectives.

A four-year Honours programme leading to the degree of Bachelor of Science in Agriculture (Honours) is offered in specialized fields of agricultural science.

The Department of Agricultural Engineering offers a five-year programme in the Faculty of Applied Science leading to the degree of Bachelor of Applied Science in Agricultural Engineering.

The various Departments of the Faculty offer, through the Faculty of Graduate Studies, advanced instruction leading to the degree of Master of Science, Master of Applied Science, and Doctor of Philosophy.

In addition to the foregoing the Faculty offers a two-year course for students wishing to proceed with advanced standing to the course for the degree of Veterinary Medicine at the University of Guelph and the University of Saskatchewan, a one-year Diploma Course for young farmers, and, in cooperation with the Department of University Extension, short courses at irregular intervals to meet the needs of special groups.

Requests for further information regarding the courses available in the Faculty of Agricultural Sciences should be addressed to the Dean of Agricultural Sciences.

In preparation for admission to the Faculty of Agricultural Sciences senior secondary school students must elect Mathematics 12 and Chemistry 11 (if possible, also Chemistry 12); they should elect Physics 11 or Biology 11 (both, if possible). A Grade 13 student of British Columbia should take English 100/1, Mathematics 113, one or both of Physics 101, Zoology 105 (or Botany 105) and additional non-science courses to give the full programme of five courses. The problem of Grade 13 chemistry is explained on page A30 under the heading "Science."

Students seeking transfer from other universities or colleges will be granted

advance credit for parallel courses in the first two years of the degree programme where standings obtained are above the minimum passing grade at the other institutions.

# APPLIED SCIENCE (Engineering)

Engineering studies in the Faculty of Applied Science follow a general pattern in which the first two years are devoted largely to the development of basic concepts in mathematics and physical sciences with some consideration of certain applied fields. In the final two years the work is concerned with application of the sciences in specific areas of engineering.

High standing in courses in mathematics, physics and chemistry, either in a university or college, is prerequisite to admission to the Faculty. Practical work outside the University, scheduled field trips, and the activities of professional and technical societies all contribute to the rounding out of an engineering course and the student is expected to participate in them as fully as circumstances permit.

The degree of Bachelor of Applied Science is granted on completion of

one of the following courses:

- 1. Agricultural Engineering
- 2. Chemical Engineering
- 3. Civil Engineering
- 4. Electrical Engineering
- 5. Geological Engineering
- 6. Mechanical Engineering
- 7. Metallurgical Engineering
- 8. Mineral Engineering
- 9. Engineering Physics

Extension of engineering studies at the post-graduate level is becoming increasingly important. The Faculty offers post-graduate courses and provides research facilities in many areas of engineering for students proceeding to the degree of Master of Applied Science or Doctor of Philosophy. Acceptance as a candidate for the M.A.Sc. degree requires a high level of accomplishment in the undergraduate course. A substantial programme of academic courses and research, occupying at least twelve months, must be completed to merit this degree. Acceptance as a candidate for the Ph.D. degree requires demonstrated academic and research ability; the programme of studies and research occupies at least two years' resident study following the Master's degree. For both degrees a competence in a second language may be required.

The Department of Civil Engineering offers a Diploma course in Surveying to graduates of recognised universities in any field who have an adequate background in mathematics and physics. For details see the Faculty of Applied

Science Calendar.

For admission to courses in Engineering, a student must have completed the First Year in Science at the University of British Columbia or its equivalent at an approved university or college or by Grade 13.

Required subjects are:

English 100 (Literature and Composition) Mathematics 120 (1968-1969 session) or

Mathematics 100 and 121 (1969-1970 session) or

Mathematics 120 prior to 1968 or its equivalent elsewhere.

Students offering Mathematics 120 prior to 1968 or its equivalent elsewhere will be required to enrol in a special section of Mathematics 151.

Chemistry 103 or 110 or 120 Physics 110 or 120 or 130

An elective chosen from courses offered in the Faculty of Arts.

The passing grade for entrance to courses in Engineering in each of Mathematics, Chemistry and Physics, is 60 per cent, and 50 per cent in other

subjects.

In preparation for admission to the Faculty of Applied Science a senior secondary school student in British Columbia should include in his studies Chemistry 12, Mathematics 12 and Physics 12. (Where this is not possible a student should take Mathematics 12, one of Chemistry 12 or Physics 12, and an "11" course in Physics or Chemistry.) In Grade 13 a student must have taken: English 100/1, Chemistry 112, Mathematics 113, Physics 101, one nonscience elective. For direct admission to the Faculty from Grade 13 a student must have passed the full programme shown with not less than 60% in each of the mathematics and science examinations. The Faculty of Applied Science will consider applications for entrance to second-year Applied Science from students at U.B.C. who have achieved an overall second-class standing in the combined first and second years in the Faculty of Science and have an appropriate background for their intended program in Applied Science. Application should be made to the Office of the Dean.

Subjects normally required from other British Columbia universities and

colleges:

Capilano College:

English 1A, 1B; Chemistry 1A, 1B or 2A, 2B; Mathematics 2A, 2B,

Physics 1A, 1B; 6 semester-hours Arts electives.

A minimum grade of B in each of Chemistry, Mathematics and Physics and a pass in English and the Arts electives.

Notre Dame University:

Chemistry 111; Mathematics 111; Physics 111; English 111; and one Arts elective course. A minimum grade of 70% in each of Chemistry 111, Mathematics 111, and Physics 111, and 60% in English 111 and the Arts elective. Okanagan College:

English 101, Chemistry 101 or 102, Mathematics 102, Physics 101 or

102, 6 semester hours of Arts electives.

A minimum grade of "B" in Chemistry, Mathematics and Physics and a pass in English and the Arts electives.

Selkirk College:

Chemistry 110 or 111; Mathematics 111; Physics 111; English 111; plus

3 units of Arts elective.

A minimum grade of C+ in each of Chemistry, Mathematics and Physics, and a pass in English and the Arts elective.

Simon Fraser University:

Chemistry 101, 102, 106, 116; or Chemistry 102, 103, 116, 117; Mathematics 113, 114; Physics 101, 102; two of English 101, 102, 103, 111; six units of Arts electives.

A minimum grade of "C" in each of the above courses with a grade point average of 2.70 in Chemistry 101, 102, 106, 116 or 102, 103, 116, 117; Mathematics 113, 114; (Mathematics 151, 152 after 1969-70); Physics 101, 102 (based on A=4; B=3; C=2).

Vancouver City College:

Chemistry 15A and 15B; Mathematics 17A and 17B; Physics 15A and

15B; English 17A and 17B; plus an Arts elective in each of two semesters.

A minimum grade of "C" in each of the above courses with a grade point average of 2.7 in all the chemistry, mathematics and physics courses (based on A = 4, B = 3, C = 2).

The University of Victoria:

Chemistry 120 and 121 or 124 and 121; Mathematics 130; Physics 101; English 100; plus an Arts elective.

A minimum grade of "C+" in each of Chemistry 120 and 121 or 124 and 121, Mathematics 130 and Physics 101 and a pass in English and the elective.

#### ARCHITECTURE

The course in the School of Architecture sets out to integrate the arts and the sciences as a means of stimulating the creative genius of the architect. Consequently a strong academic background is essential. Admission is dependent upon a degree in Arts, Science or Applied Science, wherein certain standards must be met and proof of imaginative and creative ability.

The first degree to be granted is that of Bachelor of Architecture (B.Arch.). It is hoped that the very nature of the study will encourage and prepare students for the pursuit of learning at higher and related levels, for example: urban and regional planning, landscape architecture, and industrial design. In some cases students may undertake research in problems directly concerned with architecture in the related subjects in liberal arts or applied science, or problems of concern to practical building.

Senior secondary school students planning a career in Architecture should elect Mathematics 12, and at least, Chemistry 11 and Physics 11.

#### ARTS

The Faculty of Arts seeks to provide its student body—the largest in the University—with an opportunity to acquire the foundation of a liberal education. By offering studies in breadth as well as in depth, it designedly accords special recognition to the responsibility it shares with the other Faculties to foster in the university student a spirit of free and positive enquiry, a power of critical judgment, and a sensitive capacity for creative expression. Emphasizing such fundamental principles, and choosing its materials of study from the old as well as the new, the Faculty of Arts attempts to prepare the student for both the avocations and the vocations of life. For many professional careers the basic experience of a liberal education is considered indispensable; in none is it considered superfluous. A specific illustration of its recognized worth may be found in the fact that satisfactory work in the Faculty of Arts is a prerequisite for admission to various professional faculties and schools at the University of British Columbia (e.g. Law, Librarianship, Social Work), and to the Faculty of Graduate Studies in the fields of the Humanities and the Social Sciences.

Departments in the Faculty in which a student may study are: Anthropology and Sociology, Asian Studies, Classics (including Classical Studies, Greek, Latin, Linguistics), Creative Writing, Economics, English, Fine Arts, French, Geography, German, Hispanic and Italian Studies, History, Music, Philosophy, Political Science, Psychology, Religious Studies, Slavonic Studies (including Polish, Russian), Theatre.

The Faculty offers two routes to the Bachelor of Arts: the Major Programme and the Honours Programme. During their first two years most students take two courses in English, two courses in a foreign language (optional), and at least six electives chosen in accordance with their interests. Before graduating each student takes at least one course in mathematics or the sciences. In the last two years a student in the Major Programme completes five courses in a single field of his choice, two courses outside his special field and three electives; in this way reasonable depth and breadth may be secured. The student who pursues an Honours degree will, during his third and fourth years, study one or two fields in considerable depth and will be required to elect at least two courses more than are required in the General Programme. Those who intend to enter graduate study often select an Honours Programme.

Students entering the first year may apply for New Arts I, a new programme designed to introduce students to university work through closer contact with professors and more intensive reading and written work. There will be three sections of New Arts I, each with an enrolment of 120 students taught by 6 members of faculty. There will be no formal courses in the Programme; instruction will be conducted through discussion groups and occasional lectures dealing with one or more themes or problems. In addition, students must take six units of work outside the Programme to complete the requirements of the first year in Arts. These courses shall be chosen in consultation with an adviser. A detailed curriculum will be distributed during Registration Week.

NOTE: Students seeking entrance to New Arts I should complete and return to the Registrar's Office the application form mailed out with registration material during the Summer. 360 students will be selected at random from the list of applicants. The names of these students will be posted in the New Arts Building at the commencement of the Fall registration period. Information will be available in the New Arts Building about the sequence of steps for enrolment in the programme and in the two regular courses needed to complete a full first year in Arts.

Students who register in the Programme must remain in it for one academic year; that is, after the last day for changes in programme, they may not drop New Arts I and substitute regular courses for it. There will not be a supplemental examination for students who fail New Arts I.

Inevitably, students entering the Faculty of Arts will be confronted by a wide variety of courses and programmes. They should read the *Calendar* of the Faculty with care and, if they need assistance and advice, consult one of the academic or departmental advisers.

In preparation for admission to the Faculty of Arts secondary school students should obtain as strong an academic background as possible in their fields of interest. Students interested in languages should take as many courses in the various languages as their study schedule will allow. For many Departments in the Faculty no special senior secondary school programme is necessary beyond a wide choice of academic subjects in the Academic-Technical Programme.

For further information see the calendar of the Faculty of Arts.

• Anthropology and Sociology is a combined department offering courses of study leading to B.A., M.A., and Ph.D. degrees. Courses from both disciplines may be incorporated in any programme. Emphases in both sociology and anthropology include the following at the present time: (1) comparative institutions, with particular reference to religious and political systems, (2) development studies, (3) social and cultural ecology, (4) research method and theory building, (5) experimental sociology and small groups, (6) economic anthropology, (7) ethnomethodology and communication processes, (8) kinship studies, (9) sociology of organizations, work, and industry, (10) ethnography of northwestern America, south and southeast Asia, and Oceania. In addition, work may be done in archaeology, museum administration, and a number of other fields which have less formal emphasis.

The facilities available to the Department include a Small Groups Laboratory, the Museum of Anthropology, the Archaeology Laboratory, and a graduate library and reading room. In addition, students of the Department make use of such facilities as the Asian Studies Library, the Computer Centre, the Statistical Centre for the Social Sciences, the Human Relations Area File, and the facilities of the Institute of Industrial Relations.

- Asian Studies offers Honours and Major programmes in Chinese and Japanese language and literature, in the pre-modern history of China, Japan and India, and, in collaboration with other departments in the Faculty, multi-disciplinary programmes in the civilizations of Eastern, Southern and Southeastern Asia. Programmes with an Asian emphasis can also be arranged for students wishing to take an Honours or Major programme in other departments in the Faculty of Arts. A degree in Asian Studies can lead to positions in such fields as education, librarianship, government service, international organizations, and business.
- Classics offers Honours programmes in Classics (Greek, Latin, Classical Studies), Greek and Latin; Major programmes in Greek, Latin, and Classical Studies. In all programmes the aim is a broad liberal education. The Honours and Major programmes in Classics and in Latin prepare the student for secondary teaching. The Honours programme in Classics is the best preparation for graduate study in the field, although Honours or a Major in Greek or in Latin will generally permit admission. Students in this Department will also have the opportunity to work in Greek and Roman History, Archaeology, and Art. The Major in Classical Studies does not lead to graduate study, which requires a knowledge of the Greek and Latin languages. The Department also offers the degrees of M.A. and Ph.D.
- Comparative Literature offers an M.A. programme for candidates with good qualifications in languages and literature wishing to engage in the further study of two (or more) national literatures and of those general problems of criticism and literary history which are not confined to the literature of one country or language. The number of seminars offered within the programme can be supplemented by seminars offered by other departments (special attention is drawn to Slavonic Studies 542, Creative Writing 515, English 507 and Theatre 510) and graduate courses offered by Language and Literature departments. Undergraduates who might be interested in preparing for the M.A. programme are recommended to enrol in the Majors or Honours programme of one of the literature departments, and meanwhile consult an Advisor for the Comparative Literature Committee at the earliest opportunity for suggestions about the choice of elective subjects. While the greatest stress is laid upon the advanced study of literatures in the original language (i.e. in the upper-division courses of the separate language departments), attention should also be paid to such courses as Creative Writing 405, English 310, Classical Studies 310, 315 and 316, Slavonic Studies 306, 345, 431, Theatre 320, and Asian Studies 302, 335, 345. The graduate seminars in Comparative Literature are open to suitably qualified fourth-year undergraduates by permission of the instructor.
- Creative Writing offers a major programme of workshop and tutorial study leading to the B.A. degree, and a graduate programme leading to the M.A. degree. It also encourages students with writing talent, whose main course of study lies in other departments and faculties, to consider a Creative Writing workshop as one of their elective subjects.

Its introductory workshop (C.W.201) is open to all students, including freshmen, and concentrates on short prose forms. Its second introductory workshop (C.W.202) is open to all students, including those from first year, and asks that the student write poetry, drama and short stories. The senior workshops (C.W.407—Drama; C.W.408-9—Fiction; C.W.410—Poetry; C.W. 415—Translation) and the senior tutorials (C.W.447, a reading course for writers; and C.W.496, 497, 498, for unusually talented writers) are designed for students on the Major programme and those who are combining an interest in Creative Writing with another major field of study. English Honours students, with the consent of both departments, may register in C.W.499 and substitute creative work for the English Honours graduating essay.

No special curriculum is demanded of the Major-programme student; he is encouraged to select a range of courses from as many fields of study as may seem desirable in his particular case. The emphasis is on education rather than training.

The programme is based on the premise that capable student authors can benefit from judicious criticism and the chance to develop their abilities in an academic setting. Without sacrifice of standards, instructors are eclectic in attitude toward various modes of writing. Workshops and tutorials are designed to focus attention on the student's own work.

The most talented students are encouraged to continue in the department's graduate programme.

• Economics deals with the way in which human wants are met by allocating productive resources among various uses. It includes the study of the level and stability of total business activity, the behaviour of firms, the pricing mechanism and the economic role of government. Special fields include, among others, the economics of labour, money and banking, government finance, statistics, industrial organization, natural resources, international trade, mathematical economics, all of which are studied in special courses.

The Department offers two undergraduate programmes: the Major and the Honours programme. The Honours programme offers greater specialization, and more personal contact with the Department, than does the Major. It is designed for students whose academic record reveals that they will benefit from the more intensive work. Students graduating with an Honour's degree have an advantage in pursuing graduate work.

Graduates in economics face a broad range of opportunities in business, government and for further academic studies. The graduate programme consists of a Master's programme and a Doctoral programme.

• Fine Arts. The Department offers a Major and an Honours programme for the B.A. degree, and a graduate programme leading to the M.A. degree. The courses offered by the Department involve the fields of Western and Oriental art history and criticism.

The undergraduate programme should be considered basically as a good academic education in Fine Arts but can also be used, with the graduate programme, as a basic training for critical and historical writing, for art gallery and museum work, for teaching, research and library science.

The Department of Fine Arts also is responsible for the University Art Gallery and its programme of exhibitions and lectures, and for the administration of the Festival of the Contemporary Arts which is held every year in early February.

• French. The first two years of work in the Department of French continue the study of language initiated at the Secondary School level and develop the student's ability to read, write and speak French. For the student with minimum Secondary School preparation, the French 110 and 210 courses

concentrate mainly on basic language skills and introduce him to aspects of French civilization. He may go on from this programme into the upper division courses in French by taking French 202 and French 220 (either of these may be taken in third year). For the student entering the University with French 12 (or French 92), the first and second year programme (French 120, 202 and 220) seeks to provide a good general command of the written and spoken language and, in addition, a fairly liberal introduction to French literature. For students interested primarily in the oral aspects of the language, French 115 is available. Much of the class work in this programme is conducted in French.

In the third and fourth years, courses of study in language and literature are offered. Language courses available at this level deal with advanced translation, composition, syntax, stylistics, phonetics and the history of the language. The literature courses are designed to develop critical ability, knowledge of works of French literature and literary history, and introduce the student generally to methods of independent study and research.

On the graduate level, the department offers programmes leading to the M.A. and Ph.D. degrees, providing further opportunity for specialized study and research in all areas of French literature and language.

• Geography offers undergraduate training in the Honours and Major programmes and graduate work leading to the M.A. and Ph.D. degrees. Students with sufficiently high standing may enter graduate studies upon completing either of these undergraduate programmes.

In their broadest context Geography courses deal with the distribution and interaction of various physical and cultural features of the earth. A student will be encouraged, however, to undertake more concentrated enquiry in one of the following fields:

- 1. Physical Geography the study of landforms and physical processes associated with their formation; climatology, hydrology. Supporting elective courses should be chosen from Mathematics, Physics and Geology.
- 2. Economic Geography urban regions, manufacturing and industrialization, location theory, resource management. Supporting electives should be chosen from Economics, Commerce, and Sociology.
- 3. Cultural Geography the spatial distribution and interaction of man's cultural activities; culture regions, rural settlement, underdeveloped areas, political geography. Electives should be chosen from History, Anthropology, Sociology and Political Science.

Systematic study in each of these fields is usually conducted within a regional context. The Department offers special regional emphasis on Canada (including the Canadian Arctic), the Pacific Northwest, Soviet Union, Latin America, Monsoon Asia, and Europe.

In addition to its contribution toward a liberal education, geographic training offers a variety of employment opportunities. Positions are available in government, business and industry, as well as in high school and university teaching. Enquiries concerning a career in geography should be directed to the Geography Department office.

Details of course offerings and degree requirements are given in the Geography section of the Faculty of Arts calendar.

 German. The first two years are devoted to the study of the structure of the language and to achieving fluency in reading and expression. The third and fourth years offer (1) courses in advanced oral expression, translation and composition, (2) courses in literary history as an introduction to more detailed study and interpretation of (3) individual literary works within their historical context, (4) an introduction to research methods.

Graduate work offers opportunities for research in specialised fields leading to the M.A. and Ph.D.

- Hispanic and Italian Studies. The Department offers courses in Spanish, Portuguese and Italian language and literature, and in the history of the Iberia Peninsula and Latin America. It cooperates closely with the Departments of French and of Classical Studies in the field of Romance philology. The Department offers an undergraduate major in Spanish or Italian, undergraduate Honours in Spanish, Italian or Romance Studies. It has a graduate programme leading to an M.A. in Spanish, Italian or Romance Studies and a Ph.D. in Romance Studies. It is also possible to specialize in Latin American studies at the M.A. level. A programme in Romance Studies, whether at the graduate or the undergraduate level, may combine any of the languages taught in the Department with another Romance language, with Latin, or with linguistics. In all cases, such a combined programme must assure adequate mastery of the main field of concentration, whether it be Romance philology, a national literature, or a selected period in several Romance literatures.
- History is concerned with the study of man's past, in particular with process. It draws on the social sciences and humanities for much of its data and conceptual techniques, but remains essentially a study in the dimension of time, with methods of enquiry appropriate to such a study. Its main subdivisions are related to the conceptual techniques; political history, economic history, social history, cultural history, intellectual history. But since the intensive study of these subdivisions is usually associated with their development within a particular society, the Department of History's offerings are grouped in national or regional "fields": American, Asian, British, Canadian, Commonwealth, Medieval, Renaissance and Reformation, and Modern Europe. Classical History is studied in the Classics Department, but there is close liason with the Department of History; a special programme in International Relations is undertaken in association with the Political Science Department; and the Asian, Slavic and Modern European History programmes are designed in consultation with the appropriate area and language departments.

The primary value of the study of history is as part of a broad education in the society in which we live, and in its past development. For this purpose, the Department of History encourages the structuring of programmes under the direction of departmental advisers so as to include a wide variety of combinations of courses in the five-course Major. But for those who have the ability and the desire to study history intensively, the Department offers an Honours programme of special seminars, individual tutorials and a graduating essay. The Department also offers a Graduate programme of seminars, reading courses and thesis, for the professional training of historians, leading to the degrees of M.A. and Ph.D. Both the History Major and the Honours programme, however, are of considerable value as part of the preparation for such careers as: teaching; government service — especially the foreign service; journalism; law and politics.

• Linguistics focuses, principally, on the study of the structure of natural languages, and how this structure—phonological, morphological, syntactic, and semantic — changes through time and space. In addition to this empirical study, linguistics attempts to extract properties common to all language structure, and to develop a theory of general grammar. The study of language with respect to its acquisition, use, and cultural significance relates

linguistics to such areas as anthropology, language teaching, literature, and psychology.

The Department offers a Major programme at the undergraduate level. An Honours programme will be initiated during the 1970-71 session.

• Music. The Department of Music offers four-year courses leading to the Bachelor of Music degree with majors in Composition, Music History, General Music and Performance (Piano, Voice, Opera and all Orchestral Instruments). The Master of Music degree is offered in Musicology, Composition, Theory and Performance. The Bachelor of Arts degree with a major in Music is available to students who do not plan to pursue music as a profession.

The Bachelor of Music and Master of Music programmes offer continuing facilities for university students who plan to pursue music professionally as teachers in elementary and secondary grades, in universities, in private studios and conservatories; or as professional pianists, singers or performers in or-

chestras and chamber ensembles.

Admission requirements for first-year Bachelor of Music students are the same as for all University students with certain exceptions in the performance and composition programmes. It is possible to complete the Bachelor of Music degree in three years if a student transfers into this programme from first-year arts, science, education or Grade 13, or from another university, with a minimum of 15 units acceptable to the Faculty of Arts, but few students do well in such a compressed programme.

- Philosophy offers three kinds of undergraduate teaching: a) Courses for credit which aim at providing a thorough grounding in the elements of philosophy and at meeting some of the particular needs of students in other fields. b) An extensive programme of individual tuition for honours students. c) Series of special lectures. These are open to all members of the University, and are not for credit or examination. They represent work currently engaged in by members of the faculty or its visitors, and will give some indication of current philosophical thought in various fields.
- Political Science is concerned with the systematic study of the state, the relationship between the individual (or group) and the state, the process of decision-making relevant to public policies, and the external relations of the state. It is the science of power which deals with decisions regarding the authoritative (or politically binding) allocation of values. It has a wide scope and draws on the findings of history, philosophy, law, sociology, and other disciplines. Its main subdivisions are: Political Theory, National and Local Government, Public Administration, Political Parties and Public Opinion, International Relations. The professional activity (and to a large extent the teaching) of political scientists is focussed on the following: (1) examination of ideas (2) description and analysis of legal governments (3) construction of a scientifically-oriented discipline (4) elaboration of a normative doctrine (5) proposals for political and social action and reform. The purpose of political science is to understand politics rather than instruct in political behaviour or inculcate 'expertness'.
- Psychology: a social and life science concerned with the study of human and animal behaviour processes and characteristics. Many students will undertake courses in Psychology as part of their preparation for such fields as social work, education, medicine, commerce, or as part of a liberal education. Some of these students will elect Psychology as their major in the Arts programme, while others will select specific psychology courses related to their intended careers.

The Honours programme is intended primarily for those students who plan

a career in Psychology. Such a career, whether in the academic field, or research, or professional practice in the clinical, industrial or other applied areas, normally requires graduate work to the doctoral level. The Honours course is therefore designed to equip students for graduate work. The emphasis of the Department is upon Psychology as an academic discipline, and Honours students are afforded opportunities to participate in its research activities.

- Religious Studies offers courses at an introductory level to the major religious traditions of the world, and at a more advanced level, to Hinduism, Buddhism, Christianity and the religions of the Ancient Near East. A student may take elective courses in religious studies or he may enrol in either the Major or Honours programme leading to the B.A., or, if qualified, he may pursue a course of study leading to the M.A. in one of four fields: Buddhism, Christian Thought and Institutions, Comparative Religion, and Old Testament and Cognate Studies.
- Slavonic Studies presents two concentrations. Within the Department is a wide range of courses in Russian and Polish language and literature, and Serbo-Croat. Students aiming at all-round ability in Russian, including the spoken language, take an intensive course in the first two years, followed by comprehensive practical and literary studies in the third and fourth years. Non-intensive courses in the first two years are designed mainly to teach students to read Russian; special sections are organized for scientists. Russian and Polish studies in a variety of specialties are also pursued at the graduate level.

The other concentration is in Slavonic area studies. Courses in Russian and East European history, politics, economics, geography and other subjects, given in this and other departments, may be combined under specific programmes, including a general programme for Slavonic area studies.

• Theatre The Department of Theatre offers courses in the history of theatre, dramatic literature and criticism, acting, directing, theatrical design and production. The B.A. programme for majors is intended to balance the practical and academic aspects of theatrical training within the concept of the degree in Liberal Arts. The department does not prepare the student for the professional theatre; however, the B.A. programme prepares the student for the teaching of drama in the schools and for acceptance into any professional school or graduate programme in North America.

Most courses offered by the department are open to any student in the University who has taken the prerequisite. In addition, the Department offers a full programme of theatrical presentations for the benefit of university audiences. All students may participate in all productions of the department.

#### COMMERCE AND BUSINESS ADMINISTRATION

The Faculty of Commerce and Business Administration offers a four-year course of study (following completion of First Year of Arts or Science or two semesters at a regional junior college) leading to the degree of Bachelor of Commerce. It also offers programmes of study leading to the degrees of Master of Business Administration and Doctor of Philosophy.

It is intended that students who obtain the Bachelor of Commerce degree will on the one hand be familiar with the principles and techniques of those who are dealing most successfully with the varied problems of business—organization, development, control, and social responsibilities and, on the other hand, have the intellectual and cultural background to enable them to deal constructively as business men and citizens with the social, political and legal problems of their times and environment.

The Faculty does not attempt to prepare graduates in the skills and techniques of individual industries or services nor does it expect its graduates to assume immediate managerial responsibilities. It does assume that its graduates will be well trained in general techniques of business and will be ready to adapt these principles and practices to specific problems. It expects its graduates to display well-disciplined minds and sound work habits.

In accordance with this philosophy the curriculum is organized to ensure a proper blending of regular arts or science courses, business courses, and specialized courses in particular fields in commerce and business administration.

No particular programme of studies in the secondary school is necessary in preparation for admission to the Faculty except that students should take mathematics to the Grade 12 level. In Grade 13 the full five-course programme must include English 100/1 and Mathematics 113.

#### DENTISTRY

The dental programme consists of four years of professional study, leading to the degree of Doctor of Dental Medicine (D.M.D.)

The specific objective of the academic programme is to prepare dentists who will be able to practise their profession with a high degree of technical skill and competence based upon a sound understanding of the fundamental principles of basic biological sciences which underlie the practice of dentistry, and will be possessed of a deep insight into their social, professional and ethical responsibilities to the community at large. It is intended that the graduating dentist shall have the necessary scientific and technological foundation to begin the practice of modern dentistry but not that he should be completely knowledgeable in all phases of dental science and dental art. It is hoped to impart to students the concept that graduation is but a beginning step in their professional education and that this educational process must be continued throughout their professional careers through graduate study, post-graduate and continuing education courses, and programmes of self-study.

Admission to the Faculty of Dentistry is based primarily on academic ability and personal qualities as evidenced by predental scholastic records, aptitude tests, letters of recommendation, and personal interviews. Since facilities for pre-clinical and clinical instruction are limited, enrolment must of necessity be restricted to those who, in the opinion of the Faculty, are best qualified to meet the mental and physical demands of the curriculum and most likely to be able to complete successfully the full course of study. The fulfilment of the minimum requirements for admission should not be regarded as assurance that the applicant will necessarily be accepted.

In preparation for admission to the Faculty of Dentistry secondary school students should carry mathematics, chemistry and physics courses to the Grade 12 level (Mathematics 12, Chemistry 12, Physics 11 or Biology 11). Beyond Grade 12 level three further years of study are required as a minimum for admission to the study of dentistry. Students may complete the pre-Dentistry requirements in full at Simon Fraser University or the University of Victoria, or may complete the prerequisite studies in part at regional colleges or Grade 13; all such students must assume the responsibility of choosing courses at the other institutions that are parallel to the required pre-Dentistry courses at the University of British Columbia. An essential requirement is a good academic record with an accumulated average of at least Second Class in all courses.

Dental Hygiene. The programme of dental hygiene consists of two years of undergraduate professional education after first year university leading to a diploma in Dental Hygiene. The two-year curriculum of dental hygiene is under the direction of the Department of Public and Community Dental Health of the Faculty of Dentistry.

This programme is planned and organized to provide the professional education and training necessary for the specialized responsibilities of the dental hygienist in preventive dental health services. The purpose of the programme is to train and assist students to become competent dental hygienists, capable of participating with individuals, groups and other health personnel in providing dental health services. The specific objective of the academic programme is to prepare dental hygienists to practise their technical and professional skills with a high degree of competence. It is intended that the graduating hygienist will have a scientific understanding of the biological sciences upon which her profession is based and will ethically assume her professional and social responsibilities in society. It is desired that the graduating hygienist will be imbued with the concept of continuing education through postgraduate and refresher courses and constant self-study throughout her professional life.

Dental hygienists are university educated personnel with specialized skill in clinical and preventive dentistry and dental health education. They are the only dental auxiliaries who are licensed to provide direct clinical services to patients under the supervision of a dentist. Their duties include examination and recording of the patient's dental condition, prophylactic care of the teeth, taking and processing of x-rays, topical application of fluorides and other preventive agents, dental health education for individuals and groups and other duties relating to all aspects of clinical dentistry. Indeed, the amount of responsibility delegated to dental hygienists has increased markedly over the past several years and promises to increase even further in the future to keep pace with the expanding needs for dental care and the changing emphasis of dental practice from treatment to prevention. The dental hygienist may look forward to a very useful and interesting career as a needed member of the health profession.

The programme of dental hygiene offers excellent preparation for countless opportunities open to registered dental hygienists in different fields. In private practice the dental hygienist, as a member of the dental health team, provides preventive clinical services and education under the supervision of the dentist. In public schools, in compliance with school policies and under the direction of the supervising dentist and school administrator, the dental hygienist provides clinical services and health education in a programme designed to improve and maintain the dental health of school children. In public health positions, the dental hygienist aids in the maintenance of the total health of the community by augmenting the services of the public health dentist in areas of prevention, education and care. In industry, the dental hygienist provides preventive and health educational services for the beneficiaries of the industrial health programmes. In hospitals, as a member of the total health team, the dental hygienist provides maintenance and preventive services to assist the patient in his attainment of maximum health. In research, under the supervision of the dentist, the physician and the basic scientist, the dental hygienist participates in areas of basic and applied research. In teaching, a registered dental hygienist may instruct part-time in clinical dental hygiene in a school of dental hygiene. The profession is ideal for those who wish to combine a career with marriage. It is anticipated that the greatest future demand for dental hygienists will be in private dental practice, but there is an increasingly urgent need for qualified hygienists as educators in schools of dental hygiene and for consultants and co-ordinators of community dental health programmes. In whatever field the dental hygienist chooses to enter, the opportunities for service are increasing at home and abroad.

The entering class is selected on a competitive basis. Factors which are considered include: i) scholastic achievement; ii) personal qualifications. Careful consideration is given to the candidate's sincerity of interest, character and personality, personal appearance and health. Willingness to place public service first is a paramount requirement for anyone planning to enter one of the health professions. A basically ethical attitude, habits of dignity, tact, courtesy and neatness and poise, and a pleasant social manner are essential qualities of a successful dental hygienist. Since the hygienist will work under the supervision of a dentist, and with the general public and members of other professions, the ability to accept criticism and to co-operate under administrative direction is very important. General manual dexterity and adeptness in the use of small instruments are indispensable. The dental hygiene student should be in good health, and have good posture, vision and hearing.

In preparation for admission to the programme of dental hygiene secondary school students should carry Mathematics, English, Chemistry and Biology to the Grade 12 level. Physics 11 is recommended. Beyond Grade 12 level one further year of study is required as a minimum for admission to the study of dental hygiene. This year may be completed at a university, junior college or in Grade 13. A minimum 60% academic average is required.

### **EDUCATION**

The Faculty of Education provides a basic education for those who wish to become teachers, and advanced education courses for those experienced teachers who wish to achieve higher qualifications or undertake research. There are complete undergraduate programmes for those who wish to become teachers in nursery schools and kindergartens, in primary and intermediate grades, or in junior and senior secondary schools. There are specialized progrades, or in jumor and semor secondary schools. There are specialized programmes for those who wish to teach handicapped or retarded children and for those whose interests lie in the field of remedial education. There are additional provisions for specialists in Vocational, Industrial, and Adult Education. Special laboratory classes are available for intensive study of early childhood education, handicapped children, art education, music education, and science education.

This Faculty does not offer initial professional training during the summer or by evening classes. The method of earning a teacher's certificate is by fulltime attendance during a winter session beginning in September of any year. It is considered necessary that all undergraduates seeking to become teachers should spend at least two consecutive winter sessions in residence and in the Faculty of Education.

For experienced teachers a wide variety of advanced programmes has been designed for those who wish to specialise in such fields as adult education; education of the deaf; pre-school education; guidance and counselling; school administration; school psychology; tests and measurements; comparative education; history, philosophy and sociology of education; elementary education; secondary education. In addition, graduate students may specialise in academic disciplines such as English, Mathematics, Science, Social Studies, Languages, Art and Music as well as in particular educational fields such as programmed learning, audio-visual education, speech education, and special education.

# Degrees in Education:

B.Ed. (Elementary) - requiring four years of University study beyond Grade 12. (Note: Students may go out to teach after three years in the Al programme. A permanent certificate is awarded only after the completion of three years of University study.) requiring five years of University study beyond Grade 12. (Note: Students must complete the full B.Ed. (Secondary) five years before any certificate is awarded.) M.A. (Education) - requiring one full academic year of winter session residence beyond the B.Ed. (Secondary) or two full academic years beyond the B.Ed. (Elementary), the final one of which must be in residence. M.Ed. — with similar time requirements as M.A. but without the residence requirement. The degree may be achieved through summer session attendance. Ed.D. requiring two years' full-time residence beyond the

In addition to degree programmes for teachers, the Faculty also provides a one-year training programme in either Elementary or Secondary Education for those who have already obtained a University degree in another Faculty. This method of teacher education is not as complete or as satisfactory as the full B.Ed. programme. The academic content of majors in the B.Ed. degree is identical in quantity and quality with that given for B.A. or B.Sc. degrees. Almost all academic work for the B.Ed. degree is taken with professors in the Faculties of Arts and Science. Professional courses only are given in the Faculty of Education.

M.A. or M.Ed.

No particular programme of studies is necessary in secondary school in preparation for admission to the Faculty but students should anticipate their teaching majors if possible and get a thorough academic background in them. Furthermore, students should when possible take courses in art, music and theatre as these courses provide the cultural background and skills desirable for all teachers. For those students intending to specialise as teachers of art, music or theatre these courses are essential. Grade 13 students planning to enrol in the Elementary Division should take History 102; a science is also desirable.

#### **FORESTRY**

The profession of forestry offers many opportunities to young men and women with a general interest in the out-of-doors and a special concern for the management, utilization and conservation of forest and wildland resources. Since 1922, about 1,000 foresters and forest engineers have graduated from the University. Over 90 per cent of these graduates have remained in Canada and over 80 per cent. in British Columbia. Opportunities for employment of graduate foresters are excellent and salaries compare favorably with those of other professions. Foresters hold many positions of leadership and responsibility in the management, logging, manufacturing, and sales

organizations associated with B.C.'s forest industry. A wide variety of employment is available in business, government, research, teaching, consulting, and professional services.

The Faculty of Forestry offers a four-year course, following First Year Arts or Science (or the equivalent), which leads towards the Bachelor of Science in Forestry (B.S.F.) degree and is designed to educate students interested in professional careers in forestry.

As an undergraduate the student in forestry will find ample opportunity for profitable summer employment either with private industry or with various Federal and Provincial forest agencies. The student should be able to earn sufficient money to defray most of his University expenses. Summer employment in the field or manufacturing plant is considered to be an integral part of the student's training.

As an undergraduate, the student must attend three field-periods of instruction on the University's 10,000 acre Research Forest; one period of 10-field days preceding second year, 6-field days preceding third year, a period of 21-field days at the end of the third year.

The course in Forestry is arranged to provide basic knowledge of the sciences and their application to forestry problems. The course is divided into two main groups of options: the technical and the biological group. The technical group of options deals with the management of forest land, the techniques of growing, measuring, and harvesting of forest crops, and the manufacture and sale of forest products. The biological group of options is concerned with the many factors affecting the growth and health of trees and timber stands, and the relationship of forests to their environment. The biological options are specially concerned with all aspects of tree and forest research. Each option is planned to either facilitate post-graduate education or to provide the basic knowledge and skills needed for employment with industry or Government agencies. Students interested in a career in Forest Biology teaching or research rather than professional Forestry may elect a combined Honours programme in Biology and Forest Biology in the Faculty of Science.

Graduates from any option other than wood science should be eligible for registration in the Association of British Columbia Foresters.

Graduate programmes leading to the M.F. degree in all fields and to the M.Sc. and Ph.D. degrees in basic or scientific aspects of forestry and forest products are offered through the Faculty of Graduate Studies.

In preparation for admission to the Faculty, students in secondary school should elect a Sciences specialty including Chemistry 11 (and, if possible 12).

#### HOME ECONOMICS

The School of Home Economics has a two-fold function: first, to educate for professional competency and second, to encourage a spirit of intellectual

Home Economics as a profession is concerned with the ways in which it can benefit both the individual and the family. Graduates of the foods and nutrition programme may be employed in hospitals, health clinics, national and international agencies, or food companies. Graduates of the honours programme most often will continue on for higher degrees, in order to teach and carry out research in universities and research organizations.

In preparation for admission to the School of Home Economics students in secondary school are advised to include in their programme, Mathematics 11 or 12, Chemistry 11, Physics 11; Chemistry 12 and Biology 11 are suggested; and as many Home Economics courses as possible.

#### LAW

The Faculty of Law prepares students for admission to the practice of law and for business and government service. Study in the Faculty leading to the Bachelor of Laws (LL.B.) degree covers three full winter sessions.

The minimum requirement for admission to the Faculty is completion of the first three years of an approved course leading to a degree with an average of 65% in the Third Year. Most students obtain the B.A. degree or a bachelor's degree in another Faculty before seeking admission to the study of law.

A combined course in Commerce and Law is provided which leads to both the B.Com. and the LL.B. degrees. This programme consists of three years in the Faculty of Commerce and Business Administration followed by the three-year course in Law, i.e. a total of seven years following Grade 12.

No special curriculum need be followed by secondary school students who plan to enter the Faculty of Law.

#### LIBRARIANSHIP

The School of Librarianship offers a one-year post-graduate programme leading to the degree of B.L.S. (Bachelor of Library Science).

Libraries today are a fundamental part of the educational process; they are a basic resource for formal education at all levels, the chief means of self-education, and indispensable for scholarship and research. The task of librarians is to raise the value of print to its highest power. Librarians promote reading by making available a wide selection of materials; by organizing and describing the collections so as to facilitate their use; by stimulating and guiding reading for pleasure; by assisting and participating in the many-sided pursuit of information. Librarians must know and appreciate books and they must know how to make books effective.

The purpose of the School of Librarianship is to give a selected group of university graduates the understanding, motivation, skills and knowledge to make libraries most useful to our society and thus promote the ends which reading serves.

The teaching programme of the School, while not ignoring the need for instruction in the technical aspects of librarianship, gives chief emphasis to developing in its students the understanding, motivation and bibliographical knowledge by which to make libraries most useful to our society. A close knowledge of books and the sources of information for their effective use is the primary aim, and a semi-tutorial approach, by which faculty members work closely with students in small groups, is the basic teaching method.

In the first term, students take a sequence of required courses constituting the core of librarianship studies. These basic courses include cataloguing and classification, reference work and bibliography, the fields and functions of librarianship, book selection and evaluation, publishing and the book trade, and children's literature. In the second term, courses are for the most part optional and students concentrate their studies in fields of special interest. The chief fields of specialization are: university libraries, public libraries, school libraries, special libraries, cataloguing, reference service and technical services. Opportunities for employment in all these fields are now excellent.

A reading knowledge of foreign languages is useful in all areas of library work and essential in many. Students are advised to acquire a working knowledge of at least two foreign languages, preferably French, German, Russian, or Latin.

No special curriculum need be followed by students in secondary school who plan to enter the School of Librarianship.

#### MEDICINE

The Faculty of Medicine provides the basic training of students who wish to find their employment in one of the many fields of medicine.

Careers in clinical medicine include general practice and the specialties. General practice has an unlimited scope and the physician is free to make of it what he wishes. However, the successful general practitioner is usually one who serves as the family physician in a community. The specialties are so varied that one can be found to suit any personality or temperament. Because of the wide selection of careers in clinical medicine, a pre-medical student need not worry whether he will be suited for a particular field of medicine. If in the course of his training he discovers a preference for one branch of clinical medicine, he can plan a career in this field.

Careers which do not involve care of patients are too numerous to list, but most of them can be classified as teaching, research or administrative careers. Opportunities are excellent for a physician who wishes to follow an academic career. Medical schools are growing so rapidly that not enough qualified physicians can be found to fill the available positions. Teaching positions in the basic medical sciences are open to graduates with either a Ph.D. or M.D. degree. In Canada, most medical research is carried out by teachers in medical schools and the teaching hospitals. Most members of medical school departments are actively engaged in research programmes. Careers which are predominantly administrative are to be found in the university, the hospital, government and industry. Many are closely associated with clinical medicine and include public health, hospital administration, insurance medicine, industrial medicine, military medicine, aviation medicine, space medicine, etc. Opportunities are increasing in all these fields for physicians with special interests and talents.

A physician's education can be divided into four phases: (i) pre-medical preparation (minimum 3 years, beyond Grade 12, Senior Secondary School Graduation); (ii) medical school training (4 years); (iii) intern training (minimum 1 year) and specialization (minimum 4 years); (iv) continuing education.

At present the academic sessions in each of the first three years of the course are of 32 weeks' duration and that in the final year is of 30 weeks' duration. An increase in duration of the academic term in the final two years of the course is under consideration by a special committee of the faculty of Medicine appointed to study curricular revision.

In the pre-medical years in the Faculty of Arts or the Faculty of Science the student should develop scholarly talents and acquire a broad education. He must demonstrate to himself and to the medical school that he is an efficient scholar and is likely to master the courses which lie ahead.

In preparation for pre-medical studies a student in senior secondary school should take Chemistry 11 (and, if possible, 12), Mathematics 12 and Physics 11 (and 12, if available and of interest to the student).

#### NURSING

The School of Nursing offers programmes to students preparing for professional nursing, and to registered nurses extending their preparation by either degree or diploma programmes.

Admission of secondary school graduates and university general course students to the baccalaureate programme (leading to the degree of Bachelor of Science in Nursing) is after the completion of prescribed prerequisite courses at the First Year University level. It is four years in length and upon satisfactory completion of the programme the student is eligible to write the registration examinations of the Registered Nurses' Association of British Columbia. In preparation for admission to the study of nursing, senior secondary school students should take Mathematics 12, Chemistry 11, Physics 11 and one of Biology 12, Chemistry 12, Physics 12 (Biology is advised though not requisite). For students entering from other British Columbia universities and colleges, please refer to section in Applied Science p. A11, for comparable course numbers and equivalents. For students entering from Grade 13, please refer to section in Science p. A30.

Admission of registered nurses to the baccalaureate programme (leading to the degree of Bachelor of Science in Nursing) requires university entrance standing comparable to the above, and applicants are advised to establish their eligibility and course requirements prior to registering for general courses for which credit may be sought. Without credit beyond University entrance, the course is approximately three years in length. The University requires that credit equivalent to two years of work be taken at this University, one year of which, the final year, must be in full time attendance.

The baccalaureate programmes, based on the belief that the professional nurse should be a broadly educated person, combine the study of courses in Arts and Science with nursing courses selected to equip the student to solve nursing problems with professional competence, to fulfill the nursing role in the health team, and to develop, to the extent possible, leadership qualities which will serve to further the development of health services. Opportunities upon graduation include nursing in both hospitals and public health agencies, and with increasing experience, those positions in health agencies which include teaching, administration, and participation in research.

Registered nurses not wishing to undertake degree preparation may enroll in one of three diploma programmes offered by the School. These programmes each require university entrance standing for admission, are designed to meet present day needs of British Columbia health agencies for nursing personnel prepared to function as public health nurses, hospital nursing service unit administrators, and psychiatric nurses. For students wishing to proceed to further University study, some credit may be applied from diploma courses to the baccalaureate programme within a specified time following completion of any of the diploma programmes.

For baccalaureate nurses, the School offers a graduate programme leading to the degree of Master of Science in Nursing. Admission requirements include graduation from an integrated (or generic) programme or its equivalent. The programme is approximately two years in length and is designed to prepare selected graduates for leadership roles in nursing with emphasis being placed on the development of an expert in clinical nursing. Opportunities upon graduation are extensive at this level owing to acute shortages of well-prepared nurses in teaching, administration, and research in widely varied settings, including the newly developing interprofessional team activities.

All enquiries regarding nursing programmes should be sent to The Director of the School of Nursing, preferably in the early spring of the year for which the individual is applying.

#### PHARMACEUTICAL SCIENCES

Pharmacy is that profession which is concerned with the science of preparing from natural and synthetic sources suitable and convenient materials for distribution and use in the treatment and prevention of disease. It embraces a knowledge of the identification, selection, pharmacologic action, preservation, combination, analysis, and standardization of drugs and medicines. It also includes their proper and safe distribution whether dispensed on the prescription of a licensed physician, dentist or veterinarian or, in those instances where it may legally be done, dispensed or sold directly to the consumer.

The minimum requirement for the degree of Bachelor of Science in Pharmacy is five years of academic training beyond the Grade 12 level. This programme for Pharmacy is the standard agreed upon by the Canadian Conference of Pharmaceutical Faculties. The curriculum in Pharmacy has been designed to provide a core of required subjects comprising the necessary basic sciences and an amount of professional orientation and technology which will enable all graduates to function as competent pharmacists. Since graduates in pharmacy may find employment not only in community pharmacy but also in hospital pharmacy, pharmaceutical sales and promotion, industrial pharmacy, governmental pharmacy, and in other fields, elective courses are provided which will enable the student to enlarge his understanding of and preparation for the branch of pharmacy in which he intends to work.

Secondary school students contemplating admission to the Faculty of Pharmacy should by the end of Grade 12 have completed Chemistry 12 (or at least 11), Mathematics 12 and, if possible, Physics 11 or Biology 11.

Admission to the Faculty of Pharmacy follows a full year or two semesters of study in a university or college; subjects required are the equivalent of the following University of British Columbia courses: Chemistry 103, 110, 120, English 100, Mathematics 100 and 121 (120, 1968-69 or earlier), Biology 101 or Physics 130, and one non-science elective.

#### PHYSICAL EDUCATION AND RECREATION

The School of Physical Education and Recreation provides opportunity for study leading to the bachelor's and the master's degrees in physical education. Undergraduates are required to have a major in a second subject suitable for teaching in the secondary schools. Many graduates teach in the secondary and the elementary schools of the province; others find opportunities for employment in recreation and physical education in community centres, Y.M.C.A. and similar organizations.

Students who wish to prepare specifically for a career in recreation should enrol for the B.P.E. degree on the Programme for Specialization in Recreation.

Students may also study toward the Bachelor of Education degree with specialization in physical education and in an academic subject.

Secondary school students, who plan to enrol for the B.P.E. degree (with specialization in Physical Education), should take Mathematics 12, Chemistry 12 (at least 11), Physics 11, and, if possible, Biology 11.

Students on the B.P.E. programme (Physical Education) also undertake studies in another subject suitable for teaching in the secondary schools.

# REHABILITATION MEDICINE (Physical and Occupational Therapy)

The course offered at the School of Rehabilitation Medicine is combined training in physical and occupational therapy. The purpose of this course is to provide basic knowledge and technical skills required to practise these therapies.

The rehabilitative aspects of medical treatment become more important as the profession of medicine moves further into the field of chronic care. Increased recognition by physicians and patients of the value of the therapist's work has led to greater use of remedial treatment and remedial work techniques at all levels of care, acute as well as chronic. As the practising physician is asked to take more responsibility for these community services, it becomes apparent that he will require competent assistants. The present combined course in physical and occupational therapy is medically orientated to produce a well-qualified therapist who can fill an increasingly important role as the third member of the medical treatment team at hospital, rehabilitation centre, outpatient and home level, along with the nurse and physician. It is anticipated that increased interest in this field will place all branches of therapy in a more prominent position and create many more opportunities for those wishing to avail themselves of this training.

In preparation for admission to the School, secondary school students should include in their studies Chemistry 12 (at least 11), Mathematics 12, and, if possible, Physics 11 or 12. For admission to the School of Rehabilitation Medicine a student must complete a full year or two semesters of university or college work taking the equivalent of the following University of British Columbia courses: English 100, Chemistry 110, Biology 101, Mathematics 100 and 121 (120, 1968-69 or earlier), and one elective.

#### **SCIENCE**

The Faculty of Science consists of several departments; a general description of the studies offered in these departments is given below. Opportunities are offered for study to the bachelor's, master's and doctor's degrees.

Secondary School students should prepare themselves for admission to the Faculty of Science by presenting a Sciences Specialty on the Academic-Technical Programme for Senior Secondary School graduation.

Students from secondary schools in British Columbia planning to enter the Faculty of Science at the University of British Columbia are strongly advised as a minimum to have completed satisfactorily Chemistry 11, Mathematics 12, Physics 11 and Biology 11. In addition, a student must have one of Biology 12, Chemistry 12 or Physics 12 and, if possible, this course should be chosen in the proposed area of specialization at the University. Students should note that without the equivalent of Chemistry 11 and Physics 11, as a minimum, they may face major difficulties in meeting all the requirements of First Year of the Faculty of Science and will find it particularly difficult to complete in a minimum period of time a Major or Honours programme in Chemistry or Physics, or meet requirements for admission to the Faculty of Applied Science.

Grade 13 students should take English 100/1, Mathematics 113, Chemistry 112, Physics 101 and one of Botany 105 or Zoology 105. (Biology 12 should be taken as an extra in Grade 13, if possible, if one of these other courses is not available).

Students planning to enter the University from Grade 13 in British Columbia should note that Biology 100 will not be accepted for credit in First

Year of the B.Sc. degree course. Depending upon his interest, a student should elect Botany 105 or Zoology 105, either of which will be accepted for credit as equivalent to Biology 101 and be accepted as a prerequisite for admission to advanced courses in Botany, Microbiology, Physiology, and Zoology.

Students planning to enter the University from Grade 13 should also note that Chemistry 112 will be accepted for unit credit in the Faculty of Science as equivalent to Chemistry 103. However, Chemistry 112 will not be accepted as equivalent to Chemistry 110 or 120, except that a student with very high standing in Chemistry 112 may, with the permission of the Head of the Department of Chemistry, be allowed to proceed to courses for which Chemistry 110 is the normal prerequisite. Otherwise, unless a student has a high standing in Chemistry 112, he will be required to take Chemistry 110 or Chemistry 120 without unit credit before he can proceed on a Major or Honours programme in Chemistry. Chemistry 112 may, as Chemistry 103, be used as prerequisite to Chemistry 230.

Physics 101 will be accepted for credit as equivalent to Physics 110 or 130, but not Physics 120.

Mathematics 112 will be accepted for unit credit in the Faculty of Science as equivalent to Mathematics 130; Mathematics 113 will be accepted for unit credit as equivalent to Mathematics 100 and 121. A student who hopes to earn the B.Sc. degree will be seriously handicapped if he enters the Faculty of Science with only Mathematics 112. A student must have the equivalent of Mathematics 100 and 121 or 120 to take a Major or Honours programme in Mathematics. For most other programmes in the Faculty of Science, Mathematics 100 and 121 are required.

 Chemistry offers undergraduate training to chemistry specialists in an Honours programme and also in a Major programme; students wanting a less intensive background may take a general programme.

The Honours B.Sc. programme is a four-year course, with emphasis in the last three years on all branches of chemistry, and with mathematics and physics as ancillary subjects. It is intended to serve primarily as a basis for graduate work leading to the M.Sc. and Ph.D. degrees. The B.Sc. Major in chemistry includes many of the courses prescribed for Honours, but differs from Honours in having more electives in the course requirements of the final year, and in not requiring as high a standing of achievement. It provides full professional qualification in chemistry and is intended for persons seeking employment at the B.Sc. level in industry, Government research laboratories or in education as teachers of secondary school chemistry. Graduates of this programme, with appropriate standing, will be eligible for admission to graduate work.

• Geology offers programmes following the Honours, Major and General course as outlined in the Faculty of Science calendar. Practical field experience is essential and is provided by a Field Geology course and summer work, usually found with the government surveys and mining and oil companies.

Specialization in Geology is also possible by taking the Geological Engineering course in the Faculty of Applied Science. This course is especially suitable for students intending to work for the mining industry.

Students in First Year Science should take Geology 105 if they wish to specialize in geology; students who take the equivalent of First Year Science at another institution that does not offer Geology as a subject of study and who wish to take either the Honours or the Major programme will take Geology 105 in the Second Year and will follow a special course sequence worked out in consultation with advisors of the Department of Geology.

• Geophysics is a very broad subject which is concerned with the use of techniques in physics to study the nature and history of the Earth and its relationship with the solar system. It has practical applications such as prospecting for oil and minerals through the use of seismology, gravity and magnetism, and also covers a number of more fundamental fields. These include geomagnetism and the physics of the upper atmosphere, geochronology and isotopic studies, and thermal problems. For some of these studies some background in geology is desirable while for others chemistry or mathematics is more useful. In any case a reasonably strong background in physics is essential.

Three programmes are offered in the Department of Geophysics: Major in Geophysics, Combined Honours in Geophysics and Physics, and Combined Honours in Geophysics and Geology. The first programme provides a thorough basic introduction in geophysics, physics and geology, while the latter programmes provide a more intensive training in two of the three subjects.

In addition, a Geophysics option is available to students in the Applied Science Faculty enrolled in Geological Engineering and in Engineering Physics.

The Department of Geophysics also offers a Major in Astronomy, and Combined Honours Astronomy with Physics.

# • Life Sciences

Biochemistry is a scientific discipline which is concerned with the determination of the nature of chemical transformations within cells and tissues and the understanding of mechanisms by which chemical energy is transformed into useful work. Studies in biochemistry are concerned with the chemical substances needed to maintain life and growth, the biochemistry of reproduction and heredity and special problems of special tissues. Students contemplating careers as biochemists are advised that a good foundation in chemistry and biology is needed. The Honours and Major programmes leading to the B.Sc. degree have been designed to provide this training. The Major programme can lead to technical positions in various types of research institutes and departments and the Honours course is planned to lead into post-graduate study.

Biology is not treated as a department but as a field of study. Programmes are sponsored and instruction is offered cooperatively by the Departments of Biochemistry, Botany, Microbiology, Physiology and Zoology in courses in the Principles of Biology, Biometrics, Cell Physiology, Cytology, Ecology and Genetics. A combined Honours programme in Biology and Chemistry is available. A programme leading to the B.Sc. degree with combined Honours in Biology and Forest Biology has been developed by the Faculty of Science and the Faculty of Forestry for students primarily interested in research and teaching in this field and planning to proceed to graduate work. Students wishing to continue on a graduate programme in Biology should consult with the Life Science department or departments most appropriate to the field of specialization. In special cases inter-departmental graduate programmes can be arranged.

Botany. Honours, Major and general course programmes are available. The Honours course, covering a wide range of experimental and descriptive courses in botanical and biological subjects, is designed primarily to lead to post-graduate study. Courses in anatomy, biochemistry, cytology, ecology, genetics,

morphology, mycology, phycology, physiology and taxonomy form part of this programme. Students with an interest in an experimental approach to the study of plants are encouraged to include a larger number of courses in mathematics, physics and chemistry in their programmes. The Major course programme is suitable for those intending to teach either Botany or Biology in schools or for those intending to work in government laboratories, research institutes or museums. The general course is designed for those wishing to obtain a broad background in science.

Microbiology embodies the study of bacteria yeasts, molds and viruses. These studies are concerned with public health aspects, industrial applications and the biochemistry and genetics of microorganisms. The techniques and concepts learned through a study of microorganisms are of very general use to students in such fields as chemistry, the biological sciences, the medical sciences and home economics.

Physiology is a broad scientific discipline concerned with the normal function of living organisms. Certain aspects of the subject are therefore closely related to the interests of other Departments-Bacteriology (microbial physiology), Botany (plant physiology) and Zoology (comparative physiology). The Department of Physiology offers an Honours programme leading to the B.Sc. degree, in which emphasis is placed upon the physiology of vertebrate, and especially mammalian, organisms. The course of study includes intensive consideration of the general properties of living cells and of the individual organ systems of body and their control by the nervous system and by the endocrine organs. The programme is intended primarily to prepare the student for future graduate and research study, particularly in bio-medical fields.

Zoology concerns itself with the scientific study of all aspects of animal life: classification; the structure or anatomy of animal forms; their behaviour; their relationships with the environment; the chemistry and physics of animal function; the nature of their populations; the detailed anatomy of their cells and the molecular details of cell contents.

Many students will undertake several courses in zoology to prepare themselves for entry into such applied fields of human activity as medicine, dentistry, home economics, agriculture, or physical education. Others may wish to enter one of the zoological professions among which will be Fisheries Biology and Management; Forest Entomology, Agricultural Entomolgy, Parasitology and Wildlife Management Biology. Still other students will elect to study zoology for its intrinsic interest as a scientific discipline or to prepare themselves to undertake research or to teach zoology in universities or secondary schools.

General courses offered provide study in the structure and function of vertebrate and invertebrate animals, organ physiology, animal ecology, genetics and the philosophy and history of zoology.

Beyond these introductory programmes the department offers many undergraduate courses of a more specialized nature, such as the Biology of Vertebrate Animals, Biology of Fishes, Parasitology, Entomology, Embryology, Experimental Zoology, Animal Behaviour and Genetics.

The department maintains large research collections of insects, animal parasites, fishes, marine invertebrates, mammals and birds. It has its own experimental Aquaria with both fresh and salt water facilities, its own field trucks and equipment, small research boats and access to the larger vessels of the Institute of Oceanography and the Fisheries Research Board. The department has made a special feature of marine study and research, much of which is centred in the Institute of Fisheries. A small limnological station is maintained on Marion Lake.

The department has unique facilities for research with large and small wild mammals and birds. Special equipment available for this work includes a Vivarium, animal behaviour theatres, and thermoregulated respirometers that will measure the use of energy by animals from mice to deer.

The research laboratories are well-equipped with specialized physiological and biochemical instruments, electron microscopes and a modern computing centre

• Mathematics offers Honours and Major programmes in both the Faculty of Science and the Faculty of Arts. Students who plan to combine the study of mathematics primarily with that of physics, chemistry or other sciences should register in the Faculty of Science. Those who plan to combine mathematics with economics, philosophy, or other Arts subjects should register in the Faculty of Arts.

The Honours programme in mathematics, whether taken in the Science or Arts Faculty, is intended primarily for students who plan a career in mathematics or its applications. Such a career, whether in industry, government agency or in the academic field, normally requires graduate study to the master's or to the doctoral level. The Honours course is therefore designed primarily to equip students for graduate study in mathematics.

The Mathematics major in either the Science or Arts Faculty prepares students for secondary school teaching or for jobs in business, industry, or government agencies that require a moderate knowledge of mathematics. Outstanding students in the major programme may be given permission to take certain honours courses in partial preparation for graduate studies in Mathematics.

Senior Secondary School students wishing to take Science, Engineering, Architecture, or an honours or major programme in Mathematics must complete Mathematics 12.

• Physics offers courses leading to the B.Sc. degree (Honours, Major and General) described in the Faculty of Science calendar and to the B.A.Sc. degree in Engineering Physics described in the Applied Science calendar. Most of the graduates in the Honours course, many Engineering Physics graduates, and some Majors continue with graduate work leading to the Master's and the Ph.D. degrees. This is becoming ever more necessary and customary as preparation for a professional career in government, industrial or academic research. Financial aid for graduate studies is available from University and other sources for students with good records. Students who do not plan to go on for graduate work prepare themselves either for a career as secondary school teachers or for employment in industry or in government departments such as the Meteorological Service. The general degree programme provides a broad general education, but does not lead to a professional career in science.

#### SOCIAL WORK

The School of Social Work offers work leading to the degree of M.S.W. The School is accredited by the Council on Social Work Education, the authorized professional accrediting body for graduate social work education.

The accepted education for the profession of social work consists of a minimum of two university years of graduate study including lectures, clinical practice work in the field, and a research project or thesis, leading to the degree of Master of Social Work. The total course is designed to give a broad preparation for the field of social work and to develop skill in one or more fields of practice.

Requirements for entrance to the School are as follows:

- (a) The Bachelor of Arts degree, or an equivalent, from a recognized university. An emphasis on the humanities and/or the social sciences is preferred. Preference is given applicants with the equivalent of Second Class standing of this University (65% average).
- (b) Personal qualifications for the field of social work. Because maturity is an important factor, students are usually advised to wait until they are at least 21 years of age before beginning their professional educa-

It is recommended that in the First and Second Years of University undergraduates select for their electives as many introductory courses in the social sciences and/or humanities as possible. Third and Fourth Year courses which are particularly likely to be suitable for undergraduates proceeding to social work are anthropology, economics, political science, psychology and sociology.

No special programme of studies in secondary school need be followed to prepare a student for admission to Social Work. A suggested Grade 13 course is English 100/1, History 101 or 102 or both, Botany 105 or Zoology 105, and electives to make up a full programme of studies.

#### ADMISSION

# The University of British Columbia

Enquiries: to the Office of the Registrar, The University of British Columbia, Vancouver 8.

Deadlines: Winter Session, August 1. Summer Session, April 1,

All necessary educational documents and an Application for Admission form must be submitted by the designated date.

#### General Reservation on Admissions:

The University reserves the right, the published regulations notwithstanding, to reject applicants for admission on the basis of their overall academic records even if they technically meet entrance requirements and to limit enrolment if its facilities and resources are inadequate by selecting from among qualified applicants those who will be admitted.

# Appeals:

Applications are screened carefully in accordance with Senate policy. The Senate Admissions Committee reviews doubtful cases and cases of appeal against decisions made on the basis of Senate policy.

#### A. Admission from Grade 12, British Columbia Secondary Schools

The minimum academic qualification for admission to the University is Senior Secondary School Graduation (Academic-Technical Programme). This programme is approved by the Senate of the University for the purpose and is administered by the Board of Examiners of the Province on which are representatives of both the University and the Department of Education.

An applicant will be admitted who obtains an average of at least 65%

on recommended grades from an accredited senior secondary school or on a combination of school grades and gradings on examinations conducted by the Department of Education and is considered by the Admissions Committee to give promise of success in university studies. If the applicant has an average below 65% but not less than 60% he will be admitted on the same conditions if the University has the resources to accommodate him.

The average is calculated on four marks by considering English 12, and the highest marks of three subjects constituting an Arts, Sciences, or Technical Specialty. Borderline cases are reviewed and where doubt exists the overall average of the academic subjects of Grades 11 and 12 is a factor in the final decision.

Where there is need to compare letter grades with percentages, the following equivalences will be used: A-86%; B-73%; C+-67%; C-60%; P-50%.

A Grade 12 student who passes one or two Grade 13 subjects may, if the standing obtained is sufficiently high, be granted advance placement in this subject or subjects on registration at the University, but no advance credit will be assigned, i.e., his university programme will not be shortened thereby.

Graduates in the Arts or Sciences specialties will be required to have a second language to the "11" level. Graduates in a Technical specialty must have credit for a second language to the "10" level.

The University reserves the right to require additional study time of those admitted whose previous studies are inappropriate to the programme to be taken at University.

Students who complete graduation through "college preparatory" studies are expected to complete at least two semesters of college and study before applying for admission to the University.

# B. Admission from Grade 13, British Columbia Secondary Schools

An applicant will be admitted, subject to the regulations of the Faculty being applied for, if he has obtained in the Departmental Grade 13 examinations:

- (i) passes in the five subjects of a full study programme with an overall average of at least 60%, or
  - (ii) passes in three or in four subjects with an average in these of at least 65%.

Furthermore, admission under the conditions listed will be subject, normally, to the applicant having an acceptable Grade 12 standing, and having passed at least three Grade 13 examinations at one examination period.

A student who does not meet the requirements as stated may re-apply after he has completed the full Grade 13 programme of five subjects with the required standing.

A student once having been admitted to the University shall be subject to the University regulations in respect of supplemental examination privileges and may not obtain standing for subjects subsequently completed by way of Grade 13 Departmental examinations and thereby circumvent these regulations.

A student may not receive credit for subjects taken through Grade 13 examinations after he has been granted 15 units of course credit either as advance standing on admission to the University or through completion of university courses or a combination of these.

See p. A30 under "Science" for a description of Grade 13 science course equivalents.

# Admission on Transfer from a Regional, District or City (junior) College in British Columbia

The University is guided in its evaluation of academic programmes of study offered in the public colleges in British Columbia by the Academic Board which is charged under the *Universities Act* with the power "to advise . . . on orderly academic development . . . of colleges established under the Public Schools Act by keeping in review the academic standards of each . . . ".

The University will accept students on transfer from public colleges on the same basis as students transferring from a provincial university. A student who chooses courses at a public college that are appropriate to his academic objective at the University and who obtains adequate standing in them will be accepted for further studies at the University under the same conditions that apply to a student who has taken all his post-secondary studies at the University.

A student seeking transfer to the University following success in his studies through two semesters (one year or 30 semester-hours of credit) at a college will be considered on standing shown on the transcript of his record issued by the college. This level of admission is comparable to that following Grade 13.

A student seeking transfer to the University following success in his studies through four semesters (two years or 60 semester-hours of credit) at a college will be considered for admission to the level of the third year at University.

# Some elements of transfer policy:

- 1. The basic principle is that transfer be considered only for those students whose previous academic records are satisfactory. The minimum standing considered as satisfactory is a C average or gradepoint average of 2.0 (calculated on a 4-point scale: A=4, B=3, C=2, D=1) on all college courses attempted.
- The University does not insist that individual courses taken at the colleges have exact counterparts in the University curriculum in order that credit be granted on transfer. However, transfer cannot be permitted if an applicant is deficient in the academic preparation required of the study programme into which transfer is being requested. Academic college courses having no counterparts in the University curriculum will be recorded as "unassigned credit", providing the standing in them is C or better.
- 3. Students transferring from any college or university may not be granted transfer credit for courses in which they obtained the minimum passing grade. A college grade of D (below 55% in U.B.C. marking) is not credited on transfer to degree programmes leading to degrees such as: B.A., B.Ed., B.Sc. but after a student has completed at least one year of successful study at the University he may petition for credit up to 6 units (12 semester hours) for college courses with D grades.

A college grade of D in a preparatory year such as pre-Commerce or pre-Forestry does not prevent acceptance to the Faculty concerned unless it has been assigned to a subject for which admission requirements prescribe a better grade. For example, pre-Engineering requires that no grade be less than C.

4. Students who have attended college are expected to have completed at least two semesters of study at the college before applying to the University; i.e. transfer should not be sought on the basis of less than 30 semester-hours of college credit. Students who have attended more than two semesters are normally expected to present 60 semester-hours (four semesters) before applying to the University for admission.

- 5. Transfer credit from two-year institutions is applied only on the University first (freshman) and second (sophomore) years. The maximum credit permissible on transfer is normally 60 semester-hours.
- A student may not receive credit for subjects taken at a college after he has been granted 30 units (60 semester-hours) of course credit either on transfer or by a combination of transfer and University credit.
- 7. A student attending a college (or another university) on a student visa will not be considered for transfer to the University unless his standing on admission to the college met the minimum University requirement expected of students admitted direct to the University from the student's home country.

# D. Applicants from outside British Columbia.

Applicants completing schooling outside British Columbia whose homes are in British Columbia will be considered on the same basis as applicants from this province. This policy applies to students who, subsequent to High School Graduation, become domiciled in British Columbia.

# 1. Applicants from other Canadian provinces

(All applications are subject to a \$10.00 fee except to Graduate Studies). The University is not able under present conditions to accept generously the applications of all students who seek admission. In particular, students seeking admission to Faculties giving professional studies are normally discouraged from transferring prior to their completion in full of the pre-professional studies.

The minimum academic qualification for admission is matriculation provided that the subject matter presented and the standing obtained, in addition to meeting the University requirements, meet the entrance requirements of the applicants' own provincial universities.

Admission will be limited to applicants with good academic records. All applications are considered on an individual basis. Applicants should not anticipate acceptance if their average standing on senior matriculation is less than 5% above the minimum standing required by their own provincial universities. Applicants holding Grade 12 certificates will not be granted advance credit in a degree programme for subjects of Grade 12.

Alberta—Grade 12, average at least 65%, considered for admission to the First Year of faculties such as Arts, Education, Science.

Saskatchewan—as for Alberta except that the minimum acceptable average is 70%.

Manitoba—as for Alberta.

Ontario-Grade 13, average at least 70%, considered for admission to the Second Year in faculties of Arts and Education but to the First Year in the Faculty of Science. At least four subjects and seven credits must be presented; this represents a one subject deficiency at the First Year level in the faculties of Arts and Education (the deficiency can be made up in the Second Year).

Applications cannot normally be accepted for direct admission from Grade 13 to the following programmes: engineering, forestry, nursing, rehabilitation medicine, dental hygiene, commerce, pharmacy.

Quebec—Graduation from a C.E.G.E.P. in an acceptable programme with satisfactory academic record. Admission normally anticipated into the Second Year of faculties such as Arts and Education.

-McGill Senior School Certificate or the Senior High School Leaving Certificate or the equivalent with a standing at least 5% above the minimum acceptable to a university such as McGill.

New Brunswick-Applicants will be required to show a level of achievement that will grant them acceptance to the University of New Brunswick at the sophomore level with a standing of at least 5% above that required by that institution. Other conditions on acceptance are similar to those that apply to students from Ontario.

Nova Scotia-Grade 12 with an average at least 70%; otherwise similar situation to Alberta.

Newfoundland—The minimum standing required is 65% on a full First Year at Memorial University or the equivalent.

Prince Edward Island—The minimum standing required is 65% on a full First Year at Prince of Wales College or at St. Dunstan's University.

Yukon—admission requirements as for students from British Columbia.

# 2. Applicants from Other Countries

(All applications are subject to a \$10 fee except to Graduate Studies).

It is University policy to accept students from other countries only after they have carried their undergraduate studies to the highest reasonable level in their own educational systems. Under the stress of enrolment pressure the University is now taking this policy more literally than has been the practice.

Overseas students must not travel to Canada in the hope that they will be admitted, either directly or following studies in a junior college or another university, with qualifications inferior to those specified in this calendar.

Minimum standing for admission in terms of some educational creden-

- (i) General Certificate of Education (G.C.E.) -standing in five subjects including English, a second language, mathematics, a laboratory science, and one academic elective, of which at least three must be at the Advanced (A) Level. At both Ordinary and Advanced Level an average grade of "3" with no subject below "4".
- (ii) School Certificate—as for the G.C.E. (i) above with three passes at the Principal Level on the Higher School Certificate.
- (iii) University of Hong Kong Matriculation Certificate—standing equivalent to (i) above).
- (iv) Certificate of Matriculation of recognized universities.
- (v) High School Graduation and completion of at least one full year of study at an accredited college or university in the United States of America. Grade average of "B" or better. High School studies to include at least: 7 semesters of English, 6 semesters in one foreign language, 4 semesters laboratory science, 6 semesters mathematics. College or university studies of at least two semesters or three quarters to permit acceptance at the University of British Columbia at the sophomore level.

(vi) Students from India must, as a minimum requirement, possess a bachelor's degree, division I.

Original documents that *cannot be replaced* should not be sent, but rather certified copies or photographic copies should be submitted. Students admitted on the basis on such copies are required to present the original documents for verification upon registration in person.

Unless the applicant's diploma or certificate shows the gradings obtained in the several subjects of the work taken, he must arrange to have a statement of his grades sent to the Registrar by the educational body issuing the diploma or certificate.

Commonwealth students are warned that examinations written in May, June or July of one year may be considered for admission only in September of the year following.

Applications with all supporting documents must be in the office of the Registrar in Vancouver not later than June 1, for the Winter Session beginning in September.

#### Additional information for students from other countries

- (i) A student coming directly from another country must give satisfactory evidence of his ability to meet the costs of tuition, board and room, books and incidentals for his entire projected study period at the University.
- (ii) A student from a country where English is not the common language must satisfy the Registrar that his knowledge of English is adequate to permit the successful pursuit of his studies. The Registrar will normally require the applicant to take a test of facility in the English language; the test will be available to the student in his own country or at a reasonable distance. Information is given on the Application for Admission form.
- (iii) All successful applicants from foreign countries and students who have not matriculated from a high school where English is the language of instruction, shall report for screening tests on the Friday preceding the week of registration; students who fail so to report may be denied admission to the University. No such student shall be allowed to register before he has taken the screening test.

The Committee in charge of the preparatory English classes shall, upon reading the screening tests, recommend as to the student's admission and to the level and number of courses in which registration should be permitted. A student for whom the preparatory English course is prescribed must attend classes regularly if he wishes to continue with his University course. He will be admitted to the credit courses in English and certain other subjects only after he has achieved reasonable competence in the work of the preparatory classes.

- (iv) A student must enrol for the course to which he has been admitted. Transfer to another programme will not be considered until the person concerned has completed at least one session in the course for which he was admitted to this University.
- (v) A person from overseas, who has been admitted to a university or college in Canada or the United States, will not be permitted to transfer to this University until he has obtained a baccalaureate degree.

# E. Applicants for admission to the Faculty of Graduate Studies

The minimum requirement for admission to the Faculty of Graduate Studies is graduation from a recognized university or four-year college with at least a bachelor's degree in an honours programme or the equivalent. The standing required is at least an "upper second class".

Applicants should direct their initial enquiry, giving as much information as possible on their academic expectations and objectives as well as a clear indication of their academic ability, to the Head of the Department at the University in which they hope to do graduate study.

The calendar of the Faculty of Graduate Studies gives full details on programmes of study being offered, the names of the Heads of Departments, and other pertinent information.

# F. Limitation of Attendance:

- (a) The University reserves the right to limit attendance, and to limit the registration in, or to cancel or revise, any of the courses listed. The curricula may also be changed as deemed advisable by Senate. Information concerning limitations on registration and attendance for the various faculties and schools is found in the sections of this calendar devoted to those faculties and schools.
- (b) Except in special circumstances, no student under the age of sixteen is admitted to the University.

#### REGISTRATION

Every student is required to state the names of all educational institutions of secondary or higher level attended and to submit evidence of the standing obtained at each.

1. Registration for New Students: As a preliminary step, a student applying for registration for the first time in the University must obtain from the Registrar's office an Application for Admission form. The completed form, together with necessary certificates and two recent passport-type photographs of the applicant, must be submitted by August 1 in the case of a student proposing to attend the winter session, except for students from other countries who must apply by June 1, and by April 1 for the summer session. (For application dates, Faculties of Law, Medicine and Pharmacy and Schools of Architecture, Nursing and Social Work students are referred to appropriate sections of this bulletin).

Following receipt of this form the applicant will, in due course, be advised with respect to his admission and standing, and, if eligible, given instructions on procedure for completing registration.

Documents submitted in support of applications become the property of the University and must remain in the office of the Registrar.

Re-registration: A student in the regular winter session will be sent, along with a statement of his marks, an Authorization to Register if he has qualified for admission to the next higher year of his course, or an Application for Registration, as soon as possible after the sessional examinations.

Change of Programme: A student who wishes to transfer to another faculty or school within the University must notify the Registrar of his intentions well in advance of the opening of the next session and before August 1.

3. Completion of Registration: Registration must be completed in person on the dates indicated in the Authorization to Register form. Assessed fees are due and payable at the time of registration. No student will be permitted to complete registration until such fees have been paid.

Each student is required as part of his first application to furnish the information necessary for the University record, and to sign the following declaration:

"I hereby accept and submit myself to the statutes, rules and regulations, and ordinances of The University of British Columbia, and of the faculty or faculties in which I am registered, and to any amendments thereto which may be made while I am a student of the University, and I promise to observe the same."

In the information furnished for the University records, the student is requested but not required to indicate his religious denomination. This information is available upon request to the representatives of the denominations.

4. Change of Registration: A student desiring to make a change in the programme of courses for which he has registered must apply to the Registrar's office. Except in special circumstances, no change will be permitted after two full weeks of the autumn term have elapsed.

All other pertinent changes, including those in address and telephone number, must be reported promptly to the Registrar's office.

5. Student Responsibility: Each student is responsible for the completeness and accuracy of his registration. He must ensure that there is no discrepancy between the programme he is following and that entered on his course card in the Registrar's office.

A student may not take courses for which he has not registered, and may not drop courses without permission.

#### CLASSIFICATION OF STUDENTS

- 1. Full: a student proceeding to a degree in any faculty who has met all requirements of the year in which he is registered.
- 2. Conditioned: a student proceeding to a degree with defects in his standing which do not prevent his entering a higher year under the regulations governing *Examinations and Advancement* of the faculty in which he is registered.
- 3. Occasional: a student who has been granted permission to enroll in certain courses and attend classes on the understanding that he will not be entitled to credit towards a degree in any work taken.

This category includes the student who, because of maturity, has been permitted to enroll in spite of deficiencies in his formal academic record. In the event that he obtains sufficiently high standing and indicates his desire to proceed to a degree, he may later be given credit by the faculty concerned for all or part of the work taken.

#### 4. Probationary:

- (a) A student who passes 6 units in the Second Year of University following Grade 12, while not receiving credit in the year, may re-enrol on probation to repeat his studies but during the subsequent session may be required to withdraw at any time for unsatisfactory progress.
- (b) A student in the First Year who obtains credit for only 9 units on a full programme will be re-admitted on probation but during the subsequent session may be required at any time to withdraw for unsatisfactory progress.
- (e) A student at any level of University study who fails for a second time, whether in repeating a year or in a later year, will be required to withdraw from the University; he may be re-admitted after a period of at least one year if his appeal to Senate is supported by the Committee on Admissions of the Faculty concerned and upheld by Senate.

#### GENERAL CONDUCT

The University authorities do not assume responsibilities which naturally rest with parents. This being so, it is the policy of the University to rely on the good sense and on the home training of students for the preservation of good moral standards and for appropriate modes of behaviour and dress.

#### ATTENDANCE

Except where specifically stated otherwise in the regulations of a particular faculty or school a student may not receive a degree unless he completes the equivalent of two winter sessions in attendance at the University, one of which must be the final year.

Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments may be excluded from the final examinations. Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes.

Students, who because of illness are absent from a December or April examination, must submit a certificate, obtained from a doctor, to the University Health Service as promptly as possible.

#### GRADUATION

Every candidate for a degree must make formal application for graduation. Application for graduation must be made not later than March 15. Special forms for this purpose are provided by the Registrar's Office.

# WITHDRAWAL

Any student who after registration decides to withdraw from the University must report to the Registrar's Office. He will be required to obtain clearance from the University, to the satisfaction of the Registrar, before being granted Honourable Dismissal or recommended, where applicable, for refund of fees.

The Senate of the University may require a student to withdraw from the University at any time for unsatisfactory conduct, for failure to abide by regulations, for unsatisfactory progress in his programme of studies or training, or for any other reason which is deemed to show that withdrawal is in the interests of the student and/or the University.

#### FEES

- 1. The University reserves the right to change fees without notice. Students who have not completed their course requirements when a change in fees is made will be affected by the change.
- 2. Fees must be paid by certified cheques, bank or postal money orders or by travelers cheques (payable to "The University of British Columbia").
- 3. The schedules below for full-time students give fees payable by students in each winter session, including the "Alma Mater" fee but not the "Graduating Class" or "Hospital" fee.
- 4. The Alma Mater fee, authorized by the Board of Governors, is exacted from all students in the winter session for the support of the Alma Mater Society. This fee is either \$29 or \$19, depending upon a student's course load. Inquiries with respect to this fee should be directed to the Alma Mater Society.

- 5. The Graduating Class fee, authorized by the Board of Governors, is exacted from all students in the winter session who are registered in the Final Year of a course leading to a first bachelor's or the M.D. degree. This fee of \$7 is for the support of the graduating class activities. Inquiries with respect to this fee should be directed to the Alma Mater Society.
- 6. A student who withdraws after October 20 and before lectures begin in January is entitled to a refund of one-half of the sessional fees, if these have been paid in full, but no refund of A.M.S. fees. A student who notifies the Registrar prior to October 20 of his withdrawal from the University will be entitled to a refund of fees paid less \$36 (\$35 tuition fee \$1 A.M.S. fee) for each week, or part of a week, from the beginning of lectures in September. A student who withdraws after February 16 will receive no refund of fees. A student who notifies the Registrar prior to February 16 of his withdrawal will be entitled to a refund of one-half of the sessional fees, if these have been paid in full, less the A.M.S. fee and \$36 for each week, or part of a week, from the beginning of lectures in January.
- 7. The total sessional fees are due in September, but as a convenience to students fees may be paid in two instalments, one on registration in September and the balance by the opening day of lectures in January. Students are not entitled to admission to classes until they have registered and paid fees. Students who arrange to pay fees in two instalments should mail certified cheques, bank or postal money orders for the balance of the sessional fees to the Finance Department before lectures begin in January with a note showing name and registration number.
  - 8. Fees are not transferable from one session to another.
- 9. When permission to register late is granted, a late fee additional to all other fees, will be charged. The late fee is \$25 plus \$5 per diem after the last prescribed day for registration of the late registrant's faculty and year. This fee must be paid at the time of registration. Refund of this fee will be considered only on the basis of a medical certificate covering illness or on evidence of domestic affliction, and students wishing to appeal may do so, on such grounds, providing they do so in writing to the Registrar, prior to November 1.

Students undertaking summer employment should understand that the late registration fee will not be waived if, because of the employment, they are not able to be present to register during registration week. Such students should honour their summer employment contracts and budget for the late fee as part of their summer financing.

10. A late payment fee of \$20 additional to all other fees will be assessed after January 15, 1970, this fee will be increased to \$30 after January 30, 1970. Refund of this fee will be considered only on the basis of a medical certificate covering illness or on evidence of domestic affliction. Students who are unable to pay their fees on time owing to new Canada Loan or Bursary arrangements not having been finalized should see the Finance Department prior to January 15, 1970. Appeals must be made by February 15. If fees are not paid in full by February 16, 1970, the registration of students concerned will be cancelled and they will be excluded from classes.

If a student whose registration has been cancelled for non-payment of fees applies for reinstatment and his application is approved by the Registrar, he will be required to pay a reinstatement fee of \$10, the late fee of \$30, and all other outstanding fees before he is permitted to resume classes.

11. Students living outside the Province of British Columbia are not eligible for payment of hospitalization costs under the British Columbia Insurance Service until they have lived in the Province for the previous 12 months.

All Canadian provinces accept responsibility for hospital costs for their students attending the University of British Columbia provided the hospital insurance premiums (required in Ontario, Manitoba and Saskatchewan) have been paid. Alberta requires a higher rate of co-insurance than other provinces.

Students outside of Canada should make sure they have a medical plan which includes hospitalization benefits. A Plan which is especially for students is the University Health and Accident Plan, which includes medical care plus hospitalization benefits. For further information consult the Health Service.

The hospital rate in British Columbia ranges from \$20-\$30 a day.

# Students not living in British Columbia should read the above carefully. Full-time Students

Sessional fees are payable in full at the time of registration. However, students may pay fees in two instalments, the first at registration in September (see the amount of the September payment shown in parentheses by the sessional fees in the following list). Students who elect to pay fees in two instalments must make the payment of the balance not later than the first day of lectures in January. Students who withdraw should notify the Registrar immediately in order that the fee assessment may be revised, whether or not fees have been paid. Fees assessed and not paid or cancelled may prevent a student from returning to the University at some future date.

Refunds will be calculated as of the date on which the Registrar is notified of withdrawal. The maximum refund possible is the total of fees paid less \$10.

Fac	ulty and Course:	Sessional fe	ee amount
1.	Agricultural Sciences—		
	Agriculture (B.Sc., Agr.)	\$469.00	(249)*
2.	Applied Science—	*	(/
	Architecture (B.Arch.) Engineering (B.A.Sc.) Nursing (B.S.N. or Diploma)	551.00 551.00 409.00	(290) (290) (219)
3.	Arts—	200.00	(===)
	Arts (B.A.) Home Economics (B.H.E.) Librarianship (B.L.S.) Music (B.Mus.) Social Work (M.S.W.), 1st Year 2nd Year	457.00 457.00 503.00 573.00 503.00 457.00	(243) (243) (266) (301) (266) (243)
4.	Commerce and Business Administration—		
	First Year (B.Com.) Other Years (B.Com.) (B.ComC.A.) Spring Term	457.00 535.00 119.00	(243) (282) (—)
5.	Dentistry—		` /
	Dentistry (D.M.D.) Dental Hygiene	673.00 535.00	(351) (282)
6.	Education—		, ,
	Education (B.Ed.) Industrial Arts Emergency Day Programme Physical Education (B.P.E.)	457.00 39.00 457.00	(243) (—) (243)

7.	Forestry (B.S.F.)	535.00	(282)
8.	Law (LL.B.)	535.00	(282)
9.	Medicine—  Medicine (M.D.)  Rehabilitation Medicine (B.R.M.)	673.00 409.00	(351) (219)
10.	Pharmaceutical Sciences (B.Sc., Pharm.) First Year Other Years	457.00 535.00	(243) (282)
	Science (B.Sc.)	457.00	(243)

<sup>\*</sup>September instalment in parentheses.

12. The Graduate Student Centre fee of \$26.00, authorized by the Board of Governors for the support of the Graduate Student Centre, is required of all "on campus" students registered in the Faculty and is payable in full at the time of registration. Graduate students in Summer Session are assessed a fee of \$3.00. The Alma Mater Society fee of \$29.00, authorized by the Board of Governors, is required of all students in their first year in the Faculty.

		September	January	Sessional
(a)	Ph.D. or Ed.D. degree:	•		Fee
	First Year	\$205.00	\$150.00	\$355.00
	Second Year	176.00	150.00	326.00
	Third Year	176.00	150.00	326.00
	each subsequent year on campus	76.00		76.00
	each subsequent year off campus	25.00		25.00

A student taking a master's degree at the University of British Columbia and then proceeding to a doctor's degree shall pay the same total fees (including fees paid on the master's course) as a student admitted directly to doctoral studies. A student with the master's degree from elsewhere will be exempt the fees as scheduled for the Third Year.

A student who fails to register as required will forfeit his candidacy; it will be re-established only if his application for reinstatement is approved by the Head of the Department concerned and the Dean of Graduate Studies, and the student pays a fee of \$100.00 plus any applicable incidental fees.

# (b) Master's degree:

15-18 unit programme. Total fee \$600.00 plus Graduate Study Centre fee and A.M.S. fee when applicable.

	September	January	Sessional Fee
lst Year	\$205.00	\$150.00	\$355.00
2nd Year	176.00	150.00	326.00
each subsequent year on campus	76.00		76.00
each subsequent year off campus	25.00		25.00

Candidates completing the degree requirements before the beginning of the Second Term of the Second Year will be exempt half of the balance of the two-year fee still outstanding. In case an exemption is granted, the final payment must be made at least one month before the expected date of completion.

A student who fails to register as required will forfeit his candidacy; it may be re-established only if his application for reinstatement is approved by the Head of the Department concerned and the Dean of Graduate Studies, and the student pays the total of the prescribed fees for the years in which he failed to re-register. Any student who completed residence requirements prior to September 1965 will be required only to re-register and pay fees for the session in which work for the degree is to be completed.

- (c) Master's candidates taking their course work during Summer Sessions or those who do not pay the fees as indicated in (b) will be assessed fees on a course basis but may not pay less than the prescribed fee of \$600. The Summer Session Association or A.M.S. fee will be assessed on registration in each session. Master's candidates taking their course work during Winter Sessions may attend Summer Session courses, if recommended by their study programme advisors, without further payment of fees.
- (d) Graduate students accepted as candidates for a graduate degree who are required to take prerequisite or additional courses may do so without additional fee, provided that they keep within an overall maximum of 27 units for the Master's degree; they are subject to sessional fees of \$30.00 per unit for courses beyond 27 units.
- (e) Students not admissible to the Faculty of Graduate Studies who hope to qualify for admission will register as Qualifying and will be assessed fees on a per unit basis for all courses taken. Fees paid under these circumstances will not subsequently be credited in a graduate degree programme. Admissions in this category are limited and are not normally granted to holders of degrees of other universities.
- (f) Graduate students not working toward a graduate degree will be registered as Unclassified and will be assessed fees on a per unit basis.

### Part-time Students, day or evening classes.

Students taking at least 80% of the studies of a normal full-time programme will be assessed fees on the same basis as full-time students.

In those Faculties and Schools having courses on a unit basis, students taking 12 units or more will be assessed fees as for Full-time Students; those taking less than 12 units but more than 6 units will be assessed fees on the basis of \$30 per unit; those taking 6 units or less will be assessed fees as shown below for the Summer Session.

In those Faculties and Schools not using the unit system fees will be assessed on the basis of the fraction of the full programme of studies being taken in terms of contact-hours, as follows: 4/5 or greater, as for Full-time Students; from 3/5 up to but not including 4/5 of full studies—80% of sessional fees; from 2/5 to 3/5-60% from 1/5 to 2/5-40% below 1/5-20%.

Students (such as those described in 12 (e), (f), above) who are required to pay fees on a per unit basis will be assessed \$30 for each unit if taking more than 6 units, and will be assessed as for the Summer Session if taking 6 units or less.

Students enrolled in the Winter Session taking 6 units or less must pay

fees in full in September as required of Extra-Sessional students. Arrangement for any other procedure must be made with the Accountant.

All part-time students will be assessed A.M.S. fees: \$19 on a course up to and including 6 units or a study programme less than 2/5 of a full programme; \$29 on all others.

A student in a baccalaureate programme who registers for a graduating essay or thesis in a winter session and who is unable to complete the requirements for it, is required to register again in the session in which he plans to submit the essay or thesis and pay a fee of \$50 plus A.M.S. fee if he is on campus or a \$25 fee if he is off campus. A student will be considered 'on campus' if he is making use of the library facilities and having interviews, on occasion, with his faculty adviser.

#### Summer Session

Fees payable on Registration:

Minimum Class Fee	\$ 50.00
3-unit course	100.00
2-unit course	68.00
l½-unit course	50.00
1-unit course	34.00
½-unit course	17.00
Summer Session Association	2.00
Change of course	5.00
Graduate Student Centre	. 3.00
Auditor only—one-half regular tuition fee.	

#### Extra-Sessional Classes

Fees will be assessed on the same basis as for Summer Session and are payable in full on registration.

# Correspondence Courses

The correspondence course fee for a three-unit course is \$100.00.

Refunds will be granted if applied for in writing within ninety days of registration on the following basis:

- (1) within 30 days, refund \$85.00
- (2) within 60 days, \$60.00
- (3) within 90 days, \$35.00

Correspondence students may take examinations at the University free of charge; an invigilation fee of \$10.00 is payable for examinations held at other centres. Supplemental examination fees are the same as those given under "Special Fees" below.

# Special Fees

For late registration, winter session	\$25.00
(\$25.00 plus \$5.00 per diem on and after prescribed date.)	
For late payment, after January 15	20.00
For late payment, after January 30	30.00
For late registration, summer session	20.00
For reinstatement after cancellation of registration	10.00
Change of course, summer session	5.00
Regular supplemental examination, per paper	7.50

Supplemental examination at regular centres, per paper	10.00
Supplemental examination at special centres, per paper	20.00
Special examination (Applied Science, Agricultural Sciences,	
Forestry), per paper	20.00
Review of Assigned Standing, per paper	5.00
Library (extra-mural readers)	7.00
Library (mailing deposit)	2.00
Students borrowing books from the Library for preparatory reading will be required to make this deposit to cover mailing costs.	
Laboratory coupons, per book	5.00
These coupons may be used to pay for breakages in laboratory equipment, or for such other purposes as may be determined by the Board of Governors.	

Fees for transcripts of academic record: first one free-of-charge, except following graduation, when the first three are free-of-charge; additional transcripts, \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment received.

#### THE UNIVERSITY HEALTH SERVICE

The University Health Service is located in the West Wing of the Wesbrook Building and comprises an up-to-date Out-Patient Department on the main floor together with a twenty-six bed hospital on the third floor. This facility is available to all students who are taking six units or more.

In addition to providing medical and nursing care and investigation of any health problems arising in students, the Health Service also provides chest X-rays and various immunization procedures.

Full details of the scope of service provided and how the student may best avail himself of the facilities offered, are set forth in the brochure, "Student Health Service", issued to all new students. Others may obtain copies of this brochure at the Health Service office.

# Requirements of the University Health Service Medical Examinations

Students registering at this University for the first time, taking six or more units, are required to submit a medical questionnaire on the approved form before registration can be completed. A physical examination is not mandatory, but would be much appreciated. The University reserves the right to insist upon a medical examination if circumstances warrant. The necessary forms are provided at the time of acceptance. Certain schools and faculties require medical examinations. Evidence of successful immunization against smallpox is required. Registration for those students who do not comply with this examination may be cancelled.

# Requirements for:

Students entering the following Faculties or Schools are required to have a medical examination:

Faculty of Medicine and School of Rehabilitation Medicine Faculty of Dentistry and the Programme of Dental Hygiene School of Nursing—undergraduate and postgraduate and diploma courses A successful U.B.C. applicant is required to have the examination at the Health Service preceding admission to the Faculty. If the student is new to the University of British Columbia, or lives outside the Greater Vancouver area, a medical examination by his own physician, submitted on the form provided by the Health Service, is acceptable.

For medical and dental students the requirements also include immunization against smallpox, Haemoglobin and V.D.R.L. tests and chest X-ray within three months of submission of application.

For the students of the School of Nursing and the Programme of Dental Hygiene, the requirements include chest X-rays and certain tests and immunizations. (Listed in the applicants' directions.)

Students registering in professional Physical Education courses are required to have a physical examination by Health Service physicians. Appointments for these examinations must be made at the time of registration. The examination must be completed during the first two weeks of the session.

# Communicable Disease Programme

Preventive tests and inoculations are given by the Health Service. Tuberculosis.

A tuberculin test is provided by the University Health Service in cooperation with the Provincial Board of Health, Tuberculosis Division. Free chest x-rays are also available.

# Routine Regarding Absence due to Sickness and Injury

- 1. Students absent from December or April examinations must submit a certificate obtained from a doctor during their illness. This certificate must be in the Health Service office within the current examination period.
- 2. Students absent at other times during the session because of illness should report their absence to their instructors. A physician's statement of illness is not required.

#### Communicable Disease Programme

Preventive tests and inoculations are given by the Health Service.

#### **Tuberculosis**

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- 2. Students absent at other times during the session because of illness should report their absence to their instructors. A physician's statement of illness is not required.

# General Information on Medical and Hospital Insurance

- (a) Hospital Insurance
  - Students who are residents of the province are entitled to B.C. Hospital Insurance benefits.
  - (ii) Students who are not residents of B.C. are not eligible for payment of hospital costs under the British Columbia Hospital Service until they have had 12 months continual residence in the province, except

those entering as landed immigrants when the waiting period is three months.

All Canadian provinces accept responsibility for hospital costs for their students attending the University of British Columbia provided the hospital insurance premiums (required in Ontario, Manitoba and Saskatchewan) have been paid. Alberta requires a higher rate of co-insurance than other provinces.

Students who attend U.B.C. and are not residents of the province are required to produce evidence of adequate sickness and hospital insurance before registration can be considered complete. Non-resident students can purchase the Canada Health and Accident Plan at the time of registration. This provides acceptable sickness and hospital insurance. The rates for 1968-69 were \$35.00 for a single student and \$80.00 for a married student.

#### (b) Sickness Insurance

It is advisable for all B.C. residents to have coverage under a medical insurance plan. All the approved medical plans in B.C. provide coverage for dependents up to their 21st birthday. The coverage may be continued if the students is in full time attendance at university and mainly dependent on his parents, but the Plans must be notified of these facts, otherwise coverage ceases on the 21st birthday.

For students who are not covered by their parents' medical insurance plan, the following plans are available:—

- (i) B.C. Government Medical Plan: Many students, who have resided in B.C. for one year, may be eligible for the subsidy under the Plan, sponsored by the Provincial Government. This Plan provides comprehensive medical care all year. For those who have not resided in B.C. for one year, the Plan can be purchased at the full rates. For further details consult the Health Service or the B.C. Medical Plan, 1410 Government Street, Victoria, B.C.
- (ii) Canada Health and Accident Plan: Available only to non-residents. This plan provides both sickness and hospital insurance. It can be purchased at the time of registration, or by writing directly to Canada Health and Accident Assurance Corporation (University Health and Accident Plan), 700 Bay Street, Toronto. For further information, consult U.B.C. Health Service.

#### Summer Session

The University Health Service provides a health service for students attending the summer sessions. Details of this service may be found in the Announcement of the Summer Session.

#### STUDENT HOUSING

#### General Information

The office of the Housing Administration is open Monday - Friday, 8:45 a.m. to 5 p.m. All enquiries should be directed to the Office of Housing Administration, The University of British Columbia, Vancouver 8, B.C.

Application Forms and detailed information on Conditions are available on February 1 of each year by writing to the office or calling 228-2811.

Residence Accommodation is provided for single students on a room and board basis only. All rooms are completely furnished, and all bedding is supplied, but students are expected to bring their own towels.

No one needing special diet or under special medical care can be accommodated in University Residences.

Family Housing is provided in a limited number of unfurnished suites in Acadia Park and Acadia Camp. Details are also available from the Housing office.

#### Rates

# Single Accommodation

Only Board and Room available, except in Graduate Dormitories where room only is also available.

# FALL TERM — Rate for Term

	Single Room	Double Room
Permanent Residences	\$367.00	\$350.00
Dormitories	\$302.00	\$282.00
Graduate Dormitories	\$329.00	
Graduate Dormitories		
(room only)*	\$138.00	
Mary Bollert Annex	\$329.00	\$312.00
SPRING TERM — Rate for Term		
Permanent Residences	\$417.00	\$398.00
Dormitories	\$344.00	\$320.00
Graduate Dormitories	\$375.00	_
Graduate Dormitories		
(Room only)*	\$157.00	
Mary Bollert Annex	\$375.00	\$355.00

# BETWEEN TERM ACCOMMODATION — Daily Rates (Room and Board only) (Payable on agriculty to the area clock)

(Payable on arriv	al to the area clerk.)	)
Permanent Residences	\$3.59	\$3.44
Dormitories	\$2.97	\$2.76
Graduate Dormitories	\$3.24	_
Graduate Dormitories		
(Room only)*	\$1.65	
Mary Bollert Annex	\$3.24	\$3.04

Note: Permanent residences include Place Vanier, Totem Park, and Fort for men and women are located in Acadia Camp. Mary Bollert Annex is an Camp, women. Dormitories include Fort Camp, men. Graduate Dormitories intermediate dorm for women located in Fort Camp.

#### Married Accommodation

Rates vary according to size of accommodation. Details available from the Office of the Housing Administration.

#### Off-Campus Accommodation

The Alma Mater Society offers a student housing list as a service to its members.

In compiling this list every effort is made to compile descriptions of available homes in a strictly objective manner. Students must make their own arrangements for the contractural relationship between tenant and landlord. Listings are available from the Co-Ordinator, Off-Campus Housing, A.M.S., The University of British Columbia, Vancouver 8, B.C.

<sup>\*</sup>No meal pass and no meals provided. No cooking allowed in rooms.

# Special Accommodation

The Dean of Women provides a limited service to women students who wish to work for their room and board. A file for such recommended accommodation may be consulted by students in the Office of the Dean of Women.

Foreign students may receive additional help in finding off-campus housing through the services of International House.

#### DEAN OF WOMEN'S OFFICE

The Dean of Women's Office (Buchanan Building Room 456) acts in a consultant and liaison capacity in matters pertaining to the welfare of women students at the University. Referrals regarding academic problems, financial difficulties, employment opportunities, or circumstances of health may be made from this office. Women students having any general or personal enquiries or desiring some assistance in adjusting more successfully to university life are encouraged to consult with the Dean of Women or with a member of her staff.

A file supplying information for students who wish to work in return for their room and board is available in the Office of the Dean of Women.

The Dean of Women and her staff also present various programmes throughout the year to aid women students in their orientation to the university. One particular area of concern is familiarizing the mature women students with the facilities available at the university, and generally assisting them to derive the greatest value from university.

Students wishing to consult with the Dean of Women or with a member of her staff are welcome at any time, Monday through Friday, between the hours of 9 a.m. and 5 p.m.

#### OFFICE OF STUDENT SERVICES

The office of student services, situated on the West Mall, has three main functions: (a) counselling, (b) placement and (c) testing.

Enquiries should be addressed to the Director of Student Services, University of British Columbia, Vancouver 8, B.C.

- (a) Counselling: Full-time counsellors are available to confer with students regarding academic, vocational and personal matters. However, in academic matters students should also consult advisors in the faculty in which they are registered or plan to register with reference to course requirements, prerequisites and study programmes. The office is open during the summer months and it is particularly desirable that students planning to enter the University secure an interview during June, July and August. In assisting students the office maintains an up-to-date library of calendars or bulletins of most of the major Canadian and American universities, together with a file on professional and vocational opportunities. Copies of the booklets Career Planning for Students at the University and Student Information Bulletin are available on request.
- (b) Testing: The office administers a battery of tests to all new undergraduates entering the University from both Grade 12 and Grade 13. All students entering the University at the first or second year level are required to write these tests. Testing sessions, lasting approximately three hours, are scheduled on the dates indicated below.

1969

The following dates are primarily for students living on the lower main-

Saturday, May 31	University Auditorium	9:00 a.m	
Friday, June 6	University Auditorium	1:00 p.m	
Saturday, June 7	University Auditorium	1:00 p.m	

The following dates are primarily for foreign students and for students from the interior of British Columbia, but are also for others who may not have been able to attend previous testing sessions.

University Auditorium	9:00 a.m.
University Auditorium	9:00 a.m.
University Auditorium	9:00 a.m.
University Auditorium	2:00 p.m.
University Auditorium	7:00 p.m.
University Auditorium	1.00 p.m.
	University Auditorium University Auditorium University Auditorium University Auditorium

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May 30, June 5, June 6

Interviews will take place during the summer months and following.

Testing and consultation for students in senior years is by appointment at any time throughout the year. Testing of special groups will be announced during the term.

The College Entrance Examination Boards, The Dental Aptitude Test, The Medical College Admission Test, The American College Testing Programme, Test of English as a Foreign Language, the Graduate Record Examination and the Test for Graduate Study in Business are also administered. Students wishing to write these tests can obtain further information at the Counselling Office.

(c) Placement: The placement section endeavours, in cooperation with the various faculties concerned, to assist in securing part-time, vacation, and permanent employment for undergraduates and graduates.

# i. Permanent Employment:

Graduating students who are seeking employment should register with the Placement Office in October. Bulletins are published periodically listing the dates of campus visits of companies that are recruiting on campus. These visits commence in early November.

#### ii. Part-time Programme:

Students should register for part-time employment in September. All available part-time employment is listed in the Placement Office and, where possible students are contacted for specialized jobs. In order that there may be as little interference with studies as possible and in order to take care of the maximum number of students, jobs will normally be limited to ten hours per week. Applicants for bursaries may be offered employment either in place of a bursary or as a supplement to a bursary.

#### iii. Summer Work Programme:

Students seeking summer employment should register with the Placement Office early in March. Special noon hour meetings for this purpose are announced. Some summer positions are posted in the Placement Office and

some are arranged by interviews as part of the campus recruiting program mentioned above.

(d) Veterans' Affairs and Educational Assistance Act: All the facilities of the Student Services Office are available to ex-service students. All ex-service students on allowance and all students under the Educational Assistance Act must be interviewed by a counsellor on or before registration.

#### THE UNIVERSITY BOOK STORE

The book store is prepared to supply all textbooks, note-books, instruments and general stationery required by students. Hours are 8:45 to 5 p.m. Monday through Friday.

During the month of September, supplies and books will be available as follows:

- 1. New and used books of all faculties except Architecture, Dentistry, Law, Librarianship, Medicine, Pharmaceutical Sciences, and Social Work, will be sold in the Armoury.
- 2. New and used books for the above exceptions will be sold in the Book Store.
- 3. General supplies and stationery for all years of all faculties will be sold in the Book Store.

At the end of each regular and summer session, the book store will repurchase from students used books in good condition up to the estimated requirements for the next regular session. These books will be accepted from students until May 31 for the regular session and to August 25 for the summer session.

#### TRAFFIC AND PARKING

General. Systematic regulation of traffic speed and direction, and of parking and stopping, will be enforced on the campus. Brochures outlining traffic and parking regulations will be available at the Traffic Office. These regulations remain in effect throughout the year, and all faculty, staff and students of the University, and visitors, are responsible for familiarizing themselves with them. No parking is allowed on roadways or in any area not designated for parking.

Registration. Members of the University wishing to park motor vehicles on campus during the daytime, are required to register them and to obtain appropriate parking permits, for which a fee will be charged. Permits are obtainable at the Traffic Office.

Day Parking. Monday through Friday, 7:30 a.m. to 5:00 p.m.

Parking areas will be provided for faculty, staff and students who have valid parking permits. Areas will be clearly marked and must be used in accordance with the parking permit. Pay parking lots are available for visitors.

Night and Week End Parking regulations come into force at 5:00 p.m. Monday through Friday. Pay parking lots are available for visitors, but drivers must also park free in any other designated parking lot except for the following restricted parking areas.

- (a) Lots designated as "Faculty and Staff Only Day and Night".
- (b) Zones designated "No Parking Anytime Commercial Vehicle Loading Zone".
- (c) The Faculty Club parking lot reserved for members and their guests.

- (d) The Graduate Centre parking lot reserved for members and their guests.
- (e) A few individually reserved areas designated "reserved".
- (f) Pay lots when an attendant is in charge and a parking fee is required.
- (g) Emergency vehicle parking areas.
- (h) Federal Buildings' parking lots.
- (i) Lots designated as "No Parking Anytime except by Special Permit".

#### STUDENT ORGANIZATION

# Alma Mater Society

The Alma Mater Society with its governing executive, the Students' Council, controls all student activities and is responsible for student discipline. Every student automatically becomes a member of the Alma Mater Society when he enrolls in the University and each faculty has a representative on Council. Members of Students' Council are elected every spring to hold office through the next year.

The Society levies a compulsory fee of \$9 upon each student, which may be augmented for special purposes by action of its membership. At present, an additional levy of \$15 to be used for student union facilities, brings the Alma Mater fee to a total of \$24. An additional levy of \$5 is for the support of athletics.

The offices of the Alma Mater Society are located in the north west corner of the second floor in the Student Union Building.

#### **Publications**

The Alma Mater Society publishes "The Ubyssey", the student newspaper which appears three times weekly; "Tuum Est . . . and all that", an introductory handbook about student affairs; and "Bird Calls", a student telephone directory. In addition several undergraduate societies publish technical journals of interest to their respective professions.

# University Clubs Committee

The University Clubs Committee (U.C.C.) is comprised of representatives from each of the campus clubs (numbering nearly 100). The U.C.C. executive administers to these clubs' needs and directs their activities.

A list of these clubs will be found in "Tuum Est", and they may be contacted through the U.C.C. office in the new Student Union Building.

#### Women's Athletics

All women students in the Alma Mater Society are members of the Women's Athletic Association and are eligible to participate in the intramural and extramural women's athletic programme. There are eighteen extramural sports and eleven intra-mural sports. This programme is run entirely by the students.

Further information appears in "Tuum Est".

#### Men's Athletics

All male students are members of the Men's Athletic Association and, as such, have the opportunity to participate in the broad, twenty-seven sport, extramural programme. Athletics are administered by the Men's Athletic Committee formed of Faculty, students and alumni representatives. The Athletic Director is responsible to the Men's Athletic Committee for the implementation and direction of the sports programme.

Further information appears in "Tuum Est".

#### Fraternities and Sororities

Fraternities and sororities are recognized by the Senate of the University as student organizations. Fraternities are governed by the Inter-Fraternity Council composed of representatives of each of the fraternities and a member of the faculty. Membership in fraternities is by invitation. Sororities are governed by the Women's Panhellenic Association. Membership in sororities is by invitation.

The new Student Union Building, or SUB as it is generally known, was completed in the fall of 1968 and officially opened by Dean W. H. Gage in January 1969. SUB houses the offices of the Alma Mater Society and provides the necessary facilities for most student activities. Originally initiated by students in 1958 and extensively planned since then, SUB was financed jointly by the Alma Mater Society and the University Administration. Total cost of the project was approximately \$5 million, with the students' share being approximately 78 percent which is financed by a \$15 per year levy paid by all students.

SUB is the largest building constructed in a single stage at the University of British Columbia and contains 265 rooms of various sizes and uses. These range from a large ballroom to small conference rooms, to seminar rooms, to clubs areas. Special facilities include recreation areas (bowling alley, billiards, table tennis), commercial areas (barber shop, bank, college shop), cultural areas (art gallery, auditorium, reading and music lounges) meeting rooms and general open lounge space. These facilities can handle most studentsponsored activities. SUB also contains the largest food service facility on campus.

SUB is managed by the SUB Management Committee and is located off the East Mall to the north of University Boulevard.

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# Board of Management:

ALUMNI ASSOCIATION OF THE UNIVERSITY OF BRITISH COLUMBIA

1968-69

#### **Executive Committee**

President: Mr. Stanley Evans
Past President: Mrs. John M. Lecky
First Vice-President: Mr. David Helliwell
Second Vice-President: Dr. Walter G. Hardwick
Third Vice-President: Mr. Sholto Hebenton
Treasurer: Mr. William Redpath

# Members-at-Large

Dr. Richard Stace-Smith Mr. T. Barrie Lindsay Mr. Frank C. Walden Mr. John C. Williams Mr. John R. P. Powell Mrs. Frederick Field Mr. Peter Forward Mr. Gerald A. B. McGavin

#### Ex-Officio Members of Executive Committee:

President, Young Alumni Club: Mr. William MacDonald Chairman, Student Alumni Committee: Mr. N. E. Omelusik Deputy Chairman, Alumni Fund: Mr. Murray McKenzie

# Degree Representatives

Law: Mr. Bruce I. Cohen

Agriculture: Mr. Alex Green
Applied Science: Mr. Russell Fraser
Architecture: Mr. Richard B. Archambault
Arts: Mr. Graham Nixon
Commerce: Mr. D. Ross Fitzpatrick
Education: Mr. James Killeen
Forestry: Mr. V. Neil Desaulniers
Home Economics: Miss Jan Peskett
Senate Representatives: Mr. Vern J. Housez,
Mr. David Freeman, Mr. Douglas Sutcliffe.

Librarianship: Mr. N. E. Omelusik
Medicine: Dr. Dwight Peretz
Nursing: Mrs. J. Thomas English
Pharmacy: Mr. Gordon Hewitt
Physical Education: Mr. J. Reid Mitchell
Science: Mr. John R. Gercsak
Social Work: Mr. Edward J. Sopp
Ex-Officio Members of Board of Management:
Alumni Executive Director: Mr. Jack K. Stathers
AMS President: Mr. David Zirnhelt
AMS Treasurer: Mr. Donn Aven
1968 Graduating Class Representative:
Mr. Malcolm Elliott
President, Friends of UBC Inc. (U.S.A.):
Mr. Stanley Arkley

The Alumni Association serves the University of British Columbia by promoting its academic well being through liaison with the graduates, the government, the public, the faculty, the students and potential students.

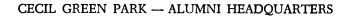
Membership is open to all graduates and former students of the University, old McGill College and Victoria College (now the University of Victoria) who have completed fifteen units of course work while in attendance. Membership is automatic upon graduation and a graduate becomes a member in good standing by making a modest donation to the University through the U.B.C. Alumni Fund Campaign.

The Association is governed by a Board of Management, elected each year at the annual meeting in May. The Association maintains an office located in Cecil Green Park, 6251 N.W. Marine Drive, Vancouver 8, B.C. It distributes the Chronicle and the University newspaper, UBC Reports, to 40,000 graduates around the world. The Graduate Records Office maintains a complete address file of all alumni. This also forms a part of the rolls of Convocation which elects a Chancellor and Convocation members of Senate every three years. Any change or correction of alumni addresses should be made to the Alumni Office.

Contributions by alumni and friends to the Alumni Fund make possible the awarding of forty-eight scholarships of \$350.00 each to B.C. High School graduates for the Norman MacKenzie Alumni Scholarship plan and an Alumni Graduate Scholarship, four National Scholarships, as well as money to assist the Library, athletics, fine arts, the President's Alumni Fund, and many other University projects of a special and unique character not normally provided for in the usual manner.

The Association also sponsors a wide range of programmes on a continual year-round basis, such as Homecoming and class reunion in October, the Student-Alumni banquet, the Young Alumni Club, Alumni Conferences, and has contact with members of the provincial and federal governments. The Association conducts research and prepares reports on many aspects of University affairs.

Anyone interested in assisting in any aspect of the Alumni Association programme may obtain further information by contacting Mr. Jack K. Stathers, Executive Director, at Cecil Green Park, CA 8-3313.



#### SUMMER SESSION

The announcement of the courses, both credit and non-credit, to be offered in the summer session (approximately seven weeks in length), is issued in March, and is available on request from the Registrar.

The regulations, etc., governing the summer session are as follows:

- 1. The maximum credit for summer session work in any one calendar year is 6 units. Correspondence courses may not be taken concurrently.
- 2. Students are requested to register on or before May 1. No student will be permitted to register after June 3. A late registration fee of \$20.00 is assessed all registrants in the period May 1 June 3.
- 3. All students desiring to obtain formal credit for work done in the summer session must be eligible for admission on the same basis as Winter Session students.
  - 4. For statement of fees, see section on fees in this bulletin.
- 5. Summer session examinations are held at the close of the summer session.
  - 6. Restriction on registration in the Summer Session:
    - (a) A student who obtained Fail standing during the last Winter Session attended may not enrol in Summer Session.
    - (b) A student in attendance at a secondary school during the previous winter may not enrol in the Summer Session.
    - (c) The University reserves the right to reject applicants for the Summer Session whose previous academic records are unsatisfactory, even if they technically meet entrance requirements.

A number of non-credit courses are also given in Summer Session under the sponsorship of the Department of University Extension. This same Department sponsors a limited number of evening credit courses, May through July. Students interested may contact that Department for further information.

#### Summer Session Association

The Summer Session Association of the University of British Columbia is composed of all persons in attendance at the summer session. All students are required to pay a fee of \$2.00 at the time of registration.

This organization originated as a body to care for the extra-curricular, intellectual and social requirements of the summer session. Growth and expansion down through the years have made it of major importance on the campus.

The organization provides intellectual, social and recreational activities for both students and staff of the summer session. It deals with all matters pertaining to student welfare on the campus; it provides certain summer session scholarships for credit and non-credit courses, and has made available a considerable sum of money for interest-free student loans. The Executive Committee of the Association serves as a liaison group between the student body and the various governing bodies of the University.

The Summer Session Association holds two general meetings each summer. The Executive meets at least weekly during the summer and as often as is deemed necessary throughout the year.

#### EXTRA-SESSIONAL CLASSES

1. Classes in the evenings or late afternoons may be taken for credit, in certain subjects, by students proceeding to the B.A. or B.Ed. degree who are eligible for registration at least as Second Year students and who have the prerequisite standing. Certain courses for students qualified to proceed to the M.A. (in Education), M.Ed., or M.S.W. degree may also be available.

- 2. Students attending the September/April extra-sessional classes will normally be tested by the ordinary winter session examinations. May/July evening extra-sessional course examinations will be held at the end of July.
- 3. Regulations in respect to credit, standing, extra-mural work, examinations and supplementals are given in the appropriate Faculty calendars.
- Correspondence and off-campus extra-sessional courses may be offered as prerequisites, but they are not acceptable for credit on a Master's pro-
- Certain courses are open to a limited number of students who do not wish to take them for credit. Non-credit students should register through the Extra-sessional Division of the Department of University Extension. In all these courses the instructor rules on any non-credit student's eligibility to enter and to remain in the course. Students will be expected to maintain the same schedule of readings and written assignments as the regular students but will not need to write the final examination.

#### CORRESPONDENCE COURSES

University credit may be obtained in a number of fields by correspondence courses offered through the Department of University Extension. Although University regulations preclude a student from taking a full degree programme by this means, these courses will be valuable to teachers wishing to improve their qualifications during their teaching year, to persons who have had to interrupt their regular university attendance, or even to graduate students of this or other universities who may wish to take certain prerequisites in other fields of study. A Correspondence Course Syllabus is available from the Department of University Extension or from the Office of the Registrar.

Admission. Correspondence courses are open to applicants with full First Year University or College or Grade 13 standing, or to holders of a teacher's certificate following an acceptable matriculation standing. Students registered in the winter session of the University are not allowed to enrol in correspondence courses concurrently with winter session work or, except in special circumstances, during the summers between successive winter sessions.

Registration. Applications for correspondence courses should be directed to the Office of the Registrar. All courses must be completed within the time specified.

Registration for all courses may take place at any time throughout the year. Credit. Full degree credit is granted for correspondence courses. However, the maximum number of units of credit which may be taken by correspondence courses towards a degree is 15 units. The University will not grant credit for correspondence courses taken concurrently from another university. Fees. Fees for a correspondence course are \$100.00 (subject to change without notice).

Examinations. Final examinations in correspondence courses may be written in April, August or December. Students who have successfully completed all course papers and assignments must notify the Office of the Registrar of the date and centre selected for their final examination. The Registrar of the University will endeavour to arrange the supervision of the examination at the centre selected by the student or an alternative centre conveniently located.

Standards in the final examinations will be the same as those for resident students. Students who fail in the final examination and the supplemental in any one correspondence course will not be permitted to register again for that correspondence course.

Course Offerings (3 units per course)

Economics 306, Labour Economics and Industrial Relations; Education 400, Philosophy of Education; Education 412, Introduction to Adult Education; English 200, Literature and Composition, English 303, English Composition (for students in the Faculty of Education only); English 392, Victorian Poetry; German 200, Second Year German; History 212, History of the United States of America; History 326, British North America, 1763-1867, History 413, The Reformation: Philosophy 100. Introduction of Philosophy: Political Science 200, Democratic Government and Politics; Psychology 100, Introductory Psychology; Psychology 206, Dynamics of Behaviour.

Certain courses are open to a limited number of students who do not wish to take them for credit. Non-credit students should register through the Extrasessional Division of the Department of University Extension. In all these courses the instructor rules on any non-credit student's eligibility to enter and to remain in the course. Students will be expected to maintain the same schedule of readings and written assignments as the regular students but will not be required to write the final examination.

Note: For non-credit diploma courses in the Faculty of Commerce and Business Administration, see the calendar for that faculty.

#### THE UNIVERSITY LIBRARY

The University of British Columbia Library, with almost 2,000,000 volumes including microforms, the largest university library in Western Canada, serves the University through a system of eleven libraries and a number of departmental reading rooms.

The Library has particularly strong holdings in the fields of Canadiana, English literature of the 19th and early 20th centuries, Chinese literature and history, forestry, fisheries, and Slavonic studies. Several of these collections are of international importance. Especially strong are the collections of serial publications.

Recent acquisitions of note are the Donaldson Collection of Burnsiana; the 50,000 volume Colbeck Collection of English literature mainly 19th century; and the Woodward and Sinclair Collections on the history of medicine and science.

Library holdings in these and other subject fields have been greatly enriched through funds and gifts provided by Mr. Walter Koerner Dr. H. R. MacMillan, Mr. Norman Colbeck, the Friends of the University Library, the Leon and Thea Koerner Foundation, the Mr. and Mrs. P. A. Woodward Foundation, the Canada Council, and many others.

# Main Library

The Main Library, which houses the central book collection, was built in 1925. The north wing was added in 1948, and the south wing (named after its donor Mr. Walter C. Koerner) in 1960. In 1964 the Library was remodelled and extended to provide better services and additional book stacks.

The first floor of the Main Library houses the administrative offices, Main Loan Desk, Circulation Office, Xerox room, Reserve Collection, and Fine Arts Library. Upstairs in the Main Concourse are the main card catalogues,

listing all material held in the campus library system; the Interlibrary Loan Office; and a central Information and Orientation Service. On the same floor in the north wing is the Ridington Room, housing the Social Sciences and Humanities reference divisions; and opening off the Main Concourse in the south wing is the Science reference division. The upper part of the north wing is occupied by the Acquisitions, Cataloguing, and Serials divisions, Gifts and Exchanges, and the U.B.C. School of Librarianship. On the top floor of the south wing are Special Collections and the Map Division.

The Main Library's book collection is housed chiefly in six levels of stacks, which are open to all library users. The first five levels house books and periodicals; level 6 houses Asian Studies, Government Publications, and the Library's microform collection. Stack entrance turnstiles are located on the first floor, in the Main Concourse, and in the Science and Social Science/Humanities reference divisions. Stack books are charged out at these turnstiles, and are returned through a book drop in the first floor entrance hall, or after hours through an outside drop by the main entrance.

The Information librarians in the Main Concourse give assistance with the card catalogues as well as general information in Library holdings and services. More specialized advisory and reference services are available from librarians in the various subject divisions: Fine Arts, Social Sciences and Humanities, Science, Government Publications, Asian Studies, Special Collections and the Map Division.

A number of individual study carrells are available to students doing advanced research. Coin-operated photocopiers will be found on stack level 5, and a Library Xeroxing service is located in the entrance hall. The Government Publications division on stack level 6 has a reader-printer for microfilm and microfiche as well as microfilm, microcard and micro-print reading machines.

Also located in the Main Library building, on the ground floor of the north wing, are the Museum of Anthropology, the Fine Arts Gallery, and the Wilson record collection and listening room. Listening facilities are available here at no cost, and borrowing privileges for a modest fee.

# Sedgewick Library

On the ground floor of the south wing is the Sedgewick Library for undergraduates, established in 1960. This large collection of books, periodicals, and reference material has been carefully selected to serve students in all undergraduate Arts courses and first and second year Science. Although the Main Library is open to all students, the Sedgewick Library is often the best and most convenient source of materials needed for these courses. Coin-operated photocopiers and two floors of study space are provided.

#### **Branch Libraries**

The University's nine branch libraries offer specialized materials and reference service to students and faculty working in particular subject fields. Although all have separate card catalogues, their holdings are listed also in the Main Library's central catalogue. A list of these branches, with their locations, is given below.

- 1) Curriculum Laboratory
- 2) Forestry/Agriculture Library
- 3) Institute of Fisheries Library

Top floor, centre block, Education Building Room 360, MacMillan Building

Room 1347-H, Biological Sciences Building 4) Law Library

5) Mathematics Library

6) Music Library

7) Social Work (Marjorie Smith) Library

8) Woodward Biomedical Library

9) Biomedical Branch Library

Main floor, Law Building
Main floor, south wing,
Mathematics Building
Fourth floor, Music Building

Basement floor, Graham House

Medical Sciences Complex, behind Wesbrook Building Vancouver General Hospital

In addition, a number of teaching departments have reading rooms containing selections of books and periodicals.

# Hours of Service

The U.B.C. Library now has one of the longest schedules of weekly opening hours in North America. During the fall and winter sessions the Main, Sedgewick and Woodward Libraries are open regularly from 8 a.m. to 9 p.m. Monday through Thursday and from 9 a.m. to 5 p.m. Friday and Saturday. Between sessions the libraries are open from 9 a.m. to 5 p.m. Monday through Friday. (The Woodward Library is open these hours on Saturday as well.) During the regular session the study area in Brock Hall, across from the Library, is open daily from 8 a.m. to midnight. Any changes in these opening hours are posted in advance.

# **Extramural Readers**

The Library's collections and services are maintained primarily for U.B.C. students and faculty. However, they may also be used by persons outside the University whose studies cannot be advantageously pursued in other libraries in the province. Those who wish to qualify as "extramural readers" must apply to the Librarian, and will be required to pay an annual fee.

#### Attention New Students

An illustrated handbook on the Main Library is available at the Main Loan Desk, the Information Desk, and in all subject divisions and branch libraries. In addition, each branch library gives out a brochure describing its collection and services. Floor plans of the Main Library, campus maps, and location guides to campus libraries are posted in the Main Concourse.

Orientation programmes and tours of the Library will be given during Registration Week. Information about these will be posted at the entrance to Sedgewick and the Main Library.

# DEPARTMENT OF UNIVERSITY EXTENSION

#### Purpose

University Extension is continuing higher education for adults, in accordance with the goals and standards of the University. The aim of the Department is to organize the resources of the University in order to provide opportunities for continuing education for interested citizens of the Province.

#### Programme Areas

The Department was formally organized early in 1936 under a grant from the Carnegie Corporation and has since developed a comprehensive and varied province-wide programme of University adult education.

(1) Credit—University Extension is responsible for the administration of extra-sessional classes and correspondence courses. (For further details see under "Extra-Sessional Classes" and "Correspondence Courses".)

- (2) Continuing Education—The Department offers an extensive programme of evening classes, short courses, conferences and special lectures in professional areas and general studies.
  - (a) Professional and Technical
    The increasing rate of our acquisition of knowledge and the continuing rapid technological change in Canadian society have accentuated the need for adults to continue learning in their own fields of work. Recognizing this need, the Extension Department, in cooperation with faculties, schools and institutes, offers opportunities for continuing education in various professions and technical occupations. Continuing education programmes include: agriculture and fisheries; architecture; education; engineering; forestry; law; social work; and community planning.
    - Programmes are offered to give the individual a greater knowledge of himself and his environment and an opportunity to develop his intellectual abilities. These programmes are generally centred around the social and natural sciences, humanities and the fine arts. Special emphasis is placed as well on programmes dealing with matters of public policy at the local, provincial, national and international level.
  - (c) Summer Session As part of the University Summer Session the Department offers programmes in education, public affairs, the arts, and other subjects.

# Programme Services

The following services support and extend the Department's offerings in Continuing Education:

# (1) Office of Short Courses and Conferences

This office presently serves faculty and community in several ways. The routine business includes all of the physical aspects of Conferences or Short Courses held on Campus. Such items as meeting rooms, meals, sleeping accommodation, signs, etc., are coordinated here.

Another function of the office is to work with planning committees in a consultative capacity to aid them in the improvement of conference quality. This may include suggestions as to procedure, techniques, speakers, clarification of aims, and other related factors.

# (2) Audio-Visual Services

Audio Visual Services distributes for a small service charge an extensive collection of 16mm films and 35mm filmstrips to individuals, organizations, and schools in British Columbia and the Yukon. Included are films deposited by the governments of Austria, Australia, Britain, the Netherlands, and New Zealand, and the Canadian Film Institute, National Film Board, and Canadian industry.

Equipment for distribution in the greater Vancouver area includes 8mm, Super 8mm, and 16mm motion picture, slide, apaque, and overhead projectors, screens, tape recorders, record players, film and T.V. production equipment.

Assistance is provided by film librarians in the selection of appropriate films or filmstrips to meet the specific needs of individuals or groups. Advice is available on film utilization techniques in order that maximum effect can be derived from the content of the film and to permit increased participation by the audience.

# (3) The Speakers' Bureau

This office functions to assist community organizations in obtaining the services of faculty members, when appropriate, for off-campus lectures. Assistance from the bureau is available on a province-wide basis. Individual lectures are arranged in response to requests and considerable emphasis is given to arranging lecture series for professional and educational groups.

# Diploma Programme in Adult Education

The Faculty of Education and the Department of University Extension jointly offer a Diploma in Adult Education. This programme is designed for persons who wish to acquire the skills and knowledge required to organize, conduct, evaluate and generally administer programmes in adult education, but who, for a variety of reasons, do not wish to pursue a graduate degree. Such persons may be or wish to be, public school adult education directors, directors of training in business and industry and the like.

Applications are invited from persons who have a bachelor's degree from a recognized university; or who are mature individuals with some university work and who have had considerable work experience or education in some field related to adult education.

The programme is equal to approximately seven months of continuous study at the university but may be taken by a combination of summer session and extra-sessional courses or by full-time attendance at the university for one full academic year.

#### COMPUTING CENTRE

The facilities of the Computing Centre are available for research and teaching. The Centre operates an IBM System 360, Model 67 with full facilities for multiprogramming. The present equipment configuration includes 768K bytes of core storage, I high-speed drum, 2 model 2314 disk storage devices, display units, card readers, and line printers. Remote terminals are available at a number of locations on the campus for conversational programming and for batch operations. There is a frequent pick-up and delivery service for input and results at other points. A key-punching service is provided.

The staff of the Centre includes a Systems Group responsible for maintenance and development of the operating system, and an Applications Group that provides consultation and programming service for users of the Centre. Non-credit courses in programming and computer use are offered to supplement the regular courses given by the Department of Computer Science.

# STAFF PERSONNEL, LABOUR RELATIONS AND ANCILLARY SERVICES

#### Office of Labour Relations and Personnel

The University Personnel Office, situated on the corner of West Mall and Memorial Road, has the following functions for the non-teaching staff of the University: recruitment and selection; recommendation and interpretation of policy concerning wages, hours and working conditions; practices as to employee benefits; job evaluation and classification; maintenance of staff records. In addition, the Director serves as Chairman of the Negotiating Committee for negotiating of contracts between the University and all labour unions represented at the University, is responsible for the drawing

up of such contracts and the execution of the terms of such contracts where they apply.

## Office of Ancillary Services

The Director of the Office of Ancillary Services is responsible for the general administration and financial functioning of the following services: Food Services, Book Store, Patrol and Parking, Mail Service, Post Office, and Office Services. All inquiries should be directed to the Director.

#### INFORMATION SERVICES

This department provides comprehensive information to the public about the University by arranging interviews with the news media, promoting participation in television and radio, and by written releases to all potential news outlets. UBC Reports is published frequently and distributed to 85,000 alumni, friends of the University, students and parents of students. It is also distributed through the Vancouver Public Library and to high school students in several school districts in Greater Vancouver. The Information Office also the University Gazette, a report on decisions by the Board of Governors, and a Summary of Senate proceedings which is distributed to faculty.

The Information Service publishes and distributes weekly to faculty, to campus notice boards, and to news outlets, a listing of campus events, This Week at UBC. Notices for inclusion must be provided in writing to The Information Office, Campus, by 10 a.m. on Wednesday of the week preceding the event. The Information Office is prepared to assist faculty members on publicity and public relations matters relating to the University.

#### CANADIAN ARMED FORCES SUBSIDIZATIONS PLANS

## Regular Force

The Regular Officer Training Plan is a completely subsidized university plan covering tuition, books, medical service and a salary for up to 5 years of undergratuate study.

The Medical Officers Training Plan and the Dental Officers Training Plan cover the above, with the addition of a graduated pay and rank throughout four years of undergraduate study.

Students interested in any of the above Regular Force plans should enquire at the Canadian Forces Recruiting Centre, 545 Seymour St., Vancouver, Phone 684-7341.

#### Primary Reserve

The Reserve Officer University Training Plan provides an opportunity for a limited number of suitable young men, enrolled in Canadian universities to perform officer training during the summer months while they are undergraduates and thereby prepare themselves for promotion to commissioned rank in the Primary Reserve of the Canadian Armed Forces. For further details contact the Region Commander, Canadian Armed Forces Primary Reserve, 4050 W 4 Ave., Vancouver 8, B.C.

#### UNIVERSITY RELIGIOUS COUNCIL

The Council is a President's Committee whose functions are to co-ordinate and supplement activities of religious organizations on the campus, to provide opportunities for liaison among the University, the Chaplains, and the student religious clubs, and to act as a forum for the discussion of problems of religious organizations on the campus. Its membership includes all the Chaplains, religious advisers to student clubs, representatives of the teaching Theological Colleges on the campus, representatives from each of the student religious clubs, and a number of members of faculty appointed by the President. The clubs represented in the Council arrange studies of various aspects of religion under their own auspices, and from time to time the Council, either itself, or in conjunction with one of the clubs, sponsors meetings of wider interest.

The attention of interested students is also drawn to the courses offered in Religious Studies (see the Faculty of Arts calendar). From time to time courses are offered on a non-credit basis by the Department of University Extension. Certain courses of similar interest may also be taken in the Departments of Anthropology and Sociology, English and Philosophy.

Students are invited to consult the following Chaplains and advisers, whose services are offered on a voluntary basis: Rev. Neil Kelly, B.A., S.T.B., M.A. (Roman Catholic), Rev. Bernice Gerard, B.A., M.A. (Pentacostal Assemblies of Canada), Rev. C. Robert Pearson, B.A., B.D. (Lutheran Council in Canada), Rev. W. E. Wilburn, B.A., B.D. (Baptist), Rev. J. A. Ross, M.A., B.D., Ph.D, (Presbyterian); Rev. John Shaver, B.A. (United Church), Rabbi Marvin Hier (Jewish), Rev. Hubert Butcher, M.A. (Cantab), Adviser to Varsity Christian Fellowship and Mrs. June Lythgoe, B.A., Adviser to the Student Christian movement.

## **PUBLICATIONS CENTRE**

The Publications Centre was established by the University in 1961 to act as editorial and subscription offices for the journals Canadian Literature and Pacific Affairs. A description of these journals appears below.

The Centre also carries on an active book-publishing programme and faculty members who wish advice on publishing are invited to consult the Centre. Mr. James Banham, Information Officer at the University, is currently acting Executive Director of the Centre. Advice on calling tenders for publications, editing and production is available.

#### Canadian Literature

Canadian Literature: A Quarterly of Criticism and Review is a magazine published officially by the University. It is devoted to the critical, historical and biographical study of literature in Canada, and to the systematic reviewing of new Canadian books. It publishes articles in both English and French, and each year issues a bibliography of books and essays in the field of Canadian literature. The subscription to Canadian Literature is \$3.50 per annum (single copies \$1.25 each). Contributions should be sent to the Editor and subscriptions to the Circulation Manager, UBC Publications Centre, Auditorium

George Woodcock, Editor; D. G. Stephens, Associate Editor; William H. New, Assistant Editor.

#### Pacific Affairs

Pacific Affairs: An International Quarterly Review of the Far East and Pacific Area. Formerly the quarterly organ of the Institute of Pacific Relations from 1928 to 1960, Pacific Affairs has been published since March 1961 under the auspices of the University. It is devoted mainly to contemporary political, economic, social and diplomatic problems of eastern and

southern Asia, the South Pacific, and to the relations of the Western world with Asia. It publishes articles, notes and comment and book reviews by a wide range of writers from many countries. The subscription is \$5.00 per annum (single copies \$1.50). Contributions should be sent to the Editor and subscriptions to the Circulation Manager, UBC Publications Centre, Auditorium.

William L. Holland, Editor. Peter Harnetty, Associate Editor.

In conjunction with the University of Washington Press, The University of British Columbia has recently published The Art of the Kwakiutl Indians, by Audrey Hawthorn, curator of The University of British Columbia Museum of Anthropology. Another recent publication is New Rules for an Old Game, the proceedings of a workshop on the new Anglo-American Cataloguing Code held in Vancouver under the sponsorship of The University of British Columbia School of Librarianship.

Among other recent books published are The Chinese in Cambodia by William Willmott; The Third China by C. P. Fitzgerald and Canadian Literature, a checklist of creative and critical writings edited by Inglis F. Bell and Susan W. Port.

A complete catalogue of books available may be obtained from the Publications Centre.

#### MUSEUMS

These consist of (1) the Anthropological Museum, housed on the first floor of the Library; (2) the Geological Museum, in Room 116, the adjoining hall and in Room 119, Forestry and Geology Building; (3) the Zoological Museum, housed in various rooms of the Biological Sciences Building; (4) the Botanical Collections and Herbaria.

The Anthropological Museum containing about 25,000 catalogued items includes the Burnett and Raley collections as well as others; the Buttimer and other collections of Indian baskets; the Michell Pierce collection of Eskimo clothing and utensils. The Burnett Collection was made by the late Frank Burnett who donated it. It contains groups of artifacts representative of the ethnology and archaeology of various parts of the Pacific Basin. The largest unit is from Melanesia, but Indonesia and North and South America are also strongly represented.

The collections made by Dr. G. H. Raley and the Rev. E. M. Collison, and donated by Dr. H. R. MacMillan, are especially full in artifacts from Kitimat and the Queen Charlotte Islands. An unusually rich collection of ceremonial material from the Southern Kwakiutl has been donated by Dr. MacMillan.

A grant from the Leon and Thea Koerner Foundation made possible the purchase of a collection of Egyptian and classical materials from the Baroness K. van Haersolte van den Doorn. The classical collection has been greatly enhanced by the Sid Leary Memorial Collection of artifacts from Cyprus and Crete.

The Fyfe-Smith collection of traditional Japanese arts and crafts and the Clegg collection of works of art, costumes and textiles form a nucleus of Japanese materials. Two additional gifts have supplemented this, one from the Prefectural Trade Association of Japan, and one from the Fujiwara Trading Company. A collection from Okinawa was made by Dr. Wayne Suttles in 1954, and one from Japan by Dr. R. P. Dore in 1958.

Some important acquisitions have been made of Chinese ceramics ceremonial objects, costumes and textiles, supported by grants from the Leon and Thea Koerner Foundation.

While it is primarily a teaching museum for the use of the University in general and Anthropology students in particular, the museum is open to the public while University is in session.

The Geological Museum is designed for the visual instruction of students and visitors and is closely coordinated with the teaching of the Department of Geology.

There are on exhibit eleven table-cases of minerals in systematic arrangement; a case of fluorescent minerals; a case of meteorites; two table-cases of ore specimens from well-known mines; eight table-cases of fossils representing the geological periods; two standing cases of prehistoric fishes, reptiles, birds and mammals. A table-case represents the primates and early man. Other exhibits include Pleistocene mammal remains from the placer gravels of Yukon and Alaska, the skull and antlers of an Irish elk and fine modern game heads.

Of special interest are a geological model of the Assynt Mountains of Scotland by Peach and Horne, and a fine mounted hooded dinosaur, *Lambeosaurus* sp. from Steveville, Alberta, on permanent loan from the National Museum, Ottawa.

In the study material, the Sutton-Thompson collection includes over 800 mineral species from 4036 localities. Its thousands of specimens are systematically arranged in readily accessible trays. Many trays of rock represent various parts of Canada, Hong Kong and elsewhere. Upwards of 500 trays of fossils represent work done by students and staff over the past 45 years in Canada, Hong Kong and other places.

The Zoological Museum contains material representative of both the vertebrate and invertebrate fields. It is housed in several rooms in the Biological Sciences building. The collection of marine invertebrates of the north-eastern Pacific Ocean is steadily increasing in size and includes the Fraser collection of hydroids of the world. The collection of vertebrates exclusive of fish now numbers about 12,600 specimens of birds, 9,200 mammals, and 1100 amphibians and reptiles. Important recent collections have been added from the west coast of Mexico as a result of the Marijean expeditions to this area in 1957 through to 1966 under the sponsorship of Dr. H. R. MacMillan.

The George J. Spencer Entomological Collection now numbers about 400,000 specimens. The most notable additions recently have been the Stace-Smith collection of Coleoptera and the Downes collection of Hemiptera and Homoptera.

The ichthyological collection includes freshwater fishes from north-western North America and marine fishes from the North Pacific Ocean and Bering Sea, including Japanese waters. Tropical marine fishes from the eastern Pacific, particularly the offshore islands, are well represented, and there are some collections from Southeast Asia.

The limnological collection, in addition to standard physical and chemical information, contains a large number of plankton and bottom fauna samples from several hundred lakes in British Columbia.

The Herbaria consist of permanent reference and research collections of dried plant specimens housed in cases in the Biological Sciences Building. All groups from the algae to the flowering plants are represented.

The total number of flowering plants and ferns is about 122,000 sheets. An effort is being made to preserve in this collection all species known to occur in the province. Its value in this regard has been greatly augmented through the donation by Mr. J. W. Eastham of several thousand B.C. specimens. In addition it contains a number of smaller collections by other botanists working

in the province as well as considerable material from other parts of North America, and from Europe, South Africa, the Hawaiian Islands, New Zealand and Australia.

The Phycological Herbarium comprises over 40,000 specimens of marine algae. It is rich in species from British Columbia, Washington, Oregon and Alaska. Collections were made in research projects supported in part by grants from the National Research Council and the Defense Research Board to the Institute of Oceanography and the Department of Botany.

In the Mycological Herbarium are over 10,000 specimens of fungi. This includes an excellent collection of Myxomycetes as well as representatives of most groups of true fungi.

The Bryophyte Herbarium contains the largest and most complete collection of British Columbia bryophytes in existence. It is well represented by material from Japan and Western Europe. The collection has been built as a direct result of sponsorship by National Research Council. This Herbarium of bryophytes and lichens contains over 60,000 specimens.

The collections are freely available to students and research institutions.

#### BOTANICAL GARDEN

The history of the Botanical Garden at the University dates back to 1912 when two acres of land were set aside on the Provincial Colony Farm at Essondale. In 1916, the collections established at Essondale were moved about 20 miles to the present University site. Dr. John Davidson was appointed as the first Director of the Botanical Garden.

The present gardens consist of 57.9 acres on the western edge of the campus. Forty-four acres were set aside in 1966 west of the Thunderbird Sports Stadium as a new Botanical Garden area. This new area will contain research and administrative facilities as well as specialized project oriented collections related to research programmes of several departments on the campus. Special greenhouse facilities will be developed and incorporated within the research centre. Research activities will be conducted by members of the Botanical Garden staff as well as research scientists in associated departments. Graduate student participation in plant research studies will form a part of the new Garden programme.

Three established areas of the Botanical Garden are now functional and are represented by Totem Park, Nitobe Memorial Garden and the Faculty Club-Graduate Centre garden complex, which contains both rhododendron and

Totem Park was opened in June 1962 and contains 3.1 acres. The original plan for the park envisaged representations of the four main stylistic divisions of the coastal Indians of British Columbia. Native trees and indigenous plants of the coastal areas are used to provide a setting for the Totem carvings. The poles, representative of the Haida Indians, were prepared under the direction of the well known Indian artisan Mongo Park. Future plans for this area include the introduction of the economically important plants used by the Indians in the coastal areas of British Columbia.

The Nitobe Memorial Garden, opened in June 1960, was dedicated to the memory of Dr. Inazo Nitobe, distinguished educator and international civil servant, who did much to interpret Japan to the West and the West to Japan. The garden, designed by Professor K. Mori of the University of Chiba, was developed to provide an authentic example of Japanese landscape architecture for the campus. Plants contained in the garden are of both Japanese and North American origin. The garden represents one of the finest examples of Japanese landscape architecture in North America.

The Botanical Garden serves as a repository for living plant collections used for teaching and research programmes and is open to the public.

#### THE FINE ARTS GALLERY

The Art Gallery, located in the Library and approached through the north entrance door, was opened in December, 1948. It was established by and has been supported with the generous assistance of the University Chapter of the I.O.D.E. and others as a memorial to the late Dean Mary L. Bollert.

The Art Gallery has no permanent collection but maintains a continuous display of loan exhibitions. These are rented or borrowed from the National Gallery, the Museum of Modern Art, the Western Canada Art Circuit, the Western Association of Art Museums, the Smithsonian Institution and other galleries and circuits. Other shows are exhibited on the invitation of the Art Gallery, by local and other artists, art organizations and institutions. Because it has these numerous sources of material, the Gallery is able to bring to the University a wide variety of exhibitions which are representative of the principal trends in art. Many of the exhibitions are accompanied by explanatory talks given by the artists concerned, the Curator and other members of Faculty, and by discussions.

The Gallery is under the supervision of the Curator and is open from 10:30 a.m. to 5:00 p.m., Tuesday through Saturday, and from 7:00 to 9:00 on Tuesday evenings.

## FACILITIES FOR PHYSICAL EDUCATION AND ATHLETICS

## War Memorial Gymnasium

The Memorial Gymnasium was officially dedicated on October 26, 1951. This building, which cost approximately \$800,000, was the result of a student-alumni campaign to honour the men and women of British Columbia who served in World Wars I and II. It was financed by public subscriptions, a Provincial Government grant, and in major degree by a special student levy. Accommodating more than 3000 spectators in the main hall, it contains also an Apparatus Gymnasium, a Snack Bar, a Physiotherapy Treatment Centre, a Human Performance Laboratory, and offices of the School of Physical Education and Recreation and the Athletic Department.

#### Women's Gymnasium

This building was completed in 1929 and presented to the University by the Alma Mater Society. It contains the offices of Women's Athletics.

#### Swimming Pool

During 1954 an open-air swimming pool was built adjoining the Memorial Gymnasium to provide for the swimming and diving events of the British Empire and Commonwealth Games held during the first week of August. A gift from the British Empire and Commonwealth Games Canada (1954) Society, the pool is 50 feet wide and 165 feet long. Under the 10-metre diving tower the water is 16'6" deep. During the Games the pool was surrounded by 6000 seats.

#### Thunderbird Park

To supplement the original playing field of about 13 acres adjacent to the

War Memorial Gymnasium and to replace facilities lost as a result of the construction of the Student Union Building, Thunderbird Park was developed in the south campus and was officially opened in June, 1967. Development of the old site was started early in January, 1931 and was made possible through funds provided chiefly by subscriptions from the faculty, students, and friends of the University. The original stadium and running track have been demolished and have been replaced by the Student Union Building. The area still retains the William Eugene MacInnes Field and the Gymnasium Field. The William Eugene MacInnes Field is situated in an area northwest of the War Memorial Gymnasium. This field was made possible by contributions from Mr. and Mrs. W. H. MacInnes in memory of their son, a graduate of this University in the combined course of Arts and Mining Engineering.

Thunderbird Park embraces an area of more than 60 acres and contains the Thunderbird Stadium, the Winter Sports Centre, the Wolfson Field, the O. J. Todd Field, the Arthur Lord Field, the Frank Buck Field, the Chris Spencer Field, the John Owen Pavilion, the Harry Logan Track, and five

unnamed playing fields.

## Winter Sports Centre

A Winter Sports Centre, consisting of a hockey rink with an ice surface of 200 feet by 85 feet surrounded by seating accommodation for 1284, a curling area with six sheets of ice, and a lounge and snack bar, was opened officially on October 25, 1963. The Centre, constructed at a cost of \$500,000.00, was made possible by generous donations from the Alma Mater Society, the University, the Molson Foundation, and the support of the Federal-Provincial Winter Works Programme. It is operated by the Winter Sports Centre Management Committee which is comprised of two representatives of the University, two of the Alma Mater Society, and two of the residents of the adjoining residential area.

#### Thunderbird Stadium

The stadium, constructed at a cost of more than \$1,000,000.00, was opened on October 7, 1967. It can accommodate 3000 spectators under cover of a roof uniquely suspended by cables supported by twelve reinforced concrete columns topped with huge concrete Thunderbirds. The building contains several dressing rooms, press and television facilities, a fully equipped training room, offices, and a wrestling room. It was financed by the Board of Governors as a replacement for the original stadium which had been made possible by the contributions of students and faculty.

## John Owen Pavilion

The John Owen Pavilion was opened officially on June 6, 1967. It contains dressing rooms, a classroom, office, equipment rooms, and a weight training room. It services the unique Harry Logan Track, an all-weather surface enclosing a complete complex for all field events.

The Chris Spencer Field was made possible by the generosity of the Chris Spencer Foundation, supplemented by contributions from friends of the Uni-

versity interested in cricket and field hockey.

The Wolfson Field, constructed in 1961, consists of approximately 7 acres located to the south of Agronomy Road. This area was developed as a result of a gift from the Wolfson Foundation, London, England, made through the British Columbia Playing Fields Association. A dressing pavilion is located at the south end of the Wolfson Field.

The Armoury is used for activities such as tennis, golf, indoor track

and field, and various team practices.

#### INTERNATIONAL HOUSE

International House at the University of British Columbia was officially opened on March 4, 1959 by the late Mrs. Eleanor Roosevelt. Its ideal is shared by all International Houses as expressed in the motto, "That Brotherhood May Prevail".

International House is a non-residential centre. Through its varied programmes and services, Canadian and foreign students alike have an opportunity to develop international friendships and thereby extend their knowledge and understanding of other countries.

#### PERMANENT BUILDINGS

The following listing gives the permanent buildings and the dates of their completion: 1925—Science (Chemistry), Library, Power House. 1937—Stadium. 1947—Physics (Hennings). 1948—Library, North Wing. 1949—Home Economics. 1950—Biological Sciences, Engineering. 1951—Mary Bollert Hall, Isabel MacInnes Hall, Ann Wesbrook Hall (women's residences), Wesbrook, Law. 1954—Memorial Pool, Memorial Gymnasium, Physical Metallurgy. 1956—Brock Hall Annex, Mary Murrin Hall. 1958—International House, Buchanan Building (Arts). 1959—Chemistry South Wing, Extension to Biological Sciences, Robson House, Kootenay House, Okanagan House (men's residences), Faculty Club. 1960-Sherwood Lett House (men's residence), Gordon Shrum Commons (a central social and dining hall), Walter C. Koerner Wing to the Library, George Cunningham Pharmacy building, Extension to Buchanan. 1961—Chemical Engineering, Thea Koerner Graduate and Social Centre, three units—Medical Sciences, Aldyen Hamber House, Dorothy Mawdsley House, Margaret MacKenzie House, Phyllis Ross House (women's residences), Power House extension. 1962—Chemistry extension, Lasserre building, First unit-Education. 1963-Commissary Kitchen, Chemistry East Wing, Winter Sports Centre, Frederic Wood Theatre, Physics (Hebb) extension. 1964—MacLeod Electrical Engineering, Woodward Library (Medicine), Dene and Nootka Houses (women's residences), Haida and Salish Houses (men's residences), Totem Park Common Block, Education Classroom Block and Office Block. 1965—Henry Angus Building for Commerce and Social Sciences.—Forestry—Agriculture; Dentistry; Medical Sciences Additions; Music; Stadium; Track and Field Pavilion; Acadia Park Housing Development. 1968—Metallurgy; Student Union Building; Sciences Centre Stage I.; Administration Building; Student Union Building; Faculty Club addition; Place Vanier Residences; Totem Park Residences; Civil Engineering expansion for Computing Centre; Frederic Wood Workshop. Under construction 1968: Structures Laboratory; Bio Sciences Addition (West Wing), Woodward Library Addition, Winter Sports Centre Addition. 1969—Psychiatry Wing of Health Sciences Centre; Stage I, Administration Building. Planned for construction in 1969: Pharmacy Addition; Gymnasium for Physical Education.

#### UNION COLLEGE OF BRITISH COLUMBIA

(United Church of Canada) Vancouver 8, B.C.

(In affiliation with the University of British Columbia)

Principal

Rev. W. S. Taylor, M.A., B.D., Ph.D., D.D.

Registrar

Rev. Professor R. A. Wilson, M.A., B.D., Ph.D., D.D.

Dean of Residence Rev. Professor V. J. Anderson, B.A., B.D., Th.M.

Union College offers courses of instruction in Theology leading to a diploma in Theology, and to the degrees of B.D., B.Th., and S.T.M.

A six-week Summer Session each year, concurrent with the University Summer Session, offers courses for credit toward Graduate degrees, with lectures by members of the College Faculty and visiting Professors.

For further information in reference to Faculty, courses of study, etc., see Calendar of Union College.

## THE ANGLICAN THEOLOGICAL COLLEGE OF BRITISH COLUMBIA

Vancouver 8, B.C.

(in affiliation with the University of British Columbia)

Principal and Dean of Theology THE REVEREND J. BLEWETT, B.A., B.D., D.D.

Registrar

THE REVEREND CANON T. BAILEY, M.A., B.D.

Dean of Residence THE REVEREND R. N. MUGFORD, B.A., S.T.B.

The Anglican Theological College offers courses in Theology leading to the title of Licentiate in Theology, and the degrees of S.T.B. and S.T.M.

A Summer Session each year, concurrent with the University Summer School, offers courses for credit towards Graduate degrees.

For further information in reference to Faculty, course of study, etc., see Calendar of the College.

# ST. MARK'S COLLEGE

(Roman Catholic) Vancouver 8, B.C.

(In affiliation with the University of British Columbia)

Principal

Rev. E. Carlisle LeBel, C.S.B., C.D., M.A., LL.D.

Registrar REV. N. KELLY, C.S.B., M.A.

St. Mark's College offers programmes in theology that are presented in the context of and for the University community. Credit for these courses is given according to the Provincial Charter St. Mark's holds in its own right.

As a residential college, St. Mark's accommodates 103 men students of the University of British Columbia with the purpose of developing the common interests of students, professors and priests who are studying and teaching in the various departments of the University.

During the Summer Session, the residences are occupied by women members of the student body and faculty of the University.

The resources of the College — Library, common rooms, professors and Chapel — are at the service of all University students. The offices and special facilities of the Newman Centre are located at St. Mark's.

As a College of the Church, St. Mark's offers services, especially the celebration of the Eucharist, that seek to be at one with the activity of the Church in the person of her members at the University.

For more detailed information, please consult the calendar of the College.

## ST. ANDREW'S HALL

(The Presbyterian Church in Canada) Vancouver 8, B.C.

(In affiliation with the University of British Columbia)

Dean of Residence

Rev. J. A. Ross, M.A., B.D., Ph.D.

This men's residence provides on-campus dormitory, dining-room and chapel facilities for forty-two students during both winter and summer sessions. Application forms should be requested and filed well in advance.

#### **CAREY HALL**

(Baptist Federation of Canada) Vancouver 8, B.C.

(In affiliation with the University of British Columbia)

Acting Dean

REV. W. E. WILBURN, B.A., B.D.

As a residential college, Carey Hall provides residence and dining facilities for 42 men students, mostly in single rooms. During the Summer Session only, half of this accommodation is available for women students.

Carey Hall provides guidance and oversight to Baptist pre-theology students in their undergraduate years, as well as in the area of continuing education for ministers.

Further information and application forms will be sent on request.

#### THE BRITISH COLUMBIA RESEARCH COUNCIL

The British Columbia Research Council is an independent non-profit, industrial research organization. Its work is in applied fields of direct interest to industry.

The Council cooperates with the National Research Council in providing free technical information and industrial engineering services, and is one of the few agencies in Canada which undertakes contract research on a confidential basis. Included in its activities are product and process development, economics and market research, operations research, and trouble-shooting.

The Council has a total staff of 95, of which 59 are professional scientists, engineers and economists. Close cooperation is maintained with the science, engineering and other related departments of the University.

#### DEPARTMENT OF FISHERIES AND FORESTRY

The Vancouver Laboratory is a unit of the Department of Fisheries and Forestry, Canada, and is maintained by the Federal Government for the conduct of research in wood products. The Laboratory is housed in a modern building at 6620 N.W. Marine Drive, west of the Ponderosa Cafeteria. This building was occupied in March, 1958, and consists of an administrative wing built almost entirely of British Columbia woods and a laboratory wing in which Douglas Fir glulam beams are a construction feature.

# REGISTRATION 1968-69

(as of December 1, 1968)

FACULTY OF AGRICULTURAL SCIENCES First Year	Men 24 39 46 45 154	Women 13 14 16 14 ==============================	Total 37 53 62 59 211
FACULTY OF APPLIED SCIENCE Engineering			
First Year	362	2	364
Second Year	304	2	306
Third Year	248	2	250
Fourth Year	213	1	214
Total	1127	7	1134
Total			
School of Architecture		0	co
First Year	66	2	68
Second Year	46	$\frac{2}{2}$	48 43
Third Year	41		
Total	153	6	159
School of Nursing Basic Degree Programme			
First Year		34	34
Second Year		31	31
Third Year	_	37 25	37 25
Fourth Year			
Total		127	127
Postbasic		00	00
First Year	1	28 20	29 20
Second Year		20 18	20 18
Third Year			
Total	1	66	67
Diploma Course		<u>55</u>	55
TOTAL IN FACUTY	1281	261	1542

FACULTY OF ARTS			
Arts	Men	Women	Total
First Year	851	861	1712
Second Year	871	778	1649
Third Year	647	539	1186
Fourth Year	549	489	1038
Total	2918	2667	5585
Music			
First Year	40	43	83
Second Year	35	33	68
Third Year	18	26	44
Fourth Year	27	18	45
Total	120	120	240
School of Home Economics			
First Year	_	64	64
Second Year		57	57
Third Year		85	85
Fourth Year	_	70	70
Fifth Year	_	1	1
Total		277	277
School of Librarianship	26	55	81
School of Social Work			
First Year	44	38	82
Second Year	43	43	86
Total	87	81	168
TOTAL IN FACULTY	3151	3200	6351
FACULTY OF COMMERCE AND BUSINESS	ADMI	NISTRATION	
First Year	281	12	293
Second Year	272	10	282
Third Year	234	13	247
Fourth Year	239	8	247
TOTAL IN FACULTY	1026	<del>===</del> 43	1069
FACULTY OF DENTISTRY			
First Year	33	2	35
Second Year	20	<b>4</b>	20
Third Year	20 8	<del></del>	8
Fourth Year	6	<u></u>	7
Dental Hygiene		20	20
Demai Hygiene			
Total	67	23	90

FACULTY OF LAW  First Year  Second Year  Third Year  TOTAL IN FACULTY  FACULTY OF MEDICINE	Men 218 147 102 467	Women 11 5 5 21	Total 229 152 107 488
First Year	55	9	64
Second Year	54	9	63
Third Year	49	7	56
Fourth Year	50	10	60
Total	208	35	243
School of Rehabilitation Medicine			
First Year	_	32	32
Second Year	_	32	32
Third Year		32	32
Fourth Year	1	15	16
Total	1	111	112
TOTAL IN FACULTY	209	146	355
FACULTY OF PHARMACEUTICAL SCIENCES First Year Second Year Third Year Fourth Year	24 21 12 19	25 16 15 13	49 37 27 32
TOTAL IN FACULTY	<del></del> 76	<del>===</del> 69	==== 145
FACULTY OF SCIENCE First Year Second Year Third Year Fourth Year	1131 740 555 403	282 154 99 110	1413 894 654 513
TOTAL IN FACULTY	2829	645	$\frac{-}{3474}$
Qualifying Year	111	45	156
Unclassified	149	101	250
SUB-TOTAL WINTER SESSION	13262	<del>8455</del>	21717
Correspondence Courses	258	345	603
TOTAL WINTER SESSIONSummer Session 1968	2864	8800 2800 ===== 11600	22320 5664 27984
GRAND TOTAL 1908-09	10304	11000	41304

## DEGREES CONFERRED 1968

## Spring Congregation:

May 31, June 1, 2; LL.D.-4; D.Sc.-3; D.Litt.-1; Ph.D.-54; M.A.-80; M.B.A.—18; M.S.W.—81; M.Sc.—52; M.A.Sc.—22; M.S.A.—7; M.F.—1; M.P.E.—2; —M.Ed.—46; M.Mus.—1; M.S.P.—1; Ed.D.—3; M.Arch.—1; LL.M.—1; B.L.S.—84; B.A.—665; B.H.E.—43; B.Mus.—18; B.Com.—177; LL.B.—99; B.S.A.—39; B.A.Sc.—182; B.Arch.—16; B.S.N.—37; B.Ed.—331; B.P.E.—48; B.S.F.—32; M.D.—54; B.S.P.—31; B.Sc.—394; B.S.R.—3; D.M.D.—6: Total—2637.

#### Fall:

Ph.D.—42; D.Ed.—2; M.A.—45; M.Sc.—32; M.A.Sc.—15; M.S.A.—3; M.F. -3; M.B.A.—21; M.S.P.—1; M.Ed.—51; M.S.W.—3; M.Mus.—3; M.P.E.—4; B.A.—235; B.H.É.—8; B.Mus.—5; B.Sc.—77; B.A.Sc.—15; B.Arch.—1; B.S.N. -7; B.S.A.-8; B.S.P.-6; B.S.F.-1; B.Com.-39; B.Ed.-350; B.P.E.-23; Total—1000.

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## REQUEST FOR CALENDAR

In addition to this General Information bulletin the University publishes separate Faculty and School calendars and an Awards and Financial Assistance bulletin.

Application for one or more of these publications may be made by completing the address box below, checking the appropriate squares to indicate the publications required, and detaching and mailing this page to:

The Office of the Registrar,

The University of British Columbia, Vancouver 8, Canada. ☐ Awards and Financial Pharmacy Assistance bulletin ☐ Science Faculties of: Schools of: ☐ Agriculture ☐ Architecture ☐ Applied Science ☐ Community and Regional Arts (including Music) Planning ☐ Commerce and ☐ Home Economics **Business Administration** ☐ Librarianship ☐ Dentistry □ Nursing ☐ Education □ Physical Education ☐ Forestry and Recreation Graduate Studies Rehabilitation Medicine □ Law 7 Medicine ☐ Social Work The University cannot supply all calendars to individual requests and would be grateful if you would ask only for those you require. If you wish them sent by air mail or first class mail, please include postage. If you wish to obtain a composite calendar at a cost of \$5.00, please check here and include a money order for the amount which in cludes postage. The calendar will be mailed to you through the Bookstore by surface mail. Application for Admission form □ Re-registration form DO NOT DETACH FROM: The Office of the Registrar, The University of British Columbia Name City, Zone and Province Country ....

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# THE FACULTY OF AGRICULTURAL SCIENCES

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA
VANCOUVER 8 • BRITISH COLUMBIA CANADA

# The Faculty of Agricultural Sciences Calendar, 1969-70

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For topics not listed above, see the General Information bulletin.

#### Financial Assistance

A list of Fellowships, Scholarships, Bursaries and Loans open to students in the University will be found in the publication "Awards and Financial Assistance" which may be obtained from the Registrar's Office. For details, consult this publication. In general, application must be made to the Dean of Inter-Faculty and Student Affairs.

## ACADEMIC STAFF

MICHAEL SHAW, M.Sc., Ph.D. (McGill), F.L.S., F.R.S.C., Dean of the Faculty and Professor of Agricultural Botany.

## Department of Agricultural Economics

- G. R. WINTER, B.Sc. (Alta.), M.S., Ph.D. (Iowa State), Professor and Chairman of the Department.
- P. L. Arcus, B.Ag.Sc., M.Ag.Sc. (Massey), Ph.D. (Iowa State), Assistant Professor.
- M. J. Dorling, B.Sc. (Reading), Diploma (Ag. Econ.) (Oxon.), M.S. (Iowa State), Ph.D. (McGill), Assistant Professor.
- C. Verner, A.M. (William and Mary), M.A., Ed.D. (Columbia), A.Hum. (Hon.) (Andrew College, Georgia), Professor of Adult Education.

## Department of Agricultural Mechanics

- T. L. COULTHARD, B.E. (Sask.), M.Sc. (Calif.), P.Eng., Professor and Chairman of the Department.
- E. L. Watson, B.A.Sc. (Brit. Col.), M.Sc. (Calif.), P.Eng., Associate Professor.
- L. M. STALEY, B.A.Sc. (Brit. Col.), M.Sc. (Calif.), P.Eng., Associate Professor.

## Department of Animal Science

- W. D. Kitts, M.S.A. (Brit. Col), Ph.D. (Iowa State), Professor and Chairman of the Department.
- J. C. Berry, M.S.A. (Brit. Col.), Ph.D. (Iowa State), Professor.
- R. M. Beames, M.Agr.Sc. (Queensland), Ph.D. (McGill), Assistant Professor.
- C. R. Krishnamurti, M.V.Sc. (Madras), Ph.D. (Alta.), Assistant Professor.
- R. G. Peterson, B.S. (Wyoming), M.S., Ph.D. (Illinois), Assistant Professor.
- R. M. Tart, B.Sc. (Durham), Ph.D. (Newcastle), Assistant Professor.

# Department of Food Science

- W. D. Powrie, M.A. (Toronto), Ph.D. (Massachusetts), Professor and Chairman of the Department.
- P. M. TOWNSLEY, B.S.A. (Brit. Col.), M.S., Ph.D. (Calif.), Associate Professor.
- S. NAKAI, B.Sc., Ph.D. (Tokyo), Assistant Professor of Dairying.

# Department of Plant Science

- V. C. Brink, M.S.A. (Brit. Col.), Ph.D. (Wisconsin), Professor of Agronomy and Chairman of the Department.
- D. P. Ormrod, B.S.A. (Brit. Col.), Ph.D. (Calif.), Professor of Plant Science.
- A. J. RENNEY, B.S.A. (Brit. Col.), M.S. (Calif.), Ph.D. (Oregon State), Professor of Agronomy.
- M. Shaw, M.Sc., Ph.D. (McGill), F.L.S., F.R.S.C., Professor of Agricultural Botany.
- ROY L. TAYLOR, B.Sc. (S.G.W.U.), Ph.D. (Calif.), Professor of Plant Science and Director of the Botanical Garden.

- G. W. Eaton, B.S.A. (Toronto), Ph.D. (Ohio State). Associate Professor of Horticulture.
- C. A. HORNBY, M.S.A. (Brit. Col.), Ph.D. (Cornell), Associate Professor of Horticulture.
- J. W. Neill, M.C., B.S.A. (Toronto), Ph.D. (Oregon State), Associate Professor of Horticulture.
- B. SIVAK, M.Sc. (Brit. Col.), Lecturer, Plant Pathology.

## Department of Poultry Science

- W. D. Kitts, M.S.A. (Brit. Col), Ph.D. (Iowa State), Professor and Chairman of the Department.
- MRS. BERYL E. MARCH, B.A., M.S.A. (Brit. Col.), Associate Professor.
- C. W. Roberts, B.Sc. (Oklahoma), M.S., Ph.D. (Minnesota), Associate Professor.
- J. F. RICHARDS, M.Sc. (Man.), Ph.D. (Minnesota), Assistant Professor.
- J. Bielly, M.S.A. (Brit. Col.), M.S. (Kansas State), F.A.I.C., F.P.S.A., F.R.S.C., Research Professor.

## Department of Soil Science

- C. A. Rowles, M.Sc. (Sask.), Ph.D. (Minnesota), Professor and Chairman of the Department.
- L. M. LAVKULICH, M.Sc. (Alta.), Ph.D. (Cornell), Assistant Professor.
- L. E. Lowe, M.A. (Oxon.), M.Sc., Ph.D. (McGill), Assistant Professor.
- J. DEVRIES, B.Sc. (Alberta), M.S.A. (Toronto), Ph.D. (Washington State), Assistant Professor.

## Honorary Lecturers in the Faculty of Agricultural Sciences

- H. Andison, B.S.A. (Brit. Col.), Plant Science.
- I. BANDY, B.A., M.A., Ph.D. (Brit. Col.), Plant Science.
- T. H. BLACKBURN, B.A., M.Sc. (Trinity), Ph.D. (Aberdeen), Soil Science.
- M. F. CLARKE, M.S.A. (Brit. Col.), Ph.D. (Penn.), Plant Science.
- L. FARSTAD, B.S.A. (Sask.), M.S.A. (Brit. Col.), Soil Science.
- D. G. Finlayson, M.A. (Brit. Col.), Ph.D. (Western Ont.), Plant Science.
- R. E. FITZPATRICK, B.S.A. (McGill), Ph.D. (Toronto), Plant Science.
- R. H. HANDFORD, B.S.A. (Man.), M.S.A. (Sask.), Ph.D. (Minn.), Plant Science.
- H. R. MacCarthy, B.A. (Brit. Col.), Ph.D. (Calif.), Plant Science.
- H. D. McCausland, B.S.A. (Man.), D.V.M. (Toronto), Animal Science and Poultry Science.
- G. J. Okulitch, M.S.A. (Brit. Col.), Food Science.
- P. N. Sprout, B.S.A. (Brit. Col.), Soil Science.
- C. C. STRACHAN, B.S.A. (Brit. Col.), Ph.D. (Mass.), Plant Science.
- H. L. A. Tarr, M.S.A. (Brit. Col.), Ph.D. (McGill and Cantab.), Poultry Science.

# FACULTY OF AGRICULTURAL SCIENCES

The Faculty of Agricultural Sciences offers courses leading to:

- 1. Bachelor of Science in Agriculture B.Sc. (Agr.)\*, Major Course.
- 2. Bachelor of Science in Agriculture B.Sc. (Agr.)\*, Honours Course.
- Master of Science (M.Sc.), Faculty of Graduate Studies.
- 4. Doctor of Philosophy (Ph.D.), Faculty of Graduate Studies.
- 5. Diploma in Agricultural Sciences.

The Faculty of Agricultural Sciences offers a wide selection of courses emphasizing the basic and agricultural sciences, with the object of developing an understanding of the applications of scientific principles to agriculture in students whose aptitudes and interests lie in the natural and social sciences and whose vocational objectives are directed towards scientific research, business and industry, secondary school teaching, or public and private service.

The work of the Faculty is concerned with primary agriculture as exemplified by an understanding of soil, by the growing, protecting, harvesting and marketing of crops and by the care, nutrition and management of animals. As it is also concerned with the processing and marketing of agricultural products, it trains students for industries such as dairying, meat-packing, fruit and vegetable processing, brewing and wine-making. Another facet of the work of the Faculty is the opportunity afforded students to specialize in basic sciences such as genetics, physiology, nutrition, and pathology, with application directed towards plants and animals, or in biochemistry and microbiology with emphasis on animals, plants and foods. Work is given in pedology and in the application of microbiology, chemistry, physics and mineralogy to soils. Complementary courses in agricultural economics relating to production, prices, marketing and public policy in agriculture are available to those whose challenge lies in the field of economics or rural sociology. A general course in agricultural engineering provides for specialization in agricultural mechanization.

In addition to well-equipped laboratories for research and teaching in various aspects of the basic agricultural sciences, and of the application of engineering and economics to agriculture, the Faculty also has available greenhouses and land as ancillary facilities for undergraduate and graduate studies in agronomy, horticulture, floriculture and plant protection; and supplementary resources for teaching and research with beef and dairy cattle, swine, sheep, fur-bearing animals and poultry.

## Major, Double Major and Honours

In the Major Course the Faculty offers a four-year programme of study designed to prepare graduates to enter a wide variety of careers associated with agriculture in business, education, extension, farming, management, marketing, quality control and research in either private enterprise or the public service. The first two years of work are devoted largely to acquiring

<sup>\*</sup> The colour of the hood is maize, the Bachelor's hood trimmed with the colour and the Master's lined.

a knowledge of the basic sciences and to laying a foundation for the work of the following years. During the last two years a student may select, in consultation with the Dean, a generalized course or a course which emphasizes one phase of agriculture.

The Double Major Course enables the student to gain a degree of specialization in two Departments within the Faculty.

In the Honours Course the Faculty offers a four-year programme of study to students who are primarily interested in and capable of a career in various specialized fields of study associated with agriculture. The first two years are devoted mainly to laying a foundation in the sciences and the humanities. The student is also brought into early association with the fundamental agricultural sciences and techniques. In this way the student has the opportunity of obtaining the proper background for specialization in the final two years.

Study in the Major course and in the Honours course in the Faculty of Agriculture Sciences is offered in the following:

Agricultural Economics Agricultural Economics and Commerce Agricultural Mechanics Agriculture and Teaching Agriculture and Wildlife Management Animal Science: Genetics. Nutrition, and Physiology Agricultural Entomology Food Science

Plant Science: Agronomy Horticulture, Genetics, Nutrition and Plant Protection Poultry Science: Nutrition. Physiology, Genetics and Processing Soil Science: Soil Chemistry Soil Physics Soil Genesis and Classification Forested Soils Soil and Water Conservation and Management

# Master's and Doctor of Philosophy Courses See Faculty of Graduate Studies calendar.

## Veterinary Medicine

A two-year pre-veterinary course leading to admission to the four-year course in Veterinary Medicine offered by the Colleges of Veterinary Medicine at the University of Guelph or at the University of Saskatchewan may be pursued in the Faculty. The course requires two full years work at the University. The specific requirements in the case of each student will be determined after consultation with the Head of the Department of Animal Science.

The Diploma Course (not offered 1969-70).

#### Short Courses

Short Courses are available for men and women who are unable to take advantage of the longer courses, but who desire to extend their knowledge of agriculture.

Special announcements giving details of the various courses are issued each year, and may be obtained from the Director of University Extension on application.

#### Professional Association

In order to practise as a Professional Agrologist in the Province of British Columbia it is necessary to be registered as a member in the British Columbia Institute of Agrologists. A student who plans to become an agrologist may enroll with the Institute as an undergraduate. Applications should be forwarded to the Registrar, B.C. Institute of Agrologists, 15389 Roper Ave., White Rock, B.C.

## COURSES LEADING TO THE DEGREE OF B.Sc. (Agr.)

## Admission Requirements

Students may gain admission direct from secondary school or on transfer from a recognized university or college.

A student of a British Columbia Secondary School, following Grade 12, will be admitted if he obtains an average of at least 60% on recommended grades from an accredited senior secondary school, or on a combination of school grades and gradings on examinations conducted by the Department of Education and is considered by the Senate Admissions Committee to give promise of success in university studies.

A student who has completed appropriate studies with satisfactory standing beyond Grade 12 may be considered for admission and the granting of advance credit. Credit on transfer is restricted to the first year following Grade 13 or to First and Second Year following junior college. An applicant holding a Grade 12 certificate of another Canadian province will not be granted advance credit for subjects of Grade 12.

In preparation for admission to the Faculty of Agricultural Sciences senior secondary school students must elect Mathematics 12 and Chemistry 11 (if possible, also Chemistry 12); they should elect Physics 11 or Biology 11 (both, if possible). A grade 13 student of British Columbia should take English 100/1, Mathematics 113, one or both of Physics 101, Zoology 105 (or Botany 105) and additional non-science courses to give the full programme of five courses. The problem of Grade 13 chemistry is explained on page A29 under the heading "Science."

Students seeking transfer from other universities or colleges will be granted advance credit for parallel courses in the first two years of the degree programme where standings obtained are above the minimum passing grade at the

The University reserves the right to reject applicants for admission on the basis of their overall academic records even if they technically meet entrance requirements and to limit enrolment if its facilities and resources are inadequate.

## Four-Year Major Course Curriculum

Candidates for the B.Sc. (Agr.) degree in the four-year general course must complete 62 units of work as required below; 30 of these units normally are taken in the first two years. The particular programme of courses taken by a student in any year must be prepared in consultation with a member of Faculty and is subject to approval by the chairman of the department concerned, the Dean and the Committee on Courses. No more than 19 units of study may be taken by a student in any one year without approval of Faculty.

A student's standing at graduation will be determined by averaging the marks obtained in the best 32 units of required work of the third and fourth

## Four-Year Double Major Course Curriculum

Candidates for the B.Sc. (Agr.) degree in the four-year double major course must complete a minimum of 62 units of work as required below; 30 of these units normally are taken in the first two years. The double major course allows the student to gain a degree of specialization in two departments within the Faculty by choosing, in consultation with the two chairmen concerned, at least 9 units of course work recommended by each of the two departments, to be completed during the third and fourth years. The Research Project may be integrated by the two departments,  $1\frac{1}{2}$  units being allotted

A student's standing at graduation will be determined by averaging the marks obtained in the best 32 units of required work of the third and fourth

#### Four-Year Honours Course Curriculum

Candidates for the B.Sc. (Agr.) degree in the honours course must complete 68 units of work as required below; 30 of these units normally are taken in the first two years. Students who propose to take the honours course must obtain the consent of the department concerned and of the Dean before entering the third year. Consent normally will be granted only to those students who have taken the prerequisite courses for the particular field of study and have a clear academic record at the end of their second year, with at least Second Class standing. To remain in the honours course, a student must obtain at least Second Class standing in each of the last two years in all courses as required by the chairman of the department concerned.

The particular programme of courses taken by a student in any year must be prepared in consultation with a member of Faculty and is subject to approval by the chairman of the department concerned, the Dean and the Committeee on Courses. No more than 19 units of study may be taken by a student in any one year without approval of Faculty.

Honours are of two grades: First Class and Second Class. A student's standing at graduation will be determined by averaging the marks obtained in the best 38 units of required work in the third and fourth years. A student who fails to obtain Second Class standing at graduation will be granted appropriate standing in the Major programme.

# Requirements for the B.Sc. (Agr.) Degree

Subject	Major	Double Major	Honours
First Year			
Chemistry 103 (110 or 120)	3	3	3
Mathematics 100 (Note 1)	2	2	2
Mathematics 121	1	1	1
Physics 110 or 120 or English 100 (	Note 2) 3	3	3
Biology 101	` 3	3	3
Agricultural Sciences 101	3	3	3
Totals	15	15	15

Second Year Chemistry 230 (Note 3)	3	3	3
Economics 200	3	3 3	3
Agricultural Sciences 201 (Note 4) Electives*	3 6	3 6	3 3 3 6
Totals	15	15	15
Third Year			
Agricultural Sciences 300 (Note 5)	1	I	1
Plant Science 321	$1\frac{1}{2}$	$\frac{11/_{2}}{3}$	$\frac{11/_{2}}{3}$
Non-science elective	3	3	3
General electives*	$10\frac{1}{2}$	$10\frac{1}{2}$	131/2
Totals	16	16	19
Fourth Year			
Departmental Research Project (425) (Note 6)	$1\frac{1}{2}$ or 3	3	3
Departmental Seminar (423)	1	1	1
Electives*	$12 \text{ or } 13\frac{1}{2}$	12	15
Totals	16	16	19
Minimum units for graduation	62	62	68

#As early as possible in their programme, students should consult with the chairman of the department in which they wish to specialize.

\* Electives to be chosen from Agricultural Sciences, Applied Science, Forestry, Science or Arts in consultation with the chairman of the department in which the student plans to complete his Research Project. A student who has not yet chosen a major field may wish to consult with several departments and his counsellor.

#### Notes:

- 1. Mathematics 100 and Mathematics 121 are prerequisites for Mathematics 200 and Mathematics 205. Mathematics 121 is the prerequisite for Mathematics 140.
- 2. If English 100 is chosen in the first year, Physics 110 or 120 must be taken as a second year elective. Both Physics 110 or 120 and English 100 must be taken in the first two years.
- 3. Students who have definitely chosen the Major or Honours option in Agricultural Economics may wish to substitute Mathematics 200 for
- 4. As Agricultural Sciences 201 (3) is not being offered in 1969-70, Second Year students should elect two courses numbered 200, each consisting of  $1\frac{1}{2}$  units.
- 5. Normally Agricultural Sciences 300 (Field Trip) is taken prior to registration in the Third Year.
- 6. In the graduating year each student is required to prepare a report on a research project, the title of which must be approved by the chairman of the department concerned.

Fees-Subject to change without notice

First Term Fees, \$249 B.Sc. (Agr.); (includes A.M.S. fee of \$29), payable in full at the time of registration. However, students may pay full fees of \$469 B.Sc. (Agr.), at time of registration. Fourth Year students are assessed an additional \$7 to cover the graduating fee.

Second Term Fees, \$220 B.Sc. (Agr.); payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Finance Department before this date with a note showing name and registration number.

A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.

Partial Course: Consult the General Information bulletin.

#### Graduation

Every candidate for a degree must make formal application for graduation. Application for graduation must be made not later than March 15. Special forms for this purpose are provided by the Registrar's office.

#### Attendance

Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments, may, on the recommendation of the chairman of the department, be excluded by the Dean of the Faculty from the final examinations. Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes.

Students, who because of illness are absent from a December or April examination, must submit a certificate, obtained from a doctor, to the University Health Service as promptly as possible.

#### Withdrawal

Any student who after registration decides to withdraw from the University must report to the Registrar's office. He will be required to obtain clearance from the University, to the satisfaction of the Registrar, before being granted Honourable Dismissal or recommended, where applicable, for refund of fees. (See the General Information bulletin.)

The Senate of the University may require a student to withdraw from the University at any time for unsatisfactory conduct, for failure to abide by regulations, for unsatisfactory progress in his programme of studies or training, or for any other reason which is deemed to show that withdrawal is in the interests of the student and/or the University.

#### EXAMINATIONS AND ADVANCEMENT

- 1. Examinations in all subjects, obligatory for all students, are held in April. In the case of subjects which are final at Christmas and in the case of courses of the First and Second Years, examinations will be held in December as well. Applications for special consideration on account of illness or domestic affliction must be submitted to the Dean not later than 48 hours after the close of the examination period.
- 2. In any course which involves both laboratory work and written examinations, students will be required to make satisfactory standing in both parts. Results in laboratory work will be announced prior to the final examination, and students who have not obtained a mark of at least 50% will neither be permitted to write the examination nor to receive any credit for the course. If the course is repeated no exemption will be granted from the work in either part.

- 3. Successful candidates will be graded as follows: First Class, an average of 80% or over; Second Class, 65 to 80%; Pass, 50 to 65%.
- 4. (a) A student taking 9 or more units in the winter session will receive credit for a course only if, as a result of the final examinations of that session, he passes in courses totalling at least 9 units, including the course in question. The passing grade for a course is 50%.

(b) A student taking fewer than 9 units in the winter session will receive credit for a course only if, as a result of the final examinations of that session, he passes in all his courses. The passing grade for a course

is 50%.

- (c) A student in the summer session will receive credit for each course in which he obtains a grade of at least 50%.
- 5. Courses for which credit has not been obtained must be repeated, or permissible substitutes taken, in the next regular session attended. In the winter session the total of all courses taken may not exceed 19 units except with approval of the Faculty.
- 6. (a) In the winter session, if a student's general standing in the final examination of any year is sufficiently high, the Faculty may grant him supplemental examinations in the subject or subjects in which he has failed provided (i) he has written the final examination in the subject and has obtained a final mark of not less than 40% and (ii) he has obtained at least 9 units of credit in the session.
- (b) In the summer session, a candidate will be granted a supplemental in a subject which he has taken during that session provided (i) he has written the final examination and has obtained a final mark of not less than 40%, and (ii) he has obtained 3 units of credit in that session.
- 7. Special examinations will not be granted, except by special permission of the Faculty, and on payment of a fee of \$20.00 for each paper. Application for special examinations must be made at least two weeks prior to the scheduled meetings of the Faculty in October and February.
- If a supplemental granted in a course is passed with a grade of at least 50%, credit will be given for the course.
- 9. In all but the Final Year a candidate who has been granted a supplemental may write it only once. If he fails, he must repeat the course or take a permissible substitute. In the Final Year he may write it twice.
- 10. Supplemental examinations, covering the work of both the first and second terms, will be held in August in respect of winter session examinations, and in December in respect of summer session examinations.
- 11. Term essays and examination papers will be refused a passing mark if they are noticeably deficient in English; and, in this event, students will be required to pass a special examination in English to be set by the Department of English.
- 12. A student with standing defective in respect of more than 3 units, although he will not be permitted to register in a higher year, may be allowed to continue by registering in the lower year and by taking courses in accordance with Paragraph 5 above.
- 13. A student who fails in the first year of University following Grade 12 will not be permitted to re-enrol at University to repeat the studies of that year. Consideration will be given to re-admitting a student in this category following his satisfactory completion of at least two semesters of a junior college or its equivalent. A student who passes nine units, may re-enrol on probation but during the subsequent session may be required to withdraw at any time for unsatisfactory progress.

- 14. A student in the Second Year who fails but obtains passing marks in at least six units on a full programme will be re-admitted on probation but during the subsequent session may be required at any time to withdraw for unsatisfactory progress. A student who fails Second Year with passing marks in fewer than six units may not re-enrol in the following Winter Session. Consideration will be given to re-admitting a student in this category following satisfactory completion of at least two semesters of study at a college after his failure at University.
- 15. A student at any level of University study who fails for a second time, whether in repeating a year or in a later year, will be required to withdraw from the University; he may be re-admitted after a period of at least one year if his appeal to Senate is supported by the Committee on Admissions of the Faculty concerned and upheld by Senate.
- 16. Any student whose academic record, as determined by the tests and examinations of the first term of the First or Second Year, is found to be unsatisfactory, may be required to discontinue attendance at the University for the remainder of the Session.

#### **Examination Results**

Results of the sessional examinations in April are mailed to students in the graduating classes about the time of Congregation, and to students in the lower years by approximately mid-June. Any student who must meet an application date for another institution prior to mid-June should inform the transcript clerk in the Registrar's Office in order that arrangements may be made to meet the deadline.

## Review of Assigned Standing

Reviews of assigned standing are governed by the following regulations:

- 1. Any request for the review of an assigned grade, other than for a supplemental examination (in which a request for a review will not be granted), must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 tor each course concerned which will be refunded only if the mark is raised.
- 2. Each applicant for a review must state clearly why he believes the course deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a second time before results are announced. For this reason an applicant granted a supplemental should prepare for the examination since a change in the original mark is unlikely and the result of the review may not be available before the end of the supplemental examination period. A review will not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.
- 3. Reviews will not be permitted in more than two courses (6 units) in the work of one academic year, and in one course (3 units) in a partial course of 9 units or less or in the work of one summer session.

## Supplemental Examinations

Supplemental examinations may be written in August at the following centres: Cranbrook, Dawson Creek, Kamloops, Kitimat, Ocean Falls, Penticton, Powell River, Prince George, Prince Rupert, Trail, Victoria; and at

Whitehorse, Y.T. Other centres outside of British Columbia are restricted to universities or their affiliated colleges.

In unusual circumstances, a student working in a remote area may be permitted to write supplemental examinations at a special centre if satisfactory arrangements can be made. Since permission is contingent on completion of arrangements, only early applications will be considered.

The fee for each supplemental examination written at the University is \$7.50; at a regular outside centre, \$10.00; at a special centre, \$20.00. In the event that a candidate does not appear for an examination a refund will be authorized only if, within 10 days after the scheduled examination, the candidate submits to the Registrar an adequate explanation for the failure to write the examination; if such refund is made, it will be \$5.00.

Applications for supplemental examinations in respect of the winter session examinations, accompanied by the necessary fees, must be in the hands of the Registrar by July 8.

## Transcript of Academic Record

A transcript of a student's academic record will, on request of the student, be mailed direct to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the inscription "official transcript only if presented with seal unbroken." On graduation or withdrawal a student may obtain for his own use a copy of his record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of mid-term examinations.

Student records are confidential. Transcripts are issued only at the request of students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made arrangements satisfactory to the Finance Department to meet any outstanding indebtedness.

Granted Honourable Dismissal indicates that the student is in no disciplinary difficulty at the time the transcript is issued; the term has no reference to scholastic status.

Application for a transcript should be made at least one week before the document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

## TEACHER TRAINING COURSE

As well as satisfying the requirements of their own departments in the Faculty, students planning to enter the one-year Teacher Training Course for Graduates through Agricultural Sciences must have Biology 101, Chemistry 103 or 110, or 120, Mathematics 100 and 121 (120, 1968-69 or earlier), Physics 110 or 120 or 130, and in addition must have at least 9 units of credit in approved courses selected from one of the following: Biological Sciences, Chemistry, Mathematics or Physics. The particular courses should

be selected according to the requirements of the Faculty of Education (Academic Concentrations and Majors for Secondary Teachers). Geology 105—General Geology, is strongly recommended.

For further particulars see Faculty of Education calendar.

#### COURSES IN AGRICULTURAL SCIENCES

The number of units assigned to a course is given in round brackets immediately following the course number. Thus 101 (3) under Agricultural Sciences indicates that Agricultural Sciences 101 is a three-unit course.

The hours assigned for laboratory, lectures and tutorials in a course are indicated as follows:

2 lectures and 3 hours laboratory per week, both terms.	[2-3; 2-3]
1 lecture and 2 hours laboratory per week, first term.	[1-2; 0-0]
1 lecture and 2 hours laboratory per week, second term.	ГО-0: 1-21

2 lectures, 3 hours laboratory and 2 hours tutorial or discussion per week, both terms. [2-3-2; 2-3-2]

## Agricultural Sciences

- 101. (3) Concepts and Resources in Agriculture (1).—Analysis of contemporary problems in food production and processing; introduction to the nature and properties of agricultural systems.

  [3-2; 3-2]
- 201. (3) Concepts and Resources in Agriculture (11).—(Not offered in 1969-70) [3-2; 3-2]
- 300. (1) Field Trip.—Observing, recording and correlating agricultural facts in the field. One week of work is required of all students prior to Third Year entry. Staff and other members of the B.C. Institute of Agrologists. The cost to each student will be approximately \$25.

### Agricultural Economics

- 300. (3) Management in Primary Agriculture.—Records, accounts and economic principles used in deciding enterprise combination and resource use in Agriculture. Planning procedures and methods of research. Management problems connected with farms, ranches, orchards, specific enterprises, resources, financing, valuation, getting started and obtaining information.
- 320. (1½) Agricultural Business Management.—Decision processes in the non-farm agricultural firm. Management games, quality and inventory control, production scheduling, game theory, network analysis. [0-0; 3-0]
- 340. (1½) Rural Development.—The economic causes and consequences of slow growing rural regions. Legislation, welfare measures, disguised unemployment, education, taxation and population changes. Methods for initiating and stimulating growth. [0-0; 3-0]
- 400. (2) Enterprise Evaluation.—Observing, recording and evaluating economic performance and profitability of local agricultural firms. Laboratory only. Enrolment limited. [0-4; 0-4]
- 401. (1½) Extension Methods.—An introduction to practices and policies of agricultural extension. Aspects of adult learning, community organization, mass communications, and major agencies of extension will be considered.

  [0-0: 2-21]
- 403. (3) The Organization of Rural Society.—Characteristics of people, groups and organizations; dimensions of the rural community, nature and

direction of community development. Prerequisite: Sociology 200 or consent [3-0; 3-0] of instructor.

- 406. (1½) Agricultural Market Organization.—Structure, conduct and performance in agricultural markets. Marketing, margins, legislation, marketing boards and co-operatives. Historic attempts to improve market channels and [3-0; 0-0] achieve market power.
- 407. (11/2) Agricultural Market Prices.—Determinants of farm prices and income; policies designed to influence market prices and returns to farmers; price fluctuations and cycles; price analysis and forecasting; fitting supply and demand functions. [0-0; **3-**0]
- 408. (3) Research Methods.—Examination and evaluation of research models and philosophies commonly used in agricultural economics. Experimental and analytical design. Research for policy formation. Practical experience in use of computerized research models. Laboratory experience in fitting functions, solving linear programmes and simulation. [3-0; 3-0]
- 423. (1) Seminar.—Application of economic analysis to contemporary problems in agricultural economics.
  - 425.  $(1\frac{1}{2} \text{ or } 3)$  Research Project.
  - 430. (1½) Directed Studies.—On an approved problem.

# Other Courses Which Qualify for Agricultural Economics Credit:

Approved courses in Economics, Mathematics.

Commerce, Education, Geography.

## Courses for Graduate Students

- 500. (1-3) Graduate Seminar.
- 501. (3) Advanced Marketing.—Price-making forces at retail, wholesale and farm market level. Critical analysis of various marketing schemes. Prerequisite; adequate background in economics. Offered in 1969-70.
- 502. (3) Agricultural Problems and Policy.—Influential doctrines in agricultural policy; problems of economic efficiency and welfare. Critical review of present and proposed price and income policies. Prerequisite: adequate background in economics. Offered in 1969-70.
- 504. (3) Extension Planning and Evaluation.—A study of the relative effectiveness of various methods for the diffusion of agricultural information. (not offered in 1969-70).
  - 530. (1-3) Directed Studies.—On an approved problem.
  - 549. (5-6) Master's Thesis.

## Agricultural Mechanics

- 300. (11/2) Power Systems in Agriculture and Food Processing.—Work and energy, thermal, electric and hydraulic power sources. Prerequisite: Physics 110 or 120 or 130. [2-2; 0-0]
- 301. (11/2) Thermal Systems in Agriculture and Food Processing.—Liquidvapour phase relationships, heat transfer, psychrometry, drying and refrigeration. Prerequisite: Agricultural Mechanics 300. [0-0; 2-2]
- 303. (11/2) Machine Systems in Production Agriculture.—Mathematic models for system selection, machine-power, unit-soil relationships, physicalmechanical principles of seeding, fertilization, spraying and harvesting. Pre-[0-0; 2-2] requisite: Consent of Instructor.

- 304. (1½) Drainage.—Introduction to hydrology, rainfall and run-off relationships. Textbook: Schwab et al, Elementary Soil & Water Engineering. [2-2; 0-0]
- 305. (1½) Irrigation.—Sources of water, soil and water relationships, application methods, and efficient use. Textbook: Israelsen, Irrigation Principles and Practices. [0-0; 2-2]
- 401. (3) Food Mechanics. Thermodynamics, evaporation, chemical and mechanical separations, mixing, instrumentation, canning and freezing, electromagnetic radiation. Prerequisites: Agricultural Mechanics 301 and Mathematics 202. [2-3; 2-3]
- 414. (1½) Planning Agricultural Structures and Systems.—Functional planning and work study methods, materials handling systems analysis.

  [2-2; 0-0]
- 415. (1½) Environmental Control for Agriculture.—Energetics, heat and moisture interrelationships, control systems. [0-0; 2-2]
  - 423. (1) Seminar.—Lectures, discussions of scientific papers.
  - 425. (3) Undergraduate essay.
  - 430. (1-3) Directed Studies.

Courses for Graduate Students

- 500. (1-3) Graduate Seminar.
- 501. (3) Advanced Food Mechanics.—Problems in the selection and operation of food-processing machinery. Problems in specific industries may be attempted by individual students where feasible. Prerequisite: Agricultural Mechanics 401.
- 530. (3) Directed Studies.—On an approved problem (farm power and machinery, farm structures, irrigation and drainage, processing).
  - 549. (5-6) Master's Thesis.

#### Animal Science

- 200. (1½) An Introduction to Animal Science.—The origin, function and future roles of breeds of livestock; principles of breeding, selection, management, nutrition and physiology; animal health. Textbook: Cole, Introduction to Livestock Production, 2nd edition, 1966. [3-2; 0-0]
- 313. (3) Genetics in Agriculture.—The principles of genetics as applied to plants, animals and poultry. The inheritance of specific characters and genetic variability as used to improve agricultural production. (Note: This course is the same as Plant Science 313 and Poultry Science 313). [2-2; 2-2]
- 318. (1½) Animal Production.—Interrelated problems associated with improving efficiency and level of livestock productivity. [0-0; 2-2]
- 320. (3) Animal Physiology.—The functions of muscle, circulation, nerves, digestion and metabolism; respiration, excretion, reproduction and the endocrines of domestic animals. Physiological implications concerned with animal growth development and lactation. Textbook: Dukes, The Physiology of Domestic Animals. [2-2; 2-2]
- 322. (3) Fundamentals of Animal Nutrition.—Study of the essential nutrients and their functions in animal nutrition. Nutrient relationships, animal requirements and feed values. Energetics and energy units in growth and production. Textbook: Maynard and Loosli, Animal Nutrition (1962). Recommended concurrently: Chemistry 230. (Note: This course is the same as Poultry Science 322.) [2-3; 2-3]

- 406. (1½) Technology of Animal Products.—The chemical, physical, and microbiological changes arising in the processing of animals and animal byproducts. Prerequisites: Chemistry 230, Microbiology 200. [0-0; 2-2]
- 413. (1½) Genetics and Animal Performance.—Standards of excellence, selection and mating systems; herd and pedigree studies; genetic aspects and consequences of performance testing and of other animal improvement policies. Prerequisite: Animal Science 313 or a course of similar content.

[2-2; 0-0]

418. (3) Environmental Physiology.—The environment and its effects on livestock productivity; mechanisms of response and adaptation. Textbook: Hafez, Adaptation of Domestic Animals. Prerequisite: Consent of instructor.

[2-2; 2-2]

- 420. (1½) Animal Metabolism.—A study of intermediary metabolism in domestic animals; the use of radioactive isotopes and other modern techniques in the study of metabolic processes in animals; in vitro rumen fermentation procedures; metabolic features of ruminant tissues. Prerequisite: Chemistry 230. [0-0; 1-4]
- **422.** (3) Nutritional Principles of Livestock Feeding.—The application of principles of nutrition and the economic and nutritional problems involved in feeding all types of livestock. Nutritive equivalents for maintenance and production functions, composition and use of feedstuffs. [2-2; 2-2]
  - 423. (1) Seminar.
  - 425. (1½ or 3) Research Project.
  - 430. (1-3) Directed Studies.—On an approved problem.

## Courses for Graduate Students

- 500. (1-3) Graduate Seminar.
- 513. (3) Advanced Animal Breeding.—Special phases and recent research findings. Lectures, seminars and research.
- 518. (1½) Advanced Animal Physiology I.—The influence of environmental factors on growth and reproduction; measurement of physiological responses. [2-2; 0-0]
- 520. (1½) Advanced Animal Physiology II.—Current topics in the study of metabolism in domestic animals; metabolic disorders. [0-0; 2-2]
- 521. (1½) Advanced Animal Nutrition I.—Bioenergetics and growth; energy utilization and requirements in animal nutrition. Reference: Kleiber, Fire of Life. [2-2; 0-0]
- 522. (1½) Advanced Animal Nutrition II.—Recent advances on the function of the individual nutrients in livestock. Interrelationship of nutrients.

[0-0; 2-2]

- 530. (1-3) Directed Studies.
- 549. (5-6) Master's Thesis.
- 649. Ph.D. Thesis.

#### Food Science

- 301. (1½) Food Chemistry.—Constituents of food and their properties including carbohydrates, proteins, lipids, pigments, flavours and vitamins.
  - [2-2; 0-0]
- 302. (1½) Analytical Methods.—Principles and procedures employed for the analysis of food products. [0-0; 2-3]

- 303. (1½) Dairy Products Technology.—Properties of milk as related to the characteristics of natural and derived products. [2-2; 0-0]
- 304. (1½) Food Processing—Tissue Systems.—Principles of sequential process operations in the transformation of plant and animal tissues to food pro-[3-0; 0-0] ducts.
- 305. (1½) Food Processing—Fluid and Semisolid Systems.—Principles of sequential process operations in the conversion of biological fluids and semi-[0-0; 3-0] solids to food products.
- 403. (1½) Principles of Dairy Products Processing.—Chemical and physical properties of milk and its products and the changes that occur during [0-0; 2-2]manufacture and storage.
- 413. (1½) Applied Cell Culture.—Animal and plant cell culture techniques for the production of materials of significance in Food Science. The course will emphasize new applications of cell and tissue culture in industry. Prerequisite: Microbiology 200 or 201. [1-4; 0-0]
- 414. (1½) Applied Microbiology.—Microbiological culture techniques for the production of materials of significance in Food Science. Prerequisite: Microbiology 200 or 201. TO-0; 1-41
  - 423. (1) Undergraduate Seminar.
  - 425. (1½ or 3) Undergraduate Research Project
  - 430. (1-3) Directed Studies

#### Courses for Graduate Students

- 500. (1-3) Graduate Seminar.
- 503. (1½) Advanced Dairy Chemistry.—Chemical and physical properties and mechanisms of stability change of milk proteins.
- 504. (1½) Sensory Properties of Food.—Chemical and physical processes underlying the sensory properties of food and their detection.
- 513. (11/2) Advanced Cell Culture.—Intensive study of the products of selected cell culture. Prerequisite: Food Science 413 and 414 or equivalent. (Not offered in 1969-70.)
  - 530. (1-3) Directed Studies.
  - 549. (5-6) Master's Thesis.

#### Plant Science

# (Agronomy, Horticultural, Plant Protection)

- 200. (11/2) Introduction to Field Crops.—Study of important grain, forage and root crops, noxious weed seeds, commercial and seed grades of Canada, identification of principal types and varieties of field crops. Special problems of production, weed control and harvesting.
- 202. (1½) General Horticulture.—Horticultural enterprises, both commercial and home. An introduction to important tree fruits, small fruits, vegetables, landscape materials. Description, identification, classification, displaying and judging of the various crops. [0-0; 3-2]
- 304. (1½) Range Management.—Ecology and management of rangeland. Textbook: Sampson, Range Management. [2-2; 0-0]
- 305. (11/2) Forage Management and Conservation.—Grasses and legumes for pasture and forage, their management and conservation. Textbook: Hughes, Heath and Metcalf, Forages. [0-0; 2-2]

- 311. (3) Small Fruits and Tree Fruits.—The science and practice of small fruit and tree fruit growing and handling; grapes, bramble fruits, currants, gooseberries, blueberries, cranberries, apples, pears, quinces, peaches, nectarines, cherries, plums, apricots, citrus fruits, nuts. Texts: Shoemaker, Small Fruit Culture, Shoemaker and Tesky, Tree Fruit Production. [2-2; 2-2]
- 313. (3) Genetics in Agriculture.—The principles of genetics as applied to plants, animals and poultry. The inheritance of specific characters and genetic variability as used to improve agricultural production. Note: This course is the same as Animal Science 313 and Poultry Science 313. [2-2; 2-2]
- 316. (1½) Landscape Horticulture.—Culture and identification of plant materials. Elementary principles of landscape composition. [2-2; 0-0]
- 317. (3) Vegetable Crops.—Vegetable growing; sites, soils, planting, fertilizing, irrigating, cultivating; vegetable varieties; vegetable forcing. [2-2; 2-2]
- 320. (1½) Field Studies and Practices in Agronomy, Horticulture, or Plant Protection.—Four months of field work under the direction of an accredited plant scientist supported by a report relative to some phase of the field operation.
- 321. (1½) Biometrics.—Elementary principles of the analysis, presentation and interpretation of biological data. Prerequisite: First year Mathematics. [3-2; 0-0]
- 322. (1½) Design of Experiments.—Practical problems and discussion of experimental design and interpretation. Prerequisite: Plant Science 321 or equivalent. (Same as Forestry 466). [0-0; 2-2]
- 324. (3) Physiology of Crops.—Plant metabolism, including enzymes, photosynthesis, respiration, growth regulation, plant-water relationships, translocation, mineral nutrition. Various aspects of plant growth including influence of environmental factors. Prerequisite: Biology 101. [2-2; 2-2]
- 332. (1 or 1½) Pesticides.—Chemical properties and physiological effects of insecticides, fungicides, herbicides, rodenticides, acaricides, and nematocides. Agricultural Sciences students must register for 1½ units.

  [2-0; 0-0 or 2-2; 0-0]
- 338. (1½) Weed Control.—Common noxious weeds of the province. Losses caused by weeds, weed characteristics; cultural, biological and chemical methods of control. [0-0; 2-2]
- 339. (3) Pathology of Crops.—Common diseases of agricultural plants; control measures; laboratory and field techniques. [2-2; 2-2]
- 405. (1½) Field Crops for Food, Oil and Fibre.—Factors contributing to the optimum production of those field crops harvested for their grain, root, tuber, oil, sugar or fibre. [2-2; 0-0]
- 413. (1½) Plant Breeding.—Plant breeding programmes for improved agricultural plants and the maintenance of desirable forms, with emphasis on the role of genetics in crop production. Textbook: Briggs and Knowles, *Introduction to Plant Breeding*. Prerequisite: Plant Science 313 or its equivalent. [0-0; 2-2]
- 416. (1½) Landscape Construction and Design.—Principles of landscape design. Garden construction. Visits to landscaped sites. Landscape problems. Prerequisite: Horticulture 316. (Not offered in 1969-70)

  [2-2; 0-0]
- 418. (1½) Floriculture.—A study of controlled environmental factors in the greenhouse with application to commercial flower crops. (Not offered in 1969-70). [0-0; 2-2]

- 420. (1½) Agricultural Climatology.—Microclimate in crop growth and [0-0: 2-2] development.
  - 423. (1) Undergraduate Seminar.
  - 425. (1½ or 3) Research Project.
- 426. (3) Crop Processing.—Composition and properties of foods of plant origin. Methods of physical and chemical analysis of plants and plant products. Principles of processing and preservation of field crops, fruits and [2-2; 2-2] vegetables.
  - 430. (1-3) Directed Studies.
- 433. (3) Crop Entomology.—An introduction to insects of economic importance in agronomic and horticultural crops; classification, life history, ecology and control. [2-2; 2-2]

### Courses for Graduate Students

- 500. (1) Graduate Seminar.
- 501. (3) Advanced Pomology.—Discussion of current research problems, systematic pomology, developmental and reproductive physiology, determination of nutrient requirements of fruit crops, morphogenesis. Open to graduate students with a background in pomology and physiology. Text: Childers, Modern Fruit Science. (Offered in 1969-70 and alternate years.)
- 507. (3) Advanced Plant Genetics and Breeding.—The genetics of crop plants.
- 508. (3) The Ecology and Physiology of Weed Control.—Effects of environmental factors and phytotoxic agents on unwanted plants. Permission of instructor.
- 509. (3-5) Advanced Plant Pathology.—Laboratory and field techniques and procedures. Experimental methods, culture methods, virus studies, miscellaneous experimental methods, interpretation of experimental results.
- 510. (3) The Physiology and Biochemistry of Plant Pathogens.--An advanced course on the interactions between plant pathogens and their hosts. Prerequisite: An advanced course in plant biochemistry and permission of the instructor.
- 512. (1-3) Responses of Plants to Controlled Environments.—Experimental modification of the plant environment and its effects on growth, development, and post-harvest characteristics. Lectures and laboratories. Prerequisites: Botany 330 or Plant Science 324.
- 516. (1-3) Advanced Landscape Horticulture.—Lectures and assigned problems in organization and development of man's environment with emphasis on the use of plant materials in landscape. Field Trips. History of Landscape design.
- 517. (3) Advanced Vegetable Crops.—The improvement and production of vegetable crops, with emphasis on research methods and current problems. (Offered in 1968-69 and alternate years.)
  - 530. (3) Directed Studies.
  - 549. (5-6) Master's Thesis.
  - 649. Ph.D. Thesis.

### Poultry Science

200. (1½) General Poultry Science.—Principles and practices employed in poultry production. Textbook: Card, Poultry Production, 10th edition.

[0-0; 3-2]

- 313. (3) Genetics in Agriculture.—The principles of genetics as applied to plants, animals and poultry. The inheritance of specific characters and genetic variability as used to improve agricultural production. Note: This course [2-2; 2-2] is the same as Animal Science 313 and Plant Science 313.
- 322. (3) Fundamentals of Nutrition.—Study of the essential nutrients and their functions in animal nutrition. Nutrient relationships; animal requirements and feed values. Energetics and energy units in growth and production. Textbook: Maynard and Loosli, Animal Nutrition (1962). Recommended concurrently: Chemistry 230. (Note: This course is the same as Animal Science 322.) [2-3; 2-3]
- 404. (1½) Poultry Management.—Systems of poultry management with emphasis on the relationship of environmental factors to efficiency of production. Prerequisite: Consent of instructor.
- 406. (1½) Product Technology.—Physical-chemical properties of meat and eggs as related to processing, preservation, quality evaluation and control. Prerequisite: Chemistry 230; or equivalent.
- 410. (11/2) Poultry Nutrition.—Principles of poultry nutrition. Recent advances in the knowledge of the nutritive requirements of the domestic fowl. References: Ewing, Poultry Nutrition, latest edition. Prerequisite: Chemistry 230. [2-3; 0-0]
- 411. (11/2) Poultry Feeds and Feeding.—Physiology of avian digestion. Review of nutritional requirements. Composition and classification of feedstuffs. Formulation of rations for different classes of poultry. Feeding practices and management. Textbook: Heuser, Feeding Poultry. [0-0; 2-2]
- 413. (3) Advanced Genetics in Agriculture.—Current genetical concepts and their application in Agriculture. Prerequisite: Animal, Plant or Poultry Science 313, or a course of similar content and the consent of the instructor. [2-2; 2-2]
- 414. (11/2) Hygiene.—Hygienic measures for the prevention and control of disease. Prerequisite: Microbiology 200. [2-2; 0-0]
- 415. (11/2) Poultry Diseases.—Anatomy and physiology of the fowl; common ailments of poultry and their treatment; autopsies; inspection of farms. Prerequisite: Microbiology 200. [0-0; 2-2]
- 420. ( $1\frac{1}{2}$ ) Physiology of Reproduction.—Fundamentals of egg production and reproduction in the domestic fowl. Recent advances in endocrinology affecting poultry. [0-0; 2-2]
- 423. (1) Seminar.—Poultry literature; research and experimental problems; preparation of reports and bulletins.
  - 425.  $(1\frac{1}{2}-3)$  Research Project.
  - 430. (1-3) Directed Studies.—On an approved problem.

# Courses for Graduate Students

- 500. (1-3) Graduate Seminar.
- 506. (1½) Meat and Egg Science.—Recent advances relating to the physical, chemical and functional properties of meat and egg products. [0-0; 2-2]
- genetics 513. (3) Poultry Genetics.—Advanced population and biometrical genetics. Textbook: Falconer, Quantitative Genetics, and selected research literature. Prerequisites: Poultry Science 313, or equivalent. [3-0; 3-0]
- 521. (1½) Advanced Poultry Nutrition I.—The function of fat-soluble vitamins. [2-3; 0-0]

- 522. (1½) Advanced Poultry Nutrition II.—Protein nutrition; concepts of amino acid balance; methods of evaluating protein quality. [0-0; 2-3]
- 523. (11/2) Biometrical Techniques.—Advanced biometrical techniques in agricultural experimentation. Prerequisite: Plant Science 321 or equivalent.
- 530. (3) Directed Studies.—On an approved problem. (Breeding, nutrition, physiology and poultry products marketing and technology.)
  - 549. (5-6) Master's Thesis.
  - 649. Ph.D. Thesis.

### Soil Science

- 200. (11/2) An Introduction to the Study of Soils.—Physical, chemical and biological properties of soils; soil formation, classification, use and conserva-[3-2] or [3-2] tion. Course repeated in Spring term.
  - 203. (2) General Forest Soils.—(Not offered in 1969-70.)
- 311. (1½) Soil and Aquatic Microbiology.—Basic principles and techniques used in the study of the morphology, ecology and metabolism of soil and aquatic microorganisms. The role of various microbial species in nature's economy. (This course is the same as Microbiology 322). [0-0-0; 2-3-1]
- 312. (1½) Soil Microbiology.—Microbiological and biochemical processes of soil microorganisms in soils. Prerequisites: Soil Science 311. (Not offered in 1969-70.) [0-0; 1-4]
- 314. (11/2) Soil and Water Conservation.—Man's record on the earth from a conservation standpoint. The concept of environmental conservation. Effect of climate, vegetation, topography and soil properties on runoff and erosion. [2-2; 0-0] Soil Pollution. Planning for conservation of soil and water.
- 315. (1½) Soil Fertility.—Principles underlying soil management practices including nutrient supply, fertilizers and soil amendments; experimental methods and soil analysis. Prerequisite: Soil Science 200, (or 203), or permission of instructor. [0-0; 2-2]
- 404. (11/2) Chemical Properties of Soils.—Nature and properties of soil colloids and the behaviour of ions in soils, laboratory methods for the identification and characterization of colloids. Prerequisites: Chemistry 205 and permission of instructor. [3-2; 0-0]
- 413. (11/2) Soil Physics.—A study of physical properties and processes of soils, with emphasis on basic principles. Laboratory exercises in physical methods used in soil investigations. Prerequisites: Soil Science 200 or equivalent, Physics 110 or 120 or 130, or permission of instructor. [3-2; 0-0]
- 414. (1½) Physical Edaphology.—A study of soil physical condition and plant growth. Prerequisite: Soil Science 413, Botany 330 or Plant Science 324 may be taken concurrently. [0-0; 3-2]
- 416. (1½) Soil Classification, Cartography and Use.—Prerequisite: Soil Science 200 or consent of instructor. [3-2; 0-0]
- 417. (1½) Interpretation and Use of Soil Survey Information.—A systematic approach to soil interpretation for applied objectives. Prerequisites: Soil Science 416. [0-0; 3-2]
- 418. (11/2) Methods of Soil Analysis.—Selection of methods for soil chemical analysis, and interpretation of results. Permission of instructor required. [1-4; 0-0]
- 419. (1½) Soil Surveying.—Two to three months of field work under direction of a soil surveyor, supported by an essay relative to some phase of the field operations. Prerequisite: Second Class standing in Soil Science 416.

- 423. (1) Undergraduate Seminar.
- 425. (11/2 or 3) Undergraduate Essay.
- 430. (1-3) Directed Studies.—Systematic work on approved problem.

### Courses for Graduate Students

- 500. (2) Graduate Seminar.
- 504. (1½-3) Advanced Soil Chemistry.—A study of research findings in specific phases of Soil Chemistry. (Offered in 1969-70 and alternate years.)
- 512. (1½-3) Advanced Soil Microbiology.—Lectures and laboratories relating to modern methods, concepts and research in soil microbiology. Prerequisites: Chemistry 230 and Soil Science 312; or by permission of instructor. (Not offered in 1969-70.)
- 513. (1½-3) Soil Physics.—Retention and flow properties of soils with respect to water, gas and heat. Thermodynamics of soil water. Consent of instructor.
- 516. (3) Soil Genesis and Classification.—Principles of soil classification; reactions and processes of soil genesis; development of major soil groups of the world. Saturday field trips required. Prerequisites: Soil Science 416 or equivalent and consent of instructor. Offered in alternate years. (Not offered in 1969-70.)
  - 530. (3) Directed Studies.
  - 549. (5-6) Master's Thesis.
  - 649. Ph.D. Thesis.

### COURSES GIVEN IN OTHER FACULTIES

Students in Agricultural Sciences should choose from among the following courses in their first two years as indicated in the B.Sc. (Agr.) degree requirements:

### Biology

101. (3) Principles of Biology.—An introductory course emphasizing principles of wide application to all living organisms, including cell structure and function, the mechanism of inheritance, evolution, and adaptation to environment. A comparative approach to the unity and diversity of organisms will be stressed. Biology 11 is strongly recommended. An additional one hour tutorial period is required each week for those students who have not previously had Biology 11 or its equivalent in high school. Biology 100 from Grade 13 in British Columbia will not be accepted as equivalent to Biology 101; however, Botany 105 or Zoology 105 will be accepted as equivalent for prerequisite purposes. [3-3; 3-3]

### Chemistry

- 103. (3) General Chemistry.—A study of the fundamental principles of chemistry including the molecular structure of both inorganic and organic compounds. Prerequisites: Mathematics 12 (or Mathematics 130 concurrently); Physics 11 or its equivalent is strongly recommended. [3-3; 3-3]
- 110. (3) Principles of Chemistry.—A study of the fundamental principles of Chemistry with particular reference to the nature of solutions, the solid state and the molecular structure of both inorganic and organic substances. This course is intended for prospective Science and Engineering students who have not taken Chemistry 12. Prerequisites: Chemistry 11, Physics 11. Mathematics 100 and 121 and a first year Physics course must precede or be taken concurrently.

  [3-3-1; 3-3-1]

- 120. (3) Principles of Chemistry.—Similar to Chemistry 110 but the subject matter is treated in somewhat more detail. This course is intended for those prospective Science and Engineering students who have taken Chemistry 12. Prerequisites: Chemistry 11 and 12, Physics 11. Mathematics 100 and 121 and a first year Physics course (110 or 120) must precede or be taken concurrently.

  [2-3-1; 2-3-1]
- 230. (3) Organic Chemistry.—The fundamental principles of modern organic chemistry including a discussion of the main classes of organic compounds. Prerequisite: Chemistry 103 or 110 or 120. Credit will not be given for both Chemistry 203 and 230.

  [3-3; 3-3]

### **Economics**

200. (3) Principles of Economics.—The institutions and processes involved in the production and distribution of wealth; basic determinants of prices and costs, the determinants of income and employment; international trade.

### Mathematics

- 100. (2) Calculus I.—Ideas, techniques and applications of differentiation and integration. Prerequisite: Mathematics 12 (Secondary School Programme, British Columbia) or the equivalent. [2-1; 2-1]
- 121. (1) Introduction to Vectors and Matrices.—Systems of linear equations, vectors, matrices, determinants, linear dependence. Prerequisite: Mathematics 12 (Secondary School Programme, British Columbia) or the equivalent.

  [2-0; 0-0] or [0-0; 2-0]
- 200. (3) Algebra and Geometry.—Introduction to matrices, linear equations, linear transformations of the plane, determinants, vectors, complex numbers, elementary theory of equations, mathematical induction. Prerequisite: Mathematics 100 and 121 (Mathematics 120, 1968-69 session or earlier).

### **Physics**

- 110. (3) Mechanics, Electricity and Atomic Structure.—Particle kinematics and dynamics; rigid body dynamics; work and energy concepts; general wave motion, sound and light; electricity and magnetism; atomic spectra; waves and elementary particles; laboratory work emphasizing physical techniques of obtaining, treating and interpreting data as applied to mechanics, heat, electricity, optics, and radioactivity. Mathematics 100 and 121 (Mathematics 120, 1968-69 or earlier) must precede or be taken concurrently with this course.

  [3-3\*-2\*; 3-3\*-2\*]
- 120. (3) Matter and Mechanics.—The structure and properties of matter; photons, waves, spectra; electrons, atoms; Newtonian mechanics of particles and rigid bodies; laboratory investigations emphasizing the use of electrical instruments (Geiger counter, cathode ray oscilloscope, microwave apparatus, etc.). Prerequisites: Physics 12 (or 92) plus permission of the Physics Departmental Advisor. Mathematics 100 and 121, (Mathematics 120, 1968-69 or earlier) must precede or be taken concurrently with this course.

[2-3-1; 2-3-1] In addition to the above, third and fourth year electives chosen from the Faculties of Arts, Applied Science, Forestry and Science may include some of the following courses. The Calendars of the Faculties offering the courses should be consulted for detailed descriptions.

Applied Science 270, 281

Biochemistry 410

<sup>\*</sup>Alternate weeks.

Biology 310, 321, 322, 334 Botany 302, 330, 425, 435 Chemistry 205, 210, 220, 304, 305, 409 Economics 300, 304 English 100, 150, 200, 305 Forestry 300, 350, 351, 418, 410, 464, 482, 485 Geography 101, 102, 212, 366, 370 Geology 105, 150, 412 Mathematics 200 Microbiology 200, 307, 308, 322 Physics 155, 204

Zoology 202, 311



# THE FACULTY OF APPLIED SCIENCE

ENGINEERING

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA

VANCOUVER 8 • BRITISH COLUMBIA CANADA

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For topics not listed above, see the General Information bulletin.

### Financial Assistance

A list of Fellowships, Scholarships, Bursaries and Loans open to students in the University will be found in the publication "Awards and Financial Assistance" which may be obtained from the Registrar's office. For details, consult this publication. In general, application must be made to the Dean of Inter-Faculty and Student Affairs.

### FACULTY OF APPLIED SCIENCE

- W. M. Armstrong, B.A.Sc. (Toronto), P.Eng., M.C.I.M., Professor and Dean of the Faculty.
- L. G. R. CROUCH, B.Sc. (Victoria, Australia), M.Sc. (Utah), P.Eng., M.C.I.M., Professor of Mining Engineering and Assistant to the Dean.

### Department of Agricultural Engineering

- T. L. COULTHARD, B.E. (Sask.), M.Sc. (Calif.), P.Eng., Professor and Chairman of the Department.
- L. M. STALEY, B.A.Sc. (Brit. Col.), M.Sc. (Calif.), P.Eng., Associate Professor. E. L. Watson, B.A.Sc. (Brit. Col.), M.Sc. (Calif.), P.Eng., Associate Professor.
- V. RAUDSEPP, Dipl. C.E. (Tallinn, Estonia), P.Eng., Honorary Lecturer.

### Department of Chemical Engineering

- J. S. Forsyth, B.Sc. (Glasgow), Ph.D. (Leeds), A.R.I.C., M.I.Ch.E., F.C.I.C., Professor and Head of the Department.
- S. D. Cavers, M.A.Sc. (Brit. Col.), Ph.D. (Calif. Inst. Tech.), P.Eng., F.C.I.C., Professor.
- N. Epstein, M.Eng. (McGill), Eng. Sc.D. (New York Univ.), F.C.I.C., M.A.I.Ch.E., Professor.
- Francis E. Murray, B.Sc. (Alta.), Ph.D. (McGill), M.TAPPI, M.Tech. Sect. C.P.P.A., Associate Professor.
- K. L. PINDER, M.Eng. (McGill), Ph.D. (Birmingham), F.C.I.C., Associate Professor.
- D. W. THOMPSON, B.Sc., Ph.D. (Birmingham), M.C.I.C., A.M.I.Ch.E., A.M.A.I.Ch.E., Associate Professor.
- K. B. MATHUR, Dipl. Chem. Eng. (Delhi), M.A.Sc. (Michigan), Ph.D. (Birmingham), Visiting Associate Professor.
- R. M. R. Branion, B.A.Sc., M.A.Sc. (Toronto), Ph.D. (Sask.), Assistant Professor.
- J. LIELMEZS, B.Sc. (Denver), M.Sc. (Northwestern), Assistant Professor. MD. A. QUDDUS, M.Sc. (Dacca), Ph.D. (Paris), Teaching Postdoctoral Fellow. N. V. S. Sastri, M.Sc. (Andhra), Ph.D. (Bangalore), Postdoctoral Fellow.

### Honorary Professors in Chemical Engineering

D. W. Duncan, B.S.A. (Brit. Col.), Ph.D. (Mass. Inst. of Tech.). C. CRAIG WALDEN, M.A. (Sask.), Ph.D. (Minn.).

### Honorary Lecturers in Pulp and Paper Technology

JACK E. BARRETT, B.S. (E.E.) (Tri-State College), Mem. Simulation Council. THOMAS D. C. BOLGER, B.Sc. (Brit. Col.), M.TAPPI, M.I.S.A.

RAYMOND CHALK, B.A.Sc. (Brit. Col.), M. TAPPI, M.Tech. Sect. C.P.PA. ROBERT E. CHAMBERLAIN, B.A.Sc. (Brit. Col.), P.Eng. (Alta.), M.TAPPI, M.I.S.A.

CARMEL J. COSGROVE, M. Tech. Sect. C.P.P.A.

EDWIN H. DAHLGREN, B.A., B.S. (Wash.), M.S. (Princeton).

Francis W. Flynn, B.Ch.E. (Minn.), Mem. Tech. Sect. C.P.P.A.

JOHN V. HATTON, M.A., D.Phil. (Oxon.), M.TAPPI, M.Tech. Sect. C.P.P.A.

ROBERT M. HOPKINS, B.E. (Nova Scotia Tech.), M.Sc. (Maine).

Bruce I. Howe, B.Sc. (Queen's).

KENNETH HUNT, B.A., M.Sc. (Brit. Col.), Ph.D. (Queen's), M.C.I.C., Member the Chemical Society.

JOHN L. KEAYS, B.A., B.A.Sc., M.A.Sc. (Brit. Col.), Ph.D. (McGill), M.A.C.S., M. TAPPI, M. Tech. Sect. C.P.P.A., M.ESPRI.

GLEN D. KING, B.Sc. (Wash.), M. TAPPI.

WALLACE B. MACKAY, Dipl. Chem. Eng. (New South Wales), A.M. Inst. Ch.E., M. Tech. Sect. C.P.P.A.

JASPER MARDON, M.A. (Cantab.), F.R.I.C., A.M. Inst. Ch.E., M. Inst. Fuels, C.G.I.A., M. Tech. Sect. C.P.P.A., M. TAPPI.

ROMANO G. MERET, Ind. Chem. (Padua), M. TAPPI, M. Tech. Sect. C.P.P.A.

JAMES R. MUNRO, M. Inst. Power Eng.

DALE W. READ, B.Sc. (Brit. Col.), Ph.D. (McGill).

Douglas W. Smiley, B.A.Sc. (Brit. Col.).

Donald L. Stewart, B.A.Sc. (Brit. Col.), P. Eng., M. Tech. Sect. C.P.P.A. Bernard C. H. Sun, B.Sc.A. (Nat'l Taiwan), M.F. (Brit. Col.).
T. Gordon Taylor, B.Sc. (Man.), M. Tech. Sect. C.P.P.A., M. TAPPI.

C. CRAIG WALDEN, M.A. (Sask.), Ph.D. (Minn.).

JOHN WARD, B.Sc., Ph.D. (London), M.C.I.C.

ELLIOT H. WOODRUFF, B.S. (Wash.), M.A.C.S., M. TAPPI.

# Department of Civil Engineering

W. D. FINN, B.E. (Nat. Univ. Ireland), M.Sc., Ph.D. (Washington), M.Am.-Soc.C.E., M.A.S.E.E., Professor and Head of the Department.

S. H. DE JONG, M.Sc. (Man.), Ph.D. (Ohio State), P.Eng., D.L.S., B.C.L.S., M.C.I.S., M.E.I.C., M.Am.Soc.C.E., Professor.

W. G. HESLOP, B.A.Sc. (Toronto), P.Eng., Mem.Am.C.I., M.E.I.C., M.C.I.M., Mem. A.C.I., Professor.

R. F. Hooley, B.A.Sc. (Brit. Col.), M.Sc., Ph.D. (Stanford), P.Eng., M.I.A.B.S.E., M.E.I.C., Professor.

ALEXANDER HRENNIKOFF, Grad. Inst. of Communication Engineering, Moscow, Russia, M.A.Sc. (Brit. Col.), Sc.D. (Mass. Inst. of Technology), P.Eng., F.Am.Soc.C.E., M.E.I.C., M.I.A.B.S.E., Research Professor.

Samuel L. Lipson, B.A.Sc. (Brit. Col.), M.S. (Calif. Inst. Tech.), P.Eng., F.Am.Soc.C.E., Mem.Am.C.I., M.E.I.C., Professor.

Archie Peebles, B.A.Sc., B.A. (Brit. Col.), M.Sc. (Iowa State), P.Eng. M.E.I.C., F.Am.Soc.C.E., Professor.

EDWARD S. PRETIOUS, B.A.Sc. (Brit. Col.), M.Sc. (Iowa), P.Eng., F.Am.Soc. C.E., Mem. I.A.H.R., Professor.

 J. D. Anderson, B.A.Sc. (Brit. Col.), M.S. in C.E. (Washington), P.Eng., M.E.I.C., M.Am.Soc.C.E., Associate Professor.
 H. R. Bell, B.A.Sc. (Brit. Col.), Dipl. Survey (London), M.Sc. (Eng.), (London), P.Eng., M.E.I.C., M.Am.Soc.Photog., M.Photogr.Soc., M.C.I.S., M.A.C.S.M., Associate Professor.

S. CHERRY, B.Sc. (C.E.) (Man.), M.S. (Illinois), Ph.D. (Bristol), P.Eng., M.Am.Soc.C.E., M.E.I.C., Associate Professor.

N. D. NATHAN, B.Sc. (Witwatersrand), S.M. (M.I.T.), M.E.I.C., M.Am.Soc. C.E., Mem. A.C.I., Prof. Mem. P.C.I., Associate Professor.

M. C. QUICK, B.Sc. (C.E.), Ph.D. (Bristol), P.Eng., Associate Professor.

E. Ruus, Grad. Tallinn, Estonia, Dr. Eng. (Karlsruhe, Germany), P.Eng., M.Am.Soc.C.E., M.E.I.C., Associate Professor.

D. L. Anderson, B.Sc. (Alta.), M.S. (Illinois), Ph.D. (Stanford), P.Eng., M.E.I.C., M.Am.Soc.C.E., Assistant Professor.

P. M. BYRNE, B.E. (Nat. Univ. Ireland), M.A.Sc. (Brit. Col.), P.Eng., Assistant Professor.

R. G. CAMPANELLA, B.S., M.S., Ph.D. (Univ. of Calif., Berkeley), P.Eng., Assoc. M.Am.Soc.C.E., Assistant Professor.

- W. K. Oldham, B.A.Sc. (Brit. Col.), Ph.D. (Texas), P.Eng., M.A.W.W.A. M.W.P.C.F., Assistant Professor.
- S. O. Russell. B.Sc., M.Sc. (Belfast), P.Eng., M.E.I.C., Mem. I.C.E., M.A.S.C.E., Mem. Int. Assoc. for Hydraulic Research, Assistant Professor.
- R. A. SPENCER, B.E., Ph.D. (Auckland), Mem. A.C.I., Mem. P.C.I., Mem. N.Z.P.C.I., Assistant Professor.
- J. FRED MUIR, B.Sc. (Man.), P.Eng., M.E.I.C., F.Am.Soc.C.E., Professor Emeritus and Lecturer.
- Earle J. Klohn, B.Sc., M.Sc. (Alta.), P.Eng., M.E.I.C., F.Am.Soc.C.E., Honorary Lecturer.

# Department of Electrical Engineering

- Frank Noakes, B.Sc. (Alta.), M.S., Ph.D. (Iowa State), P.Eng., F.A.I.E.E., M.E.I.C., Sen.Mem.I.E.E.E., Professor and Head of the Department.
- E. V. Bohn, Dipl. Math., Dr. Rer. Nat. (Göttingen), Mem.I.E.E.E., Professor.
- F. K. Bowers, M.A. (Cantab.), Mem.I.E.E.E., Professor.
- M. M. Z. KHARADLY, B.Sc. (Cairo), D.I.C., Ph.D. (London), C.Eng., M.I.E.E., Professor.
- A. Donald Moore, M.Sc. (Queen's), Ph.D. (Stanford), P.Eng., Sen.Mem. I.E.E.E., Professor.
- LAWRENCE YOUNG, M.A., Ph.D., Sc.D. (Cantab.), Sen.Mem.I.E.E.E., Professor.
- YAO-NAN YU, B.S., Dr. Eng. (Tokyo Inst. Tech.), Sen.Mem.I.E.E.E., Professor.
- M. P. Beddoes, B.Sc. (Glasgow), D.I.C., Ph.D. (London), P.Eng., Sen.Mem. I.E.E.E., A.M.I.E.E., Associate Professor.
- LORNE R. KERSEY, B.A.Sc. (Brit. Col.), Mem.I.E.E.E., Associate Professor.
- Avrom Soudack, B.Sc. (Man.), M.S., Ph.D. (Stanford), Mem.I.E.E.E., Associate Professor.
- M. S. Davies, B.A. (Cantab.), M.S., Ph.D. (Illinois), Mem.I.E.E.E., Assistant Professor.
- R. W. Donaldson, B.A.Sc. (Brit. Col.), S.M., Ph.D. (Mass. Inst. of Tech.), Assistant Professor.
- R. A. Jamieson, B.Sc., B.E. (Sydney), Mem.I.E.E.E., Assistant Professor.
- J. S. MacDonald, B.A.Sc. (Brit. Col.), S.M., Ph.D. (Mass. Inst. of Tech.), Assistant Professor.
- G. F. SCHRACK, B.A.Sc., M.A.Sc. (Brit. Col.), Dr.Math. (E.T.H., Zurich), Mem. A.C.M., Assistant Professor.
- E. L. Sigurdson, B.Sc. (Man.), Ph.D. (London), Assistant Professor.
- F. G. Berry, M.A.Sc. (Toronto), P.Eng., Mem.I.E.E.E., Senior Instructor.
- Jack Douglas, B.A.Sc. (Brit. Col.), P.Eng., Sen.Mem.I.E.E.E., Senior Instructor.
- H. R. CHINN, B.E., M.E. (New South Wales), Ph.D. (Brit. Col.), Research Associate,
- W. E. Lee, B.Sc. (Wash.), M.Sc. (Purdue), Ph.D. (Brit. Col.), Research Associate.
- S. G. Rao, B.Sc. (Vivekananda), B.E., M.E. (Indian Inst. of Science), Ph.D. (Sask.), Research Associate.
- ALAN DUNWORTH, B.Sc., Ph.D. (Manchester), Visiting Research Professor.
- A. C. Davies, B.Sc. (Eng.) (Southampton), M. Phil. (London), Visiting Lecturer.
- BARRY CHAMBERS, B.Eng., Ph.D. (Sheffield), Post-doctoral Teaching Fellow.

- J. P. Gray, B.Sc. (Durham), Ph.D. (Newcastle), Post-doctoral Teaching
- D. L. Pulfrey, B.Sc., Ph.D. (Manchester), Post-doctoral Teaching Fellow.
- H. Weischedel, Dipl.Ing. (Stuttgart), M.Sc. (Wash.), Dok.Ing. (Berlin), Post-doctoral Teaching Fellow.

### Honorary Lecturers

I. E. Breeze, M.A.Sc. (Brit. Col.), P.Eng.

JOHN H. DRINNAN, B.A.Sc. (Brit. Col.), M.Sc. (Illinois Inst. Tech.), P.Eng.

H. M. Ellis, B.A.Sc. (Brit. Col.), M.Sc., Ph.D. (Cal. Inst. of Tech.), P.Eng.

H. J. GOLDIE, B.A.Sc. (Brit. Col.), M.Eng. (McGill), P.Eng.

PETER A. NIBLOCK, M.A.Sc. (Brit. Col.), P.Eng.

MICHAEL PAVICH, B.A.Sc. (Brit. Col.), M.Eng. (McGill), P.Eng.

VERNE W. RUSKIN, B.Sc. Eng., Ph.D. (London), M.Comm. (Toronto), P.Eng.

M. A. THOMAS, B.A.Sc. (Brit. Col.), P.Eng.

GIDEON WILLONER, Dipl.Ing., Dr.Sc.Tech. (Tech. Vienna), P.Eng.

### Department of Mechanical Engineering

- J. P. Duncan, B.E., M.E. (Adelaide), D.Sc. (Manchester), P.Eng., Ch.E., F.I.Mech.E., F.I.Prod.E., A.Inst.P., Professor and Head of the Department.
- C. A. Brockley, B.A., B.A.Sc. (Brit. Col.), Ph.D. (Sheffield), P.Eng., Professor.

- H. M. McIlroy, M.Sc. (Queen's), P.Eng., Professor. V. J. Modi, B.E. (Bombay), D.I.I.Sc. (Ind. Inst. of Science), M.S. (Washington), Ph.D. (Purdue), P.Eng., Mem.A.S.M.E., Mem.A.I.A.A., Professor.
- G. V. PARKINSON, B.A.Sc. (Brit. Col.), M.S., Ph.D. (Calif. Inst. of Technology), P.Eng., Mem.A.S.M.E., Fellow, C.A.S.I., Professor, and Lecturer in Aeronautical Engineering.

W. O. RICHMOND, B.A.Sc. (Brit. Col.), M.S. (Pittsburgh), P.Eng., Mem. A.S.M.E., M.E.I.C., Professor.

Z. ROTEM, Dipl. Ing. (Lausanne), D.Sc. (Technion-Israel Inst. of Tech.),

Mem.A.S.M.E., M.I. Mech.E., Professor.

E. G. HAUPTMANN, B.Sc. (Alta.), M.S., Ph.D., (Cal. Inst. of Tech.), P.Eng., Mem.A.S.M.E., Associate Professor. M. IQBAL, B.A., B.Sc.Eng. (Punjab), M.Eng., Ph.D. (McGill), Mem.A.S.M.E.,

Mem.A.S.H.R.A.E., Associate Professor.

K. V. Bury, B.A.Sc. (Toronto), B.A. (S.G.W.U.), M.S. (Calif. Inst. of Tech.), M.B.A. (Stanford), Ph.D. (Toronto), Assistant Professor.

L. Cox, B.A.Sc. (Brit. Col.), P.Eng., Assistant Professor.

- I. S. Gartshore, D.P.A. (Olds.), B.A.Sc. (Brit. Col.), M.Sc. (Eng.) (London), Ph.D. (McGill), Assistant Professor.
- C. R. HAZELL, B.E. (Nov. Sco. Tech.), M.Sc., Ph.D. (Penn. State), P.Eng., Mem.S.E.S.A., Mem.A.S.M.E., Assistant Professor.
- H. RAMSEY, B.Sc. (Alta.), M.S., Ph.D. (Stanford), P.Eng., Mem.A.S.M.E., Assistant Professor.
- T. E. SIDDON, B.Sc. (Alta.), M.A.Sc. (Toronto), Assistant Professor.
- H. Vaughan, B.Sc. (Bristol), Ph.D. (Glasgow), Assistant Professor.
- H. K. Kuiken, Math.Eng., D.Tech.Sc. (Delft), Senior Research Associate.
- V. W. Ruskin, B.Sc.Eng., Ph.D. (London), M.Com. (Toronto), P.Eng., Special Lecturer.
- S. P. SLINN, B.A.Sc. (Brit. Col.), P.Eng., Special Lecturer.
- B. Babicki, M.Sc. (Warsaw), P.Eng., Part-time Lecturer.

- К. L. Johnson, B.Sc. Tech. (Manchester), M.A. (Cambridge), Ph.D. (Manchester), M.I.Mech.E., Lecturer, Department of Engineering, Cambridge University; Visiting Professor.
- L. F. Persen, Professor, Norges Tekniske Hogskole, Trondheim, Norway; Visiting NATO Professor.

Department of Metallurgy

E. TEGHTSOONIAN, B.A.Sc., M.A., Ph.D. (Toronto), Professor and Head of the Department.

W. M. Armstrong, B.A.Sc. (Toronto), P.Eng., Professor.

J. A. H. Lund, B.A.Sc. (Brit. Col.), Ph.D. (Birmingham), P.Eng., Professor.

E. Peters, B.A.Sc., M.A.Sc., Ph.D. (Brit. Col.), P.Eng., Professor. C. S. Samis, M.Sc. (Man.), Ph.D. (London), P.Eng., Professor. F. Weinberg, B.A.Sc., M.A., Ph.D. (Toronto), Professor.

T. H. Alden, A.B. (Amherst), M.S., Ph.D. (M.I.T.), Associate Professor.

A. C. D. CHAKLADER, B.Sc. (Calcutta), Ph.D. (Leeds), Associate Professor. A. MITCHELL, B.A., D.Phil. (Oxford), Associate Professor. I. H. WARREN, B.S. (Hon.) (London), Ph.D. (London), Associate Professor.

L. C. Brown, B.Sc. (Strathclyde), Ph.D. (Glasgow), Assistant Professor. R. G. Butters, B.A.Sc., M.A.Sc. (Brit. Col.), Assistant Professor.

N. R. RISEBROUGH, B.A.Sc., M.A.Sc. (Toronto), Ph.D. (Brit. Col.), Assistant Professor.

D. Tromans, B.Sc., Ph.D. (Leeds), Assistant Professor.

A. AKHTAR, B.Sc. (Utkal), B.E. (I.I.S.), Ph.D. (Brit. Col.), Research Associate.

C. Baker, B.Sc. (Wales), Ph.D. (Cantab.), Research Associate.

- R. H. BENTALL, B.Sc. (Leeds), Ph.D. (Cantab.), Research Associate.
- J. CAMERON, B.Sc., Ph.D., D.R.C. (Strathclyde), Research Associate.
- H. M. HAWTHORNE, B.Sc., Ph.D. (Strathclyde), Research Associate. D. B. Johnson, B.Sc., Ph.D. (Brit. Col.), Research Associate.

K. R. LINGER, B.A., Ph.D. (Keele), Research Associate.

C. M. LUKE, B.Sc., Ph.D. (London), Research Associate.

A. VIZSOLYI, Dipl.Chem. (Budapest), Research Associate. R. D. Warda, B.A.Sc. (Brit. Col.), Ph.D. (Cantab.), Research Associate.

F. A. FORWARD, B.A.Sc. (Toronto), D.Sc. (Brit. Col.), P.Eng., F.I.M., F.C.I.C., Professor Emeritus.

Lecturer from another Department

JAN LEJA, B.Sc. (London), Dipl.Ing. (Krakow), Ph.D. (Cantab.), P.Eng., F.C.I.C., Professor, Mineral Engineering.

Department of Mineral Engineering

LESLIE G. R. CROUCH, B.Sc. (Victoria, Australia), M.Sc. (Utah), P.Eng., M.C.I.M., Professor of Mining Engineering and Acting Head of the Department.

C. L. EMERY, M.Sc. (Queen's), Ph.D. (Sheffield), M.C.I.M., M.E.I.C., Pro-

HENRY M. HOWARD, B.A.Sc. (Toronto), P.Eng., M.C.I.M., Professor of Mineral Dressing.

JAN LEJA, A.R.S.M., B.Sc. (London), Dipl.Ing. (Krakow), Ph.D. (Cantab.), P.Eng. F.C.I.C., Professor.

H. MAJIMA, B.A.Sc., D.Eng. (Kyoto), P.Eng., M.A.I.M.E., Associate Professor. George W. Poling, B.Sc., M.Sc., Ph.D. (Alta.), P.Eng., Associate Professor.

T. NAGAI, B.E. (Hokkaido), Research Associate. Y. Oka, B.S.Eng. (Kyoto), Post-Doctoral Research Fellow.

Lecturer from another Department

WILLIAM H. WHITE, M.A.Sc. (Brit. Col.), Ph.D. (Toronto), Professor, Department of Geology.

# FACULTY OF APPLIED SCIENCE OUTLINE OF ENGINEERING COURSE PROGRAMME

Engineering studies in the Faculty of Applied Science follow a general pattern in which the first two years are devoted largely to the development of basic concepts in mathematics and physical sciences with some consideration of certain applied fields. In the final two years the work is concerned with application of the sciences in specific areas of engineering.

Entrance standards require that the student must have completed with high standing, courses in mathematics and the sciences either in a university or by Grade 13. Practical work outside the University, scheduled field trips, and the activities of professional and technical societies all contribute to the rounding out of an engineering course and the student is expected to participate in them as fully as circumstances permit.

The degree of Bachelor of Applied Science is granted on completion of the work in one of the following courses:

- 1. Agricultural Engineering
- 2. Chemical Engineering
- 3. Civil Engineering
- 4. Electrical Engineering
- 5. Geological Engineering
- 6. Mechanical Engineering
- 7. Metallurgical Engineering
- 8. Mineral Engineering
- 9. Engineering Physics

Extension of engineering studies at the post-graduate level is becoming increasingly important. The Faculty offers post-graduate courses and provides research facilities in many areas of engineering for students proceeding to the degree of Master of Applied Science or Doctor of Philosophy.

The requirements for entrance to the M.A.Sc. and Ph.D. programmes are set out fully in the calendar of the Faculty of Graduate Studies. In general it may be stated that acceptance as a candidate for the M.A.Sc. degree requires a high level of accomplishment in the undergraduate course; a substantial programme of academic courses and research, occupying at least twelve months, must be completed to merit this degree. Acceptance as a candidate for the Ph.D. degree requires demonstrated academic and research ability; the programme of studies and research occupies at least two years' resident study beyond the level of the Master's degree. For both degrees competence in at least one additional language besides English is expected.

The specific offerings of the several Departments are described in the section devoted to Courses in Engineering.

# Registration and Admission

The general requirements for admission to the University are given in the General Information bulletin.

For admission to courses in Engineering, a student must have completed the First Year in Science at the University of British Columbia or its equivalent at an approved university or college or by Grade 13.

Required subjects are:

English 100 (Literature and Composition)

Mathematics 120 (1968-69 session) or Mathematics 100 and 121 (1969-1970 session) or Mathematics 120 prior to 1968 or its equivalent elsewhere. Students offering Mathematics 120 prior to 1968 or its equivalent elsewhere will be required to enrol in a special section of Mathematics 151.

Chemistry 103 or 110 or 120

Physics 110 or 120 or 130

An elective chosen from courses offered in the Faculty of Arts.

The passing grade for entrance to courses in Engineering in each of Mathematics, Chemistry and Physics, is 60 per cent., and 50 per cent. in other subjects.

The Faculty of Applied Science will consider applications for entrance to second-year Applied Science from students at U.B.C. who have achieved an overall second-class standing in the combined first and second years in the Faculty of Science and have an appropriate background for their intended programme in Applied Science. Application should be made to the Office of the Dean.

Subjects normally required from other British Columbia universities and colleges:

Capilano College:

English 1A, 1B; Chemistry 1A, 1B or 2A, 2B; Mathematics 2A, 2B, Physics 1A, 1B; 6 semester-hours Arts electives.

A minimum grade "B" in each of Chemistry, Mathematics and Physics and a pass in English and the Arts electives.

Notre Dame University:

Chemistry 111; Mathematics 111; Physics 111; English 111; and one Arts elective course. A minimum grade of 70% in each of Chemistry 111, Mathematics 111, and Physics 111, and 60% in English 111 and the Arts elective.

Okanagan College

English 101, Chemistry 101 or 102, Mathematics 102, Physics 101 or 102, 6 semester hours of Arts electives.

A minimum grade of "B" in Chemistry, Mathematics and Physics and a pass in English and the Arts electives.

Selkirk College:

Chemistry 110 or 111; Mathematics 111; Physics 111; English 111, 112; plus 3 units of Arts elective.

A minimum grade of "C+" in each of Chemistry, Mathematics and Physics, and a pass in English and the Arts elective.

Simon Fraser University:

Chemistry 101, 102, 106, 116; or Chemistry 102, 103, 116, 117; Mathematics 113, 114; (Mathematics 151, 152 after 1969-70); Physics 101, 102; two of English 101, 102, 103, 111; six semester-hours of Arts electives.

A minimum grade of "C" in each of the above courses with a grade point average of 2.70 in Chemistry 101, 102, 106, 116 or 102, 103, 116, 117; Mathematics 113, 114; Physics 101, 102 (based on A = 4; B = 3; C = 2).

Vancouver City College:

Chemistry 15A and 15B; Mathematics 17A and 17B; Physics 15A

and 15B; English 17A and 17B; plus an Arts elective in each of two semesters.

A minimum grade of "C" in each of the above courses with a grade point average of 2.70 in all the chemistry, mathematics and physics courses (based on A = 4, B = 3, C = 2).

The University of Victoria:

Chemistry 120 and 121 or 124 and 121; Mathematics 130; Physics 101; English 100; plus an Arts elective.

A minimum grade of "C+" in each of Chemistry 120 and 121 or 124 and 121, Mathematics 130 and Physics 101 and a pass in English and the elective.

Candidates who expect to complete the requisite entrance standing through University or Grade 13 supplemental examinations, held in August, may apply for admission and their applications will be considered subject to the results of these examinations.

No student with deficient standing will be admitted to the First or Second Year in any course in the Faculty.

Students intending to enter Applied Science are advised to present Chemistry 12, Mathematics 12, and Physics 12 for Secondary School Graduation.

Students are not admissible directly from Grade 12 in any Canadian province.

In order to allow time for practical work in the summer, the session is kept as short as is consistent with satisfactory mastery of the work. The student, therefore, should attend at the opening of session to assure a proper approach to the course.

If the summer employment either affords experience in the work of the course, or lightens the work of the session (as for example geological survey field work for geology students), and by its nature prevents the student attending the opening of the session, he may be allowed by the Dean to enter late, provided he furnishes a statement from his employer showing that it was impossible for him to release the student earlier. The student must, however, make application in writing to the Dean prior to the first day of registration. A fee for late registration will be charged.

### Fees—Subject to change without notice

First Term Fees, \$290 (includes A.M.S. fee of \$29), payable in full at the time of registration. However, students may pay full fees of \$551 at time of registration. Fourth Year students are assessed an additional \$7 to cover the graduating fee.

Second Term Fees, \$261, payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Finance Department before this date with a note showing name and registration number.

Application fee. A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.

### Examinations and Advancement

1. Examinations are held in December and in April. December examinations are obligatory in all subjects of the First and Second Years for all students in these years. December examinations in subjects of the Third

and Fourth Years, excepting those subjects completed before Christmas, shall be optional with the departments concerned. Applications for special consideration on account of illness or domestic affliction must be submitted to the Dean as soon as possible after the close of the examination period. For information regarding medical certificates see the General Information bulletin.

- 2. Candidates, in order to pass, must obtain at least 50 per cent. in each subject; in courses including both lecture and laboratory work students will be required to pass in both the written examinations and laboratory work before standing in the subject will be granted. The grades are as follows: First Class, an average of 80 per cent. or over; Second Class, 65 to 79 per cent.; Pass, 50 to 64 per cent. In a subject in which a candidate has failed to obtain 50 per cent., the Faculty may, at its discretion, award a pass in that subject on the basis of a good aggregate standing. Such a pass will be entered on his record as an "adjudicated pass".
- 3. No student will be allowed to take any subject unless he has previously passed in, or secured exemption from, all prerequisite subjects.
- 4. A student who is required to repeat his year will not be allowed to take any work in a higher year. A student repeating his year need not repeat the laboratory work of certain courses if he has obtained a standing in this work acceptable to the head of the department in which the course is given.
- 5. A student who fails a second time in his University studies is required to withdraw.
- 6. Any student whose academic record, as determined by the tests and examinations of the first term, is found to be unsatisfactory, may be required to discontinue attendance at the University for the remainder of the session. Such a student will not be re-admitted to the Faculty as long as any supplementals are outstanding.
- 7. Term essays and examination papers may be refused a passing mark if they are noticeably deficient in English.
- 8. Honours graduate standing will be granted to those who obtain First Class Standing in the Final Year and who have obtained an average of at least 75 per cent., with no supplementals, in each of the preceding three years.

### **Examination Results**

Results of the sessional examinations in April are mailed to students in the graduating classes about the time of Congregation, and to students in the lower years by approximately June 15. Any student who must meet an application date for another institution prior to June 15 should inform the transcript clerk in the Registrar's office in order that arrangements may be made to meet the deadline.

# Review of Assigned Standing

Reviews of assigned standing are governed by the following regulations:

- I. Any request for the review of an assigned grade, other than for a supplemental examination (in which a request for a review will not be granted), must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each course concerned which will be refunded only if the mark is raised.
  - 2. Each applicant for a review must state clearly why he believes his course

deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a second time before results are announced. For this reason an applicant granted a supplemental should prepare for the examination since a change in the original mark is unlikely and the result of the review may not be available before the end of the supplemental examination period. A review will not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.

3. Reviews will not be permitted in more than two courses in the work of one academic year, and in one course in a partial study programme.

### Supplemental Examinations

1. If a student's general standing in the final examinations of any year is sufficiently high, the Faculty may grant him supplemental examinations in the subject or subjects in which he has failed. Supplementals will not be granted in more than three subjects. Notice will be sent to all students to whom such examinations have been granted.

2. A candidate who has been granted a supplemental examination may write it only twice. Permission to write a third time may be given only if the course is repeated or an equivalent course taken. Tutoring approved

by the Dean may be accepted as an equivalent course.

3. No student may enter the Third or higher year with supplementals still outstanding in more than 4 units of the preceding year, or with any supplemental outstanding in the work of an earlier year unless special permission to do so is granted by Faculty.

4. Supplemental examinations will be held in August and at the time of the regular April examinations. Special examinations will not be granted, except by special permission of the Faculty and on payment of a fee of \$20 per paper.

5. Applications for supplemental examinations, accompanied by the necessary fees, must be in the hands of the Registrar by July 8.

6. Supplemental examinations may be written in August at the following centres: Cranbrook, Dawson Creek, Kamloops, Kitimat, Ocean Falls, Penticton, Powell River, Prince George, Prince Rupert, Trail, Victoria; and at Whitehorse, Y.T. Other centres outside of British Columbia are restricted to universities or their affiliated colleges.

In unusual circumstances a student working in a remote area may be permitted to write supplemental examinations at a special centre if satisfactory arrangements can be made. Since permission is contingent on completion of arrangements, only early applications will be considered.

The fee for each supplemental examination written at the University is \$7.50; at a regular outside centre, \$10.00; at a special centre, \$20.00. In the event that a candidate does not appear for an examination a refund will be authorized only if, within 10 days after the scheduled examination, the candidate submits to the Registrar an adequate explanation for the failure to write the examination; if such refund is made, it will be \$5.

# Transcript of Academic Record

A transcript of a student's academic record will, on request of the student, be mailed direct to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the

inscription "official transcript only if presented with seal unbroken". On graduation or withdrawal a student may obtain for his own use a copy of his record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of Christmas or mid-term examinations.

Student records are confidential. Transcripts are issued only at the request of students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made arrangements satisfactory to the Finance Department to meet any outstanding indebtedness.

Granted Honourable Dismissal indicates that the student is in no disciplinary difficulty at the time the transcript is issued; the term has no reference to scholastic status.

Application for a transcript should be made at least one week before the document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

### Graduation

Every candidate for a degree must make formal application for graduation. Application for graduation must be made not later than March 15. Special forms for this purpose are provided by the Registrar's office.

### Attendance

Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments, may, on the recommendation of the Head of the Department, be excluded by the Dean of the Faculty from the final examinations. Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes.

Students who, because of illness, are absent from a December or April examination, must submit a certificate, obtained from a doctor, to the University Health Service as promptly as possible.

### Withdrawal

Any student who after registration decides to withdraw from the University must report to the Registrar's office. He will be required to obtain clearance from the University, to the satisfaction of the Registrar, before being granted *Honourable Dismissal* or recommended, where applicable, for refund of fees. (See the General Information bulletin.)

The Senate of the University may require a student to withdraw from the University at any time for unsatisfactory conduct, for failure to abide by regulations, for unsatisfactory progress in his programme of studies or training, or for any other reason which is deemed to show that withdrawal is in the interests of the student and/or the University.

# Practical Work Outside the University

Before a degree will be granted, a candidate is required to satisfy the

department concerned that he has completed a suitable amount of practical work related to his chosen profession.

Practical work such as shopwork, freehand drawing, mechanical drawing, surveying, etc., done outside the University may be accepted in lieu of laboratory or field work (but not in lieu of lectures) in these subjects, on the recommendation of the head of the department and with the approval of the Dean. Students seeking this exemption must make written application to the Dean before April 1.

### Field Trips

Students who may be required to participate in field trips will be responsible for expenses incurred in such trips.

### Professional Associations

In order to practise as a Professional Engineer in the Province of British Columbia, it is necessary to be registered as a member of the Association of Professional Engineers of the Province of British Columbia.

Students in Engineering should enroll with the Association in their Second Year and should associate themselves with the appropriate technical societies. Facilities for enrollment are available each fall at the University during the period of registration.

It is most important that the student, upon entering Third Year, should identify himself more closely with professional objectives and should establish clearly in his own mind the path he expects to follow in obtaining full professional recognition at a later date. At this time he should consult with the head of the department in which he proposes to enroll concerning the requirements for registration subsequent to graduation.

During the period between graduation and registration, the graduate should be enrolled with the Association of Professional Engineers in B.C. as an Engineer-in-Training.

### **CURRICULA**

### First and Second Years

No student with deficient standing will be admitted to First or Second Year Applied Science.

Students entering Second Year are required to submit an essay of not less than 1000 words. This should take the form of a scientific report based preferably upon original observations made during the summer. Any suitable subject, however, may be chosen. Emphasis will be placed upon the precise and accurate use of English, but credit will also be given for subject matter, form, and illustrations. If the essay is not up to the standard of a pass mark in English it will be returned for re-writing. One copy only is required, which may be retained for future reference by the department most interested. The essay shall be handed in to the Dean not later than Ocober 15.

Students should obtain a copy of Summer Essay Specifications at the Bookstore.

### FIRST YEAR

Subland	First Term			Second Term			
Subject	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.	
Geol. 150 Earth Science for Engineers	2	2*		2 1 2 2	2*		
App. Sc. 152 Engineering Draw.		]	3 2	1		3	
Chem. 156 Physical Chemistry	2	·	2	2		2	
Eng. 150 Composition	2	[		[ 2		l	
Math. 151 Linear Algebra	3			=			
Math. 155 Calculus	1	]		3 3 2 2			
Math. 156 Vector Calculus		)	]	) 3	]	) - <u>-</u> i	
Phys. 155 Mechanics	2 2	-	4 2*	2	) <u></u> .	4	
Phys. 156 Heat, Light, Sound	2	3*	2*	2	3*	2*	
Agricultural Eng. 208 Essay		ing		1	· 1		
Eng. 298 Essay			-		-	1 1	
App. Sc. 257 Introd. to Analogue Simulation	ł	}	}	2	}	2*	
App. Sc. 270 Strength of Materials	9	}	ï	2 2 2 2 2 2		ī	
App. Sc. 275 Applied Mechanics		-	li	2		1 1	
App. Sc. 278 Materials Science	2	2*	1	2	2*		
App. Sc. 281 Fluid Mechanics	2	-	ä	2	_	2	
Chem. 253 Organic Chemistry		}	} _	2		\ _	
†C.E. 250 Plane Surveying	1	{	1		{		
C.S. 251 Introd. to Computers and	-	-				(	
Programming	2	1	1			]	
Programming	(	(	(	[	[		
Differential Equations	3			3			
Math. 251 Elem. Statistics		1		3 2 2			
Phys. 250 Electricity and Magnetism	2	3	<u> </u>	2	3	<u></u>	

<sup>\*</sup> Alternate weeks.

<sup>†</sup>At end of Second Term, First Year.

# SECOND YEAR Chemical Engineering

	F	irst Ter	m	Seco	ond Ter	m
Subject	Lect.	Lab.	Prob.	Lect.	Lab,	Prob.
Eng. 298 Essay						
App. Sc. 257 Introd. to	l		l	1		1
Analogue Simulation				2		2*
App. Sc. 278 Materials Science	2	2*		2	2*	} }
Chem. 230 Organic Chemistry	3	3		2 2 3 2	2* 3 4*	
Chem. 257 Physical Chemistry	2 3 2 2	2* 3 4*	)	2	4*	) }
Min. 271 Interfacial Properties	2					1 ]
Ch. E. 250 Material Balances and	1	1	{	[	1	1 1
Phase Equilibria	1	2*	2*	1	2*	2*
C.S. 251 Introd. to Computers and	1 -	-	1	1	ļ	1 1
Programming	2	1	1	1	1	1
Math. 250 Vector Analysis and	7 -	-	-		1	
Differential Equations	3	1	1	3		_
Math. 251 Elem. Statistics	1 3			1 2		1 "
Phys. 250 Electricity and Magnetism	3 2 2	3	1 -	2 2	3	"
1 Hys, 200 Electricity and Wagnetishi	1 4	1 3	1	<del>-</del>	1 0	<del></del> -
Civil Engineering, Mechar	nical E	ngine	ering,			
Metallurgical En			O,			
	gineer	mg.				
Eng. 298 Essay						1 1
App. Sc. 270 Strength of Materials	. 2		1	2		1
App. Sc. 275 Applied Mechanics	2		1	2	1	1
App. Sc. 278 Materials Science		2*	)	2 2 2 2	2*	1
App. Sc. 281 Fluid Mechanics	2	1	$\ddot{2}$	2	1	ä
C.S. 251 Introd. to Computers and		ì	1	1	1	1
Programming	.)	ì	\	2	1	1 1
Math. 250 Vector Analysis and	7	1 "	1	1 -	1	( ]
Differential Equations	ો વ			3	1	
Math. 251 Elem. Statistics	) 5		1	2	}	1 "
Physics 250 Electricity and Magnetism	3 2 2	3		3 2 2	3	"
† Elective		]		-	3	"
†C.E. 250 Plane Surveying	Ì	i i	1	1	-	1
(Civil Eng. only)	}	1	-	}	]	
(Civil Eng. only)	<u>-1</u>		<u> </u>	<u> </u>	<u> </u>	
Electrical Engi	neerin	ıg				
Eng. 298 Essay		T		I		T
App. Sc. 275 Applied Mechanics	2		1	2		ī
C.S. 251 Introd. to Computers and	1	1	1	1		1 -
Programming	2	1	1	1	1	1
E.E. 251 Introd to Circuit Analysis	3	2*	$\hat{2}$	3	2*	2
E.E. 251 Introd. to Circuit Analysis E.E. 253 Introd. to Solid State	1	~	1 -	1	~	~
Electronics	. 2	2*	2*	2	2*	2*
E.E. 255 Elect. Engineering Problems I		-	~	2 2	-	2
Math. 250 Vector Analysis and	] "	,	,	-		~
Differential Equations	3			3		1
Math. 251 Elem. Statistics				3 2 2		1
Phys. 251 Electric and Magnetic Fields	7 5	3*	1	1 5	3*	1
1 11yo. 201 Electric and Magnetic Melds	-   -	1	.1 12	, ~	1 3	1

<sup>\*</sup>Alternate weeks. †At end of Second Term, First Year. ‡The elective course will be chosen from a list provided at registration.

# SECOND YEAR Geological Engineering

Sala a	F	irst Te	m	Sec	Second Term			
Subject	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.		
Eng. 298 Essay  App. Sc. 270 Strength of Materials  App. Sc. 278 Materials Science  ‡C.E. 250 Plane Surveying	2	 2*	i -	2 2	 2*	ï -		
C.S. 251 Introd. to Computers and Programming Geol. 204 Introd. to Stratigraphy and				2		1		
Structural GeologyGeol. 210 Mineralogy	2 2	3		2 2	3 3			
Math. 250 Vector Analysis and Differential Equations Phys. 250 Electricity and Magnetism	3 2	 3		3 2	<u>ä</u>			
Mineral Engin	eering							
Eng. 298 Essay								
Analogue Simulation	2 2 2	 2* 	ï ï 2	2 2 2 2 2	 2* 	2* I : 2		
Chem. 253 Organic Chemistry								
Programming	2 2	  2	1		3 			
Math. 250 Vector Analysis and Differential Equations	3			3				
Engineering Phys. 250 Electricity and Magnetism	2 2	2* 3		2	2* 3			
Engineering Pl	1ysics	t						
Eng. 298 Essay App. Sc. 275 Applied Mechanics App. Sc. 281 Fluid Mechanics C.S. 251 Introd. to Computers and	2 2		Ī 2	2 2		ï 2		
Programming  E.E. 251 Introd. to Circuit Analysis	3 2	2* 3*	 2 	2 3 2	2* 3*	1 2		
Differential Equations	3 2			3 2				
and one of: App. Sc. 270 Strength of Materials App. Sc. 278 Materials Science ††Humanities Elective	2 2	<u>"</u> 2*	1	2 2		1		

<sup>\*</sup> Alternate weeks.

‡ At end of Second Term, First Year.

† Students entering from 2nd year Honours Physics programme, see page C10.

†† The elective course may be chosen from a list provided at registration.

### THIRD AND FOURTH YEARS

Third Year Essays and Reports

All students entering Third Year Applied Science in other than Chemical Engineering and Civil Engineering are required to prepare an engineering report or essay. Refer to Departmental requirements.

Fourth Year Essays, Reports and Theses

Refer to departmental requirements.

Options in Third and Fourth Years

In some departments selected groups of courses are offered as options which represent different areas of interest, some designed for students who prefer the approach to engineering practice or operation, others for students who are inclined to the more mathematical or scientific aspects of engineering or who may be considering a career in research and development. In some departments the options or electives are intended to offer a choice of field without distinction between applied and scientific concepts. High quality performance in any option or field qualifies the student to continue his studies at the graduate level if he chooses to do so. All students entering Third Year must consult with representatives of the departments concerned before registering for the courses offered.

I. Agricultural Engineering
For Second Year Curriculum and reference to options see pages C16 and C19.

Year	Cublant	F	irst Te	ın.	Second Term			
1 cai	Subject	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.	
	M.E. 252 Graphics in Analysis and Design or	} Pr	ior to	entry	to Th	ird Ye	ar	
TH-RD	C.E. 350 Applied Plane Surveying Biol. 101 Principles of Biology Math. 350 Differential Equations M.E. 363 Mechanics of Materials I M.E. 378 Thermodynamics I M.E. 391 Industrial Systems A.E. 375 Heat Transfer A.E. 385 Agric. Engineering Anal. A.E. 398 Engineering Report **Elective and one of: {M.E. 365 Dynamics I M.E. 479 Thermal Power C.E. 360 Fluid Mechanics I {Chem. 257 Physical Chemistry } Min. 271 Interfacial Properties {Ch.E. 353 Mechanical and Thermal Operations	3 :3 2 2 3 :2 2	3	2*	3 3 3 2 2 2 1	3 4*	3* 2* 	
	Ch.E. 356 Control of Process Variables C.E. 370 Structural Design	1		$\ddot{2}$	1 2		$\ddot{2}$	
F O U	A.E. 450 Field Problems A.E. 489 Seminar A.E. 499 Thesis E.E. 451 Electrical Circuits	At 2	end of 3 2*	2* 2*	erm, 3	rd Yea	r 2* 2*	
RTH	†PLUS 6 UNITS CHOSEN FROM THE A.E. 460 Soil and Water Engineering	$\begin{bmatrix} 2 \\ 2 \end{bmatrix}$	3* 3* 3* 3* 3*		2 2 2 2 2	3* 3* 3* 3*		

<sup>\*\*</sup> Three units of Biological or Agricultural electives to be chosen in consultation with Department before the end of Second Year. A partial list of electives follows: An. Sc. 320; An. Sc. 418; Micro. 416.
† Electives to be chosen in consultation with Department before the end of Third Year. Typical electives would include:
Electives "A"—Plant Sc. 344; Botany 330; Food Sc. 301; Poultry Sc. 406
Electives "B"—C.E. 367; 453; 467; 476.
E.E. 367;
M.E. 367; 466; 468; 491.

\* Alternate weeks.

# 2. Chemical Engineering

For Second Year Curriculum see page C17.

		F	irst Te	m	Second Term			
Year	Subject	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.	
T H I R D	Chem. 352 Modern Analytical Methods Eng. 305 Literature of Ideas	3 2 3 1 1 2 1	2*    3	1 2* 2* 1* 1* 3*	1 3 2 3 1 1 2 1	2*	1 2* 2* 1* 1* 3*	
F O U R T H	Ch.E. 450 Diffusional Operations Ch.E. 453 Economics and Plant Design Ch.E. 454 Process Design Project Ch.E. 455 Chem. Eng. Reactor Design Ch.E. 457 Seminar Ch.E. 458 Properties of Fluids Ch.E. 460 Chem. Eng. Laboratory Ch.E. 498 Summer Essay Ch.E. 499 Thesis ‡Electives, technical and general		12 3	1 2	2 2 2 1 er tasl	4	1	

<sup>\*</sup>Alternate weeks.

<sup>‡</sup>Electives to be chosen in consultation with Department. Mathematics 357 and (or) Computer Science 350 may be taken in Third Year.

3. Civil Engineering

For Second Year Curriculum see page C17.

Year	Subject	First Term			Sec	m ·	
	- Subject		Lab.	Prob.	Lect.	Lab.	Prob.
T H I R D	Math. 350 Differential Equations C.S. 350 Programming of Numerical Algorithms C.E. 351 Engineering Surveying C.E. 355 Strength of Materials II C.E. 356 Engineering Materials C.E. 360 Fluid Mechanics I C.E. 367 Soil Mechanics I C.E. 370 Structural Design C.E. 371 Structural Theory I	2 3 3 1 2 2 2	3* 2* 2*	1  1  1 2	3 1 2 2 2 2 2 2	3* 2* 2*	1 2
F O U R T H	†C.E. 450 Engineering Surveys	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	end of	2nd 7	Ferm, 2 2 2 2 2 2 3	3rd Y	ear 2 2
	C.E. 476 Legal Aspects of Engineering ‡C.E. 451 Control Surveys I ‡C.E. 452 Control Surveys II C.E. 498 Engineering Report	3		ä* 	 3		 3*

<sup>\*</sup>Alternate weeks.

Note: In special circumstances and with permission of the Department Hea a student may substitute a graduate or an undergraduate course for a undergraduate course in the Fourth Year.

### DIPLOMA COURSE IN SURVEYING

To provide an opportunity for students other than those taking civil engineering to obtain the academic qualifications for the surveying profession, the Department of Civil Engineering will admit graduates of recognized universities, with adequate backgrounds in mathematics and physics, to its surveying courses. The successful candidates will be granted a Diploma in Surveying.

The minimum length of course will be one year of not less than 15 units. Details of requisites and prerequisites follow.

<sup>†</sup>Consult Department for requirements in Surveying.

tElective course.

# Diploma course curriculum:

### Prerequisites

The applicant must hold a Bachelor's degree from a recognized university. Except as noted below this degree should include credit for the following courses or their appropriate equivalents:

Course	No.	Units	Title
Geology	150	(3)	Earth Science for Engineers
App. Sc.	152	(2)	Engineering Drawing
Math.	151	$(1\frac{1}{2})$	Linear Algebra
Math.	155	$(1\frac{1}{2})$ (3)	Calculus
Math.	156	$(1\frac{1}{2})$ (3)	Vector Calculus
Physics 1 3 2	155	(3)	Mechanics
Physics	156	(2)	Heat, Light and Sound
*C.E.	250	• •	Plane Surveying (Spring Survey School)
Math.	250	(3)	Vector Analysis and Differential Equations
Math.	251	(2)	Elementary Statistics
Physics	250	(3)	Electricity and Magnetism
Math.	350	(3)	Applied Calculus and Differential Equations
C.S.	251	(1)	Introduction to Computers and Programming
Physics	303	(1)	Electronics
Physics	358	(3)	Physical Optics

Applicants may take certain of the above courses, in which they are deficient, concurrently with the required Civil Engineering survey courses, provided that the studies do not exceed an overall maximum of 18 units during the Diploma session.

# Required Courses

The sessional subjects of the Diploma curriculum must include:

Course	No.	Units	Title
C.E. C.E.	351 450	(1½)	Engineering Surveying Engineering Surveys (Spring Survey School; prereq. C.E. 351)
C.E. C.E. C.E. C.E.	451 452 453 454	$(1\frac{1}{2})$ $(1\frac{1}{2})$ $(1\frac{1}{2})$ $(3)$	Control Surveys I Control Surveys II Photogrammetry Thesis or Project

The above and other approved courses required to make up a minimum of 15 units and not more than 18 units are to be completed in one winter session. The courses C.E. 250 and C.E. 450, being extra-sessional, may not be included in the unit count. To complete a count of fifteen units any of a group of appropriate electives may be taken, subject to approval by the Department. A list of such electives will be available at the time of registration in September.

A candidate seeking admission should send to the Registrar a transcript of his previous academic record with his request for admission to the course and await acceptance before coming to the University.

The fee for the Diploma programme of studies is \$551.00 for the full session.

<sup>\*</sup>For students who do not have credit for C.E. 250 or its equivalent arrangements can be made to make up the deficiency in the first term of the diploma year by self study.

4. Electrical Engineering
For Second Year Curriculum and reference to options see pages C17 and C19.

Year	Sub-1	F	irst Ter	m	Second Term			
ı ear	Subject	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.	
_	E.E. 355 Signals and Systems E.E. 357 Electronic Devices E.E. 359 Switching Circuits	3 2	ä* 	2 <b>2*</b>	3 2 2	ä* 	2 2* 2*	
H	E.E. 367 Instrumentation and Measurements		2	2*		2	2*	
7	E.E. 398 Engineering Reports	2						
R	E.E. 353 Electromechanical Devices E.E. 361 Electromagnetics	3 2	3*	2* 2*	3 2 3	3*	2* 2*	
D	OPTION II: ELECTRICAL ENGINEE E.E. 371 Electrodynamics Math. 360 Real Variable	RINC	SCIE	NCE 2	1		2	
	Math. 362 Linear Algebra Math. 364 Complex Variable Phys. 356 Classical Mechanics	2 2			2 2 2 2 2			
	Compulsory — Option I E.E. 473 Systems Lab. E.E. 498 Engineering Reports M.E. 378 Thermodynamics I M.E. 384 Fluid Dynamics Phys. 472 Modern Physics †Free Elective Compulsory — Option II	 3 	6	   1     2*	3 2 2	6	1 2*	
F O	E.E. 471 Electromechanical Energy Conversion E.E. 473 Systems Lab. E.E. 498 Engineering Reports	2	3* 6	2*	2	3* 6	2*	
U	Math. 452 Differential Equations Phys. 452 Atomic and Nuclear Physics	. 3			3 3			
R	Phys. 455 Themodynamics and Statistical MechanicsElectives — Option I and Option II	3			3			
H	E.E. 469 Microwave Engineering E.E. 477 Solid State Devices Technical Elective			2* 2*	2 2		2*	
	Or two of the following  E.E. 455 Communication Systems  E.E. 463 Power Systems  E.E. 467 Control Systems  E.E. 475 Electronic Systems	2 2		2* 2* 2* 2*	2 2 2 2 2		2 <sup>*</sup> 2 <sup>*</sup> 2 <sup>*</sup> 2 <sup>*</sup>	
	E.E. 485 Computer Methods in System   Design   ‡And one Technical Elective	2	<u></u>	2*	2		2	

<sup>\*</sup>Alternate weeks.
†Any two- or three-unit course in the University, including Electrical Engineering, subject to prerequisites and time-table restrictions.

A technical elective is any 400 numbered course in Electrical Engineering, subject to time-table restrictions.

5. Geological Engineering
For Second Year Curriculum and reference to options see pages C18 and C19.

Year	Subject		irst Ter			ond Ten	
1 car	Subject	Lect.				Prob.	
	C.E. 350 Applied Plane Surveying	A A	end o		i erm,	2nd Ye	ar
1	C.E. 453 Photogrammetry	2		3 2*	3		2*
	Geophysics 302 Physics of the Earth	3			2		4.
	Math. 251 Elem. Statistics Geol. 309 Hydrogeology	2 2					••
	Geol, 311 Natural Gas and	4				~	•-
	Petroleum Geology				2		
	Geol. 320 Optical Mineralogy					-	
T	and Petrology	2	2		2	2	
	†Geol. 410 Field Geology					2 2	
H	Min 398 Engineering Report						
	OPTION I: GEOLOGICAL ENGINE	ERIN	G		_		
• )	C.E. 367 Soil Mechanics I	2	2*		2	2*	
R	Geol. 306 Palaeontology	2	2		$\frac{\overline{2}}{2}$	2	ä
	Min. 351 Introd. to Valuation	ï	<u>~</u> 3*		1	 3*	2
D	Min. 371 Mineral Dressing OPTION II: GEOPHYSICS	1	3 <sup>+</sup>	)	1	3*	
	E.E. 363 Electronics	2		3*	2	{	3*
	Math. 350 Differential Equations	3		, ,	2 3		,
	Geophysics 301 Waves and Seismology	3	N.	2*	3		2*
	OPTION III: ENGINEERING GEOL		~	-	}	ļ <sup></sup>	
	App. Sc. 281 Fluid Mechanics	2		2	2 2		2
	C.E. 367 Soil Mechanics I	2	2*		2	2*	
	Math. 350 Differential Equations				3		<u> </u>
	Geol. 404 Structural Geology	2	2		=	=	
1	Geol. 407 Petrography	2	3		2	3	
	Geol. 419 Stratigraphy and		ļ '	ļ	2		
1	Sedimentation Geol. 499 Thesis		3		2	2 3	
	OPTION I: GEOLOGICAL ENGINE	FRIN				'	
	Geol. 408 Mineral Deposits	3	<b>.</b>		3		
j	Geol. 409 Mineralography	1	3	]		4	
	Min. 457 Rock Mechanics	2	1		2	1	
F	Geophysics, 400 Applied Geophysics	2	3		=	3	
_ [	Geophysics, 403 Geochronology				2		
0	OPTION II: GEOPHYSICS	3	1	{	3		
.,	Geol. 408 Mineral Deposits	3			3		
U	Geophysics 402 Applied	,				"	
R	Geophysics Lab.		3			3	
'`	and one of:		1	1		1 1	
T	Geophys. 404 Geophysical Analysis				2		
-	Geophys. 405 Potential Field Theory	2					
H	Geophys, 406 Instrumentation	$\frac{2}{\text{OCV}}$				[	
	OPTION III: ENGINEERING GEOL C.E. 472 Soil Mechanics II	UGI			3	1	
	C.E. 472 Soft Mechanics II	ĩ			i		
	Geol. 412 Geomorphology	$\dot{2}$	2		2 2	2	
	Min. 457 Rock Mechanics	2 2 3	ī		2	ī	
	C.E. 546 Rivers and Harbours	3				] '	
	and one of:				_	] ]	
	Geophysics 301 Waves and Seismology	3 2		2*	3 2	ا ــــــــــــــــــــــــــــــــــــ	2*
	E.E. 451 Electrical Circuits	2	2*	2*	2	2*	2*
	* Alternate weeks.						

<sup>\*</sup> Alternate weeks. † Includes 3 weeks' field work after lectures in second term.

6. Mechanical Engineering

For Second Year Curriculum and reference to options see pages C17 and C19.

Year	Subject	First Term			Second Term				
		Lect.	Lab.	Prob.	Lect.	Lab.	Prob.		
	M.E. 252 Graphics in Analysis and Design At end of 2nd Term, 2nd Year								
	Design	At		f 2nd					
	E.E. 351 Circuits and Devices	3	2*	2*	3	2*	2*		
}	Eng. 305 Literature of Ideas	1 3		1	1		1 1		
T	Math. 350 Differential Equations	3			3		'		
•	Met. 380 Structure and Properties of	3	}	1	3	1			
Н	Materials	) 3	3*		) 3	3*			
	M.E. 363 Mechanics of Materials I		1		3	1	ī		
1	M.E. 364 Design Seminar			3	-		3		
	M.E. 365 Dynamics I	3		2*			) 3		
R	M.E. 372 Instrumentation and	٥		2					
_	Measurement Lab.		4		-	4	l		
D	M.E. 378 Thermodynamics I			ï		1 4	-		
]	M.E. 384 Fluid Dynamics		-	1	3		i		
	M.E. 391 Industrial Systems	$\ddot{2}$	\/	-	2		1		
	M.E. 398 Engineering Report				\ ~				
	Will, 500 Engineering Report						1 "		
	Students pre-register with a faculty advise	er tov	vards	the en	d of t	he Th	nird		
]	Year. Each student takes 5 courses (9 Ur	nite)	raius is a co	ore, an	d cho	oses S	or		
	10 Units of Electives, with the help of his	advis	er. Tv	pical r	orogra	mmes	are		
	shown on page C51.			Prosta P			-		
	M.E. 463 Mechanical Design	1 2	T	3	1 2	1	3		
	M.E. 465 Dynamics II	$\frac{2}{3}$		ĺĬ					
İ	M.E. 466 Automatic Control		1		3		1		
	M.E. 472 Project and Design Laboratory		3	)	1	3			
1	M.E. 476 Heat and Mass Transfer	. 2		1	2		1		
	M.E. 498 Engineering Report		}						
	+ ELECTIVES		ļ	1	ļ		l		
F	C.S. 350 Programming of Num.	_			l	l	Į.		
1	Algorithms	2 2	ä	) I	1 5	ä	7		
0	E.E. 465 Applied Electronics	ì	_	1	2		1		
	Math. 357 Statistics and Programming	- ;			4	\			
U	Math. 450 Analysis Met. 470 Structure of Metals II	9			3				
	Met. 470 Structure of Metals II	2			2				
R	Phys. 472 Modern Physics	5			1 5				
T	M.E. 458 Industrial Engineering			ï	22322223		Ī		
"	M.E. 467 Advanced Dynamics				$+\tilde{2}$		Î		
Н	M.E. 468 Mechanics of Materials II				3		1		
' '	M.E. 469 Optical Engineering	. 3	1	-			1		
	M.E. 473 Thermal Processes			1	)		)		
	M.E. 478 Thermodynamics II				2		1		
-	M.E. 479 Thermal Power				3		1		
	M.E. 481 Aerodynamics	3	[ 1*		'   3	[ 1	* 2*		
	M.E. 484 Dynamics of Real Fluids	2		1	ټ ا				
	M.E. 491 Industrial Management	2	<u> </u>	1	2		<u>  I</u>		
•	*Alternate weeks.								

\*Alternate weeks. †Some Electives may not be offered in a given year.

# 7. Metallurgical Engineering

For Second Year Curriculum see page C17.

				irst Term		Second Term		
Year	Subject	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.	
T H I R D	Ch.E. 352 Transport Phenomena Math. 350 Differential Equations M.E. 367 Applied Mechanics Met. 350 Met. Thermodynamics I Met. 351 Laboratory Methods Met. 352 Process Met. I Met. 353 Metallurgical Calc. I Met. 370 Structure of Metals I Met. 371 Physical Metallurgy Laboratory I Met. 378 Electron Theory of Solids Met. 382 Non Metallic Materials I Met. 390 Seminar I Met. 398 Engineering Report Min. 371 Mineral Dressing	2 3 1	3*	2*	3 3 2 2 3 1 2 	3*	2* 2 1	
F O U R T H	Met. 450 Metallurgical Thermodynamics II Met. 451 Metallurgy Laboratory Met. 452 Process Met. II Met. 453 Metallurgical Calc. II Met. 455 Research Project Met. 470 Structure of Metals II Met. 471 Physical Metallurgy Laboratory II Met. 474 Metal Fabrication I Met. 490 Seminar II Met. 498 Engineering Report Plus (6) units chosen from the following; not less than (2) units in Met courses.‡ Met. 456 Hydromet. and Kinetics Met. 458 Phys. Chem. of Metal Surfaces Met. 480 Fracture Met. 480 Fracture Met. 482 Non-Metallic Materials II **Met. 561 Nuclear Metallurgy **Met. 586 Electron Microscopy Math. 450 Analysis Phys. 352 Mathematical Physics	2 2 2 2 2 3	3*	3	2 2 2 1 2 1 1 3 2	3*	3	

<sup>\*</sup>Alternate weeks.

<sup>••</sup>Offered to Fourth Year students only with the permission of the Head of the Department.

‡Alternative electives may be arranged after consultation with the Head of the Department.

8. Mineral Engineering

For second Year Curriculum see page C18.

Year	Subject	F	irst Te	m	Second Term		
	Suojece	Lect. Lab.	Prob.	Lect.	Lab.	Prob.	
T H I R D	C.E. 350 Applied Plane Surveying C.S. 350 Programming of Numerical Algorithms Math. 251 Elementary Statistics Math. 350 Differential Equations Min. 351 Intro. to Valuation Min. 353 Methods Studies Min. 356 Rock Properties Min. 358 Rock Fragmentation Min. 370 Mineral Dressing I Min. 390 Seminar Min. 398 Engineering Report + ELECTIVES Five units selected in consultation with the department before the end of Second Year.	2 2 3 2 2 3	end o	f 2nd '	Term,	2nd Y	ear       2       1
F O U R T H	Met. 372 Physical Metallurgy Min. 352 Environmental Control Min. 452 Valuation Min. 453 Systems Analysis Min. 455 Rock Properties II Min. 460 Advanced Eng. Problems Min. 480 Research or Design Project Min. 490 Seminar Min. 498 Engineering Report + ELECTIVES Ten units selected in consultation with the department before the end of Third Year. A partial list of elective courses follows: CE. 476, Comm. 459, E.E. 451, M.E. 491, Met. 456, Microbiol. 416, Min. 456, Min. 470, Min. 471, Min. 472.	1	    3  	2 1 4 1	2 2 2	     6  	 1 

<sup>\*</sup>Alternate weeks.

# 9. Engineering Physics

For Second Year Curriculum see page C18.

	5.114	F	irst Te	m	Second Term			
Year	Subject	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.	
	E.E. 363 Circuits and Electronics	2		3*	2		3*	
T H I R D	Numerical Algorithms Math. 360 Real Variable Math. 362 Linear Algebra Math. 364 Complex Variable Phys. 351 Elec. and Mag. Phys. 352 Mathematical Physics Phys. 358 Physical Optics Phys. 398 Essay and one of: E.E. 353 Electromechanical Devices Geophys. 302 General Geophysics [M.E. 378 Thermodynamics I M.E. 378 Fluid Dynamics Met. 374 Physical Metallurgy I [Phys. 353 Cryogenics ] Phys. 354 Vacuum Physics and Beam Technology	22222	3*	1 2* 2* 1	22222 · 33 · 32 · 3	3*	2* 2*	
F O U R T H	E.E. 465 Applied Electronics Math. 452 Differential Equations Phys. 452 Atom. and Nucl. Phys. Phys. 455 Therm. and Stat. Mech. Phys. 456 Classical Mechanics Phys. 457 Continuum Mechanics Phys. 459 Experimental Physics Phys. 480 Seminar and one of: {Ch. E. 450 Diffusional Operations tCh.E. 354 Cascades E.E. 467 Control Systems Geophys. 404 Geophysical Analysis Geophys. 405 Potential Field Theory Geophys. 406 Instrumentation M.E. 481 Aerodynamics Met. 472 Physical Metallurgy II	33322 212 223	2	1	233322 - 2122 - 32	2 	1 	

<sup>\*</sup>Alternate weeks.

<sup>\$</sup>May be taken in Third Year.

#### COURSES IN ENGINEERING

Note: The following subjects may be modified during the year as the Senate deems advisable.

The hours assigned for laboratory and lectures in the course are designated as shown by the following examples:

- 2 lectures and 3 hours laboratory per week, both terms. [2-3-0; 2-3-0]
- 1 lecture per week and 3 hours laboratory in alternate weeks, both terms. [1-3\*-0; 1-3\*-0]

2 lectures and 3 hours per week alternately laboratory and problem, both terms. [2-3\*-3\*; 2-3\*-3\*]

- 1 lecture and 3 hours per week problem, both terms. [1-0-3; 1-0-3]
- 1 lecture and 2 hours laboratory per week, first term. [1-2-0; 0-0-0]
- I lecture per week first term, 2 hours laboratory second term. [1-0-0; 0-2-0]

Where no definite times are assigned for laboratory and lectures, the number of units for which credit will be granted is shown in parentheses after the course number.

# Agricultural Engineering

- 375. Heat Transfer.—Basic principles of heat transfer, applications to process equipment and building design for agriculture. Solar insolation and micro-climatology. Textbook: Kreith, *Principles of Heat Transfer*.

  [2-0-3\*; 2-0-3\*]
- 385. Agricultural Engineering Analysis. Application of engineering sciences to problems encountered in the agricultural industry. Textbook: Ver Planck and Teare, Engineering Analysis. [0-0-2\*; 0-0-2\*]
- 398. Agricultural Engineering Report.—The subject of the report should be some scientific or engineering work with which the student is familiar. Copies of report specifications are issued by the department. An outline is to be submitted on or before registration day, and the final report is due in mid-October.
- 450. Field Work.—A study of engineering problems encountered in the various phases of agriculture. Work commences at the close of the spring examinations and continues for two weeks.
- 460. Soil and Water Engineering.—Theory and practices in land drainage. Irrigation practices and principles. Engineering in soil conservation and land reclamation. Textbooks: Frevert, et al, Soil and Water Engineering; Israelsen, Irrigation Principles and Practices. [2-3\*-0; 2-3\*-0]
- 465. Agricultural Structures.—Functional planning, design, construction and environmental control in structures for plant and animal production.

  [2-3\*-0; 2-3\*-0]
- 470. Agricultural Machines.—The application of engineering principles in the development and design of power units and agricultural machines. Use of electric power; handling of agricultural materials. Textbooks: Barger et al, Tractors and their Power Units; Bainer et al, Principles of Farm Machinery.

  [2-3\*-0; 2-3\*-0]
- 480. Agricultural Products Processing.—The unit operations pertaining to processing of agricultural products. Size reduction, separation, mixing, evaporation and drying, refrigeration. [2-3\*-0; 2-3\*-0]
- 489. Seminar.—Papers, and discussions on recent agricultural engineering developments.

  [0-0-2\*; 0-0-2\*]
  - 499. Thesis.—For B.A.Sc. Degree. [0-3-0; 0-3-0]

## Courses for Graduate Students-M.A.Sc. degree:

Prerequisite—Graduation in Agricultural Engineering. Graduates from other branches of engineering may be accepted upon approval of their course by the head of the department.

Course—Includes 6 units in the Department of Agricultural Engineering of which at least 3 units must be courses numbered 500 or above.

Note: All courses listed are not necessarily offered each year.

- 561. (1) Advanced Drainage.—Theory of land drainage by tile and surface methods. Hydrologic characteristics of drainage systems. Drainage requirements of crops. Mr. Coulthard.
- 562. (1) Advanced Irrigation.—Land preparation, irrigation design, water supplies and water control. Mr. Coulthard.
- 563. (1) Quality of Irrigation Water.—Salinity of water and soils, aquatic pollution, fertilizer, pesticide and herbicide effects. Mr. Coulthard.
- 565. (1) Environmental Control for Agriculture Production.—Heat and Mass transfer applied to the design of environmental control systems in Agriculture. Mr. Staley.
- 566. (1) Design of Food Production Systems.—Labour efficiency, material flow, economic criteria, control of natural hazards. Mr. Staley.
- 580. (1) Engineering Principles Applied to Food Concentration.—Thermodynamics of water sorption and desorption. Permeability and diffusion of vapors and gases through tissues and protected interfaces. Moisture migration, capillary, slip and molecular flow. Mr. Watson.
- 582. (1) Physicomechanical Properties of Agriculture Products.—Characteristics of plant and animal material related to the design of production, harvesting and processing procedures. Methods of measurement. Mr. Staley.
- 583. (1) Viscous Properties of Foods.—Pseudoplastic, dilatent, thixotropic and rheopectic properties of foods. Model systems, food texture. Mr. Watson.
- 584. (1) Thermal Properties of Plant and Animal Products.—Methods of measurement of enthalpy, specific heat, thermal diffusivity. Steady state and transient heating, cooling and freezing. Kinetics of thermal processing. Mr. Watson.
- 597. (1-3) Topics in Agricultural Engineering.—Lectures and special topics in the field of Agricultural Engineering may be arranged upon approval of the Head of the Department. Staff.
- 598. (1) Seminar.—Presentation and discussion of current topics in Agritultural Engineering research. Staff.
  - 599. (3-6) Thesis—For M.A.Sc. degree.

#### Animal Science

An. Sc. 320. Animal Physiology.—The functions of muscle, circulation, nerves, digestion and metabolism, respiration, excretion, reproduction and the endocrines of domestic animals. Physiological implications concerned with animal growth and development and lactation. Textbook: Dukes, *The Physiology* of *Domestic Animals* (latest edition). [2-2-0; 2-2-0]

An. Sc. 418. (3) Environmental Physiology.—The environment and its effects on livestock productivity; mechanisms of response and adaptation. Prerequisite: Consent of Instructor. Textbook: Hafez, Adaptation of Domestic Animals. [2-2-0; 2-2-0]

## Applied Science

The courses listed in this section are given by combined Departments in Applied Science as arranged by the Dean of the Faculty.

- 152. Engineering Drawing.—Orthographic projection, technical sketching, engineering geometry, standards and conventions of the graphic language, graphic solution of space problems and the production of working drawings.

  [1-0-3: 1-0-31]
- 257. Introduction to Analogue Simulation.—An introduction to the use of analog computers in engineering analysis, basic components, scaling, first and second order linear and non linear differential equations, simulation of diverse engineering systems, i.e. turbine supply systems, heat flow analysis, chemical reactions.

  [0-0-0; 2-0-2\*]
- 270. Strength of Materials.—An introductory course dealing with elementary relations existing between external forces and accompanying stresses, strains and deflection produced in simple types of structural and machine elements.

  [2-0-1; 2-0-1]
- 275. Applied Mechanics.—A study of kinematics and kinetics of particles and rigid bodies. [2-0-1; 2-0-1]
- 278. Materials Science.—Introduction to atomic theory and theory of the solid state; crystal structure; metals, ceramics and polymers, the relation between structure and properties; mechanical, electrical, magnetic, chemical and nuclear properties of materials. Textbook: Van Vlack, Elements of Materials Science. [2-2\*-0; 2-2\*-0]
- 281. Fluid Mechanics.—Newtonian and non-Newtonian fluid properties; fluid pressure and manometry; static forces on submerged surfaces; streamlines and stream tubes; natural coordinates; mass conservation in one-dimensional flow; Newton's second law and momentum conservation in one- and two-dimensional flow; Bernoulli's equation irrotational flow; energy conservation; simple applications to propulsion and turbomachinery; units, dimensionless groups, and principles of similarity and modelling; flow measurement and measuring devices; flow with friction, and introduction to laminar and turbulent flow; incompressible flow in closed conduits and open channels; one-dimensional compressible flow. [2-0-2; 2-0-2]

# Biology

101. (3) Principles of Biology.—An introductory course emphasizing principles of wide application to all living organisms, including cell structure and function, the mechanism of inheritance, evolution, and adaptation to environment. A comparative approach to the unity and diversity of organisms will be stressed. Biology 11 is strongly recommended. An additional one hour tutorial period is required each week for those students who have not previously had Biology 11 or its equivalent in high school. (For prerequisite purposes Biology 12, Biology 105, Botany 105, or Zoology 105 will be considered equivalent to Biology 101.)

[3-3-0; 3-3-0]

Note: Students who have satisfactorily completed Biology 11 and Biology 12 may write a placement examination in general biology during the week of registration. If this examination is passed, the student will be granted exemption from Biology 101 and may subsequently be admitted to courses

[1-0-0; 1-0-0]

requiring Biology 101 as a prerequisite. Students wishing to sit for the placement examination must apply to do so not later than August 31, 1969. Applications should be addressed to: The Chairman, Biology 101, Department of Zoology, The University of British Columbia.

#### Botany

330. (3) Plant Physiology.—Introduction to physiological processes in plants, including photosynthesis, transpiration, absorption, enzyme and hormone action, and growth. Chemistry 230 is recommended but not required. Mr. Wort. [3-2-0; 3-2-0]

# Chemical Engineering

- 250. Material Balances and Phase Equilibria.—Stoichiometry; estimation of process design data; phase equilibria, psychometry; fuel and combustion. Textbook: Hougen, Watson and Ragatz Chemical Process Principles, Part I. [1-2\*-2\*; 1-2\*-2\*]
- 350. Transport Processes.—Macroscopic mass, heat and momentum balances; kinetics of fluid flow, heat transfer and mass transfer. Textbook: Bennett and Myers, Momentum, Heat, and Mass Transfer. [2-0-1\*; 2-0-1\*]
- 352. Transport Phenomena.—Momentum, energy and mass transfer in solids, in laminar and turbulent fluid flow, and between two phases; theory of molecular and eddy viscosity, thermal conductivity and diffusivity; microscopic and macroscopic equations of motion, dimensional analysis; radiant heat transfer. Textbook: Bennett and Myers, Momentum, Heat, and Mass Transfer.

  [3-0-2\*; 3-0-2\*]
- 353. Mechanical and Thermal Operations.—Principles of comminution and screening; of fluo-solid operations including filtration, sedimentation, classification, fluidization, and differential wetting; and of thermal operations such as evaporation, and crystallization.

  [1-0-1\*; 1-0-1\*]
- **354.** Cascades.—The theory of reversible and irreversible stagewise separations. Textbook: Foust, et al, *Principles of Unit Operations*. [1-0-1\*; 1-0-1\*]
- 355. Applied Thermodynamics.—Application of fundamental physical relationships to vapour pressures, psychrometry, thermophysics and thermochemistry. Laws of thermodynamics; physical and chemical equilibrium; fuels and combustion, process energy balances, power cycles, expansion and compression of fluids, refrigeration. Textbook: Hougen, Watson, Ragatz, Chemical Process Principles, Parts 1 and 2. [2-0-3\*; 2-0-3\*]
- 356. Control of Process Variables.—Theory and application of automatic control in chemical processes; process dynamics; instrumentation.
- 360. Chemical Engineering Laboratory.—Experiments based on material presented in 352, 353, 354, 355; plant visits. Field trips to various industries are required as part of this course. Expenses are the responsibility of the student.

  [0-3-0; 0-3-0]
- 398. Chemical Technology.—During the summer preceding entry into the Third Year of the Chemical Engineering course summer reading on the more important chemical processes is required. An examination will be set on the Saturday of registration week, Special arrangements may be made for candidates entering from other universities.
- **450.** Diffusional Operations.—Principles of mass-transfer operations including absorption, distillation, humidification, extraction, drying, and adsorption. Textbook: Treybal, Mass-Transfer Operations. [2-0-1; 2-0-1]

- 453. Economics of Plant Design.—Economics of chemical engineering processes, optimisation of operating conditions, and choice of auxiliary equipment. Exercises in plant design. [2-0-0; 2-0-0]
  - 454. Process Design Project.

[0-0-2; 0-0-2]

- 455. Chemical Engineering-Reactor Design.—Chemical reaction, kinetics, catalytic processes, and reactor design. Textbook: Levenspiel, Chemical Reaction Engineering. [2-0-0; 2-4-0]
  - 457. Seminar.—Discussion on thesis work in progress. [0-0-1; 0-0-1]
- 458. Properties of Fluids.—Thermodynamics and kinetic properties of fluids. Relationships useful in engineering. Prediction of properties. [1-0-0; 1-0-0]
- 459. (3) Major Design Problem.—The annual student contest of the American Institute of Chemical Engineers will be used as an integrated design problem. Enrolment is subject to departmental approval. (Elective.)
- 460. Chemical Engineering Laboratory.—Experiments in unit operations, instrumentation, and other topics. Plant visits. Field trips to various industries are required as part of this course. Expenses are the responsibility of the student.

  [0-12-0; 0-0-01]
- 470. Pulp and Paper Technology.—Pulp and paper processing viewed from a chemical engineering standpoint. Includes material on wood chemistry and structure, pulping, bleaching, pulp treatment, paper-making, and the structure, testing and uses of pulp and paper. One unit of credit may be obtained for selected portions of this course upon obtaining the permission of the instructor. (Elective) [2-0-0; 2-0-0]
- 498. Summer Essay.—During the summer preceding entry to the Fourth Year of the Chemical Engineering course, an essay must be prepared. This should be written on some subject of scientific or technical interest, and should preferably report personal experience. The essay must be submitted to the office of the Department one week after the first day of lectures.
  - 499. Thesis.—Research or design under the direction of a staff member.
    [0-3-0; 0-9-0]

#### Courses for Graduate Students

#### M.A.Sc. Degree:

Prerequisites—Graduation or equivalent in Chemical Engineering, or graduation in Agricultural Engineering, Mechanical Engineering, Metallurgical Engineering, Mineral Engineering, or the Chemical Engineering option of Engineering Physics.

Course—Must include Chemical Engineering 598, and at least five additional units chosen from graduate courses in the Department, and from 3 to 6 units for approved courses outside the Department, to a total of 12 units. Thesis 6 units.

#### Ph.D. Degree:

The Department offers facilities for research studies in the following fields:

- (a) Mass, momentum, and heat transfer.
- (b) Chemical engineering unit operations.
- (c) Applied thermodynamics and kinetics.
- (d) Biochemical engineering.

The Department also operates a joint research programme at M.A.Sc. and Ph.D. level with the British Columbia Research Council on researches of common interest.

- 550. (1-2) Industrial Kinetics and Catalysis.—Chemical reaction kinetics and catalytic processes; heat and mass transfer in industrial reactors; design of catalytic converters.
- 551. (1-2) Chemical Engineering Thermodynamics.—Pressure-volume-temperature relations; chemical equilibria by Gibbs' method; vapor-liquid equilibria; thermodynamic calculations by third law and quantum-statistical methods, topics of irreversible thermodynamics and information theory.
- 552. (1-2) Optimization Methods.—The mathematical and experimental techniques for optimizing processes will be discussed. Course content will vary from year to year, but will be chosen from the topics: direct search techniques, unconstrained optimization, Jacobian and Lagrangian optimization, mathematical programming, and variational calculus techniques.
- 553. (1-2) Mathematical Operations in Chemical Engineering.—Topics to be discussed will vary from year to year. Amongst these will be dimensional analysis and model theory; treatment and interpretation of chemical engineering data; formulation and solution of differential and finite difference equations; graphical, numerical and statistical methods.
- 554. (1-2) Momentum, Heat and Mass Transfer.—Prediction of velocity, temperature, and concentration profiles for flowing fluids; unifying concepts and analogies in momentum, heat, and mass transport; streamline flow and turbulence, molecular and eddy conduction and diffusion, boundary layers, smooth and rough conduits and other boundaries. References: Bird, Stewart and Lightfoot, Transport Phenomena, and current literature.
- 555. (1-2) Solvent Extraction and Gas Absorption.—Mass transfer in liquid-liquid and gas-liquid systems. Design of extraction and of absorption columns for height and for diameter. Gas-liquid and liquid-liquid equilibria. References: Treybal, *Liquid Extraction*; Sherwood and Pigford, *Absorption and Extraction*; and current literature.
- 556. (1-2) Distillation.—Systems of complete and of limited miscibility; multicomponent systems; graphical and analytical design methods; azeotropic and extractive distillation.
- 557. (1-3) Fluid and Particle Dynamics.—Review of vector and tensor analysis; Navier-Stokes equations; discussions on topics which may include hydrodynamic stability, turbulence, non-Newtonian flow, and gas, liquid and solid particle mechanics.
- 558. (1-2) Process Heat Transfer.—Steady state and transient state studies; calculation and design of industrial heat exchangers.
- 559. (1-3) Topics in Chemical Engineering.—A discussion of some aspects of modern Chemical Engineering. Subject matter varies each year.
- 560. (1-3) Biochemical Engineering.—Kinetics of growth and of biological reactions; principles of agitation; aeration; sterile techniques; product recovery operations; survey of industrial fermentations.
- 570. (1-3) Advanced Paper Technology.—Engineering aspects of the following topics will be discussed—refining, screening and cleaning, fluid mechanics of the paper machine, pressing, drying of paper, converting operations and paper rheology.
- 571. (1-3) Non-Newtonian Fluid Behaviour.—Selections from the following topics will be discussed—kinematics of deformation and flow, dynamics of continuous media, constitutive equations, physical chemical and molecular aspects of viscosity, engineering applications to pipe flow, mixing, heat transfer. Handling of suspensions and polymers.

- 572. (1-3) Pollution Control.—Source of air, water and land pollution; methods of problem assessment, technology of control with special attention to regional problems. Emphasis will vary from year to year with concentration mostly on problems arising from industrial sources.
- 598. (1) Seminar.—Presentation and discussion of current topics in chemical engineering research.
  - 599. (6) Thesis.—For M.A.Sc. degree.
  - 699. Thesis.-For Ph.D. degree.

## Chemistry

- 156. Physical Chemistry.—Physico-chemical properties of gases, chemical thermodynamics, phase equilibria, solutions of non-electrolytes and electrolytes, electrochemical cells and chemical kinetics. [2-0-2; 2-0-2]
- 230. Organic Chemistry.—The fundamental principles of modern organic chemistry, including a discussion of the main classes of organic compounds.

  [3-3-0; 3-3-0]
- **253.** Organic Chemistry.—The physical properties and chemical reactions of organic compounds. Structural isomerism, polymerizations and energetics of organic reactions.

  [0-0-0; 2-0-0]
- 257. Physical Chemistry.—Chemical thermodynamics, electrochemistry, chemical kinetics, elementary statistical thermodynamics. [2-4\*-0; 2-4\*-0]
- 352. Modern Analytical Methods.—An introduction to modern methods of analysis including optical, electrochemical and radiochemical methods, mass spectrometry, magnetic resonance spectrometry and chromatography.

  [2-0-0; 0-4-0]

For descriptions of other courses in Chemistry, see the Faculty of Science calendar.

# Civil Engineering

- 250. Plane Surveying.—Theory of construction, adjustment and application of surveying instruments. Plane surveying problems involving compass, transit, tape, level and plane table. Reduction of field data; and compilation of maps and plans from notes and calculations. Work commences at the close of the spring examination and continues for twelve days, eight hours a day, or equivalent. Textbook: Brinker and Taylor, Elementary Surveying.
- 350. Applied Plane Surveying.—Solar observation for latitude and azimuth. Stellar observation for azimuth at any hour angle. Tunnel survey, transferring azimuth down a vertical shaft. Survey of mineral (lode) claims involving fractions. Simple triangulation with repeating instruments. Tacheometry with modern instruments and techniques. Adjustments of transit and level. Work commences immediately following close of spring examinations, occupying twelve eight-hour days, or equivalent. Textbook: Brinker and Taylor, Elementary Surveying.
- 351. Engineering Surveying.—Plane surveying methods and applications to construction, route locations, earthworks and other engineering projects; limitations, relative advantages, estimated accuracies and other factors affecting choice of best method; solar and stellar determination of azimuth; types and propagation of error; control surveys and their adjustment; special and modern methods, apparatus and applications. [3-0-0; 0-0-0]
- 355. Strength of Materials II.—An extension of App. Sc. 270 to meet the needs of Civil Engineering students. Topics discussed include beam deforma-

tions by area-moment, and conjugate beam, deflections due to shear; unsymmetrical bending, bending of composite sections, plastic bending; thin-walled sections; shear centres, torsion of open and closed sections; beams on elastic foundations; strength theories; elastic instability; introduction to theory of elasticity. [3-0-0: 3-0-0]

- 356. Engineering Materials.—Properties of and standard specifications and tests for wood, steel, cement, concrete and bitumens. The manufacture and metallurgy of steels. Welding metallurgy. Cables. The manufacture of Portland Cement. Mineral aggregates. The design of concrete mixtures. Asphaltic [1-3\*-0; 1-3\*-0] mixtures. Quality control.
- 360. Fluid Mechanics I.—An extension of Applied Science 281. Theories, practical applications and laboratory experiments on orifices, nozzles, weirs, spillways, pipes, open channels, commercial pitometer, velocity meters, turbo machines, water hammer, hydraulic ram, sediment scour and settling velocities. Applications of principles of impulse and momentum, angular momentum and Bernoulli. Vector relationships, homologous laws and constants and cavitation in turbo-machines. Uniform and non-uniform steady flow in open channels. Classification of flow profiles. Steady flow in piping systems including pipe networks. Ideal fluids and flow nets. Boundary layer, lift and drag. Unsteady flow in closed conduits and open channels. Linear regression with the aid of computers, to analyze experimental data. Textbook: Streeter, Fluid Mechanics, 4th Ed. [2-2\*-1; 2-2\*-1]
- 367. Soil Mechanics I.—An introduction to the physical and mechanical properties of soil that govern its behaviour as an engineering material. Textbook: T. William Lambe, Soil Testing for Engineers. [2-2\*-0: 2-2\*-0]
- 370. Structural Design.—An introduction to structural design in timber and steel; tension and compression members, beams, connections, simple roof trusses; typical design calculations and preparation of drawings; use of codes and specifications. Textbook: To be announced. [2-0-2; 2-0-2]
- 371. Structural Theory I.—An introduction to the theory of Structural [2-0-0; 2-0-0] Analysis.
- 450. Engineering Surveys.—Route surveying, curves and earthworks; triangulation; instrument adjustment; azimuth determination; modern techniques and instruments.
- 451. Control Surveys I.—Introduction to the shape of the earth and its effect on survey accuracy and computation. Survey orientation and position deter-[3-0-3\*; 0-0-0] mination.
- 452. Control Surveys II.—Distance measurement by electronic means and reduction of field measurements to mean seal level datum; precise traversing, triangulation and trilateration; resection; strength of figure, inter-visibility of stations, computation of geodetic position, map projections and plane co-[0-0-0; 3-0-3\*1 ordinates. Geodetic levelling.
- 453. Photogrammetry.—The principles of terrestrial and aerial photogrammetry; photogrammetric problems and map compilation from aerial photographs, using radial triangulation; parallax measurement and height determination; principles of automatic plotting machines; field trips. Textbook: Moffitt, Photogrammetry. [2-0-3; 0-0-0]
- 454. Thesis or Project.—For students in the Diploma Course in Surveying
- 455. Structural Theory II.—Theory of the displacement method of analysis with its application to computer solution. A study of the load carrying behaviour of various structural forms. [2-0-0; 2-0-0]

- 460. Structural Steel Design.—Design of steel plate-girder and truss bridges; design of parts of industrial and multi-story buildings under various loading conditions by elastic procedures and limit design.

  [2-0-2; 2-0-2]
- 461. Reinforced Concrete Design.—Analysis and design of reinforced concrete structures including beams, slabs, columns, footings and rigid frames, using working stress and ultimate load techniques. [2-0-2; 2-0-2]
- 465. Municipal Water Supply and Wastewater Disposal.—A survey of the fields of water supply, treatment and distribution plus sewage collection, treatment and disposal. Emphasis will be placed upon practical aspects of the problems facing Western North America. Textbook: Steel, Water Supply and Sewerage.

  [2-0-0; 0-0-0]
- 466. Water Resources Engineering.—Introduction to the engineering development of Water Resources programmes; hydroelectric, irrigation, flood control, multi-purpose schemes. Hydraulic design of typical structures, reservoirs, spillways, for water resources projects. [0-0-0; 2-0-0]
- 467. Fluid Mechanics II.—The influence of wind and water loading on typical two dimensional structures. Such loading is discussed using the theories of hydrodynamic lift and drag, boundary layers and turbulence. [2-0-0; 0-0-0]
- 468. Basic Sanitary Engineering Concepts.—A laborator course to familiarize the student with the testing procedures used in water quality studies and in the operation of water and wastewater treatment plants. [1-2-0; 0-0-0]
- 469. Environmental Sanitation.—An outline of the sanitation problems encountered in both the urban and rural community, with special emphasis on the public health engineering aspects thereof. Text: Ehlers and Steel, Municipal and Rural Sanitation.

  [0-0-0; 2-0-0]
- 470. Transportation Engineering.—Traffic engineering, analysis and capacity. Traffic generation and assignment to highway and street systems. Geometric design. Economic Analysis of alternative designs. References: Matson, Smith and Hurd, Traffic Engineering. Highway Research Board, Highway Capacity Manual. Drew, Traffic Flow Theory and Control. [2-0-0; 2-0-0]
- 472. Soil Mechanics II.—Application of theories of soil mechanics to analysis and design of retaining walls and foundations of various kinds.

  [0-0-0; 3-0-0]
- 476. Legal Aspects of Engineering.—Certain fundamental aspects of law encountered in the work of the engineer; with emphasis on Contract Law and Specifications. Preparation of engineering contract documents including specifications, Torts and Independent Contractor, Sources of Law and major subdivisions. Companies, partnerships, mechanics liens, agency, evidence, expert witness. Textbook: Laidlaw, Young and Dick, Engineering Law. Reference: Abbett, Engineering Contracts and Specifications. Anger, Summary of Canadian Commercial Law.
- 498. Engineering Report.—Copies of specification are available in the Department near the end of the spring term. The report is due in mid-October.

#### Courses for Graduate Students

#### M.A.Sc. Degree:

Prerequisites-Graduation in Civil Engineering.

Course—Includes at least 6 units chosen from graduate courses in the Department, and other approved courses.

Note: All courses listed are not necessarily offered each year.

## Ph.D. Degree:

Facilities are provided for study in the general fields of structural engineering, hydraulics, and soil mechanics; studies in cognate fields will be selected in consultation with the candidate's committee.

- 500. (1) Fundamentals of Matrix Structural Analysis.—The linear analysis of plane and space frame structures by the stiffness method. The design and programming of a general stiffness programme for use on digital computers.
- 501. (1) Applications of Matrix Structural Analysis.—The stiffness method and the programming system will be extended to include structure buckling, yielding, vibration-modes, finite element and cables, and applied to such structures as shear walls, arches, suspension bridges and large frames.
- 503. (1) Special Advanced Topics in Structural Theory.—Selected topics in classical structural analysis. Mr. Hooley.
- 505. (1) Numerical Procedures in Structural Analysis.—Numerical and approximate methods for the solution of complex problems with wide application to engineering structures; moments and deflections of beams and beam-columns, moments and deflections of beams on elastic supports, critical buckling loads of bars of variable cross section loaded in various ways, vibrations of elastically supported mass systems. Mr. Cherry.
- 507. (1) Dynamics of Structures, I.—Fundamental analysis for the behaviour of structures and structural elements subjected to dynamic loading. A comprehensive treatment of the single degree of freedom system including the following topics: the theory of resonant vibration; energy dissipation in vibrating systems; periodic and transient exciting forces; force and response spectrum theory with special application to the earthquake problem; vibration analysis by integral transform methods, impedance and mobility methods and transfer matrix theory; random vibrations. Mr. Cherry.
- 508. (1) Dynamics of Structures, II.—A continuation of C.E. 507: The analysis of multi degree of freedom structures. Lagrange's equations; general normal mode theory; matrix methods in vibration analysis; damping in multi degree of freedom systems; forced oscillations of multi degree of freedom systems with special reference to the earthquake problem; Raleigh and Raleigh-Ritz approximations, transfer matrix techniques; vibrations of continuous systems. (Prereq. C.E. 507.) Mr. Cherry.
- 510. (1½) Inelastic Bending & Limit Design I.—Stresses and deformations in beams beyond the elastic limit; limit design; analysis by the mechanism and equilibrium methods; effect of shear and direct force; design of members for ultimate loads.
- 511. (1½) Inelastic Bending & Limit Design II.—Rigid plastic theory; non-rigid plastic theory; repeated loading; alternating plasticity and incremental failure; shakedown; order of hinge formation in frames; deflections.
- 513. (1) Advanced Reinforced Concrete Design I.—Ultimate moment and shear for reinforced concrete members; biaxial bending in columns; torsion in beams; introduction to yield line theory for slabs.
- 514. (1) Advanced Reinforced Concrete Design II.—Short and long-time deformations in members and joints; yieldline theory for orthotropic slabs; limit design for concrete frames; distribution of load concentrations and column reactions in slabs; effect of large openings in slabs and beams.
- 515. (1) Prestressed Concrete.—Design and analysis for flexure and shear, losses in prestress, anchorage zone stresses, deflections, composite beams, statically indeterminate beams. Mr. Lipson.

- 517. (1) Concrete Technology.—A study of cement, aggregates and other concrete materials; mix design methods; control and testing; a review of current literature on concrete with regard to strength, workability, volume change, durability, porosity and permeability. Mr. Heslop.
- 519. (1) Earthquake Resistant Design of Structures.—Case histories of earthquake damage and field studies of earthquakes; current design criteria and design methods for various types of structure; building code requirements; principles underlying current design methods; dynamic analysis; design to minimize earthquake damage; current research in seismic resistant design.
- 521. (1) Optimization of Engineering Design.—A study of the principles and techniques underlying the optimum design of engineering structures and systems.
- 529. (1½) Advanced Strength of Materials.—Stresses in curved beams; shear deflection; column buckling in elastic and plastic range; buckling of rings; torsion and warping of the general open and closed section; lateraltorsional buckling of some sections.
- 531. (1½) Theory of Plates—A study of stress distribution in flat plates by Fourier Analysis, finite differences, models, and the stiffness matrix approximation. Stability of compressed plates. Textbook: Timoshenko and Woinowsky-Kreiger, Theory of Plates and Shells. Mr. Hooley.
- 532. (1½) Theory of Shells.—A study of the stress distribution and stability of various shell forms. Textbook: Flugge, Stresses in Shells. Mr. Hooley.
- 533. (1) Energy Theorems of Structural Mechanics.—Configuration space; generalized co-ordinates; holonomic and non-holonomic systems. Virtual work, virtual displacements; Fourier's inequality; stationary potential energy principle; Lagrangian multipliers; equilibrium; stability of equilibrium; matrix formulation of energy theorems. Canonical forms; generalized forms of Castigliano theorems; theorems of complementary energy. Calculus of variations. Variational theorem for mixed boundary value problems. Mr. Finn.
- 535 (1½) Elasticity and Visco-elasticity.—Introduction to linear theories of elasticity and visco-elasticity and their application to engineering problems: stress and displacement fields; creep; stress relaxation; visco-elastic models; transformation of visco-elastic problems to avail of existing elastic solutions; solution inversion. Mr. D. L. Anderson.
- 537. Finite Elements.—Minimum principles; displacement, equilibrium and hybrd models; convergence and bounds; plane elasticity and bending problems; other field problems.
- Note: Additional suitable courses in Engineering Mechanics are offered by the Department of Mechanical Engineering; M.E. 550, M.E. 561, M.E. 562, M.E. 565, M.E. 567, M.E. 568.
- 540. (1) Advanced Fluid Mechanics I.—Hydrodynamics of viscous and non-viscous incompressible flow; conformal mapping for free streamline flows; laminar and turbulent boundary layers, and combined application of these theories. Mr. Quick.
- 541. (1) Advanced Fluid Mechanics II.—Turbulence, wakes and vorticity; interaction of fluids and structures; the wave equation applied to tides in estuaries. (Prereg. C.E. 540.) Mr. Quick.
- 542. (1) Unsteady Flow in Closed Conduits I.—Analyses of water hammer in penstocks and in pump discharge lines by graphical and characteristics methods; influence of friction; optimum gate closure. Mr. Ruus.

- 543. (1) Unsteady Flow in Closed Conduits II.—A study of various single and multiple surge tanks by analytical, graphical and numerical methods; stability. Mr. Ruus.
- 544. (1) Steady Flow in Open Channels.—Energy and momentum principles; uniform and gradually varied flow, backwater curves. Flow through transitions, bends and obstructions. Mr. Ruus.
- 545. (1) Unsteady Flow in Open Channels.—Surge waves in power canals, locks, and navigation canals; method of characteristics; flood routing. Mr. Ruus.
- 546. (1½) Hydraulic Engineering for Rivers, Harbours and Coasts.—Mobile boundary flow in sediment-bearing alluvial channels, and the laws relating to the geometry of their self formation. River morphology and sediment transport. Channel-bed scour at obstructions. River training and development for navigation. Water waves and tides. Behaviour of tidal estuaries. Harbour planning and protection. Coastal protection, Use of scale models. Mr. Pretious.
- 548. (1) Governing of Hydraulic Turbines.—Speed regulation of hydraulic turbines. Analyses of speed rise and analyses of turbine governing stability. Prereq. C.E. 542.) Mr. Ruus.
- 550. (1) Hydrology I.—Weather systems and precipitation processes; evaporation and transpiration, streamflow, groundwater, hydrologic measurements and data networks. Statistical methods, hydrograph analysis, reservoir and channel routing.
- **551.** (1) Hydrology II.—Advanced applications of statistical methods, hydrograph analysis and routing techniques. Flow forecasting procedures. (Prerequisite: C.E. 550).
- 554. (1) Water Resource Development I.—Availability of water, quantitative and qualitative requirements for water—municipal, agricultural, industrial, etc.; drainage and flood control. Development of water resource systems.
- 555. (1) Water Resource Development II.—Application of statistics, economics, hydrology, hydraulic and sanitary engineering to the development and operation of water resource systems. (Prereq. C.E. 550, C.E. 554).
- 558. (1) Water Resource Development Seminar.—Directed case studies. Application of concepts, processes and techniques of water resource planning to specific problems. (Prereq. C.E. 550, C.E. 554).
- 560. (1) Sanitary Engineering Design.—Design problems in water and sewage treatment, with emphasis on the hydraulic and sanitary engineering considerations.
- 562. (1½) Sanitary Engineering Laboratory.—A laboratory course to familiarize the student with laboratory procedures, instrument analysis, sampling techniques, and data analysis.
- 563. (1½) Unit Operations and Unit Processes in Sanitary Engineering.— Laboratory and field assessments of sanitary engineering operations and processes; effects of parameters thereon.
- 565. (1) Water Supply Engineering.—An outline of water quantity and quality requirements of water users, and the development of possible courses of action for meeting these requirements. Costs of implementing schemes will be considered.
- 567. (1) Water Pollution Control Engineering I.—Discussion of pollution parameters and the effects of pollutants on the water quality of rivers, lakes, and estuaries; basic technology of biological and chemical treatment of wastewater.

- 568. (1) Water Pollution Control Engineering II.—Characteristics of liquid wastes and possible methods of alleviating their effects on receiving waters. Emphasis will be placed on the procedures required to evaluate the problems.
- 570. (1½) Soil Mechanics I.—Soil composition, stress and strain at a point, principle of effective stress, pore pressure parameters; seepage, consolidation, settlement analysis; shear strength theory. Mr. Byrne.
- 571. (1) Soil Mechanics II.—Settlement analysis; strength theory; direct and triaxial shear machines; stability of slopes; lateral pressure and retaining walls; application of soil mechanics to dams; bearing capacity of soil. (Prereq. C.E. 570.) Mr. Finn.
- 572. (1½) Applications of Physical-Chemical Principles to Clay Behaviour in Soil Engineering.—Clay colloid theory; electrokinetic phenomena; structure of natural and compacted clays and its effect on swelling, shrinkage, compressibility, resilience, strength, pore pressure, permeability; mechanical and chemical soil stabilization; frost action. Mr. Campanella.
- 574. (1) Experimental Soil Mechanics.—Experimental studies of advanced aspects of soil behaviour; compressibility; shear strength; pore water pressure; dynamic tests; advanced instrumentation and measurement techniques; research reports required. (Prerequisite: C.E. 570). Mr. Campanella.
- 576. (1½) Civil Engineering Uses of Aerial Photographs.—The use of aerial photographs for efficient and economical preliminary and reconnaissance soils surveys and for programming soil explorations. Use of photo interpretation in site layout and developing a boring and sampling programme, in the correlation of test borings, drainage studies, yardage estimates and in preliminary location studies for highways and dams. Mr. Bell.
- 578. (1) Principles of Pavement Design.—The application of soil mechanics to the design of flexible and rigid highway and airport pavements. Limitations of the various design methods now in general use and of the ways of evaluating soil strength and controlling construction. Textbook: Yoder, Principles of Pavement Design. Mr. Heslop.
- 580. (1) Advanced Topics in Soil Mechanics.—Stress distributions in soil masses under various boundary conditions; soil dynamics; wave types; wave transmission characteristics; dynamic response; correlation of response with engineering properties; foundation design for dynamic loads; general plastic theory of equilibrium; stability according to various criteria. (Prereq. C.E. 570, C.E. 571, or equivalent.) Mr. Finn.
- 585. (1) Geometric Design of Highways.—Traffic capacity and geometric design of rural highways, arterial highways in urban areas, intersections at grade and grade separation interchanges. Mr. Peebles.
- 590. (1½) Geometric Geodesy I.—Geometry of the spheroid; computation of position on spheroidal surfaces; relation between geoid and spheroid; Laplace correction; Legendre's theorem; geodetic levelling. Textbooks: Clark, Plane and Geodetic Surveying, Vol. II.; Bomford, Geodesy. Mr. Bell.
- 591. (1½) Geometric Geodesy II.—Geodetic triangulation, trilateration, traversing and base measurements; least square adjustment of observations; mathematics of map projections. Textbooks: Clark, *Plane and Geodetic Surveying*, Vol. II.: Bomford, *Geodesy*. (Prereq. C.E. 590.) Mr. Bell.
- 598. (½-3) Topics in Civil Engineering.—Lectures and readings on specialized topics of current interest in the field of civil engineering. To be given on approval of the Head of the Department.

- 599. Thesis.—For the M.A.Sc. degree. (3 or 6 units.)
- 699. Thesis.—For the Ph.D. degree.

## Computer Science

- 251. Introduction to Computers and Programming.—Computer organization, binary number systems, algorithms and flow charting, introduction to an automatic programming language. [0-0-0; 2-0-1] or [2-0-1; 0-0-0]
- 350. Programming of Numerical Algorithms.—Approximation, numerical integration, solution of systems of linear equations, solution of non-linear equations, random numbers and simulation, algorithms for solution of differential equations. Prerequisite: Computer Science 251. [2-0-1; 0-0-0]

## Electrical Engineering

Note: Not all courses numbered 400 may be given in any one year.

- 251. Introduction to Circuit Analysis.—The formulation and solution of the equilibrium equations for lumped linear circuits using classical methods; superposition integrals and transfer functions.

  [3-2\*-2; 3-2\*-2]
- 253. Introduction to Solid State Electronics.—Elementary aspects of the properties of conductors, semiconductors, insulators and magnetic materials relevant to electrical engineering, together with their application in electric circuit devices.

  [2-2\*-2\*; 2-2\*-2\*]
- 255. Electrical Engineering Problems I.—An introduction to the methods of solution of electrical engineering problems using digital computers. Examples will be drawn from concurrent electrical engineering courses. [0-0-0; 2-0-2]
- 351. Circuits and Devices.—Introduction to electrical circuits, machines and electronics. (Primarily for Mechanical Engineering Students.)

  [3-2\*-2\*: 3-2\*-2\*]
- 353. Electromechanical Devices.—Analysis of electromechanical devices in terms of coupled circuits. Double-storage transducers, rotating transducers, commutator and polyphase machines. [3-3\*-2\*; 3-3\*-2\*]
- 355. Signals and Systems.—Transfer functions in systems analysis; signal representations; Fourier and Laplace transforms; modulation theory; state-variable analysis of systems; sampled-data systems; random processes in linear systems; system stability.

  [3-0-2; 3-0-2]
- 357. Electronic Devices.—Theory and application of active and passive elements in amplifiers, oscillators, modulators, detectors and related devices used in computers, communications, instrumentation and control.

  [2-3\*-2\*; 2-3\*-2\*]
- 359. Switching Circuits.—An introduction to two-state devices and the realization of simple switching operations using such devices. The representation of systems having discrete states and physical realization of such systems.

  [0-0-0; 2-0-2\*]
- 361. Electromagnetics.—Field concepts, potential theory, electrodynamics, radiation. [2-0-2\*; 2-0-2\*]
- 363. Introduction to Circuit Theory and Electronics.—Lumped elements, vacuum and semiconducting devices. [2-0-3\*; 2-0-3\*]
- 367. Instrumentation and Measurement.—The principles of DC and AC electrical instruments. Transducers for deriving electrical signals from other physical quantities. The measurements of time, frequency, and of signal characteristics.

  [0-2-2\*; 0-2-2\*]

- 371. Engineering Electrodynamics.—Introduction to vector analysis; magnetostatic and electrostatic fields; the properties of dielectric and magnetic materials; energy and forces in static fields; electromagnetic fields; relationship between field and circuit concepts; Poynting's theorem; stationary devices exploring fields for storing, transforming and controlling the flow of energy.

  [2-0-2; 2-0-2]
- 398. Engineering Reports.—An engineering report is to be made in each term on an experiment conducted in the Electrical Engineering Laboratories. These reports are to be comprehensive and will be judged on technical content and presentation. Details are available in the General Office of the Department.
- 438. Building Services (Electrical).—Principles of electrical services and illumination of buildings. For students in Architecture. [0-0-0; 3-0-0]
- 451. Electrical Circuits and Apparatus. D.C. and A.C. circuits and machinery; theory and application of electronic devices. [2-2\*-2\*; 2-2\*-2\*]
- 453. Electronic Control Instrumentation.—Application of electronic devices to systems controlling industrial processes. Input transducers; processing analogue, digital or statistical inputs; display devices and control of machinery. (Not offered in 1969-70).

  [2-0-2\*; 2-0-2\*]
- 455. Communication Systems.—Formulation of the communication problem, signal characterization, transformation of signals by systems; detection and estimation of signals in noise, performance calculations and optimization of amplitude, angle, and pulse modulation systems, signal multiplexing.

  [2-0-2\*; 2-0-2\*]
- 463. Power Systems.—Components of electrical power systems, generators, transformers, transmission lines, converters and inverters. System performance. [2-0-2\*; 2-0-2\*]
  - 465. Applied Electronics.—The theory and application of electronic devices.

    [2-2-1; 2-2-1]
- 467. Control Systems.—Linear feedback systems. Relationships between parameters and system responses. Stability, graphical methods of analysis, compensation networks. State variables. Stability of linear and non-linear systems by state variable techniques. Application of variational calculus and dynamic programming to systems optimization.

  [2-0-2\*; 2-0-2\*]
- 469. Microwave Engineering.—Theory of transmission lines and wave guides, resonators, periodic structures, passive and active microwave devices, antennas and applications. [2-0-2\*; 2-0-2\*]
- 471. Electromechanical Energy Conversion.—Electro-mechanical conversion of energy through the medium of electric and magnetic fields; the relationships between forces, voltages and energy in linear transducers; analysis by the methods of classical dynamics; derivation of the electro-mechanical differential equations of the generalized machine using the equations of dynamics and electromagnetic theory; applications to specific classes of machines; development of equivalent circuits and transfer functions for use in system studies.

  [2-3\*-2\*; 2-3\*-2\*]
  - 473. Systems Laboratory.—Experiments on integrated engineering systems.
    [0-6-0; 0-6-0]
- 475. Electronic Systems.—Examples in the solution of electronic systems design problems in all phases from general layout to the design of individual circuits. Examples will be chosen from the field of real-time digital systems, modulation systems, etc. [2-0-2\*; 2-0-2\*]

- 477. Solid State Devices.—Semiconductors, metal conductor contacts, inte-[2-0-2\*; 2-0-2\*] grated circuitry, magnetic and dielectric devices.
- 479. Microwave and Quantum Electronics.—Beam-wave interaction, travelling-wave tubes, klystrons, crossed-field devices, magnetrons; tunnel-diode amplification, parametric amplification; masers and lasers. [2-0-2\*; 2-0-2\*]
- 481. Introduction to Direct Energy Conversion.—Photovoltaic and solar cells, thermoelectric effects and applications, thermionic converters, fuel cells, [2-0-2\*; 2-0-2\*] magneto-plasmadynamic generation and propulsion.
- 483. Radiation and Propagation.—Physical principles of radiation, directive radiation, antenna systems for the various frequency ranges, wave propagation, ionospheric and tropospheric propagation; diffraction of radio waves.

[2-0-2\*; 2-0-2\*]

- 485. Computer Methods in System Design.—Analogue and hybrid simulation techniques. Minimization of cost functions with and without constraints. Sequential and gradient search methods. Applications to communications, con-[2-0-2\*; 2-0-2\*] trol, power and electronic systems design.
- 490. Topics in Electrical Engineering.—Lectures on subjects of current [2-0-2\*; 2-0-2\*] interest by Visiting Lecturers.
  - 498. Engineering Reports.—See E.E. 398.

#### Courses for Graduate Students

# Electrical Engineering-Ph.D. and M.A.Sc. degrees

Prerequisites—Graduation in Electrical Engineering, Engineering Physics, Honours Physics and Honours Math-Physics. Students, particularly those in the Honours courses, may be required to supplement their graduate studies by taking certain undergraduate courses in Electrical Engineering.

Facilities are provided for research in: automata, computers, and switching theory; bio-electronics; communication theory and signal processing; control systems; lasers and quantum electronics; microwaves and plasmas; network theory; nonlinear systems; power systems and electrical machines; radio astronomy instrumentation; solid-state electronics and thin films.

## Ph.D. Degree:

Course—Includes a thesis and 18 units of approved courses. For those holding a Master's degree or transferring from a Master's programme appropriate credit will be given for courses completed,

M.A.Sc. Degree for Graduates in Electrical Engineering and Engineering Physics:

Course—Includes a thesis and 12 units of approved courses, 6 units of which must be taken at the graduate level within the Department and 3 units in other Departments.

M.A.Sc. Degree for Graduates in Honours Physics or Honours Math-Physics:

Course-Includes a thesis and at least 12 units of approved courses, 6 units of which must be taken at the graduate level within the Department; additional course requirements will depend on the student's academic qualifications.

Students should consult the Department for information regarding courses to be offered in the current year.

551. (2) Applied Electromagnetic Theory.—Basic relations, concepts and theorems; Green's functions; transverse electromagnetic waves; transmission lines, cylindrical and surface waveguides; problems involving plane-wave, cylindrical-wave and spherical-wave functions; perturbational and variational techniques and applications; radiation.

- 553. (2) Electric Power Systems.—Matrix and network theory, power flow, stability, computer studies of power systems, power system parameters.
- 555. (1) Computational Techniques in Systems Optimization and Identification.—Gradient methods, gradient acceleration methods, dynamic optimization methods and their application to system engineering problems. Identification of system parameters by numerical techniques and special purpose on-line computers. Identification of the state of a system by adaptive parameter tracking models and by Kalman filtering methods.
- 557. (2) Non-linear Systems.—Analytical and graphical techniques applied to non-linear and time-varying systems. Stability via Liapunov's Direct Method. Applications to engineering problems.
- 559. (1) Electronic Instrumentation.—Theory and design of pulse circuits for generating, amplifying and measuring non-sinusoidal wave forms; applications in communication, instrumentation and control. Textbook: Millman and Taub, Pulse and Digital Circuits.
- 561. (2) Network Theory.—Analysis and synthesis of linear electrical networks.
- 563. (2) Theory of Automatic Control.—Linear feedback systems. Synthesis of optimum time-invariant linear systems. Theory of optimal control of linear and non-linear systems based on the principle of optimality and the calculus of variations.
- 565. (2) Communication Theory.—Axiomatic formulation of probability theory, random variables and functions of random variables, random processes; correlation functions and power density spectra, sampling theory, central limit theorem. Karhunen-Loéve expansion, transmission of signals through linear and non-linear systems, optimum systems; introduction to coding theory and to the statistical theory of signal detection. An introduction to the statistical theory of communication; correlation methods for the detection of signals in noise; optimization of linear systems.
- 567. (1) Analogue Computers. The electronic and electromechanical components used in analogue computation. Specialized circuitry and methods for function generation, multiplication and the solution of trigonometric problems. Various types of analogue computers and their applications in communications and control systems. Network analogues.
- 569. (2) Logic Design.—Representation of logical functions, simplification methods, and realizations using logic modules, multivalued logics, number systems, synchronous sequential machines, state minimization, machine decomposition, elementary automata studies.
  - 571. (1-2) Electrical Engineering Seminar and Special Problems.
- 573. (1) Synchronous Machine Dynamics.—State variable equations of synchronous machine and controllers, stability of linearized system, eigensystem sensitivity analysis and application of optimal control, nonlinear power system stability, synchronization and other synchronous machine problems.
- 575. (1) Signal Processing.—Representation of signals and noise; the detection of signals in noise, matched filter design, correlation methods; general linear, nonlinear and logical signal processing techniques; sampled-data systems and digital filtering; optical signal processing; signal-processing arrays; optimum signal design for radar and sonar; applications in communications, instrumentation and detection systems.

- 577. (2) Matrix Analysis of Electrical Machines.—Tensor concepts applied to electrical engineering problems; the theory of generalized machines; coordinate transformations for various reference frames; the analysis of power and control machines; the synchronous machine and power system problems.
- 579. (1) Solid-State Electronics.—Theory and measurement of simplifying properties and noise performance of parametric amplifiers, tunnel diodes, masers, lasers and other solid-state devices of current interest.
- 581. (2) Electrodynamics.—Field tensors; Maxwell's equations and relativity theory; electron ballistics using Lagrangian and Hamiltonian mechanics; space-charge waves in electron beams; Cherenkov radiation.
- 583. (2) Microwave Measurements and Techniques.—Theory and techniques for the measurement of wavelength and frequency, impedance, attenuation, Q-factor, power, receiver and transmitter characteristics, antenna characteristics and properties of materials.
- 585. (2) Antennas and Radio Propagation.—Elementary dipole and loop antennas. Parabolic and other reflectors. Antenna arrays. Interferometer techniques. Noise temperature of antennas. Propagation of radio waves. Applications to broadcasting, microwave links, satellite communications, and radio astronomy.
- 587. (2) Thin Film and Solid-State Electronic Devices.—Theory of electronic states and conductivity in semiconductors. Defects in crystals and ionic transport processes. Technique of thin films. Fabrication and theory of operation of various solid state devices. Integrated and thin film circuitry.
- 589. (2) Man-machine Communication.—Information channel and the source-receiver encoder; fidelity measures of a communication system; characteristics of the human operator, mechanical properties of the ear, basic correlates of the auditory stimulus and the visual stimulus; models of visual and auditory perception; data processing using optical methods; holography and the human operator.
- 591. (2) Engineering Applications of Analogue and Hybrid Computers.— Programming of system equations, time and amplitude scaling, optimization techniques, partial differential equations, application to the study of control systems.
- 593. (1) Instrumentation for Radio-Astronomy.—Dish antennas and antenna arrays. Interferometers. Aperture synthesis and supersynthesis. Low-noise preamplifiers. Multi-channel receivers. Smoothing and data reduction. This course complements Physics 570, which deals with observations and theories resulting from radio-astronomical work.
- 595. (2) Digital Systems Engineering.—The design of systems to perform data acquisition, display, and control. The role of a programmable component in modern digital systems. The interplay between hardware and software in digital system design. Implementation of digital systems using discrete and integrated components. Detailed analysis of representative pulse circuit speed considerations, worst case design, device limitations, noise factors, etc. Elementary real-time programming.
  - 599. Thesis.—For M.A.Sc. degree.
  - 699. Thesis.—For Ph.D. degree.

#### English

150. Composition.—The work consists of (1) essays, class exercises, and (2) written examinations. Students will be required to make a passing mark in each. [2-0-0; 2-0-0]

305. Literature of Ideas.—Selected readings in great writers of the past and present. For a full description of the course students should apply to their faculty office.

[1-0-1; 1-0-1]

For descriptions of other courses in English, see the Faculty of Arts calendar,

## Food Science

301. (1½) Food Chemistry.—Constituents of food and their properties including carbohydrates, proteins, lipids, pigments, flavours and vitamins. [2-2-0: 0-0-01]

#### Geology

- 150. Earth Science for Engineers.—Principles and techniques of geology applied to engineering with special emphasis on earth materials and processes. For engineering and forestry students only. Text: Arthur Holmes, *Principles of Physical Geology*, Revised Edition. Mr. Kucera. [2-2\*-0; 2-2\*-0]
- 204. (3) Introduction to Stratigraphy and Structural Geology.—General principles of stratigraphy and descriptive structural geology. Texts: Dunbar and Rodgers, *Principles of Stratigraphy*, Hills, *Elements of Structural Geology*. Perequisite: Geology 105 or 150, Geology 300 or 210 concurrently. Mr. Barnes and Mr. Ross. [2-3-0; 2-3-0]
- 210. (3) Mineralogy.—Fundamentals of Crystal Chemistry as applied to minerals. Introduction to crystallography; physical and chemical properties of minerals; determinative mineralogy; mineral relationships. Text: Berry and Mason, Mineralogy or Dennen, Principles of Mineralogy. Prerequisite: Geology 105; Chemistry 103, 110 or 120; Physics 110, 120 or 130; Mathematics 120 to precede or accompany. Mr. Gower and Mr. Meagher. [2-3-0; 2-3-0]
- 254. (1½) Introduction to Structural Geology.—This course is the second term of Geology 204. Text: Hills, Elements of Structural Geology. Mr. Ross. [0-0-0; 2-3-0]
- 300. (1½) Introduction to Mineralogy. Methods of identification of minerals; the common rock-forming and ore minerals. Intended for General Course and Education students. Text: Dana, Manual of Mineralogy, 17th edition. Prerequisite: Geology 150 or 105. Mr. Warren. [2-2-0; 0-0-0]
- 306. (3) Palaeontology.—Invertebrate, vertebrate and plant fossils, their classification, identification and evolutionary development. Text: Beerbower, Search for the Past 2nd Edit. Prentice Hall. Prerequisite: Geology 150 or 105. Mr. Best. [2-2-0; 2-2-0]
- 309. (1) Hydrogeology.—Physics of fluid flow in a saturated, permeable medium; geology of ground water, pore pressure, salt water intrusion, conservation of ground water. Text: Todd, Ground Water Hydrology. Mr. Mathews. [2-0-0; 0-0-0]
- 311. (1) Natural Gas and Petroleum Geology.—Chemistry of natural gas and petroleum; source and reservoir rocks; tools and techniques used in exploration and exploitation; petroleum and natural gas traps; economics in the petroleum industry; frontiers of petroleum exploration in Canada. Prerequisite: Geology 309. Mr. Murray.

  [0-0-0; 2-0-0]
- 317. (1½) Petrology.—The common rocks, their minerals and the processes that formed them. Text: Huang, *Petrology*. Prerequisite: Geology 300 or 210 and 204 to precede or accompany. [0-0-0; 2-2-0]

- 320. (3) Optical Mineralogy and Petrology.—Theory and use of the polarizing microscope; nature and origin of the common igneous, sedimentary and metamorphic rocks illustrated by hand-specimens and thin-sections in the laboratory. Texts: Williams, Turner and Gilbert, Petrography; Kerr, Optical Mineralogy. Prerequisites: Geology 210 or 300 to precede or accompany. Mr. Greenwood.

  [2-2-0; 2-2-0]
- 404. (1½) Structural Geology.—Studies of natural deformation using advanced techniques. Text: Hills, *Elements of Structural Geology*. Prerequisites: Geology 204 and 320. Mr. Ross. [2-2-0; 0-0-0]
- 407. (3) Petrology.—The descriptive and interpretive study of igneous and metamorphic rocks. Text: Williams, Turner and Gilbert, Petrography. Prerequisites: Geology 320. Mr. McTaggart. [2-3-0; 2-3-0]
- 408. (3) Mineral Deposits.—Manner of occurrence, genesis, structure and distribution of the principal metallic and some non-metallic mineral deposits, with type illustrations. Text: Park and MacDairmid, Ore Deposits, 1964, Freeman. Prerequisite: Geology 204; 317 or 320 must precede or accompany. Mr. White.

  [3-0-0; 3-0-0]
- 409. (2) Mineralography.—Study and recognition of the opaque minerals by the reflecting microscope. Texts: Uytenbogaardt, Tables for microscopic identification of ore minerals, Hafner. Edwards, Textures of the Ore Minerals. Prerequisite: Geology 408 must precede or accompany this course. Mr. Sinclair. [1-3-0; 0-4-0]
- 410. (1½) Field Geology.—Methods of observing, recording, and correlating geological facts in the field. Prerequisites: Geology 204, 210, and 317 or 320. Two hours a week in the second term and three weeks in the field at the close of examinations in the spring of the junior year. Limited to Honours and Engineering students. A fee of \$60 is payable in January. The fee covers room, board, and instruction at the Field School for 3 weeks. Transportation to and from camp and liability insurance is the responsibility of the students. Mr. Best.
- 412. (3) Geomorphology.—For advanced students in geography and geology; a study of the processes, principles, and laws of land formation, types of land forms, and their distribution. Text: Holmes, *Principles of Physical Geology*, 1965. Prerequisite: Geology 204. Mr. Mathews. [2-2-0; 2-2-0]
- 419. (1½) Stratigraphy and Sedimentation.—Description and interpretation of ancient and modern sediments. Text: Krumbein and Sloss; Stratigraphy and Sedimentation. Prerequisites: Geology 204, 306 and 320. Mr. Barnes.

  [0-0-0: 2-2-01]

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499. Thesis.—For B.A.Sc. degree.—Topic to be approved by the Department. [0-3-0; 0-3-0]

Courses for Graduate Students

599. Thesis.—For M.A.Sc. degree.

699. Thesis.—For Ph.D. degree.

For descriptions of other courses in Geology, see the Faculty of Science calendar.

# Geophysics

301. Waves and Seismology.—Ray theory of optics and seismology; interference, diffraction and polarization of sound and light waves. Examples will

be directed towards geophysical applications. Prerequisite: Physics 200 or equivalent, Mathematics 300 or equivalent (concurrently). (Credit will not be given both for this course and Physics 308.)

[3-0-2\*; 3-0-2\*]

302. (3) General Geophysics.—Solar system; geochronology and isotope geophysics; seismology; gravity and figure of the earth; heat flow; geomagnetism and aeronomy; continental drift. Prerequisites: Geophysics 201 or Physics 200 or equivalent. Mathematics 300 or equivalent (concurrently).

[3-0-2\*; 3-0-2\*]

- 400. (2) Applied Geophysics.—Instrumentation, application and limitations of the gravity magnetic, electrical and electromagnetic methods. Integration of the corresponding measurements with geological evidence. Prerequisite: Physics 200 or equivalent. [2-3-0; 0-3-0]
- **402.** Applied Geophysics Laboratory.—Any two of Geophysics 403, 404, 405, 406 must be taken concurrently. [0-3-0; 0-3-0]
- 403. Geochronology.—A description of age determination techniques, and the application of these techniques to geological problems. [0-0-0; 2-0-0]
- 404. (1) Geophysical Analysis.—The application of numerical methods of analysis to geophysical interpretation. Both time-domain and frequency-domain analysis will be used. Techniques discussed will include optimum and inverse filtering, power spectral analysis and correlation methods. Examples will include synthetic seismograms, and grid spacing requirements for gravity and magnetic surveys. Prerequisite: Mathematics 410 (may be taken concurrently), Physics 300.

  [0-0-0; 2-0-0]
- 405. (1) Potential Field Theory.—The quantitative interpretation, by scalar potential methods, of gravity, magnetic and electric methods of exploration. The development from Maxwell's equations of the theory of electromagnetic prospecting methods. Recommended reference: Grant and West, Interpretation Theory in Applied Geophysics. Prerequisites: Physics 300 (or equivalent), Mathematics 300 (or equivalent). [2-0-0; 0-0-0]
- 406. (1) Instrumentation.—Seismic detectors and needle magnetometers as examples of electromagnetic systems. Modulators using vibrating condensers and saturated magnetic cores, with special reference to the vibrating reed electrometer and the fluxgage magnetometer. Calibration techniques for these and other instruments. Prerequisites: Physics 300 (or equivalent), Mathematics 300 (or equivalents). [2-0-0; 0-0-0]
  - 599. (3-6) Thesis.—For M.A.Sc. degree.

For description of other courses in Geophysics see the Faculty of Science calendar.

#### Mathematics

- 151. Linear Algebra.—Vectors and matrices; dot and cross product; eigenvalues and eigenvectors; complex numbers. [3-0-0; 0-0-0]
- 155. Calculus.—Partial derivatives; multiple integrals; polar, spherical and cylindrical coordinates; improper integrals; indeterminate forms; series.

  [3-0-0; 3-0-0]
- 156. Vector Calculus.—Differentiation and integration of vector valued functions; gradient, divergence and curl; line and surface integrals; Gauss, Green and Stokes theorems. [0-0-0; 3-0-0]
- 250. Vector Analysis and Differential Equations.—Vector differentiation; divergence and Stokes' theorems; an introduction to ordinary differential equations.

  [3-0-0; 3-0-0]
- 251. Elementary Statistics.—Probability distributions; testing statistical hypotheses; estimation; analysis of variance. [2-0-0; 2-0-0]

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- 350. Applied Calculus and Differential Equations.—Fourier series; ordinary and partial differential equations; Laplace transforms; matrices and matrix methods; finite differences; Bessel functions; orthogonality. Prerequisite: Mathematics 250. [3-0-0: 3-0-0]
- 357. Industrial Statistics and Linear Programming.—Quality control; ac-[0-0-0; 2-0-0] ceptance sampling; analysis of variance; linear programming.
- 360. Real Variable.—Uniform convergence; orthogonal functions; Fourier series; ordinary differential equations; special functions. [2-0-0; 2-0-0]
- 362. Linear Algebra.—Vector spaces; linear transformations and matrices; quadratic forms; characteristic values and vestors; canonical forms. T2-0-0: 2-0-01
- 364. Complex Variable.-Elementary functions; integration; Cauchy's theorem and formulas; Taylor and Laurent series; residues; conformal mapping; Laplace transforms. [2-0-0; 2-0-0]
- 450. Analysis.—Complex variables; numerical methods; partial differential [3-0-0; 3-0-0] equations.
- 452. Theory and Applications of Differential Equations.—Introduction to partial differential equations and boundary value problems. [3-0-0; 3-0-0]

For descriptions of other courses in Mathematics, see the Faculty of Science calendar.

# Mechanical Engineering

# Sample Fourth-Year Course Progammes

Listed below as a guide to students are four typical fourth year programmes.

## A Solid Mechanics Core Courses

Gore Courses	1, 5, 0, 1, 5, 0
Math 450 Analysis	3, 0, 0; 3, 0, 0
Met 470 Structure of Metals	2, 0, 0; 2, 0, 0
ME 467 Advanced Dynamics	0, 0, 0; 2, 0, 1
ME 468 Mechanics of Materials II	0, 0, 0; 3, 0, 1
ME 469 Optical Engineering	3, 1, 0; 0, 0, 0
WIL 403 Optical Engineering	3, 1, 0, 0, 0, 0
B Thermodynamics	
Core Courses	7, 3, 6; 7, 3, 6
EE 465 Applied Electronics	2, 2, 1; 2, 2, 1
Math 450 Analysis	3, 0, 0; 3, 0, 0
Phys 472 Modern Physics	2, 0, 0; 2, 0, 0
ME 478 Thermodynamics II	0, 0, 0; 2, 0, 1
ME 484 Dynamics of Real Fluids	2, 0, 1; 0, 0, 0
C Aerodynamics	
Core Courses	7, 3, 6; 7, 3, 6
Math 450 Analysis	3, 0, 0; 3, 0, 0
ME 467 Advanced Dynamics	0, 0, 0, 0, 0, 0
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ME 478 Thermodynamics II 0, 0, 0; 2, 0, 1	
ME 481 Aerodynamics 3, 1*, 2*; 3, 1*,	2
ME 484 Dynamics of Real Fluids 2, 0, 1; 0, 0, 0	

# D Power and Industrial Engineering

Core Courses	7, 3, 6; 7, 3, 6
C.S. 350 Programming of Num. Algorithms	2, 0, 1; 0, 0, 0
Math 357 Statistics and Programming	2, 0, 0; 0, 0, 0

ME 458 Industrial Engineering	2, 0, 1; 2, 0, 1
ME 473 Thermal Processes	3, 0, 1; 0, 0, 0
ME 479 Thermal Power	0, 0, 0; 3, 0, 1
ME 491 Industrial Management	2, 0, 1; 2, 0, 1

## Mechanical Engineering

- 154. Mechanical Drawing and Graphics.—Pencil and ink work in orthographic drawing, lettering, technical sketching, graphical presentation of data, processes for reproducing data. (For B.S.F. students only.) [0-0-3; 0-0-3]
- 252. Graphics in Analysis and Design.—Technical sketching and instrument drawing, analysis and presentation of engineering data, using rectilinear, log and semi-log graphs, graphic integration and differentiation, phase plane plot, and simple nomograms. Graphic problems in kinematics. This course is taken at the end of second year Applied Science by those students intending to enter third year Mechanical Engineering in the fall. The course follows the spring examinations and runs for twelve days (two weeks), eight hours per day.
- 358. Machine Tool Laboratory.—A course designed to introduce the technology of modern workshop practice and manufacturing methods touching material forming, programmed machining and metrology. [0-3\*-0; 0-3\*-0]
- 363. Mechanics of Materials I.—Properties of materials; analysis of stress; combined stresses and theories of strength; analysis of strain; strain measurement; fatigue and stress concentration; curved bars; inelastic bending; beam deflections; elastic energy; method of virtual work; Castigliano's theorem; theorem of least work; statically indeterminate structures; rings; frames; shear distribution in bending; shear centre; St. Venant's torsion equations; torsion of non-circular sections; tubes and structural sections; elastic instability.

  [0-0-0; 3-0-1]
- 364. Design Seminar.—An introduction to methods of synthesis and design, with participation by most members of the department, in which students carry a series of design projects of varied type to the preliminary design stage.

  [0-0-3; 0-0-3]
- 365. Dynamics I.—Review of rigid body kinematics; extension to 3 dimensions; moving coordinate systems; review of rigid body kinetics; extension to 3 dimensions; Euler's equations, applications to kinematics and kinetics of mechanisms and machines; introduction to synthesis of motion.

[3-0-2\*; 0-0-0]

- 367. Applied Mechanics.—Two dimensional elasticity; theories of failure; fracture; fatigue; introduction to plasticity and rheology. [2-0-3; 0-0-0]
- 372. Instrumentation and Measurement Laboratory.—Methods of measurement; calibration and use of instruments; tests of machines and principles covered in the lecture courses. [0-4-0; 0-4-0]
- 378. Thermodynamics I.—Basic laws of thermodynamics, microscopic and macroscopic point of view. Applications to engines, refrigerators, direct energy conversion devices; thermal properties of matter. [3-0-1; 0-0-0]
- 384. Fluid Dynamics.—Continuity and Euler's equations; introduction to potential flow theory; viscous effects; boundary layer theory for incompressible flow; free and wall turbulence; scaling for model testing; fan laws; rotor and blade element theory; compressible flow theory; normal and oblique shock waves.

  [0-0-0; 3-0-1]

- 391. Industrial Systems.—A course designed to indicate the nature and range of analytical tools available for coordinating and controlling industrial operations involving technological and economic factors. [2-0-0; 2-0-0]
- 398. Engineering Report.—Copies of specifications are issued by the Department near the end of the Spring Term. An outline is to be submitted before or on registration day. The report is due in mid-October.
- 437. Building Services (Mechanical).—Physics of temperature control of buildings; basic systems of heating and air conditioning; sanitation problems, water supply and distribution in buildings; elevators and other mechanical equipment. (For students in Architecture only.) Textbook: Kinzey and Sharp, Environmental Technologies in Architecture. Mr. Slinn. [3-0-0; 0-0-0]
- 458. Industrial Engineering.—A course designed to cover organisational and technical matters of factory planning and operation with special reference to personnel and technology. [2-0-1; 2-0-1]
- 463. Mechanical Design.—Design analysis of plates; thin shells; thick cylinders; rotating discs and cylinders; mechanical springs; fasteners; plain and rolling bearings; spur gears; helical worm and bevel gears; clutches, brakes and couplings; flexible mechanical elements; hydraulic power transmission.

  [2-0-3; 2-0-3]
- 465. Dynamics II.—Mathematical formulation of a dynamical system; introduction to relativistic mechanics; introduction to space dynamics; mechanical vibration analysis; introduction to non-linear systems [3-0-1; 0-0-0]
- 466. Automatic Control.—Process and system characteristics; transient response; the closed loop; block diagrams and transfer functions; control actions; stability; frequency response; Nyquist diagrams; Bode diagrams; Nichols charts; root locus methods; system compensation; industrial and scientific applications.

  [0-0-0; 3-0-1]
- 467. Advanced Dynamics.—Advanced topics in vibration analysis, self excited oscillations, satellite librations, theory of stability, analysis of non-linear systems.

  [0-0-0; 2-0-1]
- 468. Mechanics of Materials II.—The equations of elasticity: equilibrium, compatibility, Hooke's law, St. Venant's Principle. Plane stress and plane strain, stress functions, bending of plates, some solutions of the biharmonic equation. Elastic wave propagation, waves of dilation and distortion, surface waves, waves in rods and beams, dispersion and group velocity, Timoshenko beam equation. Viscous, viscoelastic and plastic behaviour of materials, collapse of plastic structures, plastic drawing and extrusion. [0-0-0; 3-0-1]
- 469. Optical Engineering.—A course introducing basic optical principles which find application in experimental stress analysis, metrology and optical-electro-mechanical control of machines and systems. Photoelasticity, moire and diffraction theory, classical interferometry and holography will be covered as applied topics.

  [3-1-0; 0-0-0]
- 472. Project and Design Laboratory.—Experimental work on projects selected to give research, development, and design experience. [0-3-0; 0-3-0]
- 473. Thermal Processes.—Properties of gas-vapor mixtures; psychrometric calculations and charts; air conditioning. Gas and vapor refrigerating systems and variations; gas liquefaction. Combustion processes and products. Theory and use of Gas Tables and Combustion Products Tables.

[3-0-1; 0-0-0]

476. Heat and Mass Transfer.—Steady state and transient heat conduction through solids. Forced convection heat transfer. Combined free and forced

convection. Heat transfer in boiling and condensing fluids. Heat exchanger design. Heat transfer by radiation between surfaces and gases. Mass transfer. Combined heat and mass transfer. [2-0-1; 2-0-1]

- 478. Thermodynamics II.—Statistical approach to thermodynamics. Applications to combustion processes. Solid state energy conversion devices, properties of matter at high temperatures. [0-0-0; 2-0-1]
- 479. Thermal Power.—Theoretical and real combustion engine and turbine cycles and variations; two and four-stroke engines; free piston compressors and gasifiers. Theoretical and real vapor power cycles and variations; binary vapor and gas-vapor cycles. Total energy systems with gas or vapor cycles. 10-0-0; 3-0-11
- 481. Aerodynamics.—Potential flows; complex variable methods; thin airfoils; finite wings; high speed airfoils and wings; supersonic and hypersonic flow; rarefield gas dynamics; unsteady aerodynamics, performance and stability; experimental work in the low speed wind tunnel. [3-1\*-2\*; 3-1\*-2\*]
- 484. Dynamics of Real Fluids.—Introduction to Cartesian tensor notation; the Navier Stokes equation and approximate forms of these equations; Prandtl's, Euler's and creeping flow equations with application; laminar compressible flow in boundary layers; introduction to stability theory; Reynolds' turbulent flow equations and applications to turbulent shear flow analysis.

  [2-0-1; 0-0-0]
- **491.** Industrial Management.—Principles of engineering economics, structure of business enterprise, principles of management, industrial engineering techniques, management and labour. [2-0-1; 2-0-1]
- 492. Engineering Economics.—Costs, simple and compound interest; retirement of debt; present values; depreciation; economic comparison. Textbook: Grant and Ireson, *Principles of Engineering Economy*, 4th edition.

  [2-0-0; 0-0-01]
- 498. Engineering Report.—Copies of specifications are issued by the Department near the end of Spring Term. An outline is to be submitted before or on registration day. The report is due in mid-October.

#### Courses for Graduate Students

M.A.Sc. Degree:

Prerequisites — Graduation in Mechanical Engineering or Engineering Physics.

Course — Includes at least 6 units chosen from graduate courses in the Department, and other approved courses.

#### Ph.D. degree:

Facilities are provided for research and study in the field of Mechanical Engineering with concentration in the following areas:

- (a) Applied Mechanics.
- (b) Aerodynamics, Aeroelasticity and Space Dynamics.
- (c) Fluid Mechanics and Heat Transfer.

Students should consult the department for courses to be offered in the 1969-70 session since not all courses will be available.

550. Special Advanced Courses.—Special advanced courses may be arranged for a graduate student upon the approval of the Head of the Department. The credit will not be more than 3 units in any one such course.

- 558. (2) Engineering Applications of Statistical Distribution Theory.—The classical theory of the exponential, Gamma, Weibull, and type I extreme value distributions. Estimation techniques and applications to engineering problems.
- 560. (3) Experimental Stress Analysis.—Review of stress-strain formulations and techniques for solving equations of elasticity, computer and numerical methods, physical methods, brittle lacquer techniques, grid and moiré methods, two dimensional photoelasticity, photoelastic coatings, three dimensional methods, point-wise strain and displacement measurement techniques, rosette calculations, recording instruments. Laboratory.
- 561. (3) Applied Elasticity.—Analysis of stress and strain in three dimensions; plane stress and plane strain; photoelasticity; torsion; energy methods of stress analysis; bending and buckling of rods; bending of plates; stresses in thin shells. Textbook: Wang, Applied Elasticity.
- 562. (1) Introduction to Continuum Mechanics.—Cartesian tensors, transformation and invariants of stress and strain, equations of motion and equilibrium, boundary conditions, constitutive equations for elastic, viscous and viscoelastic substances, plastic yield conditions and associated flow rules.
- 563. (2) Tribology.—Physical properties of lubricants; basic hydro-dynamic theory applicable to lubrication problems; plane sliding bearings; journal bearings subjected to steady and dynamic loads; theory of rolling bearings; boundary lubrication; mechanism of metallic friction; the nature of metallic
- 564. (3) Space Dynamics I.—Dynamics of systems with variable mass; introduction to relativistic mechanics; rectilinear motion of a rocket; ascent to the moon; orbital mechanics; transfer of orbit; estimation of life time; gyrodynamics; theory of stabilized platforms; inertial guidance; performance and stability of space vehicles.
- 565. (2) Linear Mechanical Vibrations.—Single degree of freedom systems with periodic and non-periodic excitation; spectrum analysis and integral transform methods. Multiple degree of freedom systems; energy methods; Lagrange's equations; normal mode theory; matrix iteration methods. Vibration of elastic systems; introduction to vibration of plates and shells with Rayleigh and Rayleigh-Ritz approximations. Self-induced oscillations; electrical analogies; mechanical impedance and mobility; random vibrations; vibrations; vibration measuring instruments and systems.
- 566. (2) Dynamics of Automatic Control.—Linear servo-systems; transient and steady state behaviours; frequency response; the root locus method; lag correction and stabilization; multiple loop systems; synthesis; non-linear control.
- 567. (1) Nonlinear Elasticity.—Fundamentals of tensor calculus, covariant differentiation of tensors of general order, applications to continuum mechanics. Stress and strain tensors, equations of motion for elastic materials and viscous fluids in general curvilinear coordinate systems. Solution of some special problems in finite elasticity. Prerequisite: M.E. 562.
- 568. (1) Theory of Plasticity.—Selected problems in the theory of plasticity, thick walled cylinders and spheres, torsion, slip-line fields, indentation, drawing and extrusion. Prerequisite: M.E. 562.
- 569. (2) Non-Linear Vibration. Phase plane representation, singular points, exact solutions, equivalent linearization, perturbation method, averaging method, variation of parameters, forced vibration, self-excited vibration.
- 570. (3) Space Dynamics II.—Dynamics of single and multistage rocket, optimization of rocket performance, geometry of spatial orbit, orbit determination using Gauss, Laplace, and Gibbs method, orbit perturbations and

Hansen's method, optimum orbital transfer and rendezvous, active and passive stabilization of space vehicle, introduction to three body problem.

- 571. (3) Advanced Thermodynamics.—A brief review of classical thermodynamics, with an introduction to chemical thermodynamics and equilibrium. Elements of non-equilibrium thermodynamics, entropy generation and the Onsager relations. Elementary gas kinetics and the Boltzmann equation. Introduction to classical statistical mechanics, equipartition and ensembles. Effects of quantization and quantum statistical methods. Discussion of simple examples and engineering applications.
- 572. (3) Convection Heat Transfer.—Governing equations for laminar and turbulent flow. Forced convection in internal and external flow. Free and combined free and forced convection. Heat transfer at high velocities, in rarefied gases and in two-phase flow. Heat exchangers. Mass transfer.
- 573. (1½) Radiation Heat Transfer.—Monochromatic and goniometric surface properties. Energy exchange of grey, non-grey, diffuse, directional or specular surfaces. Absorption coefficient and radiation intensity in gas radiation. Radiation between a gas and its enclosure. Radiation of luminous flames.
- 574. (1½) Conduction Heat Transfer.—Two and three dimensional steady and unsteady heat transfer. Analytical methods. Relaxation, graphical and analogue methods. Conduction with heat sources and sinks. Heat transfer with variable thermal conductivity. Contact resistance. Moving boundaries. Extended surfaces, their applications and optimization. Experimental methods for determination of thermal conductivity of solids, liquids, and gases.
- 575. (3) Advanced Topics in Momentum, Heat and Mass Transfer.—Special topics in laminar boundary layer theory; arbitrary wall flux. The method of Lighthill; free convection; non-zero wall velocity. Asymptotic expansions, inner and outer solutions. Jets and wakes. Condensation with non-zero interfacial shear. Boiling. Non-Newtonian boundary layer theory: examples.
- 581. (3) Theory of Ideal Fluids.—Topics selected from the kinematics and dynamics of inviscid incompressible fluids in steady and non-steady motion; two-dimensional and axisymmetric potential flows; applications of conformal mapping; Stokes stream function; free streamline flows; vortex motions; non-steady airfoil theory.
- 582. (3) Theory of Real Fluids.—Derivation of the momentum equation for general fluids; application to simple Newtonian fluids. Exact solutions. Creeping flow: Stokes', Oseen's and Hadamard's problems. Theory of differential equations containing a large parameter. Asymptotic and singular perturbation expansions. Higher order flows around sphere and cylinder. Laminar boundary layer theory: stretched coordinates, similarity solution, wedge flows. Goertler's and Von Mises' transformations. Asymptotic integrations, stationary points, method of steepest descent, divergent series. Approximate methods. Optimal coordinates. Elementary stability problems. Turbulent flows; Reynolds' equations. Theory of locally isotropic turbulence.
- 583. (3) High Speed Gas Dynamics.—Topics selected from the dynamics of a gas considered mainly as a non-heat-conducting inviscid continuum; acoustic small-disturbance equations; initial and boundary value problems of wave propagation; applications to airfoils and wings at high speed; conical flow; slender body theory; characteristics theory; hodograph methods; shock and blast waves; similarity methods; hypersonic flow theory.
- 584. (2) Mechanics of Rarefied Gases.—The flow of a rarefied gas in terms of kinetic theory. A review of classical statistical mechanics. Free molecule flow. The Boltzmann equation applied to non-equilibrium flows.

- 585. (3) Aeroelasticity.—Idealization of elastic systems; elastic axis; influence coefficients; coupled and uncoupled modes of vibration; unsteady aerodynamics; static aeroelastic phenomena; two dimensional and three dimensional flutter theory; solution of flutter stability determinant; buffeting and stall flutter; aspect ratio and compressibility effects; flutter model and testing technique.
- 586. (2) Turbulent Shear Flow.—The basic equations of fluid motion; introduction to hydrodynamic stability; Reynolds' equations; energy equations for turbulent motion; entrainment; intermittency; similarity near a solid boundary and in free turbulence; approximate methods for predicting the growth of turbulent boundary layers and free symmetrical shear flows.
- 587. (1½) Engineering Acoustics.—Acoustic terminology. Transmission, reflection, refraction, diffraction and absorption of sound. Waveforms and spectra, statistical theory and random processes. Noise of airodynamic origin. Industrial and domestic noise problems.
- 598. (1) Seminar.—Presentation and discussion of current topics in mechanical engineering research.
  - 599. Thesis.—For M.A.Sc. degree.
  - 699. Thesis.-For Ph.D. degree.

#### Metallurgy

- 350. Metallurgical Thermodynamics I.—Thermodynamic basis of metallurgical processes; phase rule, heat of reaction, free energy, activity, thermodynamic equilibria. [0-0-0; 2-0-0]
- 351. Laboratory Methods.—Application of chemical principles in pyrometallurgical and hydrometallurgical procedures. [0-3\*-0; 0-3\*-0]
- 352. Process Metallurgy I.—Introduction to metallurgy, application of chemical principles in unit processes employed in metallurgical operations; technology of base metal production.

  [2-0-0; 2-0-0]
- 353. Metallurgical Calculations I.—Stoichiometry, heat and material balances in metallurgical processes; problems in physical metallurgy.

  [0-0-2; 0-0-2]
- 370. Structure of Metals I.—Crystallography; X-rays and X-ray diffraction; imperfection; deformation behaviour; alloy theory; phase transformations; properties of metals and alloys. [3-0-0; 3-0-0]
- 371. Physical Metallurgy Laboratory I.—Metallographic technique; photography and analysis of microstructures of ferrous and non-ferrous alloys; studies of heat treatment; X-ray diffraction; deformation behaviour.

  [0-3\*-0: 0-3\*-01]
- 372. Physical Metallurgy.—Alloying of metals; structures, heat treatment and fabrication of ferrous materials. [0-0-0; 2-0-0]
- **374.** Physical Metallurgy I.—Crystallography; X-ray diffraction; crystal imperfections and deformation behaviour; alloy theory; diffusion and phase transformations; properties of metal and alloys. [2-3\*-0; 2-3\*-0]
- 378. Electron Theory of Solids.—Classical and quantum theories of the properties of solids; bonding; transport properties; semiconductors; ionic crystals; magnetic materials and superconductors. [1-0-0; 1-0-0]
- 380. Structure and Properties of Materials.—Strengthening mechanisms; composite materials; heat treatment and properties of steel and other alloys; metal failures; casting and mechanical working; nuclear metallurgy.

[3-0-0; 3-0-0]

- 382. Non-Metallic Materials I.—Classification of ceramics, structure of oxides and silicates; refractories, raw materials, manufacture, properties, use, specification and testing.

  [0-0-0; 2-3-0]
- 390. Seminar I.—Training and practice in public speaking and presentation of technical papers. [0-0-1; 0-0-1]
- 398. Engineering Report.—All students entering Third Year Metallurgy are required to prepare an engineering report. Detailed information on form, content and dates for submission of preliminary and final copies is available in the office of the Head of the Department of Metallurgy.
- 450. Metallurgical Thermodynamics II.—Thermodynamic equilibria in metal chemistry; phase rule applications; gas-solid, slag-metal, electrolytic, and electrode reactions. Introduction to metallurgical kinetics: reaction order, rate and diffusion control. [2-0-0; 2-0-0]
- 451. Metallurgy Laboratory.—Experiments and problems illustrating the principles and practice of extractive metallurgy. [0-3\*-0; 0-3\*-0]
- 452. Process Metallurgy II.—Application of chemical principles in unit processes employed in the production of metals. Economic and engineering aspects of process selection and plant operation. [2-0-0; 2-0-0]
- 453. Metallurgical Calculations II.—Problems on material and heat balances in metallurgical unit processes; plant design and quality control; problems in physical metallurgy. [0-0-3; 0-0-3]
- 455. Research Project.—Study of a selected problem in extractive or physical metallurgy, or ceramics. [0-6-0; 0-6-0]
- 456. Hydrometallurgy, Kinetics and Corrosion.—Electrode potentials; pH-potential diagrams; equilibria in aqueous solutions; theory of rate processes; corrosion; metal oxidation. [2-0-0; 2-0-0]
- 458. Physical Chemistry of Metal Surfaces.—Thermodynamics of surfaces and interfaces; wetting and contact angles; adhesion and bonding.

  [1-0-0; 1-0-0]
- 462. Thermodynamics of Metal Systems.—Phase rule and its applications to metal systems; thermochemistry of metals and alloys; irreversible thermodynamics. [2-0-0; 2-0-0]
- 470. Structure of Metals II.—Diffusion in Solids; nucleation and growth reactions, diffusionless transformations applications of X-ray diffraction to Physical Metallurgy; dislocation theory; plastic deformation. [2-0-0; 2-0-0]
- 471. Physical Metallurgy Laboratory II.—Electron mocroscopy; zone-refining; X-ray diffraction; dilatometry; other physical metallurgical techniques. [0-3\*-0; 0-3\*-0]
- 472. Physical Metallurgy II.—Lectures and laboratory exercises, primarily for students in the Fourth Year of Engineering Physics. Diffusion in solids; nucleation and growth reactions; diffusionless transformations; applications of X-ray diffraction to physical metallurgy; dislocation theory; plastic deformation and recovery mechanisms. [2-3\*-0; 2-3\*-0]
- 474. Metal Fabrication I.—Mechanical and metallurgical principles of primary and secondary metal fabricating processes including casting, welding, powder metallurgy, and a variety of forming methods; residual stresses.

  [2-0-0; 2-0-0]
- 480. Fracture.—Ductile and brittle fracture; creep, fatigue; stress corrosion; behaviour of composites; service failures of components and structures, and related topics. [2-0-0; 0-0-0]

- 482. Non-Metallic Materials II.—Crystalline non-metallic solids, silicates, clay-properties, amorphous phases, phase changes, microstructure and properties such as thermal conductivity, thermal stress, electrical conductivity; organic polymers. [2-0-0; 2-0-0]
- 490. Seminar II.—Weekly seminar for discussion of current technical topics; written report on production methods and economic aspects of one of the metals. [0-0-1; 0-0-1]
- 498. Engineering Report.—A comprehensive report based on the student's summer work. Emphasis will be placed on English expression, as well as on the arrangement and accuracy of the material, and on the analytic interpretation of data rather than on description. Draft copy to be handed to the Head of the Department not later than October 1; final typed copy to be handed in on the first day of the second term.

#### Courses for Graduate Students

# M.A.Sc. Degree:

Prerequisites—Graduation in Metallurgical, Chemical, Mechanical Engineering or Engineering Physics.

Course—Includes at least 6 units from courses numbered 500 in Metallurgy, and other approved courses.

## M.Sc. Degree:

Prerequisites-Honours in Physics, Chemistry, or equivalent.

Course—At least 6 units from courses numbered 500 in Metallurgy, and other courses recommended or approved.

## Ph.D. Degree:

Department provides facilities for research studies in:

Hydrometallurgy: pressure oxidation and reduction reactions, electrode processes, corrosion.

Pyrometallurgy: thermodynamic and ionic equilibria in slags and fused salts, slag-metal equilibria and thermodynamic properties of metal solutions, electroslag melting systems.

Physical Metallurgy: deformation of single crystals, dislocation mechanics, diffusion and transformations, electron microscopy, solidification, creep, fatigue, superplasticity.

Mechanical Metallurgy: properties of refractory metals, dispersion hardening, composite structures, fine particle strengthening.

Ceramics: creep in refractory oxides, metal ceramic systems, solid state transitions.

- 550. (2) Metallurgical Thermodynamics.—Application of advanced thermodynamic principles in metallurgical processes. Mr. Samis.
- 552. (1) Metallurgical Kinetics.—Application of chemical reaction rate theory to metallurgical processes. Mr. Peters.
- 554. (1) Hydrometallurgy.—Modern theories of comminution, leaching, purification and precipitation processes. Mr. Peters.
- 556. (1) Metallurgical Applications of Fused Salts.—Structure and properties of fused salts; oxide and sulphide slags; slag-metal reaction rates; electrolysis from fused salts; synthesis using fused salts; other related topics. Mr. Mitchell.

- 560. (1) Metallurgy of the Rarer Metals.—Principles, practices, and research trends in the extractive metallurgy of rarer metals. Mr. Warren.
- 561. (1) Nuclear Metallurgy.—Survey of principles of reactor operation; metallurgical aspects of fuels, constructional materials, radiation damage, corrosion. Mr. Armstrong.
- 570. (2) Structure of Metals III.—Nature and properties of lattice imperfections; dislocation theory and its use to describe work hardening, creep, structure of grain boundaries and other phenomena. Mr. Teghtsoonian.
- 571. (1) Solidification I.—Crystal growth, solute segregation and constitutional supercooling, zone refining, dendritic growth structure, structure of castings. Mr. Weinberg.
- 573. (1) Solidification II.—Advanced topics in solidification. Theories of solidification; eutectic and polyphase solidification; solid-liquid interface morphology; macrosegregation and inverse segregation in castings; microsegregation, homogenization of castings. Mr. Weinberg.
- 574. (1) Topics in Physical Metallurgy.—Topics of metallurgical interest in the field of physical metallurgy to be selected for discussion. Staff.
- 575. (1) Phase Transformations.—Nucleation theory; spinodal decomposition; eutectoid decomposition; age hardening; martensitic transformations. Mr. Brown.
- 576. (1) Diffusion.—Mathematical analysis; Kirkendall effect; mechanisms; theories of self-diffusion and chemical diffusion; grain-boundary and surface effects; theory of sintering. Mr. Brown.
- 580. (1) Metal Fabrication II.—Current research and analysis of metal fabricating processes such as casting, metal forming, and powder metallurgy. Mr. Lund.
- 581. (1) Sintering Theory.—Driving force for sintering; theory of sintering in the solid state, and in the presence of a liquid phase; current theory of hot pressing and reactive hot pressing. Mr. Chaklader.
- 582. (1) Advanced Ceramics.—Complex silicate structures; ion exchange in silicates; kinetics of solid state reactions; kinetics of high temperature processes. Mr. Chaklader.
- 584. (1) Advanced X-Ray Diffraction.—Reciprocal lattice; dislocations and stacking faults; Fourier analysis; microbeam analysis; small angle scattering; applications in physical problems. Mr. Teghtsoonian.
- 586. (1) Electron Microscopy.—A basic course on the theory and practice of electron microscopy with emphasis on transmission microscopy. Mr. Tromans.
- 588. (2) Physical Metallurgy.—Topics covered will include dislocation theory, diffusion, solidification, nucleation theory and structure of liquids. Staff.
- 592. (1-3) Special Topics in Metallurgy.—A special advanced course may be arranged on approval of the Head of the Department.
- 598. Research Conference.—A required course for all graduate students in Metallurgy or Metallurgical Engineering, in which current research projects will be discussed. The course carries no academic credit
- 599. (6) Thesis.—For M.A.Sc. and M.Sc. Degrees—Research studies in chemical metallurgy, physical metallurgy, or ceramics.
  - 699. Thesis.—For Ph.D. degree.

## Microbiology

200. (3) Introductory Microbiology.—History of bacteriology; bacteria in nature; classification of bacterial forms; methods of culture and isolation; relation of bacteria to agriculture, industry, veterinary science, public health and sanitation. Prerequisite: Biology 101 or equivalent. It is recommended that Chemistry 230 be taken concurrently.

[3-2-0; 3-2-0]

416. (3) Applied Microbiology.—A first course in microbiology for advanced science and engineering students interested in the use of microorganisms in research and industry. Basic principles of microbial growth and metabolism; technology of large-scale cultivation and examples of industrial processes; review of microbial research procedures. There will be no set prerequisite for this course, but students must receive the approval of the departments.

[2-1-0; 2-1-0]

## Mineral Engineering

- 250. Introduction to Mineral Engineering.—The nature and scope of mineral engineering; introductory rock mechanics. [2-2\*-0; 0-2\*-0]
- 260. Mineral Engineering Problems.—The application of mathematics, particularly differential equations, to the formulation of, and the solution of, physical problems encountered in engineering. These include problems in structural analysis, electrical circuitry, vibrational analysis, elasticity, flow and plasticity, optics, etc. [0-0-2; 0-0-2]
- 271. Interfacial Properties.—Introduction to the properties of interfaces, electrical effects at solid-liquid interfaces; energetics of adsorption, adhesion, wetting; sols, gels, emulsions, foams.

  [2-0-0; 0-0-0]
- 350. Mineral Exploration.—Principles underlying the search for and exploration of mineral deposits; introduction to economic geology. [2-2-0; 0-0-0]
- 351. Introduction to Valuation.—Systematic exploration, sampling mineral deposits and estimating ore reserves, elements of valuation. [0-0-0; 2-0-2]
- 352. Environmental Control.—Control of occupational health hazards, mine ventilation and air conditioning. [1-0-2; 0-0-0]
- 353. Methods Studies.—Basic principles involved in the design and operation of mining systems, and methods for accumulating and analyzing data required for design. The course will include an introduction to the techniques of rock mechanics and will make use of mathematical models, and statistical methods.

  [0-0-0; 2-0-0]
- 356. Rock Properties.—Physical properties and behaviour of rocks, instrumentation and measurement techniques. [2-2-0; 0-0-0]
- **358.** Rock Fragmentation.—Breaking ground by mechanical, hydraulic, thermal, and other means; properties and behaviour of explosives; theories of blasting, design of explosive charge distribution. [2-0-0; 0-0-0]
- 370. Mineral Dressing I.—Mineral dressing unit operations, equipment, flow-sheets; milling calculations; mineral processing energetics; mill instrumentation and process control. [3-2-0; 2-4-0]
- 371. Principles of Mineral Dressing.—Economic principles and unit operations involved in the comminution and concentration or beneficiation of mineral raw materials to produce an economically marketable product.

  [1-3\*-0: 1-3\*-0]
  - 372. Flotation.—Theory of flotation, surface properties, flotation reagents.
    [0-0-0; 0-3-0]
  - 390. Seminar.—Oral presentation of topics by students before the class.
    [0-0-1; 0-0-1]

- 398. Engineering Report.—A comprehensive report based on the student's summer work. Emphasis will be placed on English expression, as well as on the arrangement and accuracy of material; also on the analytical interpretation of data rather than on description. Draft copy to be handed to the Head of the Department not later than October 15; one final typed copy to be handed in on the first day of the second term.
- 452. Valuation.—Valuation of mineral property—reliability of ore reserve estimates, mineral economics, capital budgetting decision criteria.

  [0-0-0; 2-0-0]
- 453. Systems Analysis.—The design of experiments to produce data; the use of statistics, probability theory and other techniques of operations research together with studies of the constraints imposed by financial, technical, physical and human considerations to design, to analyse, and to establish systems and sub-systems for operations in the mineral industry. [2-0-1; 2-0-1]
- 454. Problems.—Problems in mine plant design; discussion of current technical literature; mine and plant visits. Reference: Staley, *Mine Plant Design*. [0-0-0; 0-0-2]
- 455. Rock Properties II.—Physical properties and behaviour of rocks; introduction to rock mechanics. [2-0-0; 0-0-0]
- 456. Rock Mechanics.—Application of theories of rock mechanics to the rational design of rock structures, to mine design, and to open pit design.

  [0-0-0; 2-0-0]
- 457. Introduction to Rock Mechanics.—Theory of elasticity, rheology, physical properties and behaviour of rocks, strain distribution in rock structures, instrumentation and measurement techniques. [2-1-0; 2-1-0]
- 460. Advanced Engineering Problems.—The application of the mathematics, sciences, and special techniques covered in undergraduate courses to problems such as the design of rock structures, design of mining systems, design of mineral dressing plants, problems in operations research, valuation, environmental control.

  [0-0-4; 0-0-4]
- 470. Mineral Dressing II.—(Continuation of Min. Eng. 370.) Flowsheets; mill location and design, smelter contracts; metallurgical calculations; non-metallics; coal preparation; plant control. References: Taggart, Elements of Ore Dressing; Taggart, Handbook of Mineral Dressing; Gaudin, Principles of Mineral Dressing; current periodicals. [2-3\*-0; 2-3\*-0]
- 471. Surface Properties.—Surfactants and their properties; electrical effects at solid/liquid interfaces; energetics of adsorption, adhesion, wetting; utilization of surface properties in mineral engineering; flotation, and corrosion prevention.

  [2-2\*-0; 1-2\*-0]
- 472. Mineral Stability.—Graphical representation of mineral stability by potential—pH and other diagrams, and the application to flotation and hydrometallurgy. [2-0-0; 0-0-0]
- 480. Research or Design Project.—Research or design under the direction of a staff member, and preparation of thesis and/or reports based on the work done.

  [0-3-0; 0-6-0]
  - 490. Seminar.—Oral presentation of topics by students before the class.
    [0-0-1; 0-0-1]
- 498. Engineering Report.—A comprehensive report, based on the student's summer work. Emphasis will be placed on English expression, as well as on the arrangement and accuracy of the material; also on the analytic interpre-

tation of data rather than on description. Draft copy to be handed in to the Head of the Department not later than October 1; final typed copy to be handed in on the first day of the second term.

#### Courses for Graduate Students

#### M.A.Sc. Degree:

Prerequisites—Graduation in Mineral or Geological Engineering. Graduates from other branches of engineering may be accepted on approval of their course by the head of the department.

Course—Includes at least 3 units chosen from graduate courses in the Department of Mineral Engineering, and other approved courses.

#### Ph.D. Degree:

The Department provides facilities for research studies in the following fields:

- (a) Rock mechanics.
- (b) Mining systems and operations research.
- (c) Mineral dressing.
- 550. (1) Mining Methods.—A more advanced study of some aspects of mining methods. Mr. Crouch.
- 551. (2) Rock Mechanics.—Rheology and its mathematical development, testing rocks in the laboratory, testing rocks in situ, mine and excavation geometry, design of rock structures, special supports. Mr. Emery.
- 552. (2) Applied Physical Measurements.—Theory of elasticity, measurement theory and data analysis, measurement techniques and their application in experimental situations. Photoelastic, strain gauge, hydraulic, sonic devices; gravimetric, magnetic, temperature and other measurements.
- 553. (2) Operations Research.—Production engineering, linear programming, queuing theory and applications, simulation, reliability theory, game theory, dynamic programming. Mr. Emery.
- 570. (1) Theory of Fine Particles.—Measurement of particle size and surface area; physical and chemical behaviour of fine particles; methods of separation; settling; filtration. Mr. Majima.
- 571. (2) Properties of Interfaces.—Physical and chemical adsorption at various interfaces; thermodynamic models of adsorption isotherms; surfactants, insoluble monolayers, interactions at interfaces and synergistic effects; electrical effects at interfaces. Applications: flotation, corrosion, emulsification, detergency, lubrication. Mr. Leja.
- 572. (1) Nature of Adsorbed Molecules.—Modern methods of characterizing surface complexes—infrared, visible and ultra violet spectroscopy, low and high energy diffraction, electron, field emission and field ion microscopy, electroanalysis, interferometry, ellipsometry. Contributions to knowledge of: flotation, corrosion inhibition, catalysis, lubrication, adhesion. Mr. Poling.
- 590. (1-3) Special Advanced Topics.—A special advanced course may be arranged upon the approval of the Head of the Department.
- 598. (1) Seminar.—Presentation and discussion of current topics in mineral engineering research. Attendance of all students proceeding to graduate degrees in the Department is required during each year of residence.
- 599. Thesis.—For M.A.Sc. degree. Research studies in mining or mineral dressing.
  - 699. Thesis.—For Ph.D. Degree.

## Physics

- 155. Mechanics.—The principles of statics and dynamics; work and energy, impulse and momentum for linear and curvilinear motion; virtual work, friction; gravitational systems and elementary orbital motion. Textbook: Halliday and Resnick, *Physics* (Part I). [2-0-4; 2-0-4]
- 156. Heat, Light and Sound.—The thermal properties of matter; gas laws; the first and second laws of thermodynamics; applications. Radiation laws; simple harmonic motion; waves, sound, geometrical and physical optics.

Textbooks: Halliday and Resnick, Physics (Part I); Yarwood and Castle, Physical and Mathematical Tables. [2-3\*-2\*;2-3\*-2\*]

250. Electricity and Magnetism.—Quantitative study of basic principles; introduction to alternating currents. [2-3-0; 2-3-0]

251. Electric and Magnetic Fields.—Classical electric and magnetic fields, with emphasis on both microscopic and macroscopic properties leading up to Maxwell's equations and electromagnetic waves. Primarily for students intending to proceed to Electrical Engineering, or Engineering Physics, and who are taking E.E. 251 concurrently. Textbook: Halliday and Resnick, *Physics*. (Part II). [2-3\*-0; 2-3\*-0]

# Primarily for Engineering Physics Students

- 351. Electricity and Magnetism.—Classical electricity and magnetism leading up to Maxwell's equations and some of their applications. [2-0-0; 2-0-0]
- 352. Introduction to Mathematical Physics.—Applications of differential equations and elementary vector analysis to some physical problems with emphasis on the mathematical formulation of the physical problem and on the physical discussion of the solution.

  [2-0-0; 2-0-0]
- 353. Cryogenics.—Methods of producing very low temperatures and low temperature measurement. Properties of materials at low temperatures, including superconductivity and applications. Textbooks: White, Experimental Techniques in Low Temperature Physics; Lynton, Superconductivity. [3-0-0; 0-0-0]
- 354. Vacuum Physics and Beam Technology.—Flow of rarefied gases. Production and measurement of high vacua. Production of molecular and ion beams. Beam transport. Textbook: Banford, The Transport of Charged Particle Beams.

  [0-0-0; 3-0-0]
- 358. Physical Optics.—Geometrical and physical optics; optical instruments, interference, diffraction, polarization, spectroscopy. [2-3-0; 2-3-0]
- 398. Essay.—For third year Engineering Physics students only, an essay on some technical subject preferably based on summer work and at least 2000 words long to be submitted to the Department by November 15. For further details consult the Department.
- 452. Atomic and Nuclear Physics.—A quantitative study of atomic, molecular and nuclear properties of matter. Quantum aspects of radiation and wave nature of matter.

  [3-0-0; 3-0-0]
- 455. Thermodynamics and Statistical Mechanics.—Laws of thermodynamics and statistical mechanics; applications to modern physics and some problems of engineering interest.

  [3-0-0; 3-0-0]
- 456. Classical Mechanics.—Fundamentals; gravitation and cosmology; Lagrangian and Hamiltonian formulations; astromechanics; collisions and scattering; motion of symmetric tops; inertial navigation; vibrations of coupled systems; parametric resonance; anharmonic oscillations. Textbook: McCuskey, Introduction to Advanced Dynamics. [2-0-0; 2-0-0]

- 457. Continuum Mechanics.—Elastic qualities of real materials and propagation of waves therein. Turbulent flow in ocean and atmosphere. Magneto-hydrodynamic waves in space physics. [2-0-0; 2-0-0]
- 459. Experimental Physics.—Advanced laboratory course with experiments in solid state, nuclear, low temperature, and resonance physics, involving radio frequency and vacuum techniques. Textbooks: Physics 409/459 Manual; Melissinos, Experiments in Modern Physics. [0-6-0; 0-6-0]
- 480. Seminar.—Training in the oral presentation of scientific papers by the student. [0-0-1; 0-0-1]

#### For Other Students

- 356. Classical Mechanics.—Analytical Mechanics of particles and rigid bodies. [2-0-0; 2-0-0]
- 472. Modern Physics.—A course primarily for students of electrical engineering on the fundamental concepts underlying modern physics.

  [2-0-0; 2-0-0]

#### Courses for Graduate Students

## M.A.Sc. Degree:

Prerequisites—Graduation in Engineering Physics or Electrical Engineering.

Course—Includes Thesis counting at least 3 units, at least 6 units chosen from graduate courses in the Department of Physics, and other approved courses.

# 599. Thesis.—For M.A.Sc. degree.

For descriptions of other courses in Physics, see the Faculty of Science calendar.

## Plant Science

324. Physiology of Crops.—Plant metabolism, including enzymes, photosynthesis, respiration, growth regulation, plant-water relationships, translocation, mineral nutrition. Various aspects of plant growth including influence of environmental factors. Textbook: Meyer, Anderson and Bohning, Introduction to Plant Physiology. Prerequisite: Biology 101. [2-2-0; 2-2-0]

#### **Poultry Science**

406. (1½) Product Technology.—Physical, chemical properties of meat and eggs as related to processing, preservation, quality evaluation and control. Prerequisite: Chemistry 230; or equivalent. [3-2-0; 0-0-0]

# THE SCHOOL OF ARCHITECTURE

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA
VANCOUVER 8 • BRITISH COLUMBIA CANADA

# The School of Architecture calendar, 1969-70

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# Financial Assistance

A list of Fellowships, Scholarships, Bursaries and Loans open to students in the University will be found in the publication "Awards and Financial Assistance" which may be obtained from the Registrar's office. For details, consult this publication. In general, application must be made to the Dean of Inter-Faculty and Student Affairs.

#### ACADEMIC STAFF

- HENRY ELDER, M.B.E., F.R.I.B.A., M.R.A.I.C., F.I.I.A.L., Professor and Director of the School.
- Wolfgang Gerson, A.A. Dipl., F.R.A.I.C., A.R.I.B.A., Professor in charge of Graduate Studies.
- B. Paul Wisnicki, Dipl. Eng. (Lwow, Poland), P.Eng., M.E.I.C., Professor of Structures.
- ABRAHAM ROGATNICK, B.A., B.Arch. (Harvard), M.R.A.I.C., Professor.
- ROBIN P. A. CLARKE, A.A. Dipl., M.Arch. (Harvard), A.R.I.B.A., M.R.A.I.C., Assistant Professor.
- ANDREW GRUFT, B.Arch. (Cape Town), M.R.A.I.C., Assistant Professor.
- JOHN F. HALLDANE, B.Sc. (N.Z.), B.Arch.Hons. (N.Z.), Ph.D. (Auckland), A.N.Z.I.A., A.R.A.I.A., M.I.E.S. (Australia), M.H.F.S., Visiting Associate Professor of Environmental Systems.
- CHARLES A. TIERS, B.Arch. (Brit. Col.), M.Arch. (M.I.T.), M.R.A.I.C., Assistant Professor.
- WOODRUFF W. WOOD, B.Arch. (Oregon), M.R.A.I.C., Assistant Professor.
- JOHN A. GAITANAKIS, B.Arch., M.Arch.Hons. (Oregon), Reg.Arch., U.S.A., M.N.A.L. (Norway), Lecturer.
- CATHERINE WISNICKI, B.Arch. (McGill), M.R.A.I.C., Lecturer.
- ALAN J. HODGSON, M.R.A.I.C., Part-time Lecturer.
- RICHARD C. MANN, B.Arch. (Brit. Col.), M.R.A.I.C., Part-time Lecturer.
- KENNETH G. TERRISS, B.Arch. (Brit. Col.), M.Arch (M.I.T.), M.R.A.I.C., Part-time Lecturer.
- DIANE D. P. PENDAR, B.Sc. (Oregon), Instructor.
- ARTHUR C. ERICKSON, B.Arch. (McGill), M.R.A.I.C., Honorary Lecturer.

# Lecturers from Other Departments

- Walter H. Ball, B.Sc. (Civ.) (Sask.), M.E.I.C., P.Eng., National Research Council.
- J. Douglas, B.A.Sc. (Brit. Col.), Sen.Mem.I.E.E.E., Senior Lecturer, Electrical Engineering, Department of Electrical Engineering.
- STEPHEN P. SLINN, P.Eng., Department of Mechanical Engineering.
- Mrs. Helen Goodwin, Dip. Laban Art of Movement Studio, London, England. Lecturer, School of Physical Education and Recreation.

# Visiting Lecturers

RANDLE IRELAND, RONALD S. NAIRNE, MURRAY POLSON, KENNETH E. MEREDITH, WOLFGANG THIERSCH, WILSON BAKER, D. I. GUTSTEIN, R. D. HASSELL, R. HENRIQUES, M. KATZ, R. LANE-SMITH, L. REDPATH, J. STARCK, A. J. EMERY, A. GOWANS, P. M. THORNTON, P. THIEL, T. J. MALLINSON, S. FOX, J. SHADBOLT, H. RITTEL, B. J. DAVIS, P. MANNING, P. MORISSET, A. TEMKO.

# **Teaching Assistants**

- D. P. RAPANOS, B.Arch. (Brit. Col.)
- E. S. King, Dip.Arch.
- S. Dhar, B.Arch. (N.Delhi)

# THE SCHOOL OF ARCHITECTURE

The architect is trained to understand and design man's physical environment; building is a part of the environment. Architecture as an academic discipline relates the humanities, the sciences, technology and the creative arts. To understand—or create—makes demands upon a sound academic background and an ability in the realm of creative problem-solving. It is essential therefore that all students entering the School of Architecture be academically mature and that they possess an imaginative outlook.

The course is of three years duration and leads to a degree of Bachelor of Architecture. Students are advised to interrupt their academic studies at the end of First or Second Year for a prescribed period in order to experience actual conditions in practice, or to take part in construction work, or to travel in countries outside Canada.

Each year commences with a Workshop prior to the scheduled academic year, the First Year Workshop lasting for four weeks and those in Second and Third Years being two weeks in length.

Opportunities for postgraduate studies in Architecture and related fields are available at the University of British Columbia and at other institutions. For information on postgraduate studies at the University of British Columbia, reference should be made to the Calendar of the Faculty of Graduate Studies.

#### Admission

Application for admission to the School of Architecture as a candidate for a degree of Bachelor of Architecture must be made through the Registrar prior to April 30.

All applications must be supported by official transcripts in duplicate of the applicant's complete academic record to date (and a list of courses for which he is currently registered if in session). All final and supporting documents must be submitted to the Registrar in duplicate not later than June 30. If documents are not received by that time, there is no guarantee that an applicant will be considered for the forthcoming session.

Only those showing promise in the field of architecture will be considered. All students must submit to the Admissions Committee of the School of Architecture evidence of their interests and accomplishments (not necessarily shown on their transcripts) within the areas of the physical sciences, social sciences, humanities, the arts and crafts, creative thinking and/or innovation. Examples of sketches or drawings executed in the recent past should be supplied to the Admissions Committee for it is essential that students be able in graphic means of communication.

Students are urged to establish an early contact during their pre-Architecture years so as to become better acquainted with the School and its programme and to participate in extra-curricular activities.

A student concerned with entering the field of architecture should endeavour to enlarge his knowledge of man's social and physical world as well as to gain appreciation of the fine arts. The School builds upon such a background by developing three main areas of learning:

- 1. Architectural History and Philosophy
- 2. Architectural Design and Experiment
- 3. Science and Architectural Technology.

Inquiries concerning admission should be directed to the Registrar. The requirements for admission to the School of Architecture are:

1. Completion of a baccalaureate degree in Arts, Science or Applied Science at the University of British Columbia (or at another approved university) providing that an average of not less than 65% has been obtained in courses comprising the final two years of study.

OR

- Successful completion of at least three years of an approved programme of study in a School of Architecture in Canada, or at a School listed in the following accreditation programme:
  - (a) Schools of Architecture recognized by the Commonwealth Association of Architects
  - (b) Schools of Architecture listed by the Royal Institute of British Architects in the European Common Market countries

    OR
  - (c) School of Architecture accredited in the United States of America.

Candidates not meeting the requirements given in 1. or 2. above, but who contend that their background is of equal merit should apply to the Registrar for a review of their academic standing in order that their application may be considered by the School Committee on Admissions.

# General University Regulations

General University regulations concerning discipline, health and other matters as detailed in the General Information bulletin are applicable to students in the School of Architecture.

#### Attendance and Examinations

A student who fails to comply with the regulations regarding attendance at lectures and studios, except for reasons deemed satisfactory by the School, may be required either to repeat the work of the year or to withdraw from the School. Normally, examinations will be held at the close of each session in April. Term examinations and some final examinations will be held prior to the Christmas vacation or as noted elsewhere in this Calendar in connection with specific courses.

To pass his Year, a student must obtain an average mark of not less than 60% in the work of that year. However, if he has an average of over 60% and has failed not more than two subjects, he will be allowed to write supplementals, with the exception of Architectural Design. Any subject in which he obtains less than 50% in either the examination or in the laboratory or studio work is considered a failure. The School may direct such work as will be necessary to prepare for the supplemental examination or to pass the laboratory or studio work.

Term essays and examination papers may be refused a passing mark if they are illegible or noticeably deficient in English.

A student who in any year does not meet the above requirements may be required either to repeat the work of the year or to withdraw from the School. At no time will a student be permitted to repeat a year more than once nor will he be granted the privilege of repeating more than six units from a previous year. No student may enter the Third (final) year without a clear standing.

Successful candidates will be graded as follows: First Class, an average of 80% or over; Second Class, 65% to 79%; Passed, 60% to 64%. Honours standing will be granted to a student who has obtained an over-all average

of 80% or over in the Final Year and 75% or over during the two previous years with no subject below 50%.

#### **Examination Results**

Results of the sessional examinations in April are mailed to students in the graduating classes about the time of Congregation, and to students in the lower years by approximately June 15. Any student who must meet an application date for another institution prior to June 15 should inform the transcript clerk in the Registrar's office in order that arrangements may be made to meet the deadline.

# Review of Assigned Standing

Reviews of assigned standing are governed by the following regulations:

- 1. Any request for the review of an assigned grade, other than for a supplemental examination (in which a request for a review will not be granted), must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each course concerned, which will be refunded only if the mark is raised.
- 2. Each applicant for a review must state clearly why he believes the course deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a second time before results are announced. For this reason an applicant granted a supplemental should prepare for the examination since a change in the original mark is unlikely and the result of the review may not be available before the end of the supplemental examination period. A review will not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.
- 3. Reviews will not be permitted in more than two courses (6 units) in the work of one academic year, and in one course (3 units) in a partial course of 9 units or less.

# Supplemental Examinations

Supplemental examinations may be written in August at the following centres:

Cranbrook, Dawson Creek, Kamloops, Kitimat, Ocean Falls, Penticton, Powell River, Prince George, Prince Rupert, Trail, Victoria; and at Whitehorse, Y.T. Other centres outside British Columbia are restricted to universities or their affiliated colleges.

In unusual circumstances a student working in a remote area may be permitted to write supplemental examinations at a special centre if satisfactory arrangements can be made. Since permission is contingent upon completion of arrangements, only early applications will be considered.

The fee for each supplemental examination written at the University is \$7.50; at a regular outside centre, \$10.00; at a special centre, \$20.00. In the event that a candidate does not appear for an examination a refund will be authorized only if, within 10 days after the scheduled examination, the candidate submits to the Registrar an adequate explanation for the failure to write the examination; if such refund is made, it will be \$5.00.

Applications for supplemental examinations regarding the winter session examinations, accompanied by the necessary fees, must be in the hands of the Registrar by July 8.

# Transcript of Academic Record

A transcript of a student's academic record will, on request of the student, be mailed direct to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the inscription "official transcript only if presented with seal unbroken". Upon graduation or withdrawal a student may obtain for his own use a copy of his record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of Christmas or mid-term examinations.

Student records are confidential. Transcripts are issued only at the request of students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made arrangements satisfactory to the Finance Department to meet any outstanding indebtedness.

Granted Honourable Dismissal indicates that the student is in no disciplinary difficulty at the time the transcript is issued; the term has no reference

Application for a transcript should be made at least one week before the document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

#### Graduation

Every candidate for a degree must make formal application for graduation. Application for graduation must be made not later than March 15. Special forms for this purpose are provided by the Registrar's office.

#### Withdrawal

Any student who after registration decides to withdraw from the University must report to the Registrar's office and to the Director of the School. He will be required to obtain clearance from the University, to the satisfaction of the Registrar, before being granted Honourable Dismissal or recommended, where applicable, for refund of fees.

The Senate of the University may require a student to withdraw from the University at any time for unsatisfactory conduct, for failure to abide by regulations, for unsatisfactory progress in his programme of studies or training, or for any other reason which is deemed to show that withdrawal is in the interests of the student and/or the University.

# Fees—Subject to change without notice

First Term Fees, \$290 (includes A.M.S. fee of \$29), payable in full at the time of registration. However, students may pay full fees of \$551 at time of registration. Third Year students will be assessed an additional \$7 to cover the graduating fee.

Second Term Fees, \$261, payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Finance Department before this date with a note showing name and registration number.

A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.

# Practical Experience

The award of the B.Arch degree is contingent upon certain outside experience. The student is expected to spend 12 weeks working in an architect's office and a further 12 weeks on actual construction work. Bona fide evidence of this experience is to be filed with the Director. The School will advise the student whenever possible on both practice and site experience in order that his time be most usefully employed.

#### **Professional Associations**

Provincial regulations governing professional registration vary slightly across Canada, but all accept university graduation as a preliminary qualification. In order to practise as a Registered Architect in the Province of British Columbia, the graduate must present himself to the Architectural Institute of British Columbia for examination after spending two years under professional direction subsequent to his graduation. Members of the A.I.B.C. automatically become Members of the Royal Architectural Institute of Canada. An early professional contact can be established by making application to the A.I.B.C. for membership as Undergraduate Associate.

# Anticipated Expenses Involved

Apart from the cost of living and tuition, certain additional expenses must be anticipated to cover books, equipment and workshop. It is not possible to give precise figures for these expenses, but it is to be expected that each student in each year should be prepared to meet a liability of between \$300 and \$500.

# **BACHELOR'S DEGREE PROGRAMME**

# First Year

	First	Term	Second	Term
Subject	Lect.	Lab. or Studio	Lect.	Lab. or Studio
Arch. 400—Arch. Design I	1	15	1	16
Arch. 402—Elements of Architecture	3	3		
Arch. 405—Architectural History	3		3	
Arch. 406—Architectural Workshop I	4	weeks be lect	fore st	art of
Arch. 411—Building Principles and Practice	2	4	2	8
Arch. 412—Materials of Building	1	1	1	1
Arch. 416—Structures of Buildings I			2	2

# Second Year

	First	Term	Second	Term
Subject	Lect.	Lab. or Studio	Lect.	Lab, or Studio
Arch. 420—Architectural Design II	1	18	1	18
Arch. 422—Experiments in space	1	2		
Arch, 424—History of Urban Form	3			
Arch. 425—History of Urban Planning			3	
Arch. 426—Architectural Workshop II	2 7	weeks be lect	fore sta tures	art of
Arch. 431—Building Principles and Practice Seminar			3	•
Arch. 436—Structures of Buildings II	2	3	2	3
M.E. 437—Building Services (Mechanical)	3			••••
E.E. 438—Illumination in Buildings			3	

# Third Year

	First	Term	Second	Term
Subject	Lect.	Lab. or Studio	Lect.	Lab. or Studio
Arch. 440—Architectural Design III	1	28		
Arch. 441—Graduation Project	••••		3	24
Arch, 445—Theory of Architecture	2	•	2	•
Arch. 446—Architectural Workshop III	2 weeks before start of lectures			
Arch. 451—Professional Practice	4			
Arch, 456—Structures of Buildings III	2	4		
Comm. 307—Urban Land Markets	. 3			

#### COURSES IN ARCHITECTURE

- 305. (3) Architectural History.—An examination of the classical and romantic themes as explored through the language of architecture in ancient and modern times. Textbooks: Banister Fletcher, A History of Architecture on the Comparative Method, 17th ed. (Scribner) 1961; reading list. Mrs. Wisnicki. [3-0; 3-0]
- 400. (5) Architectural Design I.—Observation and examination of physical phenomena and the evolved abstraction as a basis for meaningful commitment in problem-solving. Experiments in the communication of idea-concepts and their application to the environment. [1-15; 1-16]
- 402. (2) Elements of Architecture.—The investigation of movement, form and space as determinants in architecture by isolation of the operating systems and identification of the critical variables and parameters.
- 405. (3) Architectural History.—Industrial Revolution to today. Origins of the architecture of our day, including a survey of the determining theories of art and design and of the technological developments of recent times. Open only to Fourth Year Students, graduate students and to students in the Architecture programme. Textbooks: Strayer, Gatzke, Harrison, The Course of Civilization, Vol. 2; Giedeon, Space, Time and Architecture. Mr. Rogatnick. [3-0; 3-0]
- 406. (1) Architectural Workshop I.—An introduction into project study methods to develop perception for understanding and creative decision-making. Search for relationships of architecture to history and philosophy, to science and technology, to social sciences and to other arts by discussions with people from these areas of concern. Communication of concepts, understanding needs, developing problem-solving processes towards contributions to 'man in environment.'
- 411. (4) Building Principles and Practice.—Examination of the functional requirements and performance of building materials, components and systems in response to environmental forces. Introduction to construction practice. Textbooks: D.S.I.R. Principles of Modern Building, Vols. 1 and 2; Canadian Building Digests; National Building Code and supplements; Huntington, Building Construction. J. F. Halldane, Psychophysical Synthesis of Environmental Systems. Mr. Tiers and Dr. Halldane. [2-4; 2-8]
- 412. (1) Materials of Building.—Introduction to the structure and properties of materials; materials science. The characteristics, forms, production and application of materials used in building. Laboratory tests, demonstrations and field trips.

  [1-2\*\*; 1-2\*\*]

  \*\*alternate weeks
- 416. (2) Structures of Buildings I.—Objects and criteria of structures; structural problems of buildings; skeleton systems and principal members in timber and steel. Textbooks: Salvadori & Heller, Structure in Architecture; Gaylord and Gaylord, Design of Steel Structures. Mr. Wisnicki. [0-0; 2-2]
- 420. (6) Architectural Design II.—Development of the ability to design through the understanding of thought processes. Introduction to design methodology and decision-making aids. Design problems with varying emphasis upon scope and direction. Term I: design problems without precedent. Term II: problems of the building complex and its environment. [1-18; 1-18]
- 422. (2) Experiments in Space.—A lecture course ending in a studio exercise. The lectures to be in three parts: (a) the form of architectural space, (b) things in space, and (c) nature as a space determinant. The studio exercise

- will bring together design, structure and experiments in space as environment for man. Textbooks: Hans Reichenbach, The Philosophy of Space & Time; Jammer, Concepts of Space. Mr. Elder, Mr. Lanzius.
- 424. (11/2) History of Urban Form.—A history of cities in the western world with an analysis of their physical forms as related to the cultural forms of the societies and times in which they developed. Textbooks: Lewis Mumford, The City in History; Hiorns, Town Building in History. Mr. Rogatnick and Mrs. Wisnicki.
- 425. (11/2) History of Urban Planning.—The emergence of the city planning movement as an aspect of social and political reform traced throughout the 19th and 20th century; the roots of the planning process are examined in terms of British planning legislation, the American City Beautiful movement, and the French contribution to urban structure and design. Emphasis is placed upon urban planning as a process of Government within the general framework of profound social and economic change as the city becomes the prevailing way of life in Canada. Dr. Oberlander. 10-0: 3-01
- 426. (1) Architectural Workshop II.—As for 406 above. Students entering Second Year will work closely and co-operatively with those entering First Year. Staff.
- 431. (2) Building Principles and Practice Seminar.—Seminars and tutorials treating selected topics in the science and technology of building and requiring investigation and presentation by students working in small groups. [0-0; 3-0]
- 436. (3) Structures of Buildings II.—Continuity in building structures; reinforced and prestressed concrete; performance and design of typical elements and entire systems in concrete; foundations. Prerequisite: Ap.Sc. 270. Textbook: Winter, Urquhart, O'Rourke, Nilson, Design of Concrete [2-3; 2-3] Structures. Mr. Wisnicki.
- M.E. 437. (1½) Building Services (Mechanical)).—Physics of temperature control of buildings; basic systems of heating and air conditioning; sanitation problems, water supply and distribution in buildings: elevators and other mechanical equipment. (For students in Architecture only.) Textbook: Kinzey and Sharp, Environmental Technologies in Architecture. Mr. Slinn.

[3-0; 0-0]

- E.E. 438 (1½) Illumination in Buildings.—Principles of electrical services and illumination in buildings. For students in Architecture. Mr. Douglas. [0-0; 3-0]
- 440. (3) Architectural Design III.—Problems of architectural design in relation to urban and sub-urban conditions; housing and community planning. More advanced analysis of planning; advanced structural studies. [1-28; 0-0]
- 441. (4) Architectural Graduation Project.—The graduation project will occupy the whole of the second term. The subject must have been approved by the Council of Tutors by April 1 of the previous year. A programme will be [0-0; 3-24] developed in the previous term.
- 445. (2) Theory of Architecture.—Architecture in its contemporary setting; trends, influences and the relationship to the other arts, the behavioural sciences and the engineering sciences. The course emphasizes a search for values, principles and theory. Various lecturers, discussions and papers by [2-0; 2-0] students. Mr. Gerson.
- 446. (1) Architectural Workshop III.—Field trip to examine architecture in the urban environment. Visits to large and small offices of architects. Visits to planning offices.

- 451. (2) Professional Practice.—Nature and scope of professional competence and responsibility in architectural practice. Seminar discussions on the interaction of architect, client, contractor, allied professions and regulatory authorities. The role of the law in the practice of architecture. Office organization and procedures. Staff and visiting lecturers. [4-0; 0-0]
- Comm. 307. (1½) Urban Land Markets.—Economic characteristics of urban real estate market; nature of urban land use; city growth and development; locational factors in determination of land use; types of interest in land; government regulations affecting land ownership. [3-0; 0-0]
- 456. (2) Structures of Buildings III.—Feasibility and rationality of structural systems; performance of suspension, shell and plate systems; outline of soil mechanics. Textbook: Salvadori & Heller, Structure in Architecture. Mr. Wisnicki. [2-4; 0-0]

#### THE DEGREE OF MASTER OF ARCHITECTURE

#### Academic Staff

- HENRY ELDER, M.B.E., F.R.I.B.A., M.R.A.I.C., F.I.I.A.L., Professor and Director of the School.
- Wolfgang Gerson, A.A. Dipl., F.R.A.I.C., A.R.I.B.A., Professor in charge of Graduate Studies.
- B. PAUL WISNICKI, Dipl. Eng. (Lwow, Poland), P.Eng., M.E.I.C., Professor of Structures.
- ABRAHAM ROGATNICK, B.A., B.Arch. (Harvard), M.R.A.I.C., Professor.
- ROBIN P. A. CLARKE, A.A. Dipl., M.Arch. (Harvard), A.R.I.B.A., M.R.A.I.C., Assistant Professor.
- Andrew Gruft, B.Arch. (Cape Town), M.R.A.I.C., Assistant Professor.
- CHARLES A. TIERS, B.Arch. (Brit. Col.), M.Arch. (M.I.T.), M.R.A.I.C., Assistant Professor.
- Woodruff W. Wood, B.Arch. (Oregon), M.R.A.I.C., Assistant Professor.
- JOHN A. GAITANAKIS, B.Arch., M.Arch. Hons. (Oregon), Reg.Arch. (U.S.A.), M.N.A.L. (Norway), Lecturer.

#### Programme Objectives

The graduate programme leading to a master's degree in architecture is concerned with furthering knowledge of architecture in the contemporary setting. Oriented to the future the programme emphasizes development of methods of enquiry, experimentation and investigation of architectural ideas. It is designed to give students a chance to work in special areas in which they are interested, as individuals or in teams, together with members of the professional staff. Students are therefore encouraged to investigate areas in which study is carried on by staff members. These investigations are considered to be the central work of the programme. Today this demands an academic environment in which architecture is considered as integrating knowledge of many of the disciplines that contribute to the understanding of man's continuously changing society and his attempt to adjust his physical environment to his own needs and to the enhancement of his life. The social and behavioural sciences, economics, philosophy and technology all form an

important background for this work. Co-operation with these disciplines is emphasized.

# Programme Procedure

The graduate programme has a minimum length of one full calendar year. Two regular terms must be spent in session on the campus. The first term generally will develop the theoretical basis of work in a series of lectures, seminars and discussions. During the second term students will work on research projects chosen by them in conjunction with the staff. The summer will complete the research. All research will be under the direction of a professor and, where advisable, a committee will assist in directing the work.

# Areas of Research

The programme directs interest to the following areas in which enquiry is being conducted, and students are encouraged to choose their research within these broad fields:

# 1. RESIDENTIAL AND INSTITUTIONAL ENVIRONMENTS

Mr. W. Gerson, Mr. R. Clarke

Housing - Education - Health Services - and other institutions and their role in the contemporary environment are of particular concern. Students may wish to work on the social, economic, spatial or technological aspects of these institutions or search for relationships between these concerns.

#### 2. ARCHITECTURAL HISTORY AND THEORY

Mr. A. Rogatnick

Students interested in architectural history or in theory may undertake study in those fields in which adequate resources are available to them.

#### 3. DISCIPLINE OF DESIGN

Mr. A. Gruft

Formulation of problems, basis, understanding, methodologies, use, learning, etc.

#### 4. FORM AND STRUCTURE

See course description under this name.

5. SPECIAL ARCHITECTURAL PROBLEMS OF BRITISH COLUMBIA Students may find an interest in special local problems such as the urban design for isolated communities, or building development on mountain slopes, or the design of timber structures.

#### Courses

The exchange of ideas and experiences between students and students and between students and staff is the main stimulus to individual work. All students must therefore participate in Arch. 500: Architecture Seminar. A total of eighteen units is required for a master's degree including at least one course of three units taught outside the School of Architecture in a discipline related to the student's chosen field of research. Students may wish to attend other lectures, or on advice by a professor may be asked to attend additional courses informally. At the beginning of the year before final registration a list of suggested courses outside the School will be provided for guidance of students. Each student must work on an acceptable research project.

# Arch. 500 (3) Architecture Seminar

Mr. W. Gerson and other staff

This course serves mainly as a forum for the exchange of ideas, and will be based on presentation of student papers.

The second term will concentrate on the discussion of student research projects.

# Arch. 503 (3) History of Architectural Theory and Philosophy

Mr. A. Rogatnick

The exploration and analysis of theories and philosophies of architecture and design, and the ways in which they affect architectural form.

# Arch. 504 (3) The Residential Environment

Mr. W. Gerson

Introduction to housing needs and techniques of implementation, survey of social, economic, spatial and technological problems and possibilities. Field surveys, papers and design explorations.

# Arch. 505 (3) Form and Structure

Mr. P. Wisnicki

Objectives, restraints and elements of building space and form; forcetime fields, form, material relations as structural determinants; criteria and limits ideal and practical forms; arch, vault, shell, membrane, plate and their spatial arrangements.

# Arch. 549 (9) Research Project for the Master's Degree

The project will be chosen by discussion between the students and professorial staff and must be approved by the professor of graduate studies and research. This project forms the core of the student's work and his choice of courses should relate to the subject matter of his research project.

### Awards and Financial Assistance

Subject to change. Full corrected statement for the year 1969-70 will appear in the publication "Awards and Financial Assistance."

#### In Architecture

The Architectural Institute of British Columbia Scholarship—A scholarship of \$250, the gift of the Architectural Institute of British Columbia, will be available to a student entering First Year Architecture. The award will be made to the student entering with the highest marks as determined by the average on the written examinations of Arts and Science at the University of British Columbia. To students of the Institute other assistance may be available from the Institute to assist them to attend the First Year in Architecture at the University of British Columbia.

The Architectural Institute of British Columbia Prizes—Prizes to the total of \$200, given annually by the Architectural Institute of British Columbia, are available for leading students in any year of Architecture. These prizes, which consist of books and an award of merit, will be awarded to the student in each year showing outstanding ability in architectural design and obtaining high academic standing. If, in any year, no student obtains a sufficiently high standing, the awards may be withheld.

Bapco Scholarships in Architecture—A scholarship of \$500, the gift of Bapco Ltd., with British Columbia offices in Victoria and Vancouver, is offered to students of architecture at this University. This award is offered to students who are entering the final undergraduate year of the course leading to the degree of B.Arch. The scholarship will be awarded to the student with the most outstanding over-all record in the previous year. The winner is not permitted to hold other scholarships.

The Canadian Pittsburgh Industries Scholarship—A scholarship to the value of \$250 will be awarded annually by Canadian Pittsburgh Industries Ltd., to a student in the Second Year of Architecture. The award will be made to the student submitting the best solution of an architectural problem proposed by the Staff of the School of Architecture in conjunction with the Company. The award will be made on the recommendation of the School.

The McCarter, Nairne & Partners Scholarship—A scholarship of \$400, provided by a gift from McCarter, Nairne & Partners, Architects, will be awarded annually to the student in Second Year Architecture obtaining the highest standing.

Northwest Plaster Bureau Scholarship—A scholarship of \$250 is offered by the Northwest Plaster Bureau to the student, entering the Final Year, who is considered by the faculty of the School of Architecture to be outstanding in his or her progress towards the profession of Architecture and devotion to good practices in building design and construction, and who indicates that he or she proposes to continue in the profession of Architecture after graduation.

Pan-Abode Scholarship in Architecture—A scholarship of \$500, the gift of Pan-Abode Buildings Ltd., is offered annually to a student entering Final Year of the course leading to a degree of B.Arch., who received one of the highest aggregate standings in the previous years of the course and shows outstanding promise in his future professional career.

The Central Mortgage and Housing Corporation Travelling Scholarships in Architecture—Seven scholarships may be awarded to undergraduates who are proceeding to their Final Year at a School of Architecture in Canada.

Winners will receive expenses to travel as a group to selected housing projects in Canada and the United States for a period of four to five weeks. After completion of the tour, conducted by a staff member of one of the schools, students will be required to work at the Head Office of C.M.H.C. for ten weeks to gain experience in housing, during which period they will be paid a salary of \$90 a week. Each sudent will be expected to submit a paper on the summer's tour and work experience to the director of his school, and on receipt of this paper by C.M.H.C. through the director, will receive \$650. Winners will be chosen on the basis of scholastic achievement and marked interest in housing. Awards are available only to Canadian citizens or landed immigrants in Canada. Applications must be submitted to the School of Architecture by March 15th.

The Royal Architectural Institute of Canada Medal—This medal is available to a student in the graduating class for the degree of Bachelor of Architecture. The award will be made only to a student who, in the opinion of the School, has attained a high proficiency in the course and shows those qualities of character and ability which promise outstanding achievement in the profession. In the determination of standing for this award, the work taken in the final two years will be considered. The award will not necessarily be made every year.

The Charles J. Thompson Student Aid Fund in Architecture—A fund of \$5000, to assist students in Architecture, was established by the late Charles J. Thompson, Esq., LL.D., A.R.I.B.A., F.R.A.I.C., a member of the firm of Sharp and Thompson which won the open competition for the building project of the University in 1912. Since that time, Mr. Thompson contributed much of professional skill and personal interest to construction and development on the campus. The purpose of the fund is to assist promising and needy students proceeding to a degree in Architecture. Loans from the fund, which do not become repayable or bear interest until after the student's graduation, are available for undergraduates registered in the Second or a higher year.

# THE SCHOOL OF NURSING

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA
VANCOUVER 8 • BRITISH COLUMBIA CANADA

# The School of Nursing calendar, 1969-70

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### ACADEMIC STAFF

- MISS ELIZABETH K. McCann, B.A., B.A.Sc. (Brit. Col.), M.S.N. (Wayne State), R.N., Professor and Acting Director of the School.
- Miss Alice J. Baumgart, B.S.N. (Brit. Col.), M.Sc. (Applied) (McGill), R.N., Associate Professor.
- Mrs. Helen M. Gemeroy, B.A. (Sir Geo. Williams), M.A. (Columbia), R.N., Associate Professor and Assistant Director of Nursing, Health Sciences Centre Hospital, Psychiatric Unit.
- Miss Floris F. King, B.Sc.N. (Toronto), M.P.H. (Michigan), Ph.D. (North Carolina), R.N., Associate Professor.
- MISS MARGARET M. STREET, B.A. (Manitoba), M.S. (Boston), R.N., Associate Professor.
- Miss Margaret A. Campbell, B.A., B.A.Sc. (Brit. Col.), M.S. (Western Reserve), R.N., Assistant Professor. (On leave of absence 1968-69).
- MISS PAULINE M. A. CAPELLE, B.A., B.A.Sc. (Brit. Col.), M.A. (Chicago), R.N., Assistant Professor.
- Miss H. Elizabeth Cawston, B.S.N. (Brit. Col.), M.N. (Washington), R.N., Assistant Professor.
- Miss Margaret Rose Francis, B.S. (Nursing) (Delhi), M.S. (Catholic University of America), Ed.D. (Maryland), R.N., Assistant Professor.
- Mrs. Jessie Hibbert, M.A. (San Francisco State), M.S. (U.C.L.A.), R.N., Assistant Professor.
- MISS SYLVIA HOLMES, B.Sc.N. (Alta.), M.Sc.A. (McGill), R.N., Assistant Professor.
- Mrs. Margaret Sarah M. Neylan, B.N. (McGill), M.A. (Brit. Col.), R.N., Assistant Professor.
- MRS. KIRSTINE BUCKLAND, B.A.Sc. (Brit. Col.), R.N., Instructor.
- MRS. KATHLEEN CLARK, B.S.N. (Toronto), R.N., Instructor.
- Mrs. Caroline P. Domke, B.Sc. (Nursing) (Walla Walla), R.N., Instructor.
- Mrs. Nancy Frood, B.S.N. (Brit. Col.), R.N., Instructor.
- Mrs. Kathleen M. McAllister, B.S.N. (Brit. Col.), R.N., Instructor.
- Mrs. Kathleen McIntosh, B.S.N. (Brit. Col.), R.N., Instructor.
- MRS. DOLINA NELLES, B.S.N. (Brit. Col.), R.N., Instructor.
- Mrs. Helen M. Olsen, B.S.N. (Brit. Col.), M.N. (Washington), R.N., Instructor.
- MISS HELEN L. SHORE. B.S.N. (Brit. Col.), R.N., Instructor.
- MRS. R. JO-ANN WOOD, B.S.N. (Brit. Col.), R.N., Instructor.

#### Part Time Lecturers

- Mrs. Ruth Elliott, B.Sc. (Alta.), M.S. (Calif.), R.N.
- Mrs. Nancy P. Forbes, B.S. (Hanover), M.S. (Calif.), R.N. Special Lecturer, B.C. Mental Retardation Institute.
- Miss Mary L. Richmond, B.N. (McGill), M.A. (Columbia), R.N.
- Mrs. Bettie J. Scheffer, B.S. (Nursing) (Wisconsin), R.N.

# Lecturers from other Departments:

Donald O. Anderson, B.A., M.D. (Brit. Col.), S.M. in Hyg. (Harvard), F.R.C.P. (C); Kenneth I. G. Benson, M.B., Ch.B. (Edinburgh), D.P.H. (Toronto), C.R.C.P.(C); Lloyd F. Detwiller, M.A. (Brit. Col.), M.H.A. (Minnesota); Gary Dickinson, B.Ed., M.A., Ed.D. (Brit. Col.); George R. F. Elliot, M.D., C.M. (Queen's), D.P.H. (Toronto), C.R.C.P.(C); Mildred E. Francis, B.S. (Teachers' College), Sc.M., Sc.D. (Johns Hopkins); John Gilbert, M.S., Ph.D. (Purdue); Monica Green, B.A., B.A.Sc. (Brit. Col.), M.P.H. (Michigan), R.N.; Stefan Grzybowski, M.B., Ch.B., M.D. (Edinburgh), M.R.C.P. (London), F.R.C.P(C); H. K. Kennedy, M.D. (Manitoba), D.P.H. (Toronto); Lee D. Kornder, M.D. (Brit. Col.), D.P.H. (Toronto); Anthony A. Larsen, B.A. (Brit. Col.), M.D. (Alta.), D.P.H. (Toronto), M.P.H. (Minnesota), C.R.C.P.(C); Melvin Lee, B.A. (U.C.L.A.), M.A., Ph.D. (Berkeley); Robert B. Lowry, M.D. (Queen's, Ireland), D.C.H. (London); C. J. G. Mackenzie, M.D., C.M. (Queen's), D.P.H. (Toronto); Jessie McCarthy, B.A.Sc. (Brit. Col.), M.P.H. (Berkeley), R.N.; W. A. McLeod, M.D., F.R.C.P.(C); James R. Miller, B.A., M.A. (Toronto), Ph.D. (McGill); J. Glen Moir, B.S.P. (Brit. Col.), M.S. (Michigan); Joan D. Morison, B.A.Sc. (Brit. Col.), M.A. (Columbia), R.N.; A. John Nelson, M.B., Ch.B. (Glas.), D.P.H., R.C.P.S. (Eng.); Lawrence Ranta, M.D., D.P.H. (Toronto); Donald B. Rix, B.A., M.D. (Western Ont.); John H. Smith, M.B., B.Ch., B.A.O. (Queen's, Belfast), D.I.H. (London), D.P.H. (Toronto); George Szasz, M.D. (Brit. Col.); D. J. Yeo, D.D.S. (Toronto); M.P.H. (Michigan); and others.

Clinical and Field Staff in Associated Hospitals and Agencies (1968-69)

#### Clinical Instructors:

Miss S. Anderson, Mrs. P. Armstrong, Mrs. D. Babcock, Miss F. Benedict, Mrs. R. Biley, Mrs. B. Blake, Mrs. A. Boxer, Miss E. Braund, Mrs. R. Brodie, Miss E. Burpee, Mrs. R. Carle, Miss S. Cole, Miss R. Cunningham, Miss D. Curle, Mrs. E. Darragh, Miss P. Driver, Mrs. L. Duke, Mrs. A. Dumaresq, Miss H. M. Evans, Miss J. Fernie, Miss J. Flower, Miss L. Fraser, Mrs. B. Friedman, Mrs. R. Fournier, Miss J. Galvin, Miss S. Garnett, Miss A. George, Mrs. C. Gowan, Miss E. Graham, Mrs. V. Hankinson, Mrs. I. Harvey, Miss F. Hayward, Mrs B. Hembling, Mrs. D. Hemsworth, Miss J. Hill, Mrs. H. Hintz, Mrs. M. Hodgkinson, Mrs. A. Hope, Mrs. S. Howie, Miss N. Irving, Mrs. E. Jakubovskis, Miss A. Jenkins, Captain E. Jolly, Mrs. J. Jabour, Mrs. E. Johnson, Mrs. C. Jones, Miss M. King, Miss F. Kirkpatrick, Miss L. Knighton, Major E. Kollins, Mrs. I. Kotaska, Mrs. E. Lafek, Mrs. C. Lennie, Mrs. C. Lim, Mrs. M. Lawder, Mrs. D. Logan, Miss M. Lonergan, Miss A. McColl, Dr. C. E. McDonnell, Miss L. McDonald, Mrs. R. E. McIlrath, Miss B. McKenzie, Miss M. McKillop, Mrs. J. MacVay, Mrs. J. Mitchell, Miss E. Moore, Mrs. A. Murray, Mrs. K. Negoro, Mrs. B. Nitins, Mrs. P. Nordman, Miss V. O'Connor, Mrs. F. O'Toole, Miss E. Pinnell, Miss M. Price, Mrs. J. Purves, Miss S. Petrie, Mrs. O. Rawlinson, Miss D. Ritchie, Miss F. Roberts, Miss J. Roney, Mrs. V. Rumen, Mrs. J. Russell, Sister Hayden, Sister Mary Clare, Sister C. McIntyre, Sister Patricia Kelly, Sister T. Sabourin, Mrs. S. Slinn, Mrs. S. Staples, Miss E. Smith, Miss I. Sowerby, Mrs. N. Stevens, Mrs. B. Tansey, Miss M. Thompson, Mrs. C. Toder, Mrs. J. Tronningsdal, Miss F. Trout, Mrs. M. Varley, Miss R. Wallace, Mrs. M. Walmsley, Miss D. Weiler, Mrs. M. Wheatley, Mrs. M. Whitney, Miss M. Ward, Mrs. M. Wishlow, Mrs. L. Whitmarsh, Miss G. Woodcock, Miss W. Woodland, Dr. B. R. Wylie.

Mrs. E. Allingham, Dr. L. Andrews, Mrs. D. Appleton, Mrs. R. Arnaud, Miss M. Baird, Miss A. Beattie, Miss H. Boehme, Miss E. Bradshaw, Miss A. Buchanan, Miss H. Castle, Miss C. Charter, Miss L. Crane, Mrs. M. Dillon; Miss J. Doree, Mrs. D. Drinnan, Mrs. E. Fisher, Mrs. P. Galloway, Miss A. Geddes, Miss L. Hamilton, Mrs. D. Hill, Miss E. Ingram, Mrs. L. Khairat, Miss K. Koop, Miss D. Ladner, Miss N. Lee, Miss D. Leslie, Mrs. K. Marshall, Miss J. Murphy, Miss H. MacAleese, Miss J. MacIntyre, Miss F. McDonald, Miss S. McLeod, Mrs. G. Nielsen, Miss E. Riddell, Miss R. Ross, Miss J. Russell, Miss P. Siddons, Miss T. Sieffert, Mrs. D. Slaughter, Miss B. Smith, Miss D. Smith, Mrs. H. E. Smook, Miss M. Standerwick, Miss M. Stewart, Miss J. Sutcliffe, Miss M. Thiessen, Miss D. Vosburgh, Miss H. Whittington, Miss A. Williams, Mrs. J. Wright.

# Council of the School of Nursing:

Field Supervisors:

In addition to those members of professorial rank of the teaching staff of the School, the Council has the following membership; Acting President Gage, Dean Armstrong, Dean McCreary, Dean McCrae, Dean Leung, Dean Riedel, Dr. K. F. Argue (Education), Dr. M. Lee (Home Economics), Assistant Dean C. C. Gourlay (Commerce and Business Administration), C. J. G. Mackenzie (Medicine), F. Noakes (Applied Science), A. E. Piloto (Arts), R. Rosenthal (Science), J. J. Stock (Science), M. Tadych (Social Work) on leave 1968-69, M. Upshall (Health Service).

# SCHOOL OF NURSING

The purpose of the School is to assist students to become competent professional nurses, capable of participating with other individuals and groups in providing comprehensive health services.

With this broad purpose in mind, the following are offered:

- I. For secondary school graduates, a basic programme leading to the degree of Bachelor of Science in Nursing (B.S.N.)\*, Nursing A. See page E13.
- II. For graduate nurses, programme leading to:

The Bachelor of Science in Nursing, Nursing D. See page E15.

A Diploma in Public Health Nursing, Nursing B. See page E17.

A Diploma in Administration of Hospital Nursing Units, Nursing C. See page E17.

A Diploma in Psychiatric Nursing, Nursing E. See page E18.

- III. Part-time study for graduate nurses. See page E19.
- IV. For baccalaureate nurses—a programme leading to the degree of Master of Science in Nursing.

# FACILITIES FOR CLINICAL AND PUBLIC HEALTH NURSING EXPERIENCE

During 1968-69 the facilities of the following organizations were utilized to provide students with opportunities for observation and supervised experience:

- B.C. Cancer Institute.
- B.C. Department of Health Services and Hospital Insurance

Health Branch:

Division of Public Health Nursing.

Division of Tuberculosis Control.

Mental Health Services Branch:

Mental Health Centres, Burnaby, Kelowna, Nanaimo, Prince George.

Riverview Hospital, Essondale.

Canadian Arthritis and Rheumatism Society, Vancouver.

G. F. Strong Rehabilitation Centre, Vancouver.

Grace Hospital, Vancouver.

Greater Victoria Metropolitan Board of Health.

Health Centre for Children, Vancouver General Hospital, Vancouver.

Holy Family Hospital, Vancouver.

Lions Gate Hospital, North Vancouver.

Metropolitan Health Services of Greater Vancouver.

Royal Columbian Hospital, New Westminster.

Royal Jubilee Hospital, Victoria.

St. Joseph's Hospital, Victoria.

St. Paul's Hospital, Vancouver.

St. Vincent's Hospital, Vancouver.

<sup>\*</sup> The colour of the hood is scarlet with twisted cord of university blue and white.

Shaughnessy Hospital, Vancouver.

Vancouver General Hospital.

Victorian Order of Nurses Branches:

Burnaby, North and West Vancouver, Richmond, Surrey, Vancouver, Victoria.

University of British Columbia Child Health Programme.

University of British Columbia Child Study Centre.

York House School for Girls, Vancouver.

# GENERAL INFORMATION AND REGULATIONS APPLICABLE TO BACCALAUREATE AND DIPLOMA PROGRAMMES

#### Admission

1. All inquiries relating to admission to the School of Nursing should be addressed to: The Director, School of Nursing, The University of British Columbia, Vancouver 8, B.C. Requests for application forms should specify the particular programme in which the applicant is interested.

2. Requirements for admission to Nursing are included with descriptions

of the various programmes offered.

3. Since facilities for required nursing experience may limit the number of students who can be admitted, applications should be submitted early in the Spring and should be completed by the following dates: Nursing A, August 1; Nursing D, March 15 if attendance at Summer Session is intended, otherwise August 1; Nursing B, C, E, June 1.

4. The Faculty reserves the right of selection of all students for admission and readmission to the School. Unless distance from the University makes it impracticable, a personal interview is required prior to acceptance.

Requirements for Admission:—see also General Information Bulletin.

1. The minimum academic qualification for admission to the University is Senior Secondary School Graduation (Academic-Technical Programme).

2. In preparation for admission to the baccalaureate programme in the School of Nursing, a senior secondary school graduate should include in her studies: Mathematics 11 and, if possible, 12, Chemistry 11, Physics 11 and one of Biology 12, Chemistry 12, Physics 12 (Biology is advised though not requisite).

3. For admission to the baccalaureate programme a student in Grade 13 must have taken English 100/1, Chemistry 112, Zoology 105, Mathematics 112 or 113 and one other elective. For applicants from other B.C. universities and colleges the equivalent courses are as follows (not including the additional

elective required to complete a full year's credit):

Capilano College:

English 1A, 1B; Chemistry 1A, 1B or 2A, 2B; Mathematics 101 or 102; Biology 102.

Notre Dame University:

Chemistry 111, Mathematics 101 or 111, English 111, Biology 111.

Okanagan College:

English 101, Chemistry 101 or 102, Mathematics 101 or 102, Biology 102. Selkirk College:

Chemistry 110, 111; Mathematics 111 or 112, English 111; Biology 111.

Simon Fraser University:

Chemistry 101, 102, 106 or 102, 103, 116, 117; Mathematics 113, 114; two of English 101, 102, 103, 111; Biology 101, 102.

Vancouver City College:

Chemistry 15A and B, Mathematics 15A and B or 17A and B, English 17A and B, and Biology 16A and B.

The University of Victoria:

Chemistry 120 and 121 or 121 and 124, Mathematics 130, 140 or 150, English 100, Biology 150.

4. For students from other provinces and countries see General Information Bulletin. A student who has completed Grade 12 in another Canadian province may not gain admission directly to the School of Nursing but should apply for admission to a pre-Nursing year of study if resident in British Columbia, otherwise the pre-Nursing year should be taken at the student's provincial university or in a provincial college.

Applicants holding Grade 12 certificates of other Canadian provinces will not be granted advance credit in a degree programme for subjects of Grade 12, but may, where appropriate, be given advance placement.

# Registration

All students register in the regular university registration period.

# Attendance

Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments may be excluded from the final examinations. Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes.

Students, who because of illness are absent from a December or April examination, must submit a certificate, obtained from a doctor, to the University Health Service as promptly as possible.

#### Fieldwork

Fieldwork requirements are listed specifically for each programme and must be satisfactorily completed before a student can be recommended for promotion or graduation. For baccalaureate programmes these courses are usually four weeks in duration and occur following April sessional examinations. For diploma programmes, fieldwork requirements vary slightly according to the programme and to the availability of facilities. Fieldwork is usually planned for January, May and June.

# Summer Work Experience

Because of the values which can accrue from work experiences, students in the baccalaureate programme may wish to consider summer job opportunities which would provide them with a chance to put into practice in a service-oriented situation, some of the concepts and skills that have been learned.

#### Graduation

Every candidate for a degree must make formal application for graduation. Application for graduation must be made not later than March 15. Special forms for this purpose are provided by the Registrar's Office.

#### Withdrawal

Any student who after registration decides to withdraw from the University must report to the Registrar's office. The student will be required to obtain clearance from the University, to the satisfaction of the Registrar, before being granted Honourable Dismissal or recommended, where applicable, for refund of fees.

The Senate of the University may require a student to withdraw from the University at any time for unsatisfactory conduct, for failure to abide by regulations, for unsatisfactory progress, or for any other reason which is deemed to show that withdrawal is in the interests of the student and/or the University.

#### Costs

1. Fees for full-time students-subject to change without notice:

First Term Fees—Payable in full at the time of registration. However, students may pay both first and second term fees at time of registration.

Second Term Fees—Payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Finance Department before this date with a note showing name and registration number.

(includes A.M.	lst Term S. fee)	2nd Term	Total
Nursing (B.S.N. or Diploma)— All Years	219.00	190.00	409.00

Part-time Students-see the General Information bulletin.

- 2. For costs of board and lodging see the General Information bulletin.
- 3. Because nursing practice is included, there are additional expenses, for uniforms, travel, and field work, which vary with the different programmes. Students should be prepared to have field work outside the Vancouver area and therefore should include living and travel costs for this experience in estimating total expenses. The School will provide applicants with information regarding these additional costs.
- 4. A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.

# Master's degree:

Total fee \$600.00 plus Graduate Student Centre fee and A.M.S. fee when applicable.

	ist Term	2nd Term	Total
lst Year	\$191.00	\$150.00	\$341.00
2nd Year	162.00	150.00	312.00
Food and normally noid in Contember and	[am.,aw.,		

Fees are normally paid in September and January.

Candidates completing the degree requirements before the end of the Second Year will be exempt half of the balance of the two-year fee still outstanding. In case an exemption is granted, the final payment must be made at least

one month before the expected date of completion.

	lst	Term	2nd T	erm Total
each subsequent year on campus	. \$	62.00	•	\$ 62.00
each subsequent year off campus		25.00		25.00

A student who fails to register will forfeit his candidacy; it may be reestablished only if his application for reinstatement is approved by the Head of the Department concerned and the Dean of Graduate Studies, and the student pays the total of the prescribed fees for the years in which he failed to reregister. Any student who completed residence requirements prior to September 1965 will be required only to re-register and pay fees for the session in which work for the degree is to be completed. Master's candidates taking their course work during Summer Sessions or those who do not pay the fees as indicated in (b) will be assessed fees on a course basis. The Summer Session Association or A.M.S. fee will be assessed on registration in each session. Master's candidates taking their course work during Winter Sessions may attend Summer Session courses, if recommended by their study programme advisors, without further payment of fees.

Graduate students accepted as candidates for a graduate degree who are required to take prerequisite or additional courses may do so without additional fee, provided that they keep within an overall maximum of 27 units for the Master's degree; they are subject to sessional fees of \$30.00 per unit for courses beyond 27 units.

Graduate students not admissible to the Faculty of Graduate Studies who hope to qualify for admission will register as Qualifying and will be assessed fees on a per unit basis for all courses taken. Fees paid under these circumstances will not subsequently be credited in a graduate degree programme. Graduate students not working toward a graduate degree will be registered as Unclassified and will be assessed fees on the same basis as for "Part-Time Students".

#### Examinations and Advancement

- 1. Regardless of prior credits, full-time students must complete each year a programme equal in unit value to the total number of units normally required for that year.
- 2. Examinations held in December and April are obligatory for all students. Requests for special consideration on account of illness or domestic affliction must be submitted to the Director not later than two days following the close of the examination period. For information regarding medical certificates, see the General Information bulletin.
- 3. In order to pass, candidates must obtain at least 50 per cent. in each subject. In courses including both lecture and laboratory work, students are required to pass in both the written examinations and the laboratory work before standing in the subject will be granted. In courses that include nursing practice, students must demonstrate satisfactory performance as well as pass the written examinations before standing will be granted.
- 4. Term essays and examination papers may be refused a passing mark if they are noticeably deficient in English.
- 5. Standing for the year is recorded as follows: First Class, 80 per cent. or over; Second Class, 65-79 per cent.; Pass, 50-64 per cent.
- 6. At graduation, Honours standing will be granted to those students who obtained First Class standing in the Final Year and an average of at least 75 per cent., with no supplementals, in each of the preceding years. To be eligible for Honours standing, students must have carried a full programme each year; and students in the Nursing "D" programme must have spent two academic years in full-time study at the University.
- 7. A student who fails for a second time in University studies is required to withdraw.

#### **Examination Results**

Results of the sessional examinations in April are mailed to students in the graduating classes about the time of Congregation, and to students in the lower years by approximately June 15. Any student who must meet an application date for another institution prior to June 15 should inform the transcript clerk in the Registrar's office in order that arrangements may be made to meet the deadline.

# Review of Assigned Standing

Reviews of assigned standing are governed by the following regulations:

- 1. Any request for review of an assigned grade, other than for a supplemental examination (in which a request for a review will not be granted), must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each course concerned which will be refunded only if the mark is raised.
- 2. Each applicant for a review must state clearly why she believes the course deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a second time before results are announced. For this reason an applicant granted a supplemental should prepare for the examination since a change in the original mark is unlikely and the result of the review may not be available before the end of the supplemental examination period. A review will not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.
- 3. Reviews will not be permitted in more than two courses (6 units) in the work of one academic year, and in one course (3 units) in a partial course of 9 units or less.

# Supplemental Examinations

- 1. At the discretion of the Faculty, and if a student's general standing in the final examinations of any year is sufficiently high, she may be permitted to write supplemental examinations in the subject or subjects in which she failed. Notice will be sent to all students granted supplemental privileges.
- 2. Supplemental examinations are held in August and at the time of the regular April examinations. Special examinations will not be granted, except by special permission of the Faculty and on payment of a fee of \$20 per paper.
- 3. Applications for supplemental examinations, accompanied by the necessary fees, must be received by the Registrar by July 8. The fees are \$7.50 for each examination written at the University and \$10 for each examination written at any of the following outside centres: Cranbrook, Dawson Creek, Kamloops, Kitimat, Ocean Falls, Penticton, Powell River, Prince George, Prince Rupert, Trail, Victoria; and at Whitehorse, Y.T. Other centres outside of British Columbia are restricted to universities or their affiliated colleges.

In unusual circumstances a student working in a remote area may be permitted to write supplemental examinations at a special centre if satisfactory arrangements can be made. Since permission is contingent on completion of arrangements, only early applications will be considered. No refund will be made if the examination is not written. However, if

No refund will be made if the examination is not written. However, if within 10 days of the scheduled examination the candidate explains to the Registrar her reasons for not writing, consideration will be given to a refund. The refund, if made, will be \$5.00 only.

4. No student may proceed to the work of a higher year without having completed satisfactorily all previous requirements, except by special permission of the Faculty.

# Transcript of Academic Record

A transcript of a student's academic record will, on request of the student, be mailed direct to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the inscription "official transcript only if presented with seal unbroken". On graduation or withdrawal a student may obtain for her own use a copy of her record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of Christmas

or mid-term examinations.

Student records are confidential. Transcripts are issued only at the request

of students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made arrangements satisfactory to the Finance Department to meet any outstanding indebtedness.

Granted Honourable Dismissal indicates that the student is in no disciplinary difficulty at the time the transcript is issued; the term has no reference to scholastic status.

Application for a transcript should be made at least one week before

the document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

#### BACHELOR OF SCIENCE IN NURSING

Programmes Nursing A—for secondary school graduates
Nursing D—for registered nurses

# Nursing A

The School of Nursing offers to both secondary school graduates and registered nurse students the baccalaureate programme leading to the degree of Bachelor of Science in Nursing (B.S.N.). Based on the belief that the professional nurse should be a broadly educated person, the programme combines the study of Arts, Nursing, and Science subjects needed to equip the individual for the practice of professional nursing. Facilities for experience in the nursing care of patients are provided with the co-operation of hospitals and other health agencies. Upon satisfactory completion of the programme, the graduate is prepared to practise in a wide variety of settings and with appropriate experience individuals with ability can progress to responsible nursing positions in educational institutions and service agencies.

Through clinical, academic, and fieldwork courses students are provided with opportunities to develop:

- (i) a broad concept of nursing as a service that is concerned with the promotion of mental and physical health as well as with the care of the sick, and with the welfare of the family and the community as well as that of the individual patient; a service that is rendered in homes, schools, clinics, industrial health services and other community agencies as well as in hospitals;
- (ii) understanding of biological, social, psychological and economic factors that influence health and disease;
- (iii) understanding of fundamental principles on which good nursing care is based, and a satisfactory level of skill in the bedside care of patients;
- (iv) understanding of principles of teaching and their application to the work of the nurse;
- (v) understanding of community resources for the care and prevention of illness and the promotion of health;
- (vi) understanding of fundamental principles of administration and supervision, and of organization of hospitals and other health agencies;
- (vii) appreciation of the significance and responsibilities of professional relationships and the importance of cooperative effort.

# Admission Requirements for Secondary School Graduates.

(a.) Completion of the following courses selected from First Year University courses or their equivalent at another approved university or college or in Grade 13:

English 100

Chemistry 103 or 110 or 120.

Mathematics 130.

Biology 101 (or the equivalent), and one other course which may be: Economics, Geography, History, Philosophy, Psychology, a foreign language, or another approved elective.

Students must obtain a final mark of at least 60 per cent. in either Chemistry or Biology and an overall average of at least 60 per cent. In other subjects at least 50 per cent. is required.

(N.B.: Academic requirements indicated above refer to British Columbia students. Prospective applicants from outside British Columbia should consult the Director of the School of Nursing regarding required subjects and standing. A student who has completed Grade 12 in another Canadian province may not gain admission directly to the School of Nursing but should apply for admission to a pre-Nursing year of study. Additional information given in General Information bulletin.)

# (b.) Good health.

# (c.) Personal suitability.

Application for admission, on forms obtained from the School of Nursing, should be submitted not later than August 1. Students are advised to establish contact with the School as early as possible, e.g., when they register for First Year Arts or Science or during their Grade 13 Year.

# The Programme

The programme is four years in length, with a required fieldwork course of four weeks duration in each year following completion of Sessional Examinations.

#### First Year

Chemistry 2303 unitsMicrobiology 2013 unitsZoology 3033 unitsNursing 150 Human Behaviour3 unitsNursing 154 Human Anatomy1 unitNursing 156 Introduction to Nursing3 unitsNursing 158 Nursing Laboratory1 unit				
Nursing 189 Fieldwork				
Second Year				
Anthropology 200, Psychology 200, or Sociology 200 3 units  English 200				
Third Year				
Nursing 382 Maternal and Newborn Infant Nursing 5 units  Nursing 384 Pediatric Nursing 5 units  Nursing 386 Psychiatric Nursing 5 units  *Nursing 289 Fieldwork				
Fourth Year				
**Sociology 315, or 420, or 425				

<sup>\*</sup>For current third year only.

<sup>\*\*</sup>Students may choose a third or fourth year course in Arts or Science to replace the Sociology option.

Nursing 454 Epidemiology and Health Care	3	units
Nursing 458 Teaching	3	units
Nursing 460 Administration	3	units
Nursing 463 Public Health Nursing	3	units
Nursing 467 The Nursing Profession	1	unit
Nursing 489 Fieldwork		
For course descriptions see page E20.		

Upon satisfactory completion of all requirements, students will receive the degree of Bachelor of Science in Nursing, and will be eligible to write the registration examinations of the Registered Nurses Association of British Columbia.

### Board and Residence Accommodation

For information regarding board and residence accommodation, refer to the General Information bulletin obtainable on request from the Registrar's Office. With the exception of meals and the laundering of uniforms provided at specified times by some of the hospitals where students engage in clinical nursing practice, students are financially responsible for their own maintenance throughout the entire four years of the programme.

Living accommodation for a limited number of Second and Third Year students is made available by some of the hospitals that provide clinical experience. In the allocation of this accommodation, available only on the basis of a complete term (Fall, Spring) and only during the period of clinical experience in the particular hospital, priority is given to students whose homes are outside the Vancouver area. For this accommodation students are required to pay in advance the rental for the complete term.

More detailed information regarding costs will be provided by the School of Nursing.

#### NURSING D

# Admission Requirements for Registered Nurse Students

- 1. Academic: Secondary School Graduation (Academic Technical Programme) of the Province of British Columbia, or its equivalent, with evidence of adequate ability to meet the demands of the programme.\* This is the minimum academic requirement for all applicants, irrespective of the province or country in which the applicant received her secondary school education.
- 2. Personal: Good physical and emotional health, and the personal qualities considered essential for success in the chosen field.
- 3. Nursing: Satisfactory completion of the basic course in a recognized school of nursing and registration in the province or country from which the applicant comes. The basic course should have included adequate instruction and experience in the major clinical services and an orientation to public health nursing.

Where deficiencies are found to exist for which suitable supplementary instruction and experience can be obtained, the School of Nursing will assist the student in making arrangements for such experience.

Students whose high school programme has not included Physics, should consult the Director of the School of Nursing for advice regarding prerequisites to Chemistry 103.

# 4. Credit for previous courses:

Provided sufficiently high standing was achieved in the final examinations, and dependent upon the recency and content of the courses, at the discretion of the Faculty, credit may be granted for:

- courses equivalent to English 100, Mathematics 130, Chemistry 103 or 110 or 120.
- ii. other appropriate Arts and Science courses completed at this or another approved university or college;
- appropriate post-basic nursing courses completed at this or other university.

# The Programme

Total requirements listed below represent three years of study beyond the level of University entrance. Although pre-requisites set limitations in respect to the sequence of courses, some adaptation to the needs and interests of individual students is possible. While some courses may be taken on a part-time basis, this is not the most effective plan and, in order to qualify for the degree, students must spend the equivalent of two academic years in attendance at the University, one of which must be the final year.

Before registering for any of the required courses, prospective applicants are advised to consult the Director of the School regarding their plans.

*Anthropology, Psychology and/or Sociology courses	9	units
Chemistry 103, 110 or 120, and 230	6	units
English 100, and 200 or an elective approved by the Director	6	units
Mathematics 130	3	units
**Microbiology 201	3	units
* **Zoology 303	3	units
Nursing 252 Human Behaviour	2	units
Nursing 281 Introduction to Statistics and Research Method	1	unit
Nursing 356 Perspectives in Nursing	3	units
Nursing 366 Clinical Nursing	3	units
Nursing 454 Epidemiology and Health Care	3	units
Nursing 458 Teaching	3	units
Nursing 460 Administration	3	units
Nursing 463 Public Health Nursing	3	units
Nursing 467 The Nursing Profession	1	unit
Nursing 489 Fieldwork		

For description of courses see pages E22-24.

<sup>\*</sup>Lists of approved course sequences are available in the School of Nursing.

\*\*Except with special permission of the Faculty, Chemistry 230 must precede or be taken concurrently with Microbiology 201.

\*\*\*Biology 101 or Zoology 105, or a satisfactory alternative, is prerequisite to Zoology 303.

#### **DIPLOMA PROGRAMMES**

# Nursing B, C, and E

# Admission Requirements

- 1. Academic: Secondary School Graduation (Academic-Technical Programme) of the Province of British Columbia or equivalent schooling to the level of Grade 12.
- 2. Personal: Good health, and the personal qualities considered essential for success in the chosen field.

3. Nursing:

- (a). Graduation from a recognized school of nursing and registration in the province or country from which the applicant comes.
  - (b). A period of satisfactory graduate-nurse experience.
- (c). A basic level course in psychiatric nursing including clinical experience, or in lieu of that, a period of satisfactory employment in an active psychiatric unit:
  - (i) is required for Nursing B applicants;
  - (ii) is preferred for Nursing C applicants;
  - (iii) is NOT required for Nursing E applicants.

### PUBLIC HEALTH NURSING

# Nursing B

This programme, approximately nine months in length, is designed to help selected registered nurses who are graduates of non-degree programmes to increase their knowledge and understanding of nursing and their ability to apply these to public health nursing practice.

Sociology 200		
Nursing 202 Principles of Learning and Instruction	1	unit
Nursing 220 Core concepts of Nursing	3	units
Nursing 327 The Nursing Profession	1	unit
Nursing 340 Interpersonal Relationships		
Nursing 343 Public Health Nursing	4	units
Nursing 344 Epidemiology and Health Care	3	units
Nursing 346 Fieldwork		

For course descriptions see page E21.

Upon satisfactory completion of the above requirements, students receive a Diploma in Public Health Nursing.

# ADMINISTRATION OF HOSPITAL NURSING UNITS Nursing C

This programme, approximately nine months in length, is designed to help selected registered nurses who are graduates of non-degree programmes to increase their knowledge and understanding of nursing and their ability to apply these to nursing service positions entailing administrative and supervisory functions with special reference to those of the head nurse.

While the curriculum includes an introduction to nursing education and the teaching responsibilities of the head nurse, it is not possible in the time available to provide adequate preparation for instructors, and this programme does not attempt to do so. Nurses interested in preparing themselves for teaching positions are advised to consider the Baccalaureate Degree Programme (Nursing D).

The Programme

Anthropology 200 or Sociology 200	3	units
Nursing 202 Principles of Learning and Instruction	1	unit
Nursing 220 Core Concepts of Nursing	3	units
Nursing 327 The Nursing Profession	1	unit
Nursing 340 Interpersonal Relationships	3	units
Nursing 342 Nursing Service Administration	6	units
Nursing 347 Fieldwork		

For Course Descriptions see pages E22-24.

Upon satisfactory completion of the above requirements, students receive a Diploma in Administration of Hospital Nursing Units.

# PSYCHIATRIC NURSING

# Nursing E

Approximately nine months in length, this programme is designed to help selected registered nurses who are graduates of non-degree basic programmes to increase their knowledge and understanding of nursing and their ability to apply these in psychiatric nursing practice.

The Programme	
Anthropology 200	3 units
Sociology 200	3 units
Nursing 202 Principles of Learning and Instruction	1 unit
Nursing 326 Psychiatric Nursing	7 units
Nursing 327 The Nursing Profession	l unit
Nursing 336 Fieldwork	

For Course Descriptions see pages E22-24.

Upon satisfactory completion of the above requirements, students receive a Diploma in Psychiatric Nursing.

#### PART-TIME STUDY

Nurses unable to arrange for full-time attendance may be permitted to register for certain courses regularly offered. Credit for courses completed satisfactorily may be granted only under the following conditions:

- 1. Toward one of the Diploma programmes (Nursing B, C, or E) provided:
- (a.) the student is qualified for admission to the programme before she registers for the course, and
  - (b.) all requirements are met within a period of three calendar years.
  - 2. Toward the degree of Bachelor of Science in Nursing provided:
- (a.) the student is qualified for admission to the programme and has completed satisfactorily all prerequisites before she registers for the course;
- (b.) all requirements are met within a period of six calendar years for those who have to take the entire programme, or within a proportionately shorter period of time for those who may be granted advanced credits (e.g. for Grade 13 subjects); and
- (c.) at least one academic year (preferably the Final Year) is spent in full-time study at the University, with at least half of the programme for that year consisting of courses taught in the School of Nursing.

Nurses considering part-time study should arrange for a personal interview with the Director of the School.

# COURSE DESCRIPTIONS BACCALAUREATE AND DIPLOMA PROGRAMMES

The number of units assigned to a course is given in round brackets immediately following the course number.

The hours assigned for laboratory, lectures and tutorials in a course are indicated as follows:

2 lectures and 3 hours laboratory per week, both terms.	[2-3; 2-3]
I lecture and 2 hours laboratory per week, first term.	[1-2; 0-0]
1 lecture and 2 hours laboratory per week, second term.	[0-0; 1-2]

2 lectures, 3 hours laboratory and 2 hours tutorial or discussion per week, both terms. [2-3-2; 2-3-2]

In the clinical nursing courses the ratio between class and supervised nursing experience varies but in the overall programme it is approximately 1:3. The unit values for these courses are based on both instruction and supervised nursing experience.

# **Baccalaureate Courses**

- 150. (3) Human Behaviour.—The study of human growth, development, behaviour, and communication basic to an understanding of and skill in interpersonal relationships in the practice of nursing. [3-0; 3-0]
  - 154. (1) Human Anatomy.—A study of the structure of the human body.

    [1-0; 1-0]
- 156. (3) Introduction to Nursing.—Fundamental concepts and techniques applicable to the nursing care of patients. [2-3; 2-3]
- 158. (1) Nursing Laboratory.—Planned experience designed to develop measurement, interpersonal and manipulative skills. [0-2; 0-2]
  - 189. Fieldwork.—Observation of the performance of a professional

nurse; workshop in community structure, functions, and services; practice to develop basic nursing skills.

- **252. (2)** Human Behaviour.—Some concepts basic to deeper understanding of and greater skill in interpersonal relationships, including those pertaining to human growth, development, behaviour, and communication. [2-0; 2-0]
- 267. (1) Introduction to the Nursing Profession.—The evolution of nursing including an introduction to the status of nursing in Canada to-day and the framework in which it functions. [1-0; 1-0]
- 280. (8) Nursing of Adults.—The nature and functions of nursing care in the management of health problems of adults. Experience is provided in general hospitals and other community agencies.
- 281. (1) Introduction to Statistics and Research Methods.—An introduction to statistical and research methods and their application in health sciences. [1-0; 1-0]
- 289. Fieldwork.—Participation in the provision of nursing care in the home.
- 356. (3) Perspectives in Nursing.—The nature of nursing intervention with emphasis on current theories and concepts. [3-0; 3-0]
- 366. (3) Clinical Nursing.—A course designed to provide opportunities to test theory and to practise problem-solving, interpersonal, and communicative skills in a variety of nursing situations. Prerequisites: Nursing 252 and 356.
- 382. (5) Maternal and Newborn Infant Nursing.—A family centered experience designed to prepare the student to plan, provide, and evaluate nursing care during the various phases of the maternity cycle.
- 384. (5) Pediatric Nursing.—Guided study and experience in the nursing care of children.
- 386. (5) Psychiatric Nursing.—Concepts and principles basic to comprehensive care of psychiatric patients, with emphasis on the development of communicative, interpersonal, and problem-solving skills.
- 454. (3) Epidemiology and Health Care.—Application of epidemiological methods to the prevention and control of disease and to the development of health care programmes in the community. [3-0; 3-0]
- 458. (3) Teaching.—Further consideration of principles and planning related to the teaching of patients, nursing personnel, and nursing students; and an introduction to the fundamentals of curriculum construction.

  [2-0; 2-0]
- 460. (3) Administration.—Fundamentals of administration and their application in nursing services. [3-0; 3-0]
- 463. (3) Public Health Nursing.—The components and process of public health nursing applied to the health supervision and anticipatory guidance of individuals, families, and other community groups. Guided concurrent practice is provided in agencies offering a generalized public health nursing programme. [3-0; 3-0]
- 467. (1) The Nursing Profession.—Evolution, functions, and activities of professional nursing associations, and responsibilities and privileges of membership therein; present patterns, trends, and problems of nursing education.

  [1-0; 1-0]
- 489. Fieldwork.—Planned observation and guided participation in selected nursing services or educational programmes.

# **Diploma Courses**

202. (1) Principles of Learning and Instruction for Nursing Practice.—Basic concepts of learning and their application to teaching. [2-0; 0-0]

220. (3) Core Concepts of Nursing.—Core concepts of clinical nursing and their implications for planning, providing and evaluating nursing care.

[3-0; 3-0]

326. (7) Psychiatric Nursing.—Consideration of selected concepts and techniques related to human behaviour and psychiatric disorders; and guided practice in their application to nursing.

327. (1) The Nursing Profession.—Evolution, functions, activities and relationships of professional nursing associations, with special reference to those in Canada; present patterns, trends, and problems of nursing education.

[0-0; 2-0]

336. Fieldwork.—Guided experience in a psychiatric nursing unit.

340. (3) Interpersonal Relationships.—Concepts basic to deeper understanding of human behaviour and to the development of increasing skill in interpersonal relationships. [3-0; 3-0]

- 342. (6) Nursing Service Administration.—Fundamentals of administration and their application in the hospital nursing service, with particular reference to the administration of the nursing unit; and collateral topics contributing to understanding of nursing service administration in the hospital setting.

  [6-0; 6-0]
- 343. (4) Public Health Nursing.—The fundamentals and process of public health nursing applied to individual, family, and community health situations. [4-0; 4-0]
- 344. (3) Epidemiology and Health Care.—Application of epidemiological methods to the prevention and control of disease and to the development of health care programmes in the community. [3-0; 3-0]
- 346. Fieldwork.—Planned observation and guided participation in public health nursing.
- 347. Fieldwork.—Planned observation and guided participation in the administration of hospital nursing units.

# Courses in the Faculty of Arts and in the Faculty of Science that are included in the various Nursing programmes.

- 200. (3) Introduction to Anthropology.—A comparative study of cultural institutions in the primitive world; of family and other social structures; of economics, government, language, art, religion; of the origins of man and culture, the races of mankind.

  [3-0; 3-0]
- 101. (3) Principles of Biology.—An introductory course emphasizing principles of wide application to all living organisms, including cell structure and function, the mechanism of inheritance, evolution, and adaptation to environment. A comparative approach to the unity and diversity of organisms will be stressed. Biology 11 is strongly recommended. An additional one hour tutorial period is required each week for those students who have not previously had Biology 11 or its equivalent in high school. Biology 100 from Grade 13 in British Columbia will not be accepted as equivalent to Biology 101; however, Botany 105 or Zoology 105 will be accepted as equivalent for prerequisite purposes. [3-3; 3-3]

Chemistry 103. (3) General Chemistry.—A study of the fundamental principles of chemistry including the molecular structure of both inorganic

and organic compounds. Prerequisites: Mathematics 12 (or Mathematics 130 concurrently), Physics 11 or its equivalent is strongly recommended.

[3-3; 3-3]

Chemistry 110. Principles of Chemistry.—A study of the fundamental principles of Chemistry with particular reference to the nature of solutions, the solid state and the molecular structure of both inorganic and organic substances. This course is intended for prospective Science and Engineering students who have not taken Chemistry 12. Prerequisites: Chemistry 11, Physics 11. Mathematics 130 and a first year Physics course must precede or be taken concurrently.

[3-3-1; 3-3-1]

Chemistry 120. (3) Principles of Chemistry.—Similar to Chemistry 110 but for those prospective Science and Engineering students who have taken Chemistry 12. Prerequisites: Chemistry 11 and 12, Physics 11. Mathematics 130 and a first year Physics course (Physics 110 or 120) must be taken concurrently.

[2-3-1; 2-3-1]

Chemistry 230. The fundamental principles of modern organic chemistry including a discussion of the main classes of organic compounds. Prerequisite: Chemistry 103 or 110 or 120. Credit will not be given for both Chemistry 203 and 230. [3-3; 3-3]

English 100. Literature and Composition.—A study of the principles of composition and of some twentieth-century examples of drama, short story, poetry and novel. Essays and exercises are required. [4-0; 4-0]

English 200. Literature and Composition.—A study of representative works of English literature. The course is offered in two divisions with alternate reading lists. Essays are required. [3-0; 3-0]

Mathematics 130. Finite Combinatorial Mathematics.—Permutations, combinations, the binomial theorem, probability, properties of numbers and geometric configurations. Prerequisite: Mathematics 11 (Secondary School Programme, British Columbia) or the equivalent. This course will not be accepted as a prerequisite to Mathematics 151, 155, 156, 200, 202, 220, 221, 240. [3-0; 3-0]

Microbiology 201. Principles of Microbiology.—Similar to Microbiology 200 but with a slight medical emphasis. Recommended for students of Nursing, Pharmacy and other Health Sciences. It is recommended that Chemistry 230 be taken concurrently. Credit will not be given for both Microbiology 200 and 201. [3-2; 3-2]

Psychology 200. Experimental Psychology.—The principles and methods of experimental psychology; use of elementary statistics in analysis of data; laboratory demonstrations. Prerequisite: Psychology 100. [3-0; 3-0]

Sociology 200. Issues in Sociological Theory and Method.—By working with materials involving substantive topics in sociology, students will be introduced to problems in the formulation of theory and the adequacy of methods. The emphasis will be upon conceptualising and solving problems, with the intention of assisting the student to appreciate current issues in the discipline, while providing basic skills for more advanced work.

[3-0; 3-0]

Zoology 303: Introduction to Vertebrate Physiology.—Organ physiology. Prerequisites: First Year Chemistry. If recommended by the School of Nursing, students in the Nursing D programme may be admitted to Zoology 303 without Zoology 105. [2-2; 2-2]

Note: Appropriate sequences of courses in the Social Sciences and the course descriptions for these will be provided by the School of Nursing for registered nurse applicants to the Nursing D baccalaureate programme.

Students in the Nursing D Programme who prefer an alternate to English 200 may select instead another Second Year level Arts course. The course chosen by the student must be approved by the Director of the School of Nursing. Provided the student has the prerequisites, and provided the selected course can be fitted into the timetable, any one of the following would be acceptable: Economics 200; Political Science 200; Religious Studies 200; and Second Year course in a foreign language or in History.



# MASTER OF SCIENCE IN NURSING DEGREE

# 1. Inquiries Relating to Admission.

Inquiries relating to admission to the Master's Degree Programme should be addressed to The Director, School of Nursing, The University of British Columbia, Vancouver 8.

# 2. Admission Requirements.

- a) General requirements for admission to graduate studies:—
  Information about general requirements for admission to graduate studies at the University of British Columbia is contained in the Calendar of the Faculty of Graduate Studies, under the heading, Courses Leading to the Master's Degree.
- b) Specific Requirements related to the Master of Science in Nursing Programme:—
   An applicant for admission to the Master of Science in Nursing Pro-

gramme is required to have:

i. a baccalaureate degree in nursing which represents completion of a

generic (i.e. nonspecialized) programme or a satisfactory equivalent; ii. sufficient experience as a professional nurse practitioner to enable the applicant to have demonstrated an acceptable level of competence.

# 3. Application Procedure.

Applications for admission to the Master of Science in Nursing Programme are reviewed by a committee of the School of Nursing which makes recommendations concerning the admission of the individual applicant to the Dean of the Faculty of Graduate Studies. The applicant is notified by the latter regarding the decision reached about his or her admission. The procedure for making application for the M.S.N. Programme is as follows:

- A. Application for Admission to the Faculty of Graduate Studies
  - a) The applicant submits to the Division of Graduate Studies, Registrar's Office, on or before March 1, the Application for Admission to the Faculty of Graduate Studies. (Application forms are supplied by the Registrar's Office.)
  - b) The application should be accompanied by two recent photographs of the applicant, passport type.
  - c) Two official transcripts of the applicant's record at all colleges and universities previously attended should either accompany the application or be sent directly from the institutions attended. Applicants who have attended only The University of British Columbia need not submit transcripts.
  - d) An official transcript of the record of the applicant's basic nursing preparation should also be submitted, unless such preparation was an integral part of his or her baccalaureate programme.
  - e) Reference forms supplied by the Registrar's Office should be distributed by the applicant to at least two faculty members of universities attended who are willing to make a frank assessment of the applicant's potential as a graduate student.
  - f) Facility in the use of the English language is essential for graduate studies at the University of British Columbia. It may be necessary

for an applicant to take a formal test in English usage. If so, the applicant will be informed.

# B. Application for Admission to the School of Nursing

- a) An application form for admission to the School of Nursing should be submitted to the Director on or before March 1. Included in the information required of the applicant on this form are a summary of positions held and the names and addresses of at least two professional nurses, preferably Directors of Nursing, to whom the applicant has been responsible in a work situation, and from whom confidential references may be requested. The application form should be accompanied by a statement of the applicant's goals in intering the Master of Science in Nursing Programme.
- b) The applicant is required by the School of Nursing to have a complete medical examination by his or her own physician to be reported on the form provided, and mailed to the Student Health Service in advance of registration.
- c) A report of an x-ray examination of the chest is required, the x-ray to have been taken within one year of the time of commencement of the University Session.
- d) Immunizations:—Smallpox vaccination within the year preceding admission is required for all students entering the University. The School of Nursing also requires that the Masters' students be protected against diphtheria, tetanus, and poliomyelitis. It is recommended that, if the applicant's tuberculin test is negative, he or she investigate the possibility of being revaccinated with B.C.G.
- e) Personal interview:—Unless impossible due to distance from the University, a personal interview with the Director of the School of Nursing is recommended.
- f) The applicant is required by the School of Nursing to write in advance of registration the Aptitude Test of the Graduate Record Examination. Arrangements for this test can be made by writing to: Graduate Record Examinations, Educational Testing Service, Princeton, New Jersey, OR Berkeley, California, U.S.A. (Note: Success in this test is not a criterion for admission to the programme.)
- 4. Registration and Programme Requirements.
- 5. Examinations and Supplementals.
- 6. Fees

Refer to general information on Courses Leading to the Master's Degree

# Master of Science in Nursing

The programme for full-time students, extends over two academic years and is designed to prepare selected persons for leadership roles in nursing. Emphasis is placed on study of clinical nursing practice and exploration of theoretical foundations of a functional role such as administrator, supervisor, teacher.

# The Programme

# First Year

I ii St I Cui		
N. 520 Core Concepts of Nursing	3	units units
One of		
N. 530 Nursing in Long-Term Illness		
N. 531 Psychiatric Nursing	. 4	units
*Supportive courses, numbered 300 or above,		
selected from the offerings of other		
faculties	. 6	units
	17	units
Second Year		
*One of:		
N. 560 Nursing Education	4	units
N. 570 Administration and Supervision	_	5.22.05
in Nursing Service	. 4	units
*Supportive courses, numbered 300 or above, selected from the offerings of other		
faculties	. 6	units
N. 599 Thesis	. 3	units
	13	units

\*The choice of supportive courses will require approval by the departments concerned.

# Graduate Courses

- N. 520. (3) Core Concepts of Nursing.—Seminar in historical and philosophical foundations of nursing services; theories of nursing action; components of clinical practice; methods of achieving nursing goals.
- N. 521. (4) Methods and Techniques of Research.—Logic and thought processes basic to research; formulation of research problems in nursing; research design; data collection; measurement techniques; analysis and interpretation of findings.
- N. 530. (4) Nursing in Long-Term Illness.—Seminar and guided practice in nursing of patients with long-term illnesses in institutional and community settings. Consideration of common features of long-term illnesses; effects on various physiological functions; the adaptation phenomenon; social and psychological consequences of long-term illness for the individual, family and community; nursing approaches designed to help the patient and his family cope with a long-term illness.
- N. 531. (4) Psychiatric Nursing.—Seminar and guided practice in which emphasis is placed on critical appraisal of nursing intervention in mental health problems using various theoretical models of human behaviour.
- N. 560. (4) Nursing Education.—Historical and philosophical foundations of nursing education; the role of the nurse educator; sources and definitions of educational objectives; selection and organization of content and learning experiences; evaluation of educational outcomes.
- N. 570. (4) Administration and Supervision in Nursing Services.—The nature and elements of administration; principles of administration and their application in nursing services; concepts and principles of supervision and the role of the nursing supervisor.
  - N. 599. (3) Thesis.

# Awards and Financial Assistance

Subject to change. Full corrected statement for the year 1969-70 will appear in the publication "Awards and Financial Assistance".

The complete list of scholarships and prizes in each Faculty, and bursaries and loans open to students in all faculties, is available in the section of the Calendar entitled "Awards and Financial Assistance". This section, which may be obtained on request from the Registrar's office, should be consulted by all students who wish to obtain fuller information or to submit applications. It should be noted that most awards do not require the submission of an application, and further, that the following partial list is subject to amendment. Applications for bursaries must be submitted by July 15 to the Dean of Inter-Faculty and Student Affairs, on forms obtainable from his office.

Crown Zellerbach Canada Limited Scholarship in Nursing—A scholarship of \$500, the gift of Crown Zellerbach Canada Limited, will be awarded to a student who is entering the Final Year of the degree course in Nursing. Selection of the winner will be made on the recommendation of the School of Nursing. In selecting the winner consideration will be given to the records of candidates in both the academic and practical programmes, and to their promise in the profession of nursing.

The Hamber Scholarship in Nursing—A scholarship of \$300, the gift of the late Honourable Eric W. Hamber, C.M.G., B.A., LL.D., Chancellor of this University from 1944 to 1951 and Chancellor Emeritus from 1951 to 1960, is available annually to students entering the Final Year of the degree course in Nursing. This scholarship will be awarded to a top-ranking student who has an outstanding record in both the academic and practical pro-

grammes.

The Mabel Johnston Scholarship in Nursing.—This scholarship, established through a bequest from Miss Mabel Johnston, is offered to a student

proceeding to the Master's Degree in Nursing.

The Mary Graham Holland Scholarship in Nursing—A scholarship of approximately \$750, endowed from a bequest made by the late Mrs. Mary Graham Holland, will be awarded annually to a woman undergraduate entering upon her Final Year in the School of Nursing at this University. The scholarship will be given to the student considered by the School to be the most deserving of the award.

The Nettie Neudorf Memorial Scholarship in Nursing.—As a memorial to Nettie Neudorf, B.S.N. (Brit. Col.), R.N., this scholarship of \$500 is offered to students proceeding to the Fourth Year of the degree programme in Nursing. This scholarship will be awarded, on the recommendation of the School, for excellence in the subject of obstetric nursing combined with outstanding personal qualities and promise. Preference will be given to a student needing

financial assistance.

The Provincial Health Branch Scholarship—The Health Branch of the Province of British Columbia offers the sum of \$100 to be given as a scholarship in Nursing. This scholarship will be awarded in September to a student proceeding to the Final Year of the degree programme who, on completion of the course, will seek employment as a public health nurse.

The University Nurses' Club Scholarship—A scholarship of \$100, gift of the Nursing Division of the University of British Columbia Alumni Association will be awarded annually to a student proceeding from the Third to the Fourth Year in Nursing. In selecting the winner, consideration will be given to academic standing, ability, promise, and financial circumstances.

The University of B.C. Nursing Division Alumni Association Award—A scholarship of \$200, gift of the Nursing Division of the University of British

Columbia Alumni Association, will be awarded annually to one or more students in the School of Nursing. In selecting the winners, consideration will be given to academic standing, ability, promise, and financial circumstances.

University Scholarship in Nursing and Health—A scholarship of \$200 will be awarded for general proficiency in previous work of university grade (which must include a minimum of two years' work in the Province of British Columbia), to a student proceeding to the Second Year of the course in Nursing who has successfully completed all First Year requirements and has demonstrated the potentialities of a good nurse.

The Vancouver Women's Canadian Club Scholarship in School of Nursing —A scholarship of \$100, the proceeds of a fund created by the Vancouver Women's Canadian Club, will be awarded to the student who attains the highest standing in all previous work and is entering the Final Year of her course in the School of Nursing.

The Pearl Mackenzie Scheel Scholarship—A scholarship of approximately \$250.00, established and endowed by a bequest from the late Pearl Mackenzie Scheel, is awarded annually to a student in Second Year Nursing. It will be awarded annually on the recommendation of the School to a student with high standing.

The Aline Smithson Memorial Bursary in Nursing—As a memorial to Aline Smithson (nee Lawrence) and as tribute to her exceptional personal qualities and cheerful devotion to her family and friends, this bursary has been established by her husband, H. William Smithson. In the amount of \$100 it will be awarded annually in December to a student in Nursing who is worthy and deserving of assistance, is potentially a good nurse and really loves people.

The Anna E. Sprott Memorial Bursary in Nursing.—This bursary of \$100, given in memory of Anna E. Sprott by the R.C.A.F. Chapter, I.O.D.E., will be awarded in the winter session to a student taking her Final Year in the course leading to the degree of B.S.N. in the School of Nursing. The award will be made to a student who has good academic standing and is in need of financial assistance.

The E. Frances Gunning Memorial Bursary.—This bursary of \$100 is offered annually as a memorial to Mrs. H. C. Gunning. It pays tribute to her gift for lasting friendships and to her sympathetic and active concern for others, including the students of this University. It will be awarded to a student in engineering or nursing who has comparable qualities, good academic standing and financial need.

The Unknown Warrior Chapter, I.O.D.E., Bursary in Public Health Nursing—A bursary of \$100, the gift of the Unknown Warrior Chapter, I.O.D.E., will be awarded to a woman student entering the Final Year of Public Health Nursing. The award will be granted to a student who has high scholastic standing and is in need of financial assistance.

Assistance Available from Sources Other Than the University

Victorian Order of Nurses for Canada—Bursaries of \$1800 are available for preparation in public health nursing in either a diploma programme, or a basic degree programme which includes preparation in public health nursing. On completion of their programme recipients are obligated to work for the organization for one year anywhere in Canada. Complete information and application forms may be obtained from: The Director in Chief, Victorian Order of Nurses for Canada, 5 Blackburn Avenue, Ottawa 2, Ontario.

Victorian Order of Nurses, Lord Strathcona Fund—Bursaries of \$1000 are available for preparation in public health nursing at the University of British

Columbia. Applicants must have been born in the British Isles and be resident in British Columbia. On completion of their programme recipients are obligated to work one year for the Victorian Order of Nurses anywhere in British Columbia. Complete information and application forms may be obtained from: Regional Supervisor, Victorian Order of Nurses for British Columbia, 1645 West 10th Avenue, Vancouver 9, British Columbia.

The Countess Mountbatten Bursary Fund of Canada—A bursary of \$600 and a limited number of grants of \$200 are available to provide assistance to graduate and undergraduate nursing students. The candidate's qualifications and financial needs will be considered; these being equal, consideration will be given to someone with St. John affiliation. Complete information and application forms may be obtained from: The Chairman, Countess Mountbatten Bursary Fund Committee, St. John's House, 321 Chapel Street, Ottawa 2, Ontario.

The Margaret MacLaren Memorial Fund—One or more bursaries of \$1000.00 or more available to registered nurses who have proven their ability and are preparing themselves for greater responsibility and service, offered annually by the St. John Ambulance National Headquarters, Ottawa, in memory of Miss Margaret MacLaren, a former Superintendent-in-Chief. Complete information and application forms may be obtained from: The Chairman, The Margaret MacLaren Memorial Fund Committee, St. John's House, 321 Chapel Street, Ottawa 2, Ontario.

Registered Nurses' Association of British Columbia Bursary-Loan Fund—Funds for further study in nursing are available to nurses registered in British Columbia, and to nursing students entering the final year of the Baccalaureate degree programme in nursing at the University of British Columbia. Fifty percent of this assistance is given as a bursary and 50 percent is a loan. Complete information and application forms may be obtained from: Registered Nurses' Association of British Columbia.

The Margaret Sinn Bursary—A bursary of \$400.00 to be awarded annually in the form of one or more bursaries. The general criteria for eligibility include financial need, academic and general progress with priority given to students enrolled in, or accepted for enrollment in the basic nursing degree programme. Deadline for application is June 30. Complete information and application forms may be obtained from The Registered Nurses' Association of British Columbia.

Alumnae Associations—Many Alumnae Associations offer bursaries and/or loans to their members.

Health Grant Bursaries—Funds are available to registered nurses in all provinces under this grant. The grants are primarily for improving existing health services. As they are administered provincially, conditions of eligibility, procedures for applying, and obligations entailed may vary in the different provinces. In British Columbia those interested in preparing for Public Health Nursing should apply to: Director of Public Health Nursing, Department of Health, Parliament Buildings, Victoria, British Columbia. Those who wish to prepare for positions in nursing service administration should apply to the Director of Nursing of their employing hospital. Those interested in preparing for positions with the Mental Health Services in British Columbia should seek information from: The Director of Nursing Services, Provincial Mental Health Services, Provincial Health Building, 828 West 10th Avenue, Vancouver 9, British Columbia. The Registered Nurses Association of British Columbia also sponsors applicants for the National Health Grant Bursaries and information may be obtained by contacting the Association at 2130 West 12th Avenue, Vancouver, B.C.

# THE FACULTY OF ARTS

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA
VANCOUVER 8 • BRITISH COLUMBIA CANADA

# Calendar of the Faculty of Arts, 1969-1970

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### FACULTY OF ARTS

JOHN H. YOUNG, A.F.C., M.A. (Queen's), Ph. D. (Cantab), Professor of Economics and Dean of the Faculty.

Douglas T. Kenny M.A. (Brit Col), Ph.D. (Wash), Professor of Psychology, and Associate Dean of the Faculty.

ROY DANIELLS, B.A. (Brit Col), Ph.D. (Toronto), LL.D. (Queen's, Toronto), F.R.S.C., University Professor of English Language and Literature.

# Department of Anthropology and Sociology

Professor and Head

CYRIL S. BELSHAW, M.A. (New Zealand), Ph.D. (London), Anthropology.

Professors

DAVID F. ABERLE, A.B. (Harvard), Ph.D. (Columbia), Anthropology.

CHARLES E. BORDEN, M.A., Ph.D. (Calif), Archaeology; Curator, Archaeology Laboratory.

Kenelm O. L. Burridge, M.A., B. Litt., Dip. Anth. (Oxon), Ph.D. (Australian National), Anthropology.

HARRY B. HAWTHORN, M.Sc., B.A. (New Zealand), Ph.D. (Yale), F.R.S.C., Anthropology, Director Museum of Anthropology.

REGINALD A. H. ROBSON, B.Sc. (London), Ph.D. (Minn), Sociology; Director, Small Groups Laboratory.

Associate Professors

MICHAEL M. AMES, B.A. (Brit Col), Ph.D. (Harvard), Anthropology.

WERNER COHN, B.S.S. (CCNY), Ph.D. (New School for Social Research), Sociology.

WILSON DUFF, B.A. (Brit Col), M.A. (Wash.), Anthropology.

PIERRE MARANDA, B.A. (Laval), M.A. (Montreal), Ph.D. (Harvard), Anthropology.

ADRIAN J. H. MARRIAGE, M.A. (London), Sociology.

MARTIN MEISSNER, B.Com. (Brit Col), Ph.D. (Ore), Sociology.

DOROTHY SMITH, B.Sc. (London), Ph.D. (Calif), Sociology.

WILLIAM E. WILLMOTT, M.A. (McGill), Ph.D. (London), Anthropology.

Assistant Professors

BRAXTON M. ALFRED, B.A. (Houston), Ph.D. (Colo), Anthropology.

HOWARD N. BOUGHEY, B.A. (Columbia), M.A., Ph.D. (Princeton), Sociology.

Yunshik Chang, B.A. (Seoul), M.A. (Brit Col), Ph.D. (Princeton), Sociology.

Jean-Louis M. de Lannoy, Doctorat en Droit (Louvain), Sociology.

MARTHA S. FOSCHI, B.A. (Buenos Aires), A.M. (Stanford), Sociology.

George A. Gray, A.B. (Willamette), Ph.D. (Oregon), Sociology.

HELGA E. JACOBSON, M.A. (London), Anthropology.

BONNIE G. MACDOUGALL, A.B., A.M. (Cornell), Anthropology and Linguistics.

ROBERT D. MACDOUGALL, B.Arch. (Cornell), Anthropology.

TERRANCE NOSANCHUK, B.A. (Wayne State), Ph.D. (Chicago), Sociology.

ROBERT J. POKRANT, B.A. (Leicester), M.A. (Northwestern), Sociology.

ROBERT S. RATNER, A.B. (Columbia), M.A., Ph.D. (Yale), Sociology.

THEODORE RAVETZ A.B., M.A. (Calif), Sociology.

Wm. Robin Ridington, B.A. (Swarthmore), A.M., Ph.D. (Harvard), Anthropology.

RONALD J. SILVERS, M.A. (Texas, Princeton), Sociology.

MATTHEW R. SPEIER, B.A. (Queens), M.A. (Calif), Sociology.

Roy Turner, A.M. (Chicago), Ph.D. (Calif), Sociology.

Visiting Assistant Professor

J. E. MICHAEL KEW, B.A. (Brit Col), Anthropolgy.

Part-Time Lecturers

MADELINE BRONSDON, M.A. (Brit Col), Anthropology.

Audrey E. Hawthorn, M.A. (Columbia), Curator of the Museum of Anthropology.

ELSA S. TURNER, Doctorado en Quimica (Buenos Aires), M.A. (Calif), Sociology.

# Department of Asian Studies

Professor and Head

EDWIN G. PULLEYBLANK, B.A. (Alta), Ph.D. (London), M.A. (Cantab).

Professors

Fo-ch'uan Chang, B.A. (Yenching, Peking).

WILLIAM L. HOLLAND, M.A. (New Zealand).

SHUICHI KATO, M.D. (Tokyo).

CHI LI, B.A. (Ginling, Nanking), B.Litt. (Oxon).

Associate Professors

PETER HARNETTY, B.A. (Brit Col), A.M., Ph.D. (Harvard).

JOHN F. Howes, B.A. (Oberlin), M.A., Ph.D. (Columbia).

BARRIE McA. Morrison, B.A. (Sask), M.A., B.Litt. (Oxon), Ph.D. (Chicago).

Assistant Professors

HSU-TU CHEN, B.A. (Tsinghua).

RENÉ GOLDMAN, M.A. (Columbia).

Kenji Ogawa, B.A. (Aoyama, Tokyo).

JOSEPH I. RICHARDSON, B.A., B.D. (McMaster), S.T.M. (Union Theological Seminary).

LEON M. ZOLBROD, B.A. (Wash), M.A., Ph.D. (Columbia).

Lecturers

HUNTER GOLAY, A.B. (Calif).

HILDA KATO, M.A. (Brit Col).

Lecturers from other Departments

MICHAEL M. AMES, Associate Professor of Anthropology.

RICHARD COPLEY, Assistant Professor of Geography.

Brian Harrison, Professor of History.

ARTHUR E. LINK, Professor of Religious Studies.

Bernard Saint-Jacques, Assistant Professor of Linguistics.

KERNAIL SINGH SANDHU, Associate Professor of Geography.

WILLIAM E. WILLMOTT, Associate Professor of Anthropology.

# Department of Classics

Professor and Head

MALCOLM F. McGregor, M.A. (Brit Col), Ph.D. (Cincinnati), F.R.S.C.

Associate Professors

C. W. J. ELIOT, M.A., Ph.D. (Toronto).

PATRICK C. F. GUTHRIE, C.D., B.A. (Man), M.A., Ph.D. (Toronto).

Assistant Professors

ANTHONY A. BARRETT, B.A. (Durham, Newcastle), M.A., Ph.D. (Toronto).

W. J. Dusing, M.A. (Toronto).

H. G. Edinger, B.A. (Yale), M.A., Ph.D. (Princeton).

James Russell, M.A. (Edinburgh), Ph.D. (Chicago).

GERALD N. SANDY, M.A., Ph.D. (Ohio State).

ROBERT B. TODD, B.A. (London), M.A. (Princeton).

Visiting Assistant Professor

JOHN A. VARTSOS, Dipl. in Philology (Athens), M.A. (Cincinnati), Ph.D. (Athens).

Instructors

ELIZABETH A. E. BONGIE, B.A. (Brit Col), Ph.D. (Illinois).

K. ANN McCallum, B.A. (Brit Col).

Lecturers

PHILLIP E. HARDING, M.A. (St. Andrews).

GEOFFREY B. RIDDEHOUGH, M.A. (Brit Col), A.M. (Calif), Ph.D. (Harvard). Professor Emeritus.

D. Todd, B.A. (Brit Col). Part-time.

# Department of Creative Writing

Associate Professor and Head

ROBERT HARLOW, D.F.C., B.A. (Brit Col), M.F.A. (Iowa).

Professor

Douglas Bankson, M.A., Ph.D. (Wash).

Associate Professor

JACOB ZILBER, B.A. (Wis), M.A. (Wash).

Assistant Professor

JOEL M. YATES, M.A. (Kansas City).

# Department of Economics

Professor, and Head to June 30, 1969

ANTHONY SCOTT, B.Com., B.A. (Brit Col), A.M. (Harvard), Ph.D. (London).

**Professors** 

ROBERT M. CLARK, B.A., B.Com. (Brit Col), A.M., Ph.D. (Harvard), Director of Academic Planning.

STUART M. JAMIESON, B.A. (Brit Col), M.A. (McGill), Ph.D. (Calif).

J T AIT MONTAGUE, B.A. (Western Ontario), M.A., Ph.D. (Toronto), Director, Institute of Industrial Relations.

A. MILTON MOORE, B.A. (Queen's), A.M. (Chicago).

GIDEON ROSENBLUTH, B.A. (Toronto), Ph.D. (Columbia).

JOHN H. YOUNG, A.F.C., M.A. (Queen's), Ph.D. (Cantab), Dean of the Faculty

Associate Professors

JOHN G. CRAGG, B.A. (McGill, Cantab), Ph.D. (Princeton).

JOHN F. HELLIWELL, B.Com. (Brit Col), M.A., D.Phil. (Oxon).

GERALD F. McGuigan, C.S.B., M.A. (Toronto), D. ès Sci.Soc. (Laval).

GORDON R. MUNRO, B.A. (Brit Col), A.M., Ph.D. (Harvard).

PETER H. PEARSE, B.S.F. (Brit Col), M.A., Ph.D. (Edinburgh), B.C.R.F.

RONALD A. SHEARER, B.A. (Brit Col), M.A., Ph.D. (Ohio).

JOHN VANDERKAMP, B.Ec.Sc. (Amsterdam), M.B.A. (Toronto), Ph.D. (London).

ROBERT M. WILL, B.A. (Western Ontario), A.M., Ph.D. (Duke).

Assistant Professors

DAVID E. BOND, B.A. (Dartmouth), M.A., Ph.D. (Yale).

JOHN D. BOYD, M.A., Ph.D. (Wash).

PAUL G. BRADLEY, B.C.E. (Cornell), Ph.D. (MIT).

CAROLYN CLARK, B.A. (Wellesley).

DAVID J. DONALDSON, B.A. (Toronto), A.M., Ph.D. (Stanford).

GEOFFREY B. HAINSWORTH, B.Sc. (London), Ph.D. (Calif).

E. Bruce Hurt, B.A. (Brit Col), Ph.D. (London).

MICHAEL KELLY, B.Com. (Loyola), M.A. (McGill), Ph.D. (Chicago).

HARTLEY V. LEWIS, B.A. (Toronto), M.A. (Rochester).

ROGER P. MENDELS, B.Com., M.A. (McGill), Ph.D. (Wisconsin).

Keizo Nagatani, B.A. (Hitotsubashi), M.A. (Hawaii), Ph.D. (Brown).

PHILIP A. NEHER, A.B. (Pomona), Ph.D. (Brown).

James D. Rae, B.Com. (Toronto), M.S., Ph.D. (Purdue).

ROBERT SWIDINSKY, B.Com., M.A. (Man).

RUSSELL S. UHLER, B.A. (Fresno), Ph.D. (Claremont).

Bernard Wasow, B.A. (Reed), M.A. (Stanford).

Visiting Assistant Professor

JOHANNES OVERBEEK, Certificate (Nijenrode, Braukelen, Netherlands), Licence (Geneva).

Instructors

ELIZABETH BOND, B.A. (Wellesley), M.A. (Yale).

GOPAL YADAV, M.A. (Allahabad, Queen's).

Lecturers from other Departments

Peter L. Arcus, Assistant Professor of Agricultural Economics.

H. Craig Davis, Assistant Professor in Community and Regional Planning.

HARRY L. PURDY, Lecturer in Commerce.

H. E. Ronimois, Professor of Slavonic Studies.

GEORGE R. WINTER, Associate Professor of Agricultural Economics.

### Department of English

Professor, and Head to June 30, 1969

G. H. Durrant, M.A. (Cantab), D.Litt. (South Africa).

# **Professors**

- G. PHILIP V. AKRIGG, M.A. (Brit Col), Ph.D. (Calif).
- W. E. Fredeman, B.A. (Hendrix), M.A., Ph.D. (Okla).
- E. B. Gose, M.A. (Colo), Ph.D. (Cornell).
- EDMUND MORRISON, B.A. (Brit Col), A.M., Ph.D. (Calif).
- WILLIAM ROBBINS, M.A. (Brit Col), Ph.D. (Toronto).
- M. W. Steinberg, M.A. (Queen's), Ph.D. (Toronto).
- W. M. THOMPSON, M.A. (Toronto, McMaster, Oxon), Mus.B. (Toronto), Dr.Phil. (Breslau).

# Associate Professors

- K. Alldritt, M.A. (Cantab).
- D. M. BEACH, B.A. (Reed), M.A., Ph.D. (Cornell).
- G. Creigh, B.A. (Reading), Ph.D. (Birmingham).
- J. DE BRUYN, B.A. (Brit Col), M.A. (London).
- W. F. Hall, M.A. (Cantab), Ph.D. (Johns Hopkins).
- J. A. HART, B.A. (London), M.A. (S. Carolina), Ph.D. (Duke).
- V. G. HOPWOOD, B.A. (Brit Col), M.A., Ph.D. (Toronto).
- J. F. Hulcoop, M.A., Ph.D. (London).
- R. W. INGRAM, M.A. (Birmingham), Ph.D. (London).
- J. A. LAVIN, B.A., Ph.D. (Birmingham).
- PATRICIA MERIVALE, A.B. (Calif), M.A. (Oxon), Ph.D. (Harvard).
- C. W. MILLER, B.Ed., M.A. (Sask), Ph.D. (Wash).
- A. E. Piloto, M.A. (McGill), M.Litt. (Cantab).
- P. Pinkus, B.A. (Toronto), Ph.D. (Mich).
- P. A. QUARTERMAIN, B.A., Ph.D. (Nottingham).
- I. S. Ross, M.A. (St. Andrews), B.Litt (Oxon), Ph.D. (Texas).
- J. G. SPAULDING, A.B. (Pomona), Ph.D. (Calif).
- P. G. STANWOOD, B.A. (Iowa), M.A., Ph.D. (Mich).
- D. G. STEPHENS, M.A. (UNB), Ph.D. (Edinburgh).
- S. W. STEVENSON, B.A. (Bishop's), M.A. (McGill), Ph.D. (Northwestern).
- B. Sylvester, M.A. (Connecticut), Ph.D. (Wash).
- W. TALLMAN, B.A., Ph.D. (Wash).
- J. D. WIGOD, A.B. (New York), A.M., Ph.D. (Harvard).

# Assistant Professors

- T. E. Blom, B.A. (San Diego), Ph.D. (Wash).
- F. Bowers, M.A. (Manchester), Ph.D. (Brit Col).
- A. Busza, M.A. (London).
- E. J. Carter, B.A. (London), M.A. (Calif), Ph.D. (Claremont).
- J. R. DOHENY, M.A. (Wash).
- D. L. Evans, B.A. (Portland), Ph.D. (Wash).
- G. GARNETT, B.A. (Swansea), M.Litt. (Cantab).
- M. Goldberg, B.A. (South Africa), M.A. (Cantab), Ph.D. (Cornell).
- B. L. Grenberg B.A. (Beloit), M.A., Ph.D. (N. Carolina).
- R. C. Johnson, M.A., Ph.D. (Illinois).
- A. R. KILGALLIN, M.A., Phil. M. (Toronto).

- E. R. LABRIE, B.A. (Loyola), M.A. (McGill), Ph.D. (Toronto).
- D. MACAREE, M.A. (Glasgow, Brit Col), Ph.D. (Wash).
- B. H. MAYNE, M.A., Certif. Ed. (Hull).
- W. E. Messenger, B.A. (Wash), M.A. (Cornell). Ph.D. (Calif),

RUBY NEMSER, M.A. (McGill), Ph.D. (Harvard).

- W. H. New, B.Ed., M.A. (Brit Col), Ph.D. (Leeds).
- F. S Newby, B.A. (Redlands), M.A., Ph.D (Calif).
- A. P. PISTORIUS, B.A. (Iowa), M.A. (Calif).
- D. L. POWELL, B.A. (Penn State), Ph.D. (Penn).
- G. E. Powell, B.A. (Maryland), A.M., Ph.D. (Stanford).
- H. J. Rosengarten, M.A., B.Litt. (Oxon).
- R. SEAMON, A.B. (Calif), M.A., Ph.D. (Claremont).

HELEN W. SONTHOFF, A.B. (Smith).

- J. F. STEWART, M.A. (Edinburgh), Ph.D. (USC).
- F. E. STOCKHOLDER, B.A. (CCNY), Ph.D. (Wash).
- P. A. TAYLOR, B.A. (Colo), M.A., Ph.D. (Conn).
- L. M. WHITEHEAD, M.A. (Wash), Ph.D. (Wisconsin).
- F. H. WHITMAN, B.A., M.Dip.Ed. (Melbourne), M.A. (Idaho), Ph.D. (Wisconsin).
- J. WISENTHAL, B.A. (Bishop's), B.Litt. (Oxon).
- W. E. YEOMANS, B.A. (Mount Allison), M.A. (Toronto).

### Instructors

- PEG I. BRENNAN, B.Ed., M.A. (Brit Col).
- E. Durbach, B.A. (Cantab), M.A. (Rhodes).

MARY JANE EDWARDS, B.A. (Toronto), M.A. (Queen's).

E. KATHLEEN GRANT, M.A. (Brit Col).

MARYA HARDMAN, M.A. (Brit Col).

MARGO C. HARTLEY, M.A. (Brit Col).

S. Levitan, M.A. (Penn).

Adelia F. Livesey, M.A. (Brit Col).

Joan Pavelich, B.Ed., M.A. (Brit Col).

A. R. SHUCARD, A.B. (Union), M.A. (Conn).

MARJORIE SINEL, B.A. (Simmons), M.A. (Brandeis).

HILDA THOMAS, M.A. (Brit Col).

### Lecturers

- MABEL L. H. COLBECK, M.A. (Brit Col), Ph.D. (Toronto), Associate Professor Emerita.
- S. E. READ, M.A. (McGill), Professor Emeritus.

A. BELL, B.A. (Man).

BETTY J. BELSHAW, M.A. (New Zealand).

MARGARET A. H. BLOM, M.A., Ph.D. (Wash).

- P. L. Burkhart, B.A. (Kenyon), M.A. (Guelph).
- H. MARGUERITE CLARKE, M.A. (Brit Col), Part-time.
- P. G. Ellis, B.A. (Manchester), M.A. (Man).

KATHLEEN Gose, B.A. (Middlebury), M.A. (Colo). Part-time.

SHARON HEIZER, B.A. (Calif).

ALISON HOPWOOD, B.A. (McGill), M.S.W. (Toronto), M.A. (Sussex).

HELEN A. JONES, M.A. (Dalhousie).

MARY E. KNECHTEL, B.A. (Sask).

MARGARET PARKER, M.A. (Brit Col).

MAUDE Ross, M.A., Ph.D. (Texas), Part-time.

JANE RULE, A.B. (Calif), Part-time.

Sandra Saunders, M.A. (Alta).

Agnes G. Savery, B.A. (McMaster), M.A. (McGill).

R. SNUKAL, M.A. (Man).

KATHERINE STOCKHOLDER, B.A. (Hunter), M.A. (Columbia), Ph.D. (Wash).

ELLEN M. TALLMAN, A.B. (Calif).

G. WOODCOCK.

D. WRIGHT, B.A. (TCD), M.A. (McMaster).

Annette Wrinkle, M.A. (San Jose).

Lecturers from other Departments

L. BARCLAY, Assistant Professor of Education.

M. Gibbons, Assistant Professor of Education.

J. McGechaen, Professor of Education.

RUTH McConnell, Associate Professor of Education.

NORA R. SINCLAIR, Assistant Professor of Education.

# Department of Fine Arts

Professor

B. C. BINNING, R.C.A.

R. C. CRAGG, M.A., Ph.D. (Toronto).

Associate Professors

IAN McNairn, B.A. (McMaster).

Mary Morehart, M.A., Ph.D. (Calif).

LIONEL A. J. THOMAS, A.R.C.A.

Assistant Professors

ALVIN L. BALKIND, B.A. (Johns Hopkins), Curator.

WILLIAM HERBERT GILBERT, B.A. (Brit Col).

George Rosenberg, M.A. (Cantab).\*

Lecturers

Melva J. Dwyer, M.A. (Brit Col), B.L.S., A.T.C.M. (Toronto), Honorary Lecturer.

HAROLD D. KALMAN, M.F.A. (Princeton).

TONI ONLEY.

IAN H. WALLACE, B.A. (Brit Col).

\*Executive Secretary of the Department, 1968-69.

Part-time Lecturers

Avis R. Rosenberg, M.A. (Mich).

Doris K. Shadbolt, B.F.A. (Toronto).

Lecturers from other Departments

C. W. J. Eliot, Associate Professor of Classics.

Shuichi Kato, Professor of Asian Studies.

JAMES RUSSELL, Assistant Professor of Classics.

# Department of French

Professor and Head

LAURENCE L. BONGIE, B.A. (Brit Col), Docteur de l'Université de Paris.

# **Professors**

Frédéric J. Grover, L. ès L. (Paris), Ph.D. (Calif).

GÉRARD R. TOUGAS, B.A. (Alta), M.A. (McGill), Ph.D. (Stanford).

# Associate Professors

Dominique Baudouin, Agrégé des Lettres (France).

EDWARD A. BIRD, B.A. (Brit Col), Docteur de l'Université de Paris.

KATHERINE BREARLEY, M.A. (Brit Col), Docteur de l'Université de Paris.

FRANK R. HAMLIN, B.A., Ph.D. (Birmingham).

HAROLD C. KNUTSON, M.A. (Minn), Ph.D. (Calif).

DAVID J. NIEDERAUER, M.A., Ph.D. (Calif).

MARGUERITE A. PRIMEAU, M.A. (Alta).

# Assistant Professors

HEATHER FRANKLYN, B.A., Ph.D. (Exeter).

RICHARD G. C. HOLDAWAY, B.A. (Nottingham), Ph.D. (Hull).

ALISTAIR R. MACKAY, B.A. (Brit Col), M.A., Ph.D. (Calif).

NICOLE A. D. MARZAC, L. ès L., D.E.S., Docteur ès Lettres (Paris).

EDWARD J. MATTE, B.A. (Brit Col), M.A., Ph.D. (Calif).

GEOFFREY P. MURRAY, B.A. (Bowdoin), M.A., Ph.D. (Johns Hopkins).

HELEN M. C. PURKIS, M.A. (Oxon), Docteur de l'Université de Paris.

FLOYD B. St. CLAIR, A.B., Ph.D. (Stanford).

RUTH L. WHITE, B.A. (Brit Col), Docteur de l'Université de Paris.

HELEN WILKES, B.A. (McMaster), M.A. (Middlebury), Ph.D. (Wayne State).

### Instructors

OLGA B. CRAGG, B.A. (McGill), M.A. (Bryn Mawr).

SIMONE P. KNUTSON, M.A. (Brit Col).

Rose B. McBride, M.A. (Brit Col).

### Lecturers

CAROL J. BREAM, B.A. (Wellesley), M.A. (Toronto), Part-time.

CLAUDE F. KERSHAW, Licence en Droit (Paris), Part-time.

GILL WHIELDON, B.A. (London).

# Lecturers from Other Departments

Bernard Saint-Jacques, Assistant Professor of Linguistics.

# Visiting Lecturer

GILBERT SIGAUX, L. ès L., Chevalier de l'Ordre des Arts et Lettres.

# Department of Geography

Professor and Head

J. D. CHAPMAN, M.A. (Oxon), Ph.D. (Wash).

Professors

J. Ross Mackay, B.A. (Clark), M.A. (Boston), Ph.D. (Montreal), F.R.S.C.

J. LEWIS ROBINSON, B.A. (Western Ontario), M.A. (Syracuse), Ph.D. (Clark).

Visiting Professor

JOHN R. V. PRESCOTT, B.Sc., M.A. (Durham), Ph.D. (London).

Associate Professors

ALBERT L. FARLEY, M.A. (Brit Col), Ph.D. (Wisconsin).

GARY R. GATES, B.S., A.M., Ph.D. (Indiana).

WALTER G. HARDWICK, M.A. (Brit Col), Ph.D. (Minn).

JULIAN MINGHI, B.A. (Durham), Ph.D. (Wash).

KERNIAL SINGH SANDHU, B.A. (Malaya), M.A. (Brit Col), Ph.D. (London).

ALFRED H. SIEMENS, M.A. (Brit Col), Ph.D. (Wisconsin).

JOHN K. STAGER, B.A. (McMaster), Ph.D. (Edinburgh).

Assistant Professors

RICHARD COPLEY, B.A. (Iowa), M.A. (Calif).

JOHN E. HAY, B.Sc. (Canterbury).

ROGER LEIGH, B.Sc. Econ. (London), M.A. (Brit Col), Ph.D. (London).

MARGARET E. A. NORTH, B.Sc. (London), M.A. (Kansas).

ROBERT NORTH, M.A. (Cantab), Ph.D. (Brit Col).

O. SLAYMAKER, M.A. (Cantab), A.M. (Harvard), Ph.D. (Cantab).

Lecturers from other Departments

Wм. H. Mathews, Professor of Geology.

HARRY V. WARREN, Professor of Geology.

# Department of German

Professor and Head

MICHAEL S. BATTS, B.A. (London), Dr.Phil. (Freiburg).

Associate Professors

James A. McNeely, B.A. (Brit Col), M.A., Ph.D. (Calif).

MARKETA C. GOETZ STANKIEWICZ, M.A., Ph.D. (Toronto).

Visiting Associate Professor

HELMUT KOOPMANN, Dr. Phil. (Bonn).

Assistant Professors

RONALD BEAUMONT, B.A. (Brit Col), M.A. (Calif).

MARIA FÜRSTENWALD, B.A. (SGWU), M.A., Ph.D. (McGill).

LESLIE L. MILLER, B.A. (Wales), M.A., Ph.D. (Calif).

J. Edward W. Mornin, M.A. (Glasgow).

**Instructors** 

EBERHARD FREY, M.A. (USC).

HORST MARTIN.

Lecturers

C. Kelly. Part-time.

Louis Medveczky, B.A. (Budapest).

К. Sмітн, M.A. (Brit Col). Part-time.

# Department of Hispanic and Italian Studies

Professor and Head

HAROLD V. LIVERMORE, M.A. (Cantab), Spanish and Portuguese.

Associate Professors

RACHEL GIESE, M.A., Ph.D. (Wisconsin), Italian.

KARL I. KOBBERVIG, B.A., Ph.D. (Wash), Spanish and Italian.

J. A. McDonald, M.A. (Brit Col), Spanish.

Visiting Associate Professor

Pablo Macera, Ph.D. (San Marcos, Lima).

Assistant Professors

Tomas Bartroli, B.A. (Western Ontario), M.A. (Brit Col), Spanish.

STEFANIA CICCONE, M.A. (Brit Col), Italian.

Antonio G. Comin, B.A. (Sydney), Italian.

MARIAN G. R. COOPE, M.A. (Cantab), Ph.D. (London), Spanish.

SIMON A. VOSTERS, Doctor (Nijmegen), Doctorandus (Groningen), Spanish.

Visiting Assistant Professor

ARSENIO PACHECO, Dr. Fil. y Letras (Barcelona).

Instructors

GIUSEPPINA DE STEFANIS, Dott. Ling. Lett. (Bocconi), Italian.

MARIA TOMSICH, M.A. (Brit Col), Spanish.

Lecturer

Maria C. Zanolli, Dott. Ling. e Lett (Milan), Italian.

Part-Time Lecturers

TERESA GURI, Bachillerato (Barcelona), Spanish.

JANE SABORIO, M.D. (Brit Col), Spanish.

# Department of History

Professor and Head

MARGARET A. ORMSBY, M.A. (Brit Col), Ph.D. (Bryn Mawr), LL.D. (Man), F.R.S.C.

**Professors** 

IVAN AVAKUMOVIC, M.A. (Cantab, London), D.Phil. (Oxon).

BRIAN HARRISON, M.A. (Dublin).

HARVEY MITCHELL, B.A. (Man), M.A. (Minn), Ph.D. (London).

Grady McWhiney, B.S. (Centenary), M.A. (Louisiana State), Ph.D. (Columbia).

JOHN M. NORRIS, M.A. (Brit Col), Ph.D. (Northwestern).

Visiting Professor

BERTIE WILKINSON, M.A., Ph.D. (Manchester).

Associate Professors

JANOS M. BAK, M.A. (Budapest), Dr. Phil. (Göttinger).

JOHN S. CONWAY, M.A., Ph.D. (Cantab).

T. J. HANRAHAN, C.S.B., M.A. (Toronto), M.S.L. (Pontifical Inst).

L. E. HILL, A.M. (Wash), Ph.D. (Harvard).

CHARLES W. HUMPHRIES, B.A. (McMaster), M.A., Ph.D. (Toronto).

STANLEY Z. PECH, M.A. (Alta), State Dipl. (Prague), Ph.D. (Colo).

MARGARET E. PRANG, B.A. (Man), M.A., Ph.D. (Toronto).

MURRAY M. TOLMIE, B.A. (Dalhousie), M.A. (Oxon), Ph.D. (Harvard).

LESLIE F. S. UPTON, M.A. (Oxon), Ph.D. (Minn).

ROBERT C. WALTON, B.A. (Swarthmore), S.T.B. (Harvard), M.A., Ph.D. (Yale).

JAMES H. WINTER, B.A. (Dartmouth), A.M., Ph.D. (Harvard).

Assistant Professors

A. JEAN ELDER, B.A. (Toronto), Ph.D. (Bryn Mawr).

E. J. Hundert, B.A. (City College of New York), M.A. (N.Y.U.).

Daniel M. Klang, A.B. (Calif), Ph.D. (Princeton).

ROBERT VINCENT KUBICEK, B.Ed., M.A. (Alta), Ph.D. (Duke).

J. C. LAWRENCE, M.A. (Brit Col).

FRITZ LEHMANN, A.B. (Oberlin), M.S., M.A., Ph.D. (Wisconsin).

A. N. MACDONALD, B.Sc., B.A. (Acadia), M.A. (Brown), Ph.D. (Wash).

Frank O. Marzari, M.A. (Toronto), Ph.D. (London).

H. V. Nelles, M.A. (Toronto).

ALLEN A. SINEL, B.A. (Yale), A.M., Ph.D. (Harvard).

CHRISTOPHER W. STOCKER, B.A. (Carleton), Ph.D. (Cornell).

Instructors

June I. Gow, M.A. (Glasgow).

H. K. RALSTON, M.A. (Brit Col).

A. C. L. SMITH, B.A. (Man), M.A. (Toronto).

RICHARD TYLER, A.B. (Pennsylvania), A.M. (Harvard).

Lecturers from other Departments

BOGDAN CZAYKOWSKI, Assistant Professor of Slavonic Studies.

Peter Harnetty, Associate Professor of Asian Studies.

WILLIAM L. HOLLAND, Professor of Asian Studies.

JOHN F. Howes, Associate Professor of Asian Studies.

# Department of Linguistics

Professor

ROBERT JOHN GREGG, B.A. (QUB), Ph.D. (Edinburgh).

Assistant Professor

Bernard Saint-Jacques, L. ès L. (Montreal), M.A. (Sophia-Tokyo), M.Sc. (Georgetown), Docteur de l'Université de Paris.

BONNIE MACDOUGALL, M.A. (Cornell), Assistant Professor of Anthropology and Linguistics.

Lecturer from another Department

J. H. V. GILBERT, Assistant Professor of Paediatrics.

# Department of Music

See page F105.

# Department of Philosophy

Professor and Head

BARNETT SAVERY, A.B. (Wash), A.M., Ph.D. (Harvard).

DONALD G. BROWN, M.A., D.Phil. (Oxon).

PETER REMNANT, M.A. (Brit Col), Ph.D. (Cantab).

Associate Professors

Samuel C. Coval, M.A. (Man), Ph.D. (N. Carolina), D.Phil. (Oxon).

WARREN J. MULLINS, M.A., Ph.D. (Calif).

RICHARD E. ROBINSON, B.A. (Puget Sound), M.A. (Syracuse, Calif), Ph.D (Calif).

ROBERT J. ROWAN, M.A., Ph.D. (Calif).

Assistant Professors

JAMES C. DYBIKOWSKI, B.A. (Amherst), Ph.D. (London).

HOWARD JACKSON, B.S. (Illinois), Ph.D. (Calif).

EDWIN LEVY, JR., B.S. (N. Carolina), A.M. (Indiana).

ELBRIDGE N. RAND, A.B. (Harvard).

RICHARD I. SIKORA, A.B. (Harvard), Ph.D. (Calif). Part-time.

JOHN P. STEWART, B.S., M.S. (Penn).

GARY A. WEDEKING, B.A. (SDSC), M.A. (Washington University).

Lecturers from other Departments

Fo-ch'uan Chang, Professor of Asian Studies.

# Department of Political Science

Professor, and Head to June 30, 1969.

R. S. MILNE, M.A. (Oxon).

Professors

Frank C. Langdon, A.M. (Harvard), Ph.D. (Calif).

JEAN A. LAPONCE, Dipl.I.E.P. (Paris), Ph.D. (Calif).

DONALD V. SMILEY, M.Ed., M.A. (Alta), Ph.D. (Northwestern).

W. J. STANKIEWICZ, M.A. (St. Andrews), Ph.D. (London).

Associate Professors

H. ALAN C. CAIRNS, M.A. (Toronto), D.Phil. (Oxon).

KALEVI J. HOLSTI, A.M., Ph.D. (Stanford).

OLE R. HOLSTI, A.B. (Stanford), M.A. (Wesleyan), Ph.D. (Stanford).

WALTER D. YOUNG, B.A. (Brit Col), M.A. (Oxon), Ph.D. (Toronto).

Assistant Professors

HEATH B. CHAMBERLAIN, B.A. (Princeton), M.A. (Stanford).

DAVID J. ELKINS, B.A. (Yale), M.A. (Calif).

MARTIN LEVIN, M.A. (Man).

PAUL R. TENNANT, B.A. (Brit Col), A.M. (Chicago).

MICHAEL D. WALLACE, M.A. McGill).

JOHN R. WOOD, B.A. (Toronto), M.A. (Columbia).

MARK W. ZACHER, B.A. (Yale), M.A., Ph.D. (Columbia).

# Department of Psychology

Professor

Douglas T. Kenny, M.A. (Brit Col), Ph.D. (Wash).

EDRO SIGNORI, B.A. (Alta), M.A., Ph.D. (Toronto).

Associate Professors

E. S. W. BELYEA, M.A. (Toronto).

DONALD D. GREENWOOD, B.A. (Wisconsin), Ph.D. (Harvard).

R. D. HARE, M.A. (Alta), Ph.D. (Western Ontario).

D. C. G. MacKay, M.A. (Queen's), Ph.D. (Stanford), F.R.S.A.

DEMETRIOS PAPAGEORGIS, A.B. (Hamilton), M.A., Ph.D. (Illinois).

DONALD L. G. SAMPSON, M.A., Ph.D. (Toronto).

THOMAS F. STORM, B.A. (Temple), M.S., Ph.D. (Yale).

Assistant Professors

DAVID J. ALBERT, B.A. (Kansas), M.A., Ph.D. (McGill).

D. Susan Butt, M.A. (Brit Col), Ph.D. (Chicago).

R. S. CORTEEN, M.A., Ph.D. (Edinburgh).

K. D. Craig, B.A. (Sir Geo. Williams), M.A. (Brit Col), Ph. D. (Purdue).

A. G. Devries, M.A. (Brit Col), Ph.D. (USC).

G. E. Finley, A.M., Ph.D. (Harvard).

M. S. Humphreys, B.A. (Reed), Ph.D. (Stanford).

G. J. Johnson, M.A., Ph.D. (Texas).

ROBERT E. KNOX, M.A. (Occidental), Ph.D. (Ore).

R. O'DAY, B.A. (Brit Col), M.A., Ph.D. (Mich).

WILLIAM M. PETRUSIC, B.A. (Brit Col), M.A., Ph.D. (Mich).

GERALD E. PLUM, B.A. (Wayne State), Ph.D. (Chicago).

REVA POTASHIN, M.A., Ph.D. (Toronto).

GEORGE A. RAYMOND, B.S. (Trinity), Sc.M., Ph.D. (Brown).

ARTHUR S. REBER, B.A. (Penn), M.A., Ph.D. (Brown).

RICHARD C. TEES, B.A. (McGill), Ph.D. (Chicago).

F. P. Valle, A.B. (Calif), Ph.D. (Mich).

RODERICK WONG, B.A. (Brit Col), M.A. (West Mich), Ph.D. (Northwestern).

JOHN C. YUILLE, M.A., Ph.D. (Western Ontario).

Lecturers

A. E. Cox, B.A. (Brit Col), M.A. (Toronto).

G. Alan Marlatt, B.A. (Brit. Col.), Ph.D. (Indiana).

J. E. B. RYAN, B.A. (Brit Col), M.A., Ph.D. (Toronto).

A. F. SHIRRAN, M.A. (Brit Col).

# Department of Religious Studies

Professor and Head

WILLIAM NICHOLLS, M.A. (Cantab).

Professor

ARTHUR E. LINK, M.A., Ph.D. (Calif).

Associate Professor

HANNA E. KASSIS, B.A. (American Univ., Beirut), Ph.D. (Harvard).

Assistant Professors

CHARLES P. ANDERSON, A.B. (Willamette), B.D. (Union Theological Seminary). SHOTARO IIDA, M.A. (Tohoku), Ph.D. (Wisconsin).

Lecturer

JOHN M. SHERWOOD, B.A. (San Fernando State College), B.H.L., M.A.H.L. (Hebrew Union College).

Lecturer from another Department

JOSEPH I. RICHARDSON, Assistant Professor of Asian Studies.

# Department of Slavonic Studies

Professor and Head

MICHAEL H. FUTRELL, B.A., Ph.D. (London).

**Professors** 

CYRIL BRYNER, A.B. (Stanford), Ph.D. (Prague).

ZBIGNIEW FOLEJEWSKI, M.A. (Wilno), Ph.D. (Uppsala).

H. E. RONIMOIS, M.Sc. (Tartu), Ph.D. (London).

James O. St. Clair-Sobell, M.A. (Melbourne), Ph.D. (Graz), F.R.S.C., Professor of Comparative Philology.

Associate Professors

BOGDAN CZAYKOWSKI, B.A. (Dublin), M.A. (London).

VALERIAN REVUTSKY, M.A. (Toronto), Dipl. in Drama (Moscow).

ALEXANDER W. WAINMAN, M.A. (Oxon).

Assistant Professors

FRANK BEARDOW, B.A. (Manchester), F.I.L.

Daniel Dorotich, B.Th. (Collonges), B.A. (SGWU), M.A., Ph.D. (McGill).

ALEX P. HARSHENIN, M.A. (Brit Col).

IRINA M. REID, M.A. (Brit Col), L.R.S.M., A.R.T.C.

JAN J. SOLECKI, B.Com. (London), M.A. (Brit Col, Wash).

Instructors

CATHERINE S. LEACH, M.A. (Calif).

Aram H. Ohanjanian, B.A. (Toronto).

IRINA REBRIN, B.A. (Peking).

# Department of Theatre

Associate Professor and Head

JOHN BROCKINGTON, B.A. (Brit Col), D.F.A. (Yale).

Professor

DONALD E. SOULE, B.A. (Yale), M.A. (Wisconsin), Ph.D. (Stanford).

Assistant Professors

KLAUS G. STRASSMANN, Ph.D. (Stanford).

RICHARD KENT WILCOX, A.A. (Santa Ana), A.B. (Calif), M.F.A. (Yale).

WILLIAM JOSEPH LOUIS, M.A. (Boston).

Instructors

MOYRA K. MULHOLLAND, B.A. (Brit Col), M.A. (Cornell).

STANLEY A. WEESE, B.A. (Minn), M.A. (Illinois). M. NORMAN YOUNG, B.A. (Brit Col), Technical Director. Part-time Lecturers

SHEILA OVENS, L.R.A.M.

PETER FRANKLIN WHITE.

Lecturers from other Departments

HELEN GOODWIN, Lecturer in Physical Education and Recreation.

JANIE STEVENSON, Assistant Professor of Education.



# THE FACULTY OF ARTS

The Faculty of Arts offers a wide range of programmes of study that lead to the degrees of Bachelor of Arts, Master of Arts and Doctor of Philosophy.

The Department of Music of the Faculty of Arts offers a programme of study that leads to the degrees of Bachelor of Music and Master of Music.

There are three Schools in the Faculty of Arts: Home Economics, Librarianship and Social Work. They offer programmes of study that lead to the degrees of Bachelor of Home Economics, Bachelor of Library Science, and Master of Social Work, respectively.

# ORGANIZATION

I. The Division of the Humanities includes the Departments of

Asian Studies Classics English French German

Hispanic and Italian Studies

History Linguistics Philosophy Religious Studies Slavonic Studies

II. The Division of the Social Sciences includes the Departments of

Anthropology and Sociology Economics Geography History

Political Science Psychology

III. The Division of the Creative and Performing Arts includes the Departments of

Creative Writing Fine Arts Music Theatre

IV. The three Schools are

Home Economics Librarianship Social Work

# THE DEGREE OF BACHELOR OF ARTS

I. General description of the requirements of the Faculty:

A student who enters the Faculty of Arts lays the foundation for his education by taking fifteen units of work in his first year and fifteen units of work in his second year.

At the beginning of his third year he enters one of the two programmes of study that lead to the degree of Bachelor of Arts:

The Major Programme (thirty additional units of work)
OR

The Honours Programme (thirty-six additional units of work)

If he chooses the *Major Programme*, he will take fifteen units of work in each of his last two years; if he is admitted to the *Honours Programme*, he will take eighteen units of work in each of his last two years. He may combine credit obtained in summer session with that obtained in winter session to complete the required number of units in less than the normal four years of the degree programme.

# II. Detailed description of the requirements of the Faculty:

# REQUIREMENT IN SCIENCE

To qualify for the degree of Bachelor of Arts a student must complete satisfactorily three units of work in science or mathematics (he may fulfil the requirement by taking and passing Geography 101).

Although this requirement may be met in any one of the four years, students are urged to discuss the requirement in science with a faculty adviser when registering in the first year. The range of courses offered by the Faculty of Science is wide, and includes some courses (e.g. Biology 310, Botany 310, Geophysics 310, Mathematics 204, and Zoology 400) that are specially designed for third-and-fourth year students in the Faculty of Arts. Forestry 300 also fulfills the requirements in science.

# REQUIREMENT IN LITERATURE

To qualify for the degree of Bachelor of Arts, a student must complete satisfactorily three units of work in literature in addition to English 100. He may meet this requirement by taking English 200 (normally but not necessarily in the second year) or a course in literature offered by another department. Students should ask a faculty adviser for a list of courses that meet the requirement.

# REQUIREMENT IN LANGUAGE

To qualify for the degree of Bachelor of Arts, a student must have attained Grade XII standing or the equivalent in a language other than English. If he has completed a Grade XII course in such a language at secondary school, he is not required to take further work in language. If he enters the Faculty with Grade XI in a language other than English, he must complete satisfactorily three additional units of work in the same language or six units of work in another language. If he enters the Faculty not having attained Grade XI standing in a language other than English, he must complete satisfactorily six units of work in one such language. Normally this requirement will be satisfied in the first and second years, and third-year standing will not be granted until the requirement has been met.

Students should bear in mind that proficiency in one or more languages other than English is a requirement in many graduate programmes. They are strongly advised, therefore, to continue the study of languages at the Univer-

sity.

# FIRST YEAR

- 1. English 100
- 2. Language other than English (if required)
- 3. Elective
- 4. Elective
- 5. Elective

Courses 2, 3, 4 and 5 must be chosen from List A.

Greek 100 Hebrew 100

# LIST A

Anthropology 100 History 100 to 199 Asian Studies 205, 206, 215 Italian 100 Biology 101 Japanese 100 Chemistry 103 or 110 or 120 Latin 100, 110 or 120 Chinese 100 Mathematics 130, or 100\* and 121\* Classical Studies 100 Music 100, 107, 120 Creative Writing 202 Philosophy 100 Economics 100, 101 Physics 110 or 120 or 130 Fine Arts 125 Polish 110 French 100, 110 or 120, 115, 210 Psychology 100 Geography 101, 102 Geology 105 German 100, 110 or 120 Russian 100, 110 Sociology 100

Spanish 100

Theatre 120

\*Mathematics 100 and 121 are 2- and 1-unit courses, respectively.

# NEW ARTS I PROGRAMME

Students entering the first year may apply for New Arts I, a new programme designed to introduce students to university work through closer contact with professors and more intensive reading and written work. There will be three sections of New Arts I, each with an enrolment of 120 students taught by 6 members of faculty. There will be no formal courses in the Programme; instruction will be conducted through discussion groups and occasional lectures dealing with one or more themes or problems. In addition, students must take six units of work outside the Programme to complete the requirements of the first year in Arts. These courses shall be chosen in consultation with an adviser. A detailed curriculum will be distributed during Registration Week.

Students who pass New Arts I will receive credit for nine units of work and will be admitted to all second-year courses in the Faculty of Arts except those in languages other than English, Geography, Fine Arts, Mathematics (except 204), Psychology, and Theatre (but the Department of Fine Arts and Theatre permit students to take the first- and second-year courses concurrently in the second year).

NOTE: Students seeking to enter New Arts I should complete and return to the Registrar's Office the application form mailed out with registration materials during the summer. 360 students will be selected at random from the list of applicants. The names of these students will be posted in the New Arts Building at the commencement of the Fall registration period. Information will be available in the New Arts Building about the sequence of steps for enrollment in the Programme and in the two regular courses needed to complete a full first year in Arts.

Students who register in the Programme must remain in it for one academic year; that is, after the last day for changes in programme, they may not drop New Arts I and substitute regular courses for it. There will not be a supplemental examination for students who fail New Arts I.

# SECOND YEAR

- 1. Language other than English (if required)
- 2. Elective

- 3. Elective
- 4. Elective
- 5. Elective

All courses must be chosen from List A and List B.

# LIST B

Anthropology 200
Biology 334, 340
Botany 302, 303, 304, 305
Chemistry 203, 205, 210, 220, 230
Chinese 200
Classical Studies 310, 315, 316, 330, 331
Economics 200 or 201 or 202, 304\*, 354\*, 364\*
English 200
French 202, 210 or 220
Geography 212\*, 213\*, 370\*, 371\*, 372\*, 373\*, 374\*, 375\*
Geology 204, 210
German 200, 210, 223 or 230
Greek 200, 325
Hebrew 200
Italian 200
Japanese 200

Latin 200, 205, 220 Linguistics 319 Mathematics 200, 202, 204, 205, 220, 221, 240 Microbiology 200 Music 200, 207 Philosophy 200, 212 Physics 200, 204 Polish 210 Political Science 200\*, 201\*, 202\*, 203\*, 204 Psychology 200, 206 Religious Studies 200, 205 Russian 200, 210 Slavonic Studies 205 Sociology 200, 250, 260 Spanish 200 Theatre 300 Zoology 202

\*1½-unit course.

# THE LAST TWO YEARS

At the beginning of the Third Year a student must enter

The Major Programme, which requires a measure of specialization. In this programme the student must take, during his third and fourth years, fifteen units of work in courses numbered 300 and above in one subject or in one field of concentration. In the Major Programme the degree of Bachelor of Arts will be conferred when sixty units of work, approved by the Faculty of Arts, have been completed. Thirty of these units must be taken in the Third and Fourth Years.

### OR

The Honours Programme, which requires intensive work in one subject or in one field of concentration. This programme is designed by the Department that offers it and is open only to students who, in the opinion of the Department, have shown special aptitude and would profit from it. In the Honours Programme the degree of Bachelor of Arts, with First or Second Class Honours, will be conferred when sixty-six units of work, approved by the Faculty of Arts, have been completed.

Requirements common to the Major Programme and the Honours Programme:

- (i) In the Third and Fourth Years at least six units in courses outside the student's field of concentration must be successfully completed.
- (ii) In the Third and Fourth Years a student must complete at least twenty-four units (thirty in the Honours programme) in courses numbered 300 and above.

### THIRD YEAR

On entering the *Major Programme* or the *Honours Programme* a student must draw up a plan of study for the Third and Fourth Years in consultation with a departmental adviser.

Typical Major Programme:

- 1. Course in Major subject or field of concentration.
- 2. Course in Major subject or field of concentration.
- 3. Elective course outside Major subject or field of concentration.
- 4. Elective.
- Elective.

For the Honours Programme consult the Department that offers it.

### FOURTH YEAR

At the beginning of the Fourth Year a student must have his programme of study reviewed by a departmental adviser.

Typical Major Programme:

- 1. Course in Major subject or field of concentration.
- 2. Course in Major subject or field of concentration.
- 3. Course in Major subject.
- 4. Elective course outside major subject or field of concentration.
- 5. Elective.

For the Honours Programme consult the Department that offers it.

NOTE: A student in the *Major Programme* who plans to enter the secondary programme (fifth year) of the Faculty of Education, after obtaining the degree of Bachelor of Arts, should consult the calendar of the Faculty of Education or the office of the Secondary Division of the Faculty of Education.

# SPECIAL PROGRAMMES

In addition to the Major Programmes and Honours Programmes described in this calendar, special Major or Honours Programmes can be arranged to permit students to do work in related fields, e.g., Latin and Italian, Economics and Mathematics, French and Philosophy. Consult the Department that offers either subject.

# GUIDE FOR STUDENTS

In this section of the calendar an attempt is made to describe how some of the business of the Faculty of Arts is discharged. What follows is not a set of immutable rules and regulations; the Faculty decides academic questions as they arise and reserves the right to deal as it sees fit with the academic problems of individual students.

# I. ENTERING THE FACULTY OF ARTS Admission of Students Who Reside in the Province of British Columbia

# Grade XII

An applicant must have taken and passed the Academic or Technical Programme of the Department of Education of the Province of British Columbia. He will be admitted if he obtains an average of at least sixty-five per cent on recommended grades from an accredited senior secondary school or on a combination of school grades and gradings on examinations conducted by the Department of Education and is considered by the Committee on Admissions to give promise of success in University studies. If he obtains an average below sixty-five per cent but not less than sixty per cent he will be admitted on the same conditions, if the University has the resources to accommodate him.

### Grade XIII

Credit will be allowed for subjects taken in Grade XIII in the Province of British Columbia if they are relevant to the applicant's programme of study and if

 a) the applicant has taken and passed a full programme of five Grade XIII inations three or four subjects with an average of sixty-five per cent or better,

or

b) the applicant has taken and passed at one session of Grade XIII examsubjects with an average of sixty per cent or better.

# Admission of Students Who Do Not Reside in the Province of British Columbia

An applicant must present a certificate of Senior Matriculation and be eligible for admission to a university in his own province, state or country.

Credit will be granted, where appropriate, at the level of the First and Second Years for studies completed in a junior college. Such credit may not be applied above the Second Year, *i.e.*, after the student has earned thirty units towards his degree.

Credit will be allowed for subjects taken in Grade XIII (but not in Grade XII) outside the Province of British Columbia if they are relevant to the applicant's programme of study and if the Faculty considers the level of instruction adequate and the mark obtained acceptable.

### Registration

The General Information Bulletin of the University of British Columbia describes how to apply for admission and how to register.

Please note that

- a) Applications for admission to the Winter Session must reach the Office of the Registrar before the first day of August. A fee of \$10.000 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.
- b) Once registered, a student must report in person to the Office of the Registrar to make any change in his programme of study.
- c) A student may take only courses for which he has registered.
- d) When a student drops a course without obtaining permission to do so, a failing mark is recorded.

 e) All changes in a programme of study must be made before the end of the second week of lectures.

# Fees

Consult the General Information Bulletin of the University of British Columbia for details about the assessment and payment of fees. Fees are subject to change without notice.

# Full Course\*

Fees for the Winter Session, in the amount of \$457.00, may be paid in September at the time of registration.

A student who prefers to settle his account term by term must pay \$243.00 in September at the time of registration, and \$214.00 in January on or before the first day of lectures of the second term. For the second payment the student should mail a cheque to the Finance Department with a note giving his name in full, registration number and current address.

## Partial Course\*

Fees for a partial course, which must be approved by the Faculty, are assessed at \$30.00 a unit for courses totalling more than six units, and at \$100 for each three-unit course for six units or fewer.

\*The fee for the Alma Mater Society is \$29.00 for a full course and is included in the fee of \$243.00 for the first term; for a partial course of six units or fewer the fee is \$19.00, for a partial course of more than six units the fee is \$29.00.

# Financial Help

Consult Awards and Financial Assistance, a bulletin published by the University of British Columbia.

# **Faculty Advisers**

The Faculty Advisers are professors in the Faculty of Arts who are available to assist students of the first and second years in planning their programmes. They may be consulted by students of any year with academic problems. Inquiries about appointments should be directed to the Buchanan Building switch-board, 228-2161, or by mail to the Senior Faculty Adviser, c/o The Dean of Arts, The University of British Columbia, Vancouver 8, B.C.

# II. LEAVING THE FACULTY OF ARTS

### Withdrawal

A student who decides to withdraw must present a statement of clearance, signed by the Senior Faculty Adviser, to the Office of the Registrar. The Registrar will then grant him Honourable Dismissal and decide whether or not he is entitled to a refund of fees. The term Honourable Dismissal has nothing to do with academic standing. It simply means that, at the time of withdrawal, the student's account was clear and his conduct good.

The Senate of the University reserves the right to require any student to withdraw, at any time, if that is in the best interests of the student or of the University.

### Graduation

Before the fifteenth day of March of his final year every candidate for a degree must make application to be graduated. The Office of the Registrar provides a form for the purpose.

# Transcript of Academic Record

The transcript of academic record is a confidential document that shows the

complete record of a student at the University of British Columbia. It is usually issued only at the request of the student himself.

On withdrawal or on graduation a student may obtain, for his own use, a transcript of academic record marked "unofficial."

At the request of a student, a transcript of his academic record marked "official" will be mailed to any university, agency or institution, or it can be handed to him in an envelope bearing the mention "Valid Only if the Seal is Unbroken." Application for a transcript should be made at least one week before the document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

# III. SOJOURN IN THE FACULTY OF ARTS

The student is responsible for drawing up a programme of study that meets the requirements of the Faculty. He must consult a faculty adviser, but the responsibility for meeting the requirements is his.

In the Winter Session the usual programme of study is fifteen units of work.

A course credited to one year on the transcript of academic record cannot later be transferred to any other year.

# Requirement of Residence

The student who enters the Faculty of Arts after completing Grade XII will normally spend four Winter Sessions at the University of British Columbia to qualify for a degree and the student who enters after completing Grade XIII three. Courses, taken with the permission of an academic adviser in the Winter Session or in the Summer Session may, however, be used to shorten the requirement of residence.

Some students (chiefly teachers in service) are permitted to pursue degrees largely by way of the Summer Session; these students are advised to attend at least one Winter Session, preferably that of the final year.

Students who transfer to the Faculty of Arts from other universities must take all their remaining work in the University of British Columbia, where the minimum requirement of residence is two Winter Sessions.

The maximum credit allowed for work done in one Summer Session is six units.

# Attendance

Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments may be excluded from the final examinations. Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes.

### Examinations

A student who misses an examination in December or in April should, as promptly as possible, mail a medical certificate to the University Health Service. If injury or illness did not cause the absence, he should write an explanation of the circumstances to the Dean.

When unusual circumstances arise and a student believes that it would be reasonable for the Faculty to make a concession or a special ruling in his favour, he should appeal in writing to the Dean.

The results of the sessional examinations that are held in April are mailed to students in their fourth year shortly before Congregation, and to other students by mid-June.

# Satisfactory Standing

Students who take fifteen or eighteen units of work and obtain not less than 50% in each course are declared to be in good standing. The Faculty places students in the following categories:

First Class means an average of 80% or higher;

Second Class means an average of 65 to 79%;

Pass means an average of 50 to 64%.

A student who takes fewer than nine units of work must obtain passing marks in all his courses or get credit for none.

A student who takes nine units or more of work during a Winter Session must obtain passing marks in at least three courses (nine units of work) or get credit for none.

A student may repeat, only once, any course for which he failed to obtain credit; but the restriction does not apply to English 100.

A student may choose to take three units of work each year for a simple mark of either Pass or Fail in a subject not part of or prerequisite to, his Major or Honours programme; he will receive full credit for taking and passing a course on this basis, but he may not write a supplemental examination if he fails. Since the Provincial Government awards scholarships on the basis of an average grade for fifteen units of work, students who want to take a course for Pass or Fail should take it in addition to the normal load of fifteen units (this includes all students in the first three years, and fourth-year students who are applying to the Faculty of Graduate Studies or the professional faculties).

# Unsatisfactory Standing

A student who receives failing marks in more than three units of work may not register in a higher year, except that a deficiency of six units is allowed in the Fourth Year. The Faculty may permit him to take a programme of study that includes the courses that he failed, or it may recommend substitutes for them.

A student who, for academic reasons, was required to withdraw from another Faculty or another university may enter the Faculty of Arts only if, upon appeal to the Dean, he obtains written permission to register.

A student in the Second Year who gets passing marks in fewer than six units of work may not return to the University to repeat the same programme of study. He may be admitted to the Third Year if he can show, at some later date, that he has completed, as a student at another institution, further studies that give him full standing equivalent to First and Second Year. He need not repeat studies in which he was successful previously.

A student in the First Year who gets passing marks in fewer than nine units may not return to the University to repeat studies at this level. He may be admitted if he can show, at some later date, that he has completed, as a student at another institution, the equivalent of First Year or of First and Second Year.

A student in any year who fails for the second time will be required to withdraw.

# Supplemental Examinations

A student may be granted the privilege of one supplemental examination if he

a) writes the final examinations for the Winter Session, or the Summer Session examinations in August, and earns a mark of at least 40% in the subject concerned.

# and if he

b) earns twelve units of credit in the Winter Session or three units of credit in the Summer Session.

A student in his final year may be allowed the privilege of two supplementals if he is no more than six units short of graduation.

In the computation of a student's average or year-standing, a passed supplemental examination is calculated as 50%.

The fee for writing a supplemental examination at the University of British Columbia is \$7.50; it is \$10.00 for writing one in

Cranbrook Powell River
Dawson Creek Prince George
Kamloops Prince Rupert

Kitimat Trail
Ocean Falls Victoria
Penticton Whitehorse

The fee for writing a supplemental examination, by special arrangement, in some town or city not mentioned above is \$20.00.

Application for the privilege of a supplemental examination must be made by a student in the Winter Session before the end of the first week of July and by a student in the Summer Session before the end of the first week of September. The fee is payable when the application is made.

# Review of Assigned Standing

Reviews of assigned standing are governed by the following regulations:

- 1. Any request for the review of an assigned grade, other than for a supplemental examination (in which a request for a review will not be granted), must reach the Registrar within four weeks after the announcement of examination results, and must be accompanied by a fee of \$5.00 for each course concerned. The fee will be refunded only if the mark is raised.
- 2. Each applicant for a review must state clearly why he believes the course deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a second time before results are announced. For this reason an applicant granted a supplemental should prepare for the examination since a change in the original mark is unlikely and the result of the review may not be available before the end of the supplemental examination period. A review will not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.
- 3. A student may not request the Faculty to review his standing in more than six units of work.

## PROGRAMMES AND COURSES

This part of the calendar describes the Major Programme, Honours Programme, and the courses offered by each department of the Faculty of Arts. Included also are descriptions of courses given by other faculties, primarily the Faculty of Science, that are designed especially for students in the Faculty of Arts. Subjects are arranged alphabetically, and include:

Anthropology Asian Studies

Biology

Botany

Chinese (see Asian Studies) Classical Studies (see Classics)

Classics

Comparative Literature

Creative Writing

Economics

English

Fine Arts

Forestry

French

Geography

Geophysics German

Greek (see Classics)

Hebrew (see Religious Studies)

Hispanic and Italian Studies

History

International Relations

Italian (see Hispanic and Italian Studies)

Japanese (see Asian Studies)

Latin (see Classics)

Linguistics

Mathematics

Music (for the degree B.Mus. see pp. 105-117)

Philosophy

Physics

Polish (see Slavonic Studies)

Political Science

Portuguese (see Hispanic and Italian Studies)

Psychology

Religious Studies

Romance Studies (see Hispanic and Italian Studies)

Russian (see Slavonic Studies)

Sanskrit (see Asian Studies)

Serbo-Croat (see Slavonic Studies)

Slavonic Studies

Sociology

Spanish (see Hispanic and Italian Studies)

Theatre

Zoology

The following courses may also be taken by an undergraduate in the Faculty of Arts:

Any course listed in the calendar of the Faculty of Science

Commerce 459

Forestry 300

Social Work 499

With the permission of the department concerned, a student in a Major or Honours Programme may take ancillary courses offered by other faculties.

#### TERMS AND ABBREVIATIONS

Numbering of courses: In general the number of a course indicates the first year in which it may be taken: 100—first year; 200—second year; 300—third year. In many instances, however, courses numbered 400 may be taken by third-year students; if in doubt consult the departmental descriptions below. Courses numbered 300 that can be taken in the Second Year are included in List B above p. F21.

Units of credit: Credits are described in units, shown in parentheses immediately following the course number. Eg., 200. (3) under Anthropology indicates that Anthropology 200 is a three-unit course.

Hours of instruction: The notations appearing in square brackets at the end of a course description indicate the number of hours assigned each week, during both terms, to lectures (first digit) and to laboratory, discussion or tutorial sessions (second digit); e.g.:

[3-0; 3-0] — three lecture-hours each week, both terms.

[3-0; 3-2] — three lecture-hours each week, first term; three lecture-hours and two hours of laboratory, discussion or tutorial each week, second term.

Courses not offered during the current year: Some of the courses listed in this calendar will not be offered in the current year. Consult the department that lists the course.

Prerequisites: If work must be taken before a student is eligible to enter a course, such work is specified in the course description, under the term prerequisite. Prerequisites are also described just before the list of "courses offered."

Graduate courses: At the end of each departmental description appears a list of graduate courses. For more complete information about these courses, which are usually open only to graduate students, see the Calendar of the Faculty of Graduate Studies.

#### ANTHROPOLOGY

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A.

Requirements for the degree of Bachelor of Arts:

Major

Second Year:

Anthropology 200

Third and Fourth Years:

Anthropology 300, or Sociology 300

Anthropology 400 or 450

Nine units distributed between at least two of the following groups, chosen in consultation with a departmental adviser:

- 1. Anthropology 405, Sociology 461, 463, 425 or 354
- 2. Anthropology 301, 302, 402
- 3. Anthropology 320, 331, 420, 431
- 4. Sociology 330, 355, 356, 361, 363, Anthropology 430 or Sociology 462

#### Honours

Admission to Third Year:

High second-class average in first and second years First-class standing in Anthropology 200 or Sociology 200

Admission or Continuation to Fourth Year

High second-class average in the first three years and two first-class marks in courses in the major discipline

Third and Fourth Years:

Anthropology 300 or Sociology 300

Anthropology 400 or Sociology 400

Anthropology 441

Anthropology 449

At least two other courses, seminars, or equivalent tutorial work, ordinarily in the department of Anthropology and Sociology, but in other departments with special permission.

The honours student must select his programme in consultation with his assigned tutor.

Anthropology 200 is prerequisite to all third and fourth year courses except 412.

#### Courses Offered:

- 100. (Also Sociology 100) (3) Elementary Problems in Anthropological and Sociological Analysis.—Analysis of selected topics concerned with social structure and processes, through lectures, discussions, readings, and research papers. This is not a survey course, but one which introduces the student to methods and points of view which are characteristic of the disciplines. (Not offered in 1969-70). [3-0; 3-0]
- 200. (3) Introduction to Anthropology.—A comparative study of cultural institutions in the primitive world; of family and other social structures; of economics, government, language, art, religion; of the origins of man and culture, the races of mankind.

  [3-0; 3-0]
- 300. (3) Social Organization.—The structure and organization of society; the individual and society; kinship; the social frame of economy, religion and art; social control and political institutions. [3-0; 3-0]
- 301. (3) Indians of British Columbia.—Native cultures of British Columbia; a survey of the native peoples of the New World; racial, linguistic and cultural relationships; intensive study of a few representative tribes. [3-0; 3-0]
- 302. (1½-3) Comparative Ethnography of Special Areas.—A specialized study of ethnographic and theoretical problems. A different region may be selected each term.

  [3-0: 3-01]

- 320. (3) Prehistory of the Old World.—Early man and cultural beginnings; the Mesolithic; the subsistence-revolution of the Neolithic; the rise of urban societies and the first civilizations. [3-0; 3-0]
- 331. (3) Art and Myth in Society.—The social and technological basis of art; theories of origin, development and interpretation. Major plastic and graphic arts, mythology, music and dance of tribal and early societies. In 1969/70, one section will specialize in Art, and another in Mythology. [3-0; 3-0]
- 400. (3) Readings in Theory.—The principles used in the analysis of culture; the history of anthropological thought and the points of view represented in the classical monographs. [3-0; 3-0]
- 402. (1½-3) Comparative Ethnography of Special Areas.—An advanced study of ethnographic and theoretical problems. A different region may be studied each term. [3-0; 3-0]
- 405. (3) Kinship.—The significance of kinship. Typology of marriage, family and systems of kinship. Regulation of marriage. Kinship behaviour and terminology. Ecology and evolution of kinship. [3-0; 3-0]
- 412. (3) Introduction to Anthropological Problems.—A comparative review of thought, values and institutions, using primarily tribal and folk materials. Some findings and applications of anthropology. For students in the fourth year who have taken no other course in Anthropology. [3-0; 3-0]
- 420. (3) Archaeology of British Columbia.—The prehistory of the Pacific Northwest and archaeological field work in this area. Students will participate in excavations at prehistoric sites near Vancouver and will receive instruction in techniques of research and in the interpretation of archaeological data.

  [2-3; 2-3]
- 430. (3) Theory and Programmes of Social Change.—General theory of cultural evolution and social change. Changes among tribal and folk peoples. Programmes of welfare and development. [3-0; 3-0]
- 431. (3) Museum Principles and Methods.—A survey of Museum of Anthropology methods and purposes, with special attention paid to the care, cataloguing, and use of ethnological collections. [2-3; 2-3]
  - 441. (3) Honours Seminar.
- 449. (3) Honours Tutorial.—Will usually require the presentation of at least one research paper.
- 450. Formal Structure of Anthropological Theories.—The logic underlying anthropological theory; methods and assumptions required for describing a theory formally and deducing consequences. Applications and examples from anthropology and related fields.

  [3-0; 3-0]

#### Graduate Courses:

- 500. (1-3) Advanced Theory.
- 501. (1-3) Social Structure and Kinship.
- 502. (1-3) Advanced Ethnography of a Special Area.
- 503. (1-3) Social Control.
- 504. (1-3) Tribal and Peasant Economic Systems.
- 505. (1-3) Religion and Society.
- 511. (1-3) Personality and Culture.
- 512. (1-3) Language and Culture.
- 515. (1-3) Cultural Evolution and Cultural Ecology.
- 520. (1-3) Advanced Prehistory of a Special Area.

- 530. (1-3) Social Change.
- 531. (1-3) The Anthropology of Development.
- 532. (1-3) Field Methods.
- 534. (1-3) Special Advanced Courses.
- 540. (3) Advanced Seminar.
- 549. (3-6) Master's Thesis.
- 649. Ph.D. Thesis.

#### ASIAN STUDIES

The Department offers programmes of study that lead to the degrees of M.A., B.A.

The courses offered at the undergraduate level fall into two categories: (a) courses on the contemporary and historical cultures of South, Southeast, and East Asia, which do not require knowledge of an Asian language; and (b) courses in language, including advanced reading courses which introduce the student to literary, philosophical, and historical works in the original. Courses in category (a) are open to all students in the Faculty of Arts. Courses in category (b) are designed to provide the essential training for those who wish to proceed to further scholarly studies in the field of Asian Studies at the graduate level, but in the more elementary courses language training at the appropriate level is also provided for those who wish to obtain some knowledge of Chinese, Japanese, or Sanskrit as part of their general education or with a view to later practical use.

The Department offers Honours and Major Programmes in Chinese and Japanese and, in cooperation with other departments, a Major Programme in Asian Area Studies which requires less in the way of language study.

Because of the special difficulty of mastering Chinese and Japanese arising from the nature of the script, it is strongly recommended that those who intend to do graduate work in any field which will require the use of these languages should begin their study of them at the earliest possible moment. The Honours Programmes are designed to give students this necessary preparation, but students may still find that their graduate programmes take longer in Asian Studies than in other fields. Students who do not take the full amount of language training provided by the Honours Programmes must, of course, expect to have to make this up before being regarded as fully qualified for graduate work and to spend still longer periods of time before obtaining higher degrees.

The Department at the same time recognizes that students often develop an interest in Asian Studies when it is too late to embark on an Honours or Major Programme in Chinese or Japanese. The Department will, therefore, arrange special intensive programmes of language training on a tutorial basis, or by a combination of classes and supervised study, for students who are otherwise well qualified for graduate studies either in the Asian Studies Department or in other departments such as History, Political Science, Anthropology, Fine Arts, etc.

Graduate credit in Asian Studies will not normally be given for the work done in such a programme. Students in other disciplines should consult the departments concerned as well as the Department of Asian Studies.

Attention is also drawn to the possibility of arranging a M.A. programme in Asian Studies and another department.

# Requirements for the degree of Bachelor of Arts:

# Major in Asian Studies

See Programme in Asian Area Studies below, p. F32.

## Major in Chinese

First and Second Years:

Chinese 100 and 200. Asian Studies 205 is recommended

## Third and Fourth Years:

9-12 units in courses in Chinese numbered 300 and above 3-6 units in Asian Studies courses numbered 300 and above

## Major in Japanese

First and Second Years:

Japanese 100 and 200. Asian Studies 205 is recommended

#### Third and Fourth Years:

9-12 units in courses in Japanese numbered 300 and above

3-6 units in Asian Studies courses numbered 300 and above

# Honours in Chinese (Japanese)

## Admission:

First and Second Class Standing in Chinese (Japanese) 200. Asian Studies 205 is recommended

## Third and Fourth Years:

18 units in Chinese (Japanese) numbered 300 or above (including 342 and 442)

12 units from Asian Studies courses selected in consultation with the Department

The following courses will be accepted for credit in Asian Studies, subject to the approval of the Department:

Anthropology 402: Comparative Ethnography of Special Areas (Asia).

Anthropology 430: Theory and Programmes of Social Change.

Fine Arts 326: History of Oriental Art.

Fine Arts 426: Chinese Art. Fine Arts 427: Japanese Art.

Fine Arts 429: Art of Southeast Asia and India.

Geography 493: Geography of South and Southeast Asia.

Geography 496: Geography of East Asia.

History 332 and 432: Diplomacy of the Great Powers. Political Science 314: Japanese Government and Politics.

Political Science 315: Communist Chinese Government and Politics.

Political Science 412: Southeast Asian Politics.

Political Science 413: South Asian Government and Politics.

Political Science 414: Contemporary Japanese International Politics. Political Science 415: Contemporary Chinese International Politics.

Religious Studies 300: Religions of India.

Religious Studies 302: Buddhism.

Religious Studies 411: Indian and Tibetan Mahayana Buddhism.

Religious Studies 412: Mahayana Buddhism.

Religious Studies 413: Contemporary Buddhist Thought and Practice.

Theatre 340: History of the Oriental Theatre.

## (i) Courses in ASIAN STUDIES

A knowledge of an Asian language is not required for any of the following courses, which are designed to present the traditional civilizations and contemporary problems of China, Japan, India, Pakistan, and the countries of Southeast Asia.

- 205. (3) Introduction to East Asia.—Geographical, ethnic and historical backgrounds of China, Japan and Korea. Survey of twentieth-century East Asian history. Open to first-year students by permission of the instructor. [3-0; 3-0]
- 206. (3) Introduction to Southeast Asia.—Geographical, cultural, and historical backgrounds of Indonesia, Malaysia, Burma, Thailand, Cambodia, Laos, Vietnam and the Philippines. Problems of nationalism, foreign policy, economic and social development since 1941. Open to first-year students by permission of the instructor. [3-0; 3-0]
- 215. (3) Civilizations of Southern Asia.—A survey of ancient and modern civilizations in India and other regions of Southern Asia; their political, social and intellectual evolution. Open to first-year students by permission of the instructor.

  [3-0; 3-0]
- 302. (3) Chinese Literature in Translation.—An introduction to Chinese literature from ancient times to the present. [3-0; 3-0]
  - 309. Far Eastern Diplomatic History, 1800-1950.—See History 309.
  - 311. Expansion of Europe: Southeast Asia and Pacific Area.—See History 311.
- 320. (3) History of Chinese Civilization.—A survey of Chinese history and culture from ancient times to 1840. [3-0; 3-0]
  - 325. Chinese Philosophy.—See Philosophy 325.
- 330. (3) History of Japanese Civilization.—Japanese political, social, and cultural history from the earliest times to 1868. [3-0; 3-0]
- 335. (3) Japanese Literature in Translation.—An introduction to Japanese literature from the earliest times to the present day. [3-0; 3-0]
- 340. (3) History of Indian Civilization to 1526.—Political and cultural history from the earliest times to the beginning of the Mughal empire. [3-0; 3-0]
- 345. (3) Indian Literature in Translation.—A survey of classical and modern literature in translation. [3-0; 3-0]
- 405. (3) Communist Movements in Eastern Asia.—A survey of the growth, organization, ideology and programmes of Communist Parties in East Asia since 1920, with special emphasis on the Chinese Communist movement and the Chinese People's Republic. [3-0; 3-0]
  - 410. History of India since 1526.—See History 410.
- 417. (3) Chinese Political Thought and Institutions.—Chinese theories and practices of government and administration from earliest times to 1949.

  [2-1; 2-1]
- 420. (3) Contemporary South Asia.—Problems of modernization and external relations of India, Pakistan, Ceylon and Burma, since independence.
  [2-1; 2-1]

- 422. Modern Japan (since 1868).—See History 422.
- 424. Modern Chinese History since 1840.—See History 424.
- 434. History of Southeast Asia Since 1800.—See History 434.

## (ii) Courses in CHINESE

- 100. (6) Basic Chinese.—An introduction to the grammar and syntax of spoken and written Chinese. [6-2; 6-2]
- 200. (6) Intermediate Chinese.—Further study of the grammar and syntar of modern Chinese. Prerequisite: Chinese 100 or equivalent. [6-2; 6-2]
- 300. (3) Advanced Modern Chinese.—Modern Chinese (spoken and written) with emphasis on readings of contemporary literature and newspapers. Prerequisite: Chinese 200 or equivalent. [3-0; 3-0]
- 301. (3) Classical Chinese I.—Introduction to Classical Chinese. For students who have *not* taken Chinese 200. Prerequisite: Chinese 100 or equivalent. [3-0; 3-0]
  - 342. (3) Reading Course in Chinese for Honours Students.
- 400. (3) Classical Chinese II.—More advanced reading in Classical Chinese literature. Prerequisite: Chinese 200 or 301 or equivalent. [3-0; 3-0]
- 410. (3) Twentieth-Century Chinese Authors.—Selected novels, stories, and poetry. Prerequisite: Chinese 300. [3-0; 3-0]
- 411. (3) Pre-modern Chinese Fiction and Drama.—Selected passages from thirteenth-century drama and seventeenth- to nineteenth-century fiction. Prerequisite: Chinese 301. [3-0; 3-0]
- 412. (3) Readings in Classical Chinese Prose.—Selected passages in philosophical and historical literature. Prerequisite: Chinese 301. [3-0; 3-0]
- 413. (3) Readings in Classical Chinese Poetry.—Translation and analysis of selected works, especially from the pre-Han, Han, Tang, and Sung periods. Prerequisite: Chinese 301. [3-0; 3-0]
  - 440. (3-9) Supervised Study in the Chinese Language.
- 442. (6) Tutorial in Chinese for Honours Students.—This course will require the presentation of at least one research paper.

# (iii) Courses in JAPANESE

- 100. (6) Basic Japanese.—An outline of the grammar and syntax of the spoken language together with an introduction to the Japanese script.

  [6-2; 6-2]
  - 200. (6) Intermediate Japanese.—Prerequisite: Japanese 100 or equivalent. [6-2; 6-2]
  - 300. (3) Advanced Modern Japanese.—Readings in Japanese prose.
    [3-0; 3-0]
  - 301. (3) Classical Japanese. [3-0; 3-0]
  - 342. (3) Reading Course in Japanese for Honours Students.
- 400. (3) Readings in Modern Japanese Prose.—Modern essays and criticism; journalistic and scholarly writing. Prerequisite: Japanese 300. [3-0; 3-0]
- 401. (3) Readings in Pre-modern Japanese Prose.—Translation and analysis of selected materials in the fields of literary criticism, aesthetics, philosophy, and history. Prerequisite: Japanese 200. [3-0; 3-0]
  - 402. (3) Readings in Japanese Poetry.—Translation and analysis of selected

works from classical, medieval and modern periods. Prerequisite: Japanese 100. [3-0; 3-0]

- 440. (3-9) Supervised Study in the Japanese Language.
- **442. (6)** Tutorial in Japanese for Honours Students.—This course will require the presentation of at least one research paper.

## (iv) Courses in INDIC LANGUAGES

- 305. (3) Introductory Sanskrit.—An introduction to epic Sanskrit designed to provide an elementary reading knowledge and to demonstrate the historical characteristics of North Indian languages. [3-0; 3-0]
  - 414. (3) Intermediate Sanskrit.—Advanced grammar and selected readings. [3-0; 3-0]
  - 440. (3-6) Supervised Study in Indic Languages.

## Graduate Courses:

- 505. (3) Topics in the History and Structure of the Japanese Language.
- 506. (3) Research Methods and Source Material in Japanese Studies.
- 508. (3) Problems in the History of the Chinese Language.
- 509. (3) Problems of Modernization in Eastern and Southern Asia.
- 510. (3) Topics in Chinese Literature.
- 511. (3) Topics in Japanese Literature.
- 512. (3) Seminar.—Topics in Pre-modern Chinese History and Institutions.
- 513. (3) Seminar on Problems of Japanese Intellectual History.
- 515. (3) Problems of Early Indian Civilization.
- 517. (3) Research Methods and Source Material in Chinese Studies.
- 525. (3) Seminar.—Topics in Pre-modern Asian history or literature.
- 549. (3-6) Master's Thesis.

#### PROGRAMME IN ASIAN AREA STUDIES

Students who want to do graduate work with a concentration in the Asian field are required to take at least nine units in one discipline (e.g., History, Political Science, Geography, Anthropology).

# Requirements for the degree of Bachelor of Arts:

#### Major

First Year:

3 units from History 100-109 or Philosophy 100 or Arts I

#### Second Year:

One of Asian Studies 205, 206, 215

#### Other recommended courses:

Anthropology 200, Economics 200, Political Science 203 (1½ units), Religious Studies 200

#### Third and Fourth Years:

Students must follow one of the following area programmes:

## A. Programme in East Asia

Chinese 100 or Japanese 100 (6 units) (Students must take one of these; they are urged to take it in their first or second year, but upper-year credit will still be given if they take it later)

3-6 units from

Chinese 200 (6)

Japanese 200 (6)

Asian Studies 302

Asian Studies 335

Philosophy 323

Religious Studies 302

Religious Studies 412

Fine Arts 326

Fine Arts 426

Fine Arts 427

Theatre 340

3 units from

History 309

History 422 History 424

Asian Studies 320

Asian Studies 330

3 units from

Asian Studies 405

Asian Studies 417

Anthropology 302 (1½-3) (by permission) Anthropology 402 (1½-3) (by permission) Political Science 314 (1½) Political Science 315 (1½)

Political Science 414 (1½)

Political Science 415  $(1\frac{1}{2})$ 

Geography 496

Additional courses should be chosen in consultation with an adviser; at least 6 units must be outside the Asian field.

#### B. Programme in South Asia

3-6 units from

Asian Studies 305

Asian Studies 345

Asian Studies 414

Religious Studies 300

Religious Studies 410

Religious Studies 411

Fine Arts 326

Fine Arts 429

Theatre 340

3-6 units from

History 310

History 410

History 434
Asian Studies 340
History 332
History 432
3-6 units from
Anthropology 302 (1½-3) (by permission)
Anthropology 402 (1½-3) (by permission)
Asian Studies 420
Economics 412
Geography 493
Political Science 413

Additional courses should be chosen in consultation with an adviser; at least 6 units must be outside the Asian field.

# C. Programme in Southeast Asia

3-6 units from Asian Studies 345 Religious Studies 302 Fine Arts 326 Fine Arts 429 Theatre 340 3-6 units from History 309 History 310 History 311 History 411 History 332 History 432 History 434 3-6 units from Anthropology 302 ( $1\frac{1}{2}$ -3) (by permission) Anthropology 402 ( $1\frac{1}{2}$ -3) (by permission) Asian Studies 420 Economics 412 (by permission) Geography 493 Political Science 412

Additional courses should be chosen in consultation with an adviser; at least 6 units must be outside the Asian field.

Advisers for the Programme in Asian Area Studies are Professors Harnetty (Asian Studies) and Ames (Anthropology) for South Asia; Howes (Asian Studies) and Langdon (Political Science) for East Asia; and Willmott (Anthropology) and Harrison (History) for Southeast Asia.

#### BOTANY

The course below is recommended for students in the Faculty of Arts; for other courses see the Calendar of the Faculty of Science.

310. (1½) Plants and Man.—An introduction to the interactions of plants and human societies. The role of man in the origins, evolution and dispersal of food, drug and economic plants and the influences of plants on man's economic, cultural and political history will be considered. [2-0-3; 0-0-0]

#### **BIOLOGY**

The course below is recommended for students in the Faculty of Arts; for other courses see the Calendar of the Faculty of Science.

310. (1½) Human Heredity and Evolution.—A course which relates genetic and evolutionary concepts to man and to human populations. Primarily for students of third and fourth years in the Faculty of Arts. Credit will not be given for both Biology 101 and Biology 310. Mr. Person and Mr. Suzuki. [0-0-0; 3-0-2]

# CHINESE (see Asian Studies) CLASSICAL STUDIES (see Classics)

## CLASSICS

The Department of Classics offers programmes of study that lead to the degrees of Ph.D., M.A., B.A.

# Requirements for the degree of Bachelor of Arts:

# Major

#### Classical Studies:

Classical Studies 100 or 331 (the latter should be taken in the second year)

15 units of Classical Studies; for 6 of these, courses in Greek or Latin numbered above 300 or Religious Studies 407 may be substituted

#### Greek:

Classical Studies 331 (preferably in the second year)

12-15 units of Greek numbered above 300; for 3 of these, a course in Latin numbered above 300 or in Classical Studies may be substituted

#### Latin:

Classical Studies 331 (preferably in the second year)

12-15 units of Latin numbered above 300; for 3 of these, a course in Greek numbered above 300 or in Classical Studies may be substituted

#### Honours

#### Classics:

First and Second Years:

Latin 120 (or 110)

Latin 220 (or 200 or 205)

Two courses in Greek

Third and Fourth Years:

The programme will normally include Greek composition, Latin composition, two or three courses in Greek authors, two or three courses in Latin authors and Classical Studies 331

#### Greek:

First and Second Years:

Two courses in Greek

#### Third and Fourth Years:

The programme will include courses in Greek authors, Greek 410 and Classical Studies 331; a reading knowledge of Latin (i.e., satisfactory completion of Latin 120 or its equivalent) will be required

#### Latin:

First Year:

Latin 120 (or 110)

Second Year:

Latin 220

## Third and Fourth Years:

The programme will include courses in Latin authors, Latin 410 and Classical Studies 331; a reading knowledge of Greek (i.e., satisfactory completion of Greek 200) is highly recommended

The Department is prepared to arrange Honours programmes in collaboration with other Departments (e.g., French, Hispanic and Italian Studies, English).

# (i) Courses in CLASSICAL STUDIES

A knowledge of the Greek and Latin languages is not required for any of the following courses, which are designed to present studies in the life, literature and thought of the Greek and Roman world. Courses 310, 315, 316, 330 and 331 may be taken by second-year students. The Department of History recognizes Courses 331, 333 and 433. Three units of credit in Fine Arts will be given for Course 330. Courses 310, 315, and 316 are acceptable alternatives to English 200.

- 100. (3) Introduction to Classical Civilization.—The history, literature, art and architecture of fifth-century Athens and first-century Rome. Pertinent readings in translations and modern texts. [3-0; 3-0]
- 310. (3) Greek and Roman Literature.—A study, through selected readings in translation, of the range and variety of literary forms invented and developed by the Greeks and Romans from Homer to Apuleius. [3-0; 3-0]
- 315. (3) Classical Epic.—Study, in translation, of the epics of Homer and the *Aeneid* of Vergil, together with related material from such writers as Hesiod, Apollonius, Ovid, and Lucan. [3-0; 3-0]
- 316. (3) Classical Drama.—Study, in translation, of a wide range of plays, both tragedy and comedy, by the Greek and Roman dramatists. [3-0; 3-0]
- 330. (3) Greek and Roman Art.—A study of the achievements of the Greeks and Romans in art and architecture from the Bronze Age to the reign of Constantine. Each period will be illustrated by a detailed analysis of selected masterpieces with particular stress on their historical, literary and social contexts. (Offered jointly with Fine Arts 330.) [3-0; 3-0]

- 331. (3) Ancient History.—The rise of the Greek city-states; special emphasis on the political, economic and cultural achievements of the fifth and fourth centuries B.C.; the growth of Rome and the development of her political institutions during the Republic; the social and economic history of the Empire; the transition from the classical to the mediaeval world. No prerequisite.

  [3-0; 3-0]
- 333. (3) The Roman Empire.—A detailed study of Roman imperial history from 30 B.C. to the end of the fourth century. A conspectus of the political theory and practice of the classical Greek world and of the Roman Republic. Attention will be directed to the development of Christianity and to the problem of Church and State. Prerequisite: Classical Studies 331 or permission.

[2-0; 2-0]
430. (3) Athens.—A study of the monuments and topography of Athens from pre-historic to Roman times. Special attention will be paid to the Agora, the Acropolis, and their importance to the life, history, and art of the city. Readings will be based primarily on archaeological reports. Open to advanced undergraduates and to graduate students.

[2-0; 2-0]

431. (3) Rome and Roman Britain.—A study of the topography and monuments of Rome and Roman Britain, intended to illustrate the significance of archaeological research for the history and art of ancient Rome and her Empire. Open to advanced undergraduates and to graduate students.

[2-0; 2-0]

433. (3) Greece.—A detailed study, in discussion, of the Greek city-states, their political and cultural evolution, their decline and their permanent contribution to western civilization. Historiography and historical method will be important objects of study. Emphasis in reading and discussion will be placed upon the ancient source-materials. Prerequisite: Classical Studies 331 or permission. [2-0; 2-0]

## (ii) Courses in GREEK

- 100. (3) Beginners' Greek.—The elements of Attic Greek. [4-0; 4-0]
- 200. (3) Introduction to Greek Prose Authors.—Prerequisite: Greek 100 or equivalent. [4-0; 4-0]
- 301. (3) Greek Literature of the Classical Period.—Plato's Apology; a play of Aeschylus; brief survey of Greek literary history. Open to second-year students. Prerequisite: Greek 200 or equivalent. [3-0; 3-0]
- 303. (3) Greek Drama.—Development of Greek tragedy and comedy; scenic antiquities; representative plays. [3-0: 3-0]
  - 305. (3) Epic Poetry.—Selections from Homer's Odyssey. [3-0; 3-0]
- 306. (3) Greek Historians.—Greek historical writing; selections from Herodotus and Thucydides. [3-0; 3-0]
- 309. (3) Greek Oratory.—The orations of Lysias and Demosthenes in their historical context. [3-0; 3-0]
- 325. (3) An Introduction to the Greek New Testament. Designed primarily for students specializing in Religious Studies. Open to students who have completed Greek 200 and to others only by permission of the Head of Department. This course does not satisfy the requirements in language nor may it be included in a major or an Honours programme in Greek, Latin or Classics. [3-0; 3-0]
  - 406. (3) Greek Comedy.—The rise and development of Greek comic drama.
    [3-0; 3-0]

- 407. (3) Introduction to Greek Philosophy.—Beginnings of Greek philosophic inquiry; selections from two of the major works of Plato and Aristotle.

  [3-0; 3-0]
- 410. (3) Advanced Composition.—Obligatory for Honours students in the Third or Fourth Year. [2-0; 2-0]

#### Graduate Courses:

- 521. (3) Aristotle's Politics.
- 522. (3) Homer and the Epic.
- 523. (3) Plato.
- 524. (3) The Tragic Poets.
- 525. (3) Thucydides.
- 535. (3) Problems in Greek History.
- 536. (3) The Monuments and Topography of Athens.
- 545. (3) Greek Epigraphy.
- 549. (3-6) Master's Thesis.
- 649. Ph.D. Thesis.

## (iii) Courses in LATIN

- 100. (3) First-Year Latin.—For students with no previous knowledge of Latin. [4-0; 4-0]
  - 110. (3) Intermediate Latin.—Prerequisite: Latin 20. [4-0; 4-0]
- 120. (3) Latin Language and Literature, I.—Prerequisite: Latin 12 (92). Reading of an anthology of Latin prose and poetry; prose composition.
  - [3-0; 3-0]
  - 200. (3) Second-Year Latin.—Prerequisite: Latin 100. [4-0; 4-0]
- 205. (6) Intensive Intermediate Latin.—An intensive course in the structure of the language and practice in reading designed to enable students with only one year of Latin to acquire a competence in the language sufficient to qualify them to enter senior courses. Prerequisite: Latin 100 or its equivalent.
- 220. (3) Latin Language and Literature, II.—Prerequisite: Latin 120 or a First or Second Class in Latin 110. Prose of Cicero; Horace's adaptations of the Greek Lyric; the developed Epic as represented by Vergil. [3-0; 3-0]
- 301. (3) Latin Literature of the Classical Period.—Readings of the major Latin authors in prose and verse. Prerequisite: Latin 200. [3-0; 3-0]

Composite Course in Latin (3).—Intended primarily for students attending the summer session. In 1969 Vergil's Aeneid will be read, partly in the original and partly in English translation, the amount of the original varying with the student's preparation. Students desiring credit in Latin 120, 200, 220, 301, 405, or 531 will register for this course under the appropriate number and will receive three units of credit upon the successful completion of the appropriate amount of work. Students registering for Latin 200 should have mastered the first five units of Ullman and Henry, Second Latin Book, or the equivalent.

- 401. (3) Philosophy.—Lucretius and the philosophical writings of Cicero. [3-0; 3-0]
- 402. (3) Drama.—Plautus, Terence and Seneca. [3-0; 3-0]

403. (3) Lyric and Elegy.—Catullus, Horace and the elegiac poets.

[3-0; 3-0]

404. (3) Satire.—Horace, Juvenal, Martial and Petronius.

[3-0; 3-0]

405. (3) Epic Poetry.—Vergil, Aeneid.

[3-0; 3-0]

406. (3) Latin Poetry.—A survey of Latin poetry from the earliest native verse to late imperial and early Christian literature. [3-0; 3-0]

407. (3) The Roman Historians.—Livy, Tacitus and the Letters of Cicero. [3-0; 3-0]

410. (3) Advanced Composition.—Obligatory for Honours students in the Third or Fourth Year. [2-0; 2-0]

425. (3) Mediaeval Latin.—An introduction to Latin literature of the Middle Ages, including a survey of the leading literary forms that existed between the Classical period and the Renaissance; mediaeval documents; the elements of mediaeval palaeography. [3-0; 3-0]

#### Graduate Courses:

- 521. (3) Cicero, Letters.
- 522. (3) Roman Elegiac Poetry.
- 523. (3) Roman Comedy.
- 530. (3) The Roman Historians.
- 531. (3) The Roman Epic.
- 535. (3) Problems in Roman History.
- 549. (3-6) Master's Thesis.
- 649. Ph.D. Thesis.

## COMPARATIVE LITERATURE

A programme of study is offered that leads to the degree of M.A.

#### **Graduate Courses:**

- 500. (3) Introduction to Comparative Literature.
- 501. (3) Studies in Genre.
- 502. (3) Studies in Literary Movements and Periods.
- 503. (3) Studies in Myth, Theme and Tradition.
- 504. (3) Topics in Comparative Literature.
- 505. (3) New Problems in Comparative Literature.
- 506. (3) Comparative Studies in Oriental and Occidental Literatures.
- 547. (3-6) Reading Course.
- 549. (3-6) Master's Thesis.

Qualified undergraduates may be admitted to these courses with the permission of the instructor. The chairman of the Programme is Professor Z. Folejewski of the Department of Slavonic Studies. The adviser for the Programme is Professor M. Goetz Stankiewicz of the Department of German.

#### CREATIVE WRITING

The Department offers programmes of study that lead to the degrees of M.A. (including programmes in cooperation with the Department of English or the Department of Theatre) and B.A.

# Requirements for the degree of Bachelor of Arts:

#### Major

First and Second Years:

Creative Writing 201 or 202

Third and Fourth Years:

15 units, chosen from upper-division courses in Creative Writing and related disciplines

## Admission to Courses

Students from any Faculty may apply, but each course is restricted to fifteen students. An applicant for Creative Writing 202 will be admitted if his submission of 20-25 pages of recent original fiction, drama or poetry, or a combination of these, is judged acceptable by the Department. Applications must reach the Department by August 15.

An applicant for a senior course in Creative Writing will be admitted on the recommendation of his 202 instructor, or in case he has taken neither of these courses, through submission of 25-30 pages of recent original work relevant to the senior course and which is judged acceptable by the Department. Deadline: August 15.

#### Instruction

Instruction is based on the premise that promising student-authors can benefit from judicious criticism and the chance to develop their abilities in an academic setting. Without sacrifice of standards, the staff members, all producing writers, are eclectic in attitude toward various modes of writing. Workshops, conferences and tutorials are designed to focus attention on the student's own work. Reading assignments are made in the Department's two magazines of current writing, *Prism International* and *Contemporary Literature in Translation*. There are no examinations, and marks are based on the writing done and on participation in workshops throughout the year.

#### Courses Offered:

- 201. (3) Writing Techniques.—Designed for beginning writers, including first-year students. Fiction, non-fiction, poetry, drama. (Summer Session only.) [3-0; 3-0]
- 202. (3) Creative Forms.—Designed for beginning writers, including first-year students by special permission. Short story, shorter play forms and lyrical and satirical verse. [3-0; 3-0]
- 405. (3) Writing of Non-fiction.—Open to selected students majoring in Creative Writing, and others by permission of the instructor. [3-0; 3-0]
- 406. (3) Writing of Plays for Radio, Screen and Television.—Some studio work may be required. [3-0; 2-3]

407. (3) Writing of Stage-Plays.—Studio work is required, and some plays may be given workshop-production. [3-0; 2-3]

**408. (3)** Writing of the Novella or Novel.— [3-0; 3-0]

409. (3) Writing of the Short Story.— [3-0; 3-0]

410. (3) Writing of Poetry. [3-0; 3-0]

- 415. (3) Theory and Practice of Translation.—For fourth-year and graduate students. Prerequisite: genuine proficiency in at least one language other than English. [3-0; 3-0]
- 447. (3) Directed Reading.—A required course for fourth-year majors in Creative Writing. The course will emphasize current trends and techniques rather than critical evaluation. Tutorial. [3-0; 3-0]
- 496. (3) Tutorial in Poetry.—For students who receive departmental permission to do special advanced work in this genre.
- 497. (3) Tutorial in Fiction.—For students who receive departmental permission to do special advanced work in this genre.
- 498. (3) Tutorial in Drama.—For students who receive departmental permission to do special advanced work in a genre.
- 499. (3) Honours Essay.—Honours students in English who receive permission from the Departments of English and of Creative Writing to substitute a creative work for the graduating essay will register for Creative Writing 499 instead of English 499.

#### **Graduate Courses:**

- 507. (3) Advanced Writing of Drama.
- 509. (3) Advanced Writing of Fiction.
- 510. (3) Advanced Writing of Poetry.
- 547. (1-4) Directed Reading.
- 549. (3) Thesis.

## **ECONOMICS**

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A

## Requirements for the degree of Bachelor of Arts:

#### Major

First and Second Years:

Mathematics 100 and 121

Economics 200 (or 201 or 202)

Economics 304, or 354 and 364 (this requirement may be deferred to Third Year.)

Mathematics 240 is suggested

#### Third and Fourth Years:

15 units in Economics including

Economics 300

Economics 401 (must be taken in Fourth Year)

A course in economic history numbered above 300

At least 3 more units in Economics in courses numbered 400 or above

#### Honours

First and Second Years:

Mathematics 100 and 121

Economics 202 (or 200 or 201)

Economics 304, or 354 and 364 (This requirement may be deferred to Third Year).

Mathematics 240 is strongly recommended

For admission to the Third Year:

First or Second Class standing in the Second Year and in Economics 202 (or 200 or 201)

Third and Fourth Years:

21 units in Economics including

Economics 332 and 342 (or 300 with departmental permission)

Economics 441

Economics 449

A course in economic history numbered above 300

3 more units in Economics courses numbered 400 or above

For admission to the Fourth Year:

First or Second Class in Economics 332 and 432

First or Second Class average in courses in Economics taken in the Third Year

(Certain courses in other departments are also acceptable for credit in the Honours Programme.)

#### Courses Offered:

Students who want to study Economics in their First Year are advised to take Economics 100 or 101. Economics 200 is available on a restricted basis to First-Year students. Consult the Department of Economics.

Economics 200 (or 201 or 202) is prerequisite to all courses with a higher number except Economics 304, 333, 354, and 364.

- 100. (3) Introduction to Economic History and Development.—An introduction to economic development emphasizing problems in the emergence and growth of industrial economies. [3-0; 3-0]
- 101. (3) Political Economy I.—Significant contemporary issues in public policy. The contribution made by elementary economic analysis to the consideration of current social issues. [3-0; 3-0]
- 200. (3) Principles of Economics.—The institutions and processes involved in the production and distribution of wealth; basic determinants of prices and costs, the determinants of income and employment; international trade.

  [3-0; 3-0]
- 201. (3) Political Economy II.—Economic analysis developed from a study of contemporary problems including price theory, resource allocation, employment theory, international trade. Students who have completed Economics 101 and wish to do further work in economics should enrol in Economics 201 rather than in Economics 200 or 202. Credit may be obtained for only one of Economics 200, 201, and 202. Prerequisite: Economics 101. [3-0; 3-0]

- 202. (3) Principles of Economics.—To be taken instead of Economics 200 or 201 by prospective Honours students; open to others by permission. Prerequisite: Second Class standing in the First Year. [3-0; 3-0]
- 300. (3) Intermediate Economic Analysis.—Theory of consumer demand; production theory; equilibrium of the firm; study of market structures; monopoly, monopolistic competition and oligopoly; the social accounts; theory of income and employment; economic fluctuations; inflation; economic growth. (Section G of this course is reserved for Graduate Students.) [3-0; 3-0]
- 303. (3) History of Economic Thought.—The development of economic analysis from ancient to modern times, including some description of the changing environment in which economists wrote. Selections from the classics in the field from Aristotle to Keynes. [3-0; 3-0]
- 304. (1½) Introduction to Empirical Economics.—Presentation and interpretation of empirical work and concepts in economics. Intuitive development of probability, random variables, estimates, standard errors, tests of hypotheses. Prerequisites (May be taken concurrently): Mathematics 120 (or 100 and 121) and Economics 200. [3-0; 0-0]
- 305. (1½) Empirical Problems in Economics.—Formulation and investigation of hypotheses in economics; students will be required to undertake applied work. Prerequisite: Economics 304. [0-0; 3-2]
- 308. (3) Money and Banking.—The role of money and financial institutions in a modern economy; structure of the financial system; credit expansion and the process of monetary control; international financial institutions; foreign exchange rates, international capital flows; monetary theory and policy. [3-0: 3-0]
- 310. (3) Government Finance.—Role of government. Theories of justice in taxation. Characteristics of a good system of taxation. Governmental expenditures. Governmental revenues, with emphasis on income and property taxes and succession duties. Dominion-Provincial-Municipal financial relations. Governmental borrowing and fiscal policy. [3-0; 3-0]
- 313. (3) Analysis of Comparative Economic Organizations. Economic analysis of allocation of resources. Capitalism and Marxian communism. Soviet economic planning in its various phases since 1917. Pre-war authorization economies. War-time controls and planning. The mechanics of industrialization. [3-0; 3-0]
- 320. (3) Economic Development in Modern Europe.—Economic growth and development in Europe mainly since 1750. Empirical study of important changes in social and economic institutions; examination of their significance for structural change and the process of industrialization; analysis of growth, change and fluctuation in the major western economies until recent times.

  [3-0; 3-0]
- 321. (3) Economic History of Canada.—The growth of the Canadian economy in relation to development of natural resources, changing market conditions, industrialism, communications and technology. [3-0; 3-0]
- 332. (3) Intermediate Price Theory.—Theories of pure competition, monopoly, monopolistic competition, and oligopoly. Theory of distribution; capital theory; general equilibrium; welfare economics. Prerequisite: Second-class in Economics 200 or 202. Chiefly for Honours students; open to others by permission.

  [3-0; 3-0]
- 333. (3) French Canada.—An interdepartmental seminar on the history, economics, and literature of French Canada. Limited to 15 undergraduates

- from any department of the Faculty of Arts, selected on the basis of previous academic performance. Seminar discussions will be held in both English and French. Prerequisite: French 220 or French 210 and 223 or equivalent proficiency in French. Students who want to use this course to fulfil the minimum requirements in either the major or honours programme in Economics must obtain the consent of the Department. [2-1; 2-1]
- 342. (3) Intermediate Income Theory.—Theory of income and employment, including determinants of the price level, balance of foreign payments, and distribution of income. Theories of business cycles and economic growth. Prerequisite: Second-class in Economics 200 or 202. Chiefly for Honours students; open to others by permission. [3-0; 3-0]
- **350. (2) Principles of Economics.**—Primarily for students in Applied Science and Forestry. [2-0; 2-0]
- 352. (1½) International Economics.—Introduction to international trade. Attention will be focused on determinants of trade, theory of international values, tariffs, and other barriers to trade. Some reference will be made to international financial issues and capital flows. [3-0; 0-0]
- 354. (1½) Probability and Economics.—Meaning, use and simple mathematics of probability theory and simple decision theory, with applications from statistics, economic theory, and industry. Prerequisites (May be taken concurrently): Economics 200 and Mathematics 240. [3-2; 0-0]
- 357. (1½) Labour Economics and Manpower.—Analysis of the labour market; labour force composition and trends; labour supply; participation rates; labour mobility; demand for labour; unemployment; wages and wage theory.

  [3-0: 0-01]
- 364. (1½) Statistical Inference in Economics.—Principles of statistical inference, estimation, hypothesis testing, prediction, up to simple regression and correlation. Prerequisite: Economics 354. [0-0; 3-2]
- 367. (1½) Economics of Industrial Relations.—Industrial relations in terms of economic structure; history, structure, and functions of trade unions; management's attitudes and organizations; nature of issues and settlements in union-management relations; industrial disputes and their settlements; third-party assistance in dispute settlement; collective bargaining and economic policy.

  [0-0; 3-0]
- 381. (1½) Industrial Organization.—Stresses mergers, bigness, monopoly; firm behaviour under changing structural conditions; public policy. [0-0; 3-0]
- 385. (1½) Land Economics.—Urban and rural allocation of land. Food production, population growth, and urban sprawl in relation to problems of land reform. Procedures for optimizing the planning of land use. [3-0; 0-0]
- 400. (3) Advanced Economic Analysis.—Method; general and partial equilibrium; economics of welfare. Theories of money, capital and interest; distribution; economic growth. Prerequisite: Economics 300 (or 332 and 342).

  [3-0; 3-0]
- 401. (3) Applied Economics.—The application of economic analysis to selected problems and issues. Restricted to economics majors in fourth year, for whom it is compulsory. Prerequisite: Economics 300 (or 332 and 342), 304.
- 407. (3) Economics of Labour.—Economic analysis of the labour market: occupational wage-structure, industrial-wage structure and the effects of unionization; participation-rates and hours of work; wage-adjustment and

incomes policy; demand-adjustment; labour mobility and structural unemployment. Prerequisite: Economics 300 (or 332 and 342). [3-0; 3-0]

- 409. (3) Economics of Natural Resources.—Efficient management of natural resources; economic characteristics of the fishing, mineral, forest, and water industries; effect of public policy on development of resources. Prerequisite: Economics 300 or 332. [3-0; 3-0]
- 412. (3) Theory of Economic Development.—Theories of economic development with application to advanced and underdeveloped economies; problems of carrying out developmental programmes. Prerequisite: Economics 300 (or 332 and 342). [3-0; 3-0]
- 415. (3) Mathematical Economics.—Dynamic models; input-output models; the application of linear programming and the theory of games to economic analysis; general equilibrium models and the mathematics of marginal analysis. Prerequisite: Economics 300 (or 332 and 342) and Mathematics 240 or 202 or 220.
  - 435. (3) Directed Reading.

[3-0; 3-0]

- 441. (3) Honours Seminar.—Reports and group discussions of selected topics. Open only to Honours and graduate students. [2-0; 2-0]
- 449. (3) Honours Essay.—Essay on some theoretical or institutional problem.
- 452. (1½) International Trade.—Comparative costs and factor endowments; theory of international values; tariffs, quotas, and other controls on trade; theory of international trade policy; current problems and issues. Students may not receive credit for both Economics 352 and Economics 452. Prerequisite: Economics 300 or 332. [3-0; 0-0]
- 454. (1½) Introduction to Econometrics.—The multiple regression model, applications and extensions. Prerequisite: Economics 364. [3-2; 0-0]
- 458. (1½) Monetary Policy.—Money in the economic system; banks, financial institutions and markets; foreign exchange market, interest rates, and international capital flows; theory and practice of monetary policy. Prerequisite: Economics 300 or 342. Students may not receive credit for both Economics 458 and Economics 308. [0-0; 3-0]
- 460. (1½) Public Finance.—Ethical judgments implicit in income redistribution by taxes and transfers. Normative theories of governmental expenditure; economic effects of taxation; problems of federal-provincial-municipal co-ordination; current tax issues. Prerequisite: Economics 300 or 332. Students may not receive credit for both Economics 310 and Economics 460. [3-0; 0-0]
- 462. (1½) International Financial Systems.—Balance of payments; market for foreign exchange; mechanism for adjusting balance of payments; internal vs. external stability; current problems and issues. Prerequisite: Economics 300 or 342. [0-0; 3-0]
- 480. (1½) Themes in Western Economic History since the Industrial Revolution.—Special emphasis on the forces contributing to rapid industrialization during the eighteenth century. Empirical study of the changing economic structures and the process of industrialization. Prerequisite: Economics 300 or 342. Students may not receive credit for both Economics 480 and Economics 320 or 321. [3-0; 0-0]
- 481. (1½) Market Structure.—Identifying and comparing market structures; oligopoly and entry; business concentrations and pricing behaviour. Prerequisite: Economics 300 or 332. [3-0; 0-0]
- 484. (1½) Transportation.—The mixture of monopoly, oligopoly, and competitive elements found in intercity transportation in Canada. The econo-

mic effects of rate-making policies are appraised against criteria found in price-theory. Prerequisite: Economics 300 (or 332 and 342). [0-0; 3-0]

- 490. (1½) Problems and Methodology in Economic History.—Changing methods of historical analysis in relation to changes in economic structure. Prerequisite: Economics 300 or 342, and 320 or 321 or 480. [0-0; 3-0]
- 491. (1½) Business Regulation and Public Policy.—Economic waste attributable to the competitive strategies (including pricing) of the modern corporation; Canadian combines policy; other policies of restricting tradepractices. Prerequisite: Economics 481 or 332. [0-0; 3-0]

## Graduate Courses:

- 500. (1½) Micro-Economics I.
- 501. (1½) Micro-Economics II.
- 503. (3) History of Economic Analysis.
- 504. (3) Applied Statistics and Econometrics.
- 506. (3) The Economics of Income Security.
- 507. (3) Economics of Labour.
- 508. (3) Money and Banking.
- 509. (3) Economic Analysis and Natural Resources.
- 510. (3) Governmental Finance.
- 512. (3) Economic Development.
- 515. (1½) Mathematical Economics I.
- 516. (1½) Mathematical Economics II.
- 520. (3) Economic History.
- 535. (1-3) Special Advanced Course.
- 536. (1-3) Directed Reading.
- 540. (3) Research Seminar.
- 549. (3-6) Master's Thesis.
- 550. (1½) Macro-Economics.
- 551. (11/2) Economic Fluctuations and Growth.
- 552. (1½) International Economics I.
- 562.  $(1\frac{1}{2})$  International Economics II.
- 581. (1½) Market Structure and Business Behaviour.
- 591. (1½) Business Performance and Public Policy.
- 600.  $(1\frac{1}{2})$  Special Topics in Economic Theory.
- 604. (3) Advanced Econometrics.
- 608. (3) Banking Processes and Policies.
- 612. (1½) Problems and Policies in Economic Development.
- 649. Ph.D. Thesis.
- 652. (1½) Topics in International Economics.
- 657.  $(1\frac{1}{2})$  Topics in the Economics of Labour.
- 667. (1½) Topics in Industrial Relations.

#### **ENGLISH**

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A.

## Requirements for the degree of Bachelor of Arts:

## Major

Third and Fourth Years:

At least 15 units in courses numbered 300 or above, chosen in consultation with a departmental adviser. English 300 may be required of all majors

#### Honours

#### Admission

First or Second Class in English 200 or 210

#### Third and Fourth Years:

English 309, 350, or 351

English 355

English 491 and 492 (Seminars)

English 496 and 497 (Reading Courses)

English 499 (Graduating essay; Creative Writing 499 may be substituted)

9 additional units in English courses numbered above 300

6 units in courses outside the department

English 200 or its equivalent is prerequisite to all English courses numbered 300 or above.

#### Courses Offered:

- 100. (3) Literature and Composition.—A study of the principles of composition and of some twentieth-century examples of drama, short story, poetry and novel. Essays and exercises are required. [3-0; 3-0]
- 150. (2) Composition.—For students in Applied Science, Forestry, and Pharmacy.

  [2-0; 2-0]
- 200. (3) Literature and Composition.—A study of representative works of English literature. The course is offered in two divisions with alternative reading lists. Essays are required. [3-0; 3-0]
- 210. (3) An Introduction to English Honours.—For prospective Honours students. [3-0; 3-0]
- 300. (3) Seminar for Majors.—Exercises in criticism involving various critical approaches to literature. A number of set texts, supplemented by additional readings, will be examined closely in small sections. [3-0; 3-0]
- 303. (3) English Composition.—The principles and practice of good writing. For students in the Faculty of Education. [3-0; 3-0]
- 304. (3) Advanced English Composition. Practice in the writing and criticism of essays. Open to students in the Faculty of Education and to others by permission. [3-0; 3-0]
- 305. (2) Literature of Ideas.—For students in Applied Science, Forestry, and Pharmacy. [2-0; 2-0]
- 309. (3) Modern English and Its Background.—A description of English phonetics, phonology, grammar and vocabulary. [3-0; 3-0]
- 310. (3) Classics of European Literature.—Aspects of the Western literary tradition from its beginnings to the twentieth century. Major representative texts in translation and their relevance to English literature. [3-0; 3-0]

- 311. (3) Children's Literature.—A survey of children's literature from early sources to recent books. The appraisal of books and authors for children. For credit in the Faculty of Education. [3-0; 3-0]
- 315. (3) Literature of the Bible. Origins and backgrounds of biblical literature; the principal translations of the Bible into English; an examination of the chief literary forms of the Bible—poetry, drama, biography, short story, etc.; influence of the Bible on English language and literature. [3-0; 3-0]
- 316. (3) The Classical Tradition in English Literature.—An investigation of the nature and importance of the classical tradition by the study of works of English literature in relation to the Greek and Latin works that have influenced them.

  [3-0; 3-0]
- 320. (3) History of Criticism.—The imagination and the poetic process; the emotional element in poetry and the tests of value; the content of poetry and the nature of poetic truth; poetic form and its varieties, diction, imagery, tone-colour and metrics. [3-0; 3-0]
- 321. (3) Approaches to Poetry.—Critical studies of representative English poems grouped according to form and content. [3-0; 3-0]
- **329.** (3) Modern Critical Theories.—A review of modern trends, with some emphasis on practical criticism. [3-0; 3-0]
- 331. (3) The Drama to 1642.—Development of English drama from the mediaeval period, with emphasis on major Elizabethan and Stuart playwrights.
  [3-0; 3-0]
- 332. (3) British Drama, 1660-1880.—Dramatic art from the Restoration to the late nineteenth century. [3-0; 3-0]
- 340. (3) The English Novel.—The major novelists of the eighteenth and nineteenth centuries. [3-0; 3-0]
- 350. (3) Old English Literature and the Development of the Language.— An elementary study of Old English language and literature and the history of the language up to modern English. [3-0; 3-0]
- 351. (3) History of the English Language.—Development of the English language from the West Germanic to the present period in terms of its phonology, morphology, syntax and vocabulary. [3-0; 3-0]
  - 354. (3) A Survey of Middle English Literature. [3-0; 3-0]
- 355. (3) Chaucer.—A detailed study of Chaucer's major works; his contemporaries and followers. [3-0; 3-0]
- 360. (3) Sixteenth-Century Survey to 1611.—The English Renaissance; its literature and some of its formative ideas. [3-0; 3-0]
- 365. (3) Shakespeare.—Lectures on various aspects of Shakespeare's art: detailed study of Richard III, As You Like It, All's Well, Julius Caesar, Othello, Macbeth, Coriolanus, The Tempest. [3-0; 3-0]
- 366. (3) Shakespeare.—Lectures on various aspects of Shakespeare's art. Detailed study of Romeo and Juliet, A Midsummer Night's Dream, The Merchant of Venice, Henry V, Measure for Measure, King Lear, Antony and Cleopatra, The Winter's Tale. [3-0; 3-0]
- 370. (3) Seventeenth-Century Literature.—Prose and poetry, exclusive of Milton. Emphasis upon the ideas, forms and styles as an expression of the educational, religious, moral and political controversies of the age. [3-0; 3-0]
- 371. (3) Seventeenth-Century Poetry.—Metaphysical and Restoration poetry with Donne and Dryden as central figures. [3-0; 3-0]
- 372. (3) Seventeenth-Century Prose.—Prose writings from Bacon to Dryden, historical, biographical, etc. [3-0; 3-0]

(371 and 372 are to be given in alternate years).

- 375. (3) Milton.—The work of Milton, with special emphasis on *Paradise Lost*. [3-0; 3-0]
- 380. (3) Eighteenth-Century Literature.—The age of Pope and the age of Johnson, including studies of representative authors such as Swift, Gray, Goldsmith, Burns and Blake. [3-0; 3-0]
- 389. (3) Currents of Thought in Eighteenth-Century Literature.—A close reading of works by Swift, Pope, Johnson and Sterne in conjunction with a study of aspects of the European Enlightenment. [3-0; 3-0]
- 390. (3) A Survey of English Literature of the Nineteenth Century.—The main movements of prose, poetry and drama. The Romantic Revival and romanticism as a continuing force. [3-0; 3-0]
- 391. (3) The Romantic Period.—Blake, Wordsworth, Coleridge, Byron, Shelley and Keats. [3-0; 3-0]
- 392. (3) Victorian Poetry.—Tennyson, Browning and Arnold. A few weeks are devoted to later poetry. [3-0; 3-0]
- 393. (3) Victorian Prose. Macaulay, Carlyle, Mill, Newman, Ruskin, Arnold and Huxley. [3-0; 3-0]
- 395. (3) Wordsworth.—A study of the life and works of Wordsworth, with special emphasis on the *Prelude*. [3-0; 3-0]
- 420. (3) Modern Period.—Hardy, Hopkins, Butler, Wilde, Wells, Shaw and Conrad. The background of ideas and social forces, especially as revealed by the literature of the period 1870-1914. [3-0; 3-0]
- 425. (3) British Drama, 1880 to the Present.—A study of the movements and major dramatists in the late nineteenth and twentieth centuries.
- [3-0; 3-0]

  429. (3) Contemporary Literature.—Major figures and trends in English literature between 1914 and 1960: Eliot, Yeats, Joyce, Lawrence, Woolf, Forster, Waugh, Orwell, Auden and Thomas.

  [3-0; 3-0]
- 440. (3) Canadian Literature.—A survey of the literature in English with some attention to major French-Canadian works in translation. [3-0; 3-0]
- 441. (3) Canadian Prose.—Canadian prose with particular reference to the novel, short story and essay. [3-0; 3-0]
- 442. (3) Canadian Poetry.—Canadian poetry, its technical and historical development from the beginnings to the present day, with reference to English and American poetry. [3-0; 3-0]
- 450. (3) A Survey of American Literature.—An examination of the main movements in American literature from Puritanism to the twentieth century.

  [3-0; 3-0]
- 451. (3) American Poetry.—A study of American Poetry with the main emphasis on poetry since Whitman. [3-0; 3-0]
- 454. (3) American Fiction.—A study of the major American novelists from Cooper to Faulkner. [3-0; 3-0]
- 460. (3) Literature of the Commonwealth.—A comparative study of the traditions of English literature outside of England, particularly of the growth of indigenous literatures (in English) in the countries of the Commonwealth.

  [3-0; 3-0]

#### Courses for Honours Students:

- 367. (3) Honours Course in Shakespeare.—A study of Shakespeare in his historical and cultural context. [1-2; 1-2]
  - 491. (3) Third Year Honours Seminar.—Practical criticism. [3-0; 3-0]

- 492. (3) Fourth Year Honours Seminar.—Literary criticism and investigation. [3-0; 3-0]
  - 496. (3) Readings in English Literature.
  - 497. (3) Readings in English Literature.
  - 499. (3) Honours Essay.

#### Graduate Courses:

- 501. (1-3) Bibliography and Methods.—Required of all graduate students lacking the equivalent.
  - 503. (3) Studies in Prose.
  - 504. (3) Studies in Drama.
  - 505. (3) Studies in Fiction.
  - 506. (3) Studies in Poetry.
  - 507. (3) Studies in Criticism.
  - 508. (3) Studies in the History and Structure of the English Language.
  - 510. (3) Old English Studies.
  - 512. (3) Middle English Studies.
  - 515. (3) Shakespeare.
  - 519. (3) Studies in the Sixteenth Century.
  - 520. (3) Studies in the Seventeenth Century.
  - 525. (3) Studies in the Eighteenth Century.
  - 530. (3) Studies in the Romantic Period.
  - 535. (3) Studies in the Victorian Period.
  - 539. (3) Studies in the Twentieth Century.
  - 540. (3) Studies in American Literature to 1890.
  - 545. (3) Studies in American Literature Since 1890.
  - 547. (1-3) Directed reading in fields in which no courses are offered.
  - 548. (3) Studies in Canadian Literature.
  - 549. (3-6) Master's thesis.

The Graduate Committee may permit a student with high standing to submit a body of creative work for the Master's degree instead of an academic thesis. Such a student must obtain at least twelve units of graduate credit in English courses and seminars, and satisfy all other requirements of the Master's programme in English.

649. Ph.D. Thesis.

#### **FINE ARTS**

The Department offers programmes of study that lead to the degrees of M.A., B.A.

# Requirements for the degree of Bachelor of Arts:

#### Major

First and Second Years:

Fine Arts 125, 228 (the former must be taken before or concurrently with the latter)

#### Third and Fourth Years:

15 units in Fine Arts courses numbered 300 and above, and 15 units in courses outside the Department (a further course in Fine Arts

may be permitted in exceptional circumstances). The student must choose one of the following programmes:

a) Major programme with emphasis on Western Art

3 courses from List A

2 courses from List A, B, or C

b) Major programme with emphasis on Oriental Art

3 courses from List B

1 course from List A

1 course from List A, B, or C

# Honours

First and Second Years:

Fine Arts 125 (First-Class standing) and Fine Arts 228 (to be taken before or concurrently with Fine Arts 125).

#### Third and Fourth Years:

21 units in Fine Arts courses numbered 300 and above, and 15 units in courses outside the Department (a further course in Fine Arts may be permitted in exceptional circumstances). The student must choose one of the following programmes:

a) Honours programme with emphasis on Western Art

4 courses from List A

Fine Arts 439 (must be taken in third year)

Fine Arts 449

1 other course from List A, B, or C

b) Honours programme with emphasis on Oriental Art

3 courses from List B

I course from List A

Fine Arts 439 (must be taken in third year)

Fine Arts 449

1 other course from List A, B, or C

A reading knowledge of two of French, German, Italian is strongly recommended.

Honours students are required to take an oral examination at the end of their fourth year, in which they will be examined on any aspect of their studies in Fine Arts.

#### Courses Offered:

- 125. (3) History of Art.—The history of architecture, sculpture and painting of the Western World from Ancient Egypt and Mesopotamia to the present.
  [3-0; 3-0]
- 228 (3) Fundamentals of Design.—An introductory study of visual forms, conducted through studio work and experiments closely related to illustrated lectures and demonstrations; the basic visual elements explored through two-and three-dimensional materials and intermedial projects. Enrolment restricted; priority given to prospective Fine Arts majors. [2-6; 2-6]

#### A. Western Art

325. (3) Mediaeval Art.—Byzantine and early Christian art; Romanesque and Gothic art and architecture. [3-0; 3-0]

- 327. (3) Art of North America.—A survey of the painting, sculpture and architecture of Canada and the United States of America from the 17th century to the present. [3-0; 3-0]
- 330. (3) Greek and Roman Art.—Emphasis on the architecture, sculpture, painting, and decorative arts of Greece and Rome. [3-0; 3-0]
- 425. (3) History of Modern Art.—Painting and sculpture in Europe and America from 1800 to the present. [3-0; 3-0]
- **430. (3)** Art of the Renaissance.—The painting, sculpture and architecture of Italy and Northern Europe from 1400 to 1600. [3-0; 3-0]
- 432. (3) European Art from 1600 to 1800.—The painting, sculpture and architecture of the major European countries during the seventeenth and eighteenth centuries. [3-0; 3-0]

#### B. Oriental Art

- 326. (3) History of Oriental Art.—A survey of the art of China, Japan, Southeast Asia, and India. [3-0; 3-0]
- 426. (3) Seminar in the History of Chinese Art.—Concepts and problems in Chinese painting, architecture, sculpture, metalwork or ceramics. Prerequisite: Fine Arts 326. [3-0; 3-0]
- 427. (3) Seminar in the History of Japanese Art.—Intensive study of various phases of Japanese Art. Prerequisite: Fine Arts 326, or permission of the instructor. [3-0; 3-0]
- 429. (3) The Art of Southeast Asia and India.—Concepts and problems in Indian painting, architecture or sculpture. Prerequisite: Fine Arts 326.

[3-0; 3-0]

# C. Seminar, Studio, and Special Lecture Courses

- 328. (3) Art and the Studio: Analysis of Techniques.—The materials and techniques of painting, with special reference to their development and historical importance. Prerequisite: Fine Arts 125 and 228. [3-0; 3-0]
- 331. (3) Social History of Art.—A study of the social, political, religious and economic background of the arts to account for changes of theme and style, from paleolithic times to the present. [3-0; 3-0]
- 428. (3) Art and the Studio: Analysis of Style.—An examination, using studio techniques (primarily, drawing) and library material, of the styles of individual artists, and of the general concept of style in art. Prerequisites: Fine Arts 125 and 228. [3-0; 3-0]
- 431. (3) Art, Science, and Humanism.—The developments of the sciences and the arts from 1600 to the present day. [3-0; 3-0]
- 434. (3) Painting and Graphics.—A studio course introducing the student to both the creative procedure and the possibilities of various forms of painting and graphics (drawing and print-making), and to the way in which ideas, imaginative concepts, and various forms of meaning may be realized through these media. Prerequisite: Fine Arts 125 and 228. Open only to students concentrating in Fine Arts, and restricted to 15 students. [3-0; 3-0]
- 436. (3) Theory and Practice of the Criticism of Art.—An examination of general questions and problems in art criticism, and the history of art criticism from the seventeenth century to the present, studied through primary texts. Prerequisite: Fine Arts 425 or permission of the instructor. Limited to 15 students. [3-0; 3-0]

- 438. (3) Theory and Practice of the Administration and Curatorship of Galleries.—A theoretical and practical study of the nature and functioning of museums and galleries, covering their history, philosophies and general procedures. For fourth-year and graduate students who are considering careers in museums and art galleries. Enrolment restricted. [3-0; 3-0]
- 439. (3) Bibliography.—Required of honours students (in third year) and graduate students. [3-0; 3-0]
- 446. (3) Understanding of the Visual Arts.—A critical introductory study of the experience and nature of the visual arts: painting, sculpture, architecture, photography and film. Not open to Fine Arts majors. [3-0; 3-0]
  - 449. (3) Honours Essay.

#### Graduate Courses:

- 525. (3) Studies in Mediaeval Art.
- 526. (3) Studies in Oriental Art.
- 527. (3) Studies in Canadian Art.
- 530. (3) Studies in Ancient Art.
- 531. (3) Studies in the Art of the Renaissance.
- 532. (3) Studies in Seventeenth- and Eighteenth-Century Art.
- 533. (3) Studies in Nineteenth- and Twentieth-Century Art.
- 536. (3) Problems in the Criticism and Methodology of Fine Arts.
- 537. (3) Theory and Criticism of Oriental Art.
- 540. (3) Directed Study in the Visual Arts.
- 541. (3) Special Advanced Courses.
- 549. (3-6) Master's Thesis.

#### FORESTRY

300. (3) Principles of Forestry and Wood Sciences.—Objectives, introduction to methods; scientific and economic bases; examples of forest land use, multiple-purpose forestry, and forest products manufacture and use. (Not available for credit towards a degree in Forestry; no prerequisites.) Mr. Thirgood and staff.

#### **FRENCH**

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A.

Requirements for the degree of Bachelor of Arts:

# Major

## French

First and Second Years:

French 120 (or equivalent), 202, 220 (French 202 and 220 may be taken in the Third Year.)

Third and Fourth Years:

French 302

12 additional units in courses numbered above 300 (excluding 301, 400, 401)

#### Honours

#### French

First and Second Years:

French 120 (or equivalent), 202, 220 (French 202 must be completed before entering the Third Year)

One year of university-level Latin or another Romance language is highly recommended

## Third and Fourth Years:

French 301, 302, 401, 402

12 additional units in French numbered above 300, including a graduating essay (French 449, 3-6 units)

## Romance Studies

## Admission:

First- or high second-class standing in the courses taken in Romance languages

A reading-knowledge of Latin

# Third and Fourth Years:

24 units numbered 300 and above in at least two Romance languages, including a graduating essay (3-6 units)

#### Courses Offered:

100. (3) Beginning French. [4-1; 4-1]

110. (3) First-Year French.—Prerequisite: French 11. [3-1; 3-1]

115. (3) First-Year French Practice.—A conversational approach to French culture. Prerequisite: French 12 or permission of the Department. [5-1; 5-1]

120. (3) Contemporary French: Language and Literature.—Prerequisite: French 12 or French 110. [3-1; 3-1]

202. (3) Studies in French Language and Style, I.—Composition, oral practice, translation. To be taken by all students intending to proceed to the Major or Honours Programmes. Prerequisite: French 120 or equivalent . [3-1; 3-1]

215. (3) Second-Year French Practice.—A continuation of French 115. Prerequisite: French 115 or permission of the Department. [4-1; 4-1]

220. (3) An Introduction to French Literature.—To be taken by all students intending to proceed to the Major and Honours Programme. Prerequisite: French 120 or equivalent. [3-0; 3-0]

301. (3) Honours Seminar, I.—To be taken in the Third Year by all students in the Honours Programme. [2-0; 2-0]

302. (3) Studies in French Language and Style, II.—Composition, syntax, versification, advanced translation and oral practice. Prerequisite: French 202. [3-1; 3-1]

306. (3) French Phonetics.—Theory and practice of French pronunciation. [2-2; 2-2]

308. (3) Introduction to the History of the French Language.—The development of the language from Vulgar Latin to the present. Prerequisite: one year of Latin.

[3-0; 3-0]

310. (3) Modern French.—A description of phonology, grammar and vocabulary. [3-0; 3-0]

- 333. (3) French Canada.—An interdepartmental seminar on the history, economics, and literature of French Canada. Limited to 15 undergraduates from any department of the Faculty of Arts, selected on the basis of previous academic performance. Seminar discussions will be held in both English and French. Prerequisite: French 220 or 202 or equivalent proficiency in French.

  [2-1; 2-1]
- 400. (3) A Survey of French Literature in Translation.—Not available for credit towards a Major or Honours Programme in French. [3-0; 3-0]
- 401. (3) Honours Seminar, II.—To be taken in the Fourth Year by all students in the Honours Programme. [2-0; 2-0]
- 402. (3) Advanced Studies in French Language and Style, III.—Stylistics, textual analysis, translation. Prerequisite: French 302. [3-0; 3-0]
- 407. (3) Mediaeval French Literature.—Representative literary texts from the eleventh to the fifteenth century. [2-0; 2-0]
- 408. (3) Literature of the Sixteenth Century.—The French Renaissance, including Rabelais, Ronsard and Montaigne. [3-0; 3-0]
- 409. (3) Literature of the Seventeenth Century.—Representative authors with emphasis on Corneille, Racine, Molière, Descartes, Pascal and La Fontaine. [3-0; 3-0]
- 410. (3) Literature of the Eighteenth Century.—The drama, the novel and the basic writings of Montesquieu, Voltaire, Diderot and Rousseau. [3-0; 3-0]
- 411. (3) Poetry and Drama of the Nineteenth Century.—Representative works and significant trends. [3-0; 3-0]
- 412. (3) The Nineteenth-Century Novel.—Representative texts and significant trends. [2-0; 2-0]
- 413. (3) Currents of Thought in Nineteenth-Century Literature.—Criticism, history, and other relevant material. [3-0; 3-0]
- 414. (3) The Twentieth-Century Drama.—Representative works and significant trends. [2-0; 2-0]
- 415. (3) The Twentieth-Century Novel.—Representative works and significant trends. [2-0; 2-0]
- 416. (3) French Canadian Literature.—Characteristic works, from its origins to the present. [2-0; 2-0]
- 417. (3) Twentieth-Century French Poetry.—Representative works and significant trends. [2-0; 2-0]
  - 420. (3) French Language and Literature.—Selected topics. [2-0; 2-0]
  - 449. (3-6) Honours Essay.

## Graduate Courses:

- 500.  $(1\frac{1}{2})$  Bibliography and Methods.
- 501. (1½-3) Studies in the Literature of Mediaeval France.
- 502.  $(1\frac{1}{2}-3)$  Studies in Sixteenth-Century Literature.
- 503. (1½-3) French Society in the Seventeenth Century.
- 504.  $(1\frac{1}{2}-3)$  Studies in the Seventeenth-Century Novel.
- 505. (1½-3) Studies in Seventeenth-Century Theatre.

- 506.  $(1\frac{1}{2}-3)$  Studies in the Eighteenth-Century Novel.
- 507.  $(1\frac{1}{2}-3)$  The French Enlightenment.
- 508. (1½-3) Studies in French Romantic Literature.
- 509. (1½-3) Studies in Post-Romantic Nineteenth-Century Literature.
- 510. (11/2-3) Modern French Poetry.
- 511. (1½-3) Contemporary French Literature.
- 512. (1½-3) Studies in Literary Criticism.
- 513. (11/2-3) Problems in French-Canadian Literature.
- 514. (1½-3) Problems Relating to the French Novel.
- 515. (3) Romance Philology.
- 516. (1½-3) Studies in the History of the French Language.
- 520. (3-6) French Language and Literature.
- 549. (3-6) Master's Thesis.
- 649. Ph.D. Thesis.

#### GEOGRAPHY

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A.

# Requirements for the degree of Bachelor of Arts:

(Suggested programmes for specialization within Geography should be obtained from the departmental office.)

# Major

First and Second Years:

Geography 101 and 102 (may be taken concurrently or in separate years)

Mathematics 100 and 121, or 130 (substitution of Mathematics requirements is possible with departmental consent.)

Majors in physical geography must also take Geography 212 and 213. (Students who take Geography 101 and 102 in First Year may take up to 3 units toward the major from list A (see below) in their Second Year)

#### Third and Fourth Years:

15 units of Geography courses selected as follows:

3 units from List A (see below)

6 units from List B

3 units from List C

3 additional units in Geography courses numbered 300 or above.

## Honours

First and Second Years:

As for Major

Third and Fourth Years:

6 units from List A, including Geography 345 and 445.

9 units from List B

3 units from List C

Geography 449

15 additional units, normally outside the department

#### Courses Offered:

Notes: Geography 102 replaces 100 and 201.

The designation [3-0; or 3-0] means that the course may be taken in either term.

- 101. (3) Introduction to Physical Geography.—Weather and climate; origin and distribution of landforms with particular reference to North America; map-projections. [3-2; 3-2]
- 102. (3) Introduction to Human Geography.—The study of human activities in their spatial and ecological contexts: economic development; cultural change; theories of the location of economic activity; urbanization; the geography of population and of resources; theories of the region and regionalization; field studies. Illustrations will be drawn from various world regions.

[2-1; 2-1]

401. (3) Introduction to Geographical Problems.—An introduction to current themes and issues in geography. For students in fourth year majoring in fields other than geography. Not credited towards the Major Programme in geography.

[2-1; 2-1]

# LIST A — METHODOLOGY AND TECHNIQUE COURSES

Students from other fields who have a special interest in the courses listed below should consult the departmental advisers if they wish to enrol in them but do not have the prerequisites.

- 345. (1½) Seminar.—Development of contemporary geographical methodology; geography as a professional field. For geography majors with at least second-class standing, and instructor's permission. Recommended for those planning to enter graduate studies. [1-2; 0-0]
- 370. (1½) Air Photograph Analysis.—Aerial photography; measurement from aerial photographs; photo-interpretation in geographic analysis; remote sensing of the earth's surface and atmosphere. Prerequisite: Geography 101 or Geology 105. [2-3; 0-0]
- 371. (1½) Research Techniques in Geography.—Methods for observing, recording and analysing data; research organization; report writing. For Geography majors only. (Not given in 1969-70). [2-3; 0-0]
- 372. (1½) Cartography.—Cartographic methods: distribution mapping; statistical analysis of data on maps, graphs, cartograms; relief representation; map reproduction. Prerequisite: Geography 101 or Geology 105. [2-2; or 2-2]
- 373. (1½) Cartographic Design.—Historical cartography; projection systems; design problems; map evaluation. For geography majors only. (Not given 1969-70). [0-0; 2-3]
- 374. (1½) Statistics in Geography I.—Introduction to statistical techniques and their application to geographical problems. Prerequisite: First-year mathematics. [3-2; 0-0]
- 375. (1½) Statistics in Geography II.—Intermediate statistical techniques and their application to geographical problems. Prerequisite: Geography 374.
- 445. (1½) Seminar.—Geographical methodology and its relations to allied fields. Prerequisite: Geography 345. [0-0; 1-2]
- 470. (1½) Aerial Photographs in Geographical Enquiry.—Conventional aerial photographs and their applications in mapping; remote sending; charac-

teristics and interpretation of multi-spectral imagery; sample applications in land inventory and resource management. Prerequisite: Geography 370. (Not given 1969-70).

# LIST B — SYSTEMATIC COURSES

Students from other fields who have a special interest in the courses listed below should consult the departmental advisers if they wish to enrol in them but do not have the prerequisites.

- 212. (1½) Climatology.—An introduction to climatology with emphasis on the hydrologic cycle; evapotranspiration and runoff estimates; Thornthwaite II classification; topics in applied climatology and paleoclimatology. Prerequisite: Geography 101. [2-2; 0-0]
- 213. (1½) Physiographic Hydrology.—The historical development of the major concepts in physical geography; structure process and stage as landform controls; emphasis upon landform assemblages resulting from hydrologic processes; regional physiographic hydrology. Prerequisite: Geography 101.
- 214. (1½) Introduction to Weather and Climate. (For students in the Faculty of Forestry only.)—Atmospheric elements, meteorological instruments and practical weather observations; classifications of climate. [2-2; 0-0]
- 312. (1½) Statistical Climatology.—Frequency, duration and intensity studies of selected climatic elements; microclimatology and its physical basis. Prerequisite: Geography 212 and 374. [0-0; 2-2]
- 313. (1½) Regional Hydrology.—Hydrologic regions of North America; techniques and criteria for defining and assessing water surplus and deficit areas. Prerequisite: Geography 213. [2-2;0-0]
- 315. (1½) Geography of Ecosystems.—The concept of the ecosystem; classification and mapping. Dynamics of selected systems, measurement of productivity, and resource potential. Prerequisites: Geography 101. [0-0; 2-2]
- 324. (1½) Introduction to Cultural and Historical Geography.—Relations between geography and history; geographic aspects of culture; culture areas and cultural landscapes; patterns and processes of culture change; cultural ecology. Prerequisite: Geography 102 (201). [2-1; 0-0]
- 337. (1½) Introduction to Political Geography.—The heritage of political geography; the spatial structure of political organization including notions of territoriality and hierarchy, centrality and nodes, boundaries and frontiers, global structures. Prerequisite: Geography 100 or 102 (201); open to majors and honours students in history and political science. [3-0; 0-0]
- 350. (1½) Introduction to Urban Geography.—Major themes in the geographic study of cities and urban systems. Prerequisite: Geography 102 (201).

  [3-0; or 3-0]
- 351. (1½) Geography of Urbanization and Industrialization.—An analysis of the geographic aspects of the growth of urban regions. Prerequisite: Geography 102 (201). [3-0 or 3-0]
- 360. (1½) Geography of Manufacturing.—Major themes in the geographic study of manufacturing activities. Prerequisite: Geography 102 (201).
  - 361. (11/2) Introduction to Regional Analysis.—Theoretical and technical

- aspects of the analysis of regional economies. Prerequisite: Geography 102 (201). [2-1; 0-0]
- 366. (3) Natural Resources and World Affairs.—Selected aspects of economic geography: energy, soils; agricultural, mineral and forest raw materials and their significance in Canadian and world affairs. Laboratory on soils in the first term.

  [2-2; 2-1]
- 407. (3) Historical Geography of North America.—The geographical implications of the exploration, settlement, and economic development of North America. (Not given in 1969-70). [3-0; 3-0]
- 412. (3) Geomorphology.—See Geology 412 in the Calendar of the Faculty of Science.
- 414. (1½) Fluvial Geomorphology.—Principles of overland flow, through flow and surface runoff. Spatial variations of fluvial processes. Deterministic and stochastic considerations in the development of channel networks. Prerequisite: Geology 412 (may be taken concurrently). [0-0; 2-2]
- 424. (1½) Problems in Historical and Cultural Geography.—Detailed analysis of selected themes in various cultural realms. Prerequisite: Geography 324. [0-0; 2-1]
- 437. (1½) Political-Geographic Analysis.—The spatial structure of political processes and behaviour. Models of selected political-geographic problems such as discontiguity, partition, changes in sovereignty, federation and defederation, disputes over territory; specific regional examples. Prerequisite: Geography 337. [0-0; 3-0]
- 450. (1½) Urban Analysis.—Geographic analysis of selected problems of the internal structure of cities and urban systems. Prerequisite: Geography 350, and one of 351, 360, 361.

  [0-0; 2-1]
- 460. (1½) Problems in Economic Geography.—Geographical analysis of selected problems in manufacturing, and transportation. Prerequisite: Geography 360, and one of 350, 351, 361. (Not given in 1969-70). [0-0; 2-1]
- 461. (1½) Geography and Economic Development.—Interrelationships between economic development and spatial change, mainly at the subnational level. Prerequisite: Geography 361 and one of 350, 351, 360. [0-0; 2-1]
- 462. (1½) Geography of Water Resources.—Systems analysis as applied to the management of water resources. Prerequisite: Geography 313
  [0-0; 2-1]
- 463. (1½) Regional Economic Development of the United States.—A brief historical-geographical survey of the distribution of economic activities; regional economic planning in the United States. Prerequisite: Geography 361, and one of 350, 351, 360. (Not given in 1969-70.)

#### LIST C — REGIONAL COURSES

Students from other fields who have a special interest in the courses listed below should consult the departmental advisers if they wish to enrol in them.

- 491. (3) Geography of the Pacific Northwest.—Regional geography with emphasis on British Columbia and the Northwest States: physical and cultural elements, patterns, and problems of location and use of resources.

  [2-1; 2-1]
  - 492. (3) Regional Geography of the United States. (Not given in 1969-70).

- 493. (3) Geography of South and Southeast Asia.—A comparative regional analysis stressing the historical development and changing cultural, economic and political patterns of the area, with special reference to India-Pakistan and Malaysia-Singapore. [2-2; 2-2]
- 494. (3) Geography of the Soviet Union.—Distribution of population and its historical origins; physical environment; distribution of resources and economic activities; major regions; Soviet power in the modern world. [2-1; 2-1]
- 495. (3) Geography of Latin America.—Pattern and change in Latin America, with detailed discussion of selected Spanish American regions. Emphasis on developmental problems. [2-1; 2-1]
- 496. (3) Geography of East Asia.—The physical and human geography of eastern Asia with emphasis on China and Japan. [2-1; 2-1]
- 497. (1½) Geography of the Canadian Arctic.—The patterns of physical and human geography in Canada's northland; the impact of the physical environment on the human occupancy of the north; exploration, trade and settlement; northern resources; current economic and social problems.

  [0-0; 3-0]
- 498. (3) Geography of Europe.—A regional analysis of Europe with special emphasis on the effects of traditional political fragmentation and of the current movement towards political integration. (Not given in 1969-70).
- 499. (3) Geography of Canada.—Regional geography; landforms, climate, natural resources, population; primary industries. [3-0; 3-0]

# Honours Essay:

449. (3) Honours Essay.

# Graduate Courses:

# First Term:

- 500. (11/2) Physical Geography.
- 501. (1½) Economic Geography.
- 502. (11/2) Cultural and Historical Geography.
- 503. (11/2) Political Geography.

### Second Term:

- 504. (1½) Quantitative and Dynamic Geomorphology.
- 505. (11/2) Climatology and Hydrology.
- 506. (1½) Economic Geography.
- 507.  $(1\frac{1}{2})$  Urban Geography.
- 508. (11/2) Political Geography.
- 509. (11/2) Cultural and Historical Geography.

### Seminars and Courses:

- 510. (1½) Cartographic and Quantitative Analysis.
- 511. (1½) Modeling Techniques in Geography.
- 512. (11/2) Techniques of Spatial Analysis.
- 513. (1½) Research Sources for Regional Study.
- 514. (1½) Contemporary Geographic Methodology.

515. (1½) History of Geographic Methodology.

521.  $(1\frac{1}{2})$  Permafrost.

Second Year and above:

560.  $(1\frac{1}{2}-3)$  Geomorphology.

570. (11/2-3) Economic Geography.

571.  $(1\frac{1}{2}-3)$  Urban and Transportation Geography.

580. (1½-3) Canada.

581. (1½-3) Western Arctic.

582.  $(1\frac{1}{2}-3)$  Monsoon Asia.

583. (1½-3) U.S.S.R.

584. (11/2-3) Latin America.

600. Doctoral Research Seminar

# Readings and Theses:

550.  $(1\frac{1}{2}-3)$  Directed Reading.

599. (6) M.A. Thesis.

699. Ph.D. Thesis.

# GEOPHYSICS

310. (3) Exploring the Universe.— A modern approach to the Earth Sciences and Astronomy within the use of advanced mathematics. This course is open to third and fourth year students not registered in the Faculty of Science or Applied Science.

[3-0; 3-0]

# **GERMAN**

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A.

# Requirements for the degree of Bachelor of Arts:

# Major

Second Year:

German 200 or 210

Third and Fourth Years:

German 223

15 units in courses numbered 300 or above, including:

German 310, 350, 407

## Honours

Third and Fourth Years:

German 310, 350, 407, 439

6 additional units of German courses numbered 300 and above

One course in German history

One university-course in French, Italian, Spanish, Russian, Latin or Greek

A graduating essay (3 units) may be offered instead of a senior course

Candidates are required to take an oral examination after the completion of course work.

### Courses Offered:

NOTE: Courses numbered 400 and above are normally given in alternate years. The department should be consulted as to whether courses with  $1\frac{1}{2}$  units of credit will be given in the first or second term.

- 100. (3) First-Year German.—Introduction to the language. [3-1; 3-1]
- 110. (3) First-Year German.—Review of grammar; extensive reading. Prerequisite: German 11 (20 or 91). [4-0; 4-0]
- 120. (3) First-Year German.—Grammar, composition, extensive reading. Prerequisite: German 11 or First Class in German 12. [4-0; 4-0]
- 123. (6) German Language—accelerated course.—Grammar, composition, reading and oral work. This course is equivalent to German 100 and 200.

  [5-2; 5-2]
- 200. (3) Second-Year German.—Reading, grammar, composition. Prerequisite: German 100. [4-0; 4-0]
  - 201. (3) See under Germanic Studies.
- 210. (3) Second-Year German.—German language and literature. Prerequisite: German 110 or German 120 (Pass or Second Class). [3-0; 3-0]
- 223. (3) Intermediate Composition and Oral Practice.—Prerequisite: German 200 or 210 or First Class in German 120. [3-0; 3-0]
- 230. (3) German for Students of Science.—Prerequisite: German 100 or equivalent. This is a terminal course. [3-0; 3-0]
- 310. (3) German Literature 1800-1900.—Major literary trends and representative figures from Romanticism to Naturalism. [3-0; 3-0]
- 323. (3) Advanced Composition.—Intensive training in translation, free composition and oral expression. [3-0; 3-0]
  - 339. (3) Third Year Honours Tutorial. [0-2; 0-2]
- 350. (3) German Literature 1700-1800.—Representative works with emphasis on Lessing, Goethe and Schiller. [3-0; 3-0]
- 400. (1½) Studies in Nineteenth-Century Drama.—Intensive study and critical interpretation of major dramatists. [3-0]
- 401. (3) Twentieth-Century Drama.—Critical interpretation of representative dramas from Naturalism to the present. [3-0; 3-0]
- 404. (3) The Romantic Movement.—A study of the literature of the period against the background of philosophical, political and social developments.

  [3-0; 3-0]
- 405. (3) Prose Works of the Nineteenth Century.—A study of the novel and the novella through their most important stages of development from 1830 to 1900. [3-0; 3-0]
  - 406. (3) Studies in the Classical Period. [3-0; 3-0]
  - 407. (3) Survey of German Literature to 1700. [3-0; 3-0]
  - 409. (1½) Currents of Thought in Eighteenth-Century Literature. [3-0]
- 410. (3) German Poetry from Goethe to Nietzsche.—The work of representative poets against the background of changing literary values. [3-0; 3-0]
- 411. (3) History of German Civilization.—Development of German culture from its beginnings to the nineteenth century. Lectures, discussions and term papers in German. This course is recommended for prospective teachers of German. Prerequisite: high standing in German 223. [3-0; 3-0]

412. (3) Twentieth-Century Poetry.—The lyric of the twentieth century with special emphasis on interpretation. [3-0; 3-0] 413. (1½) The Novel in the Twentieth Century. [3-0] 439. (3) Fourth Year Honours Seminar. [0-2; 0-2] 449. (3) Honours Essay.

# Graduate Courses:

501. (1½-3) Studies in the German Novel.

502. (11/2-3) History of the German Language.

503. (11/2-3) Seminar in Modern Authors.

504.  $(1\frac{1}{2}-3)$  Studies in Mediaeval Literature.

505. (11/2-3) Studies in Expressionism.

506. (11/2-3) Old Icelandic.

508. (1½-3) Gothic and Comparative Germanic Linguistics.

509.  $(1\frac{1}{2}-3)$  The Enlightenment.

510. (11/2-3) Studies in the Early Classical Period.

511. (11/2-3) Studies in the Later Classical Period.

512. (1½-3) Studies in Romanticism.

513. (1½-3) Seminar in Austrian Authors.

514. (1½-3) Nineteenth-Century Realism.

515.  $(1\frac{1}{2}-3)$  Contemporary Authors.

516. (11/2-3) Guided Research.

517. (1½-3) Renaissance Studies.

518.  $(1\frac{1}{2}-3)$  Studies in the Baroque.

519. (1½-3) "Sturm und Drang."

520. (1½-3) Nineteenth-Century Naturalism.

548. (11/2-3) Bibliography and Methods.

549. (3) Master's Thesis.

649. Ph.D. Thesis.

# Courses in Germanic Studies:

201. (3) Great German Literary Works in Translation.

GREEK (coe Classics)

[3-0; 3-0]

# GREEK (see Classics) HEBREW (see Religious Studies)

# HISPANIC AND ITALIAN STUDIES

The Department offers programmes of study that lead to the degrees of M.A. and B.A. For Graduate studies and Latin American studies, enquire at the Department.

Requirements for the degree of Bachelor of Arts:

# Major

### Italian

First and Second Years:

Italian 100, 200 or 105.

Third and Fourth Years:

15 units in Italian courses numbered 300 and above.

# Spanish

First and Second Years:

Spanish 100, 200 or 105.

Third and Fourth Years:

Spanish 300

12 additional units in Spanish courses numbered above 300, except Spanish 320

### Honours

# Italian

First and Second Years:

Italian 100, 200 or 105.

A reading knowledge of Latin

Third and Fourth Years:

Italian 401, 449

18 additional units in Italian courses numbered above 300

# Spanish

First and Second Years:

Spanish 100, 200 or 105.

A reading knowledge of Latin

Third and Fourth Years:

Spanish 300, 449

18 additional units in Spanish courses numbered above 300.

### Romance Studies

First and Second Years:

First- or high second-class standing in the courses taken in Romance Languages

A reading knowledge of Latin

Third and Fourth Years:

24 units numbered 300 and above in at least two Romance languages, including a graduating essay.

# (i) Courses in ITALIAN

100. (3) First-Year Italian.—Grammar, reading, conversation. [3-1; 3-1]

105. (6) Intensive Italian.—Grammar, reading, composition, conversation.
[6-0; 6-0]

200. (3) Second-Year Italian.—Reading, composition, conversation. Prerequisite: Italian 100.

223. (3) Advanced Conversation. [4-0; 4-0]

300. (3) Introduction to Italian For Senior Students.—Grammar, reading, conversation. Prerequisite: a good knowledge of another foreign language. [3-0; 3-0]

302. (3) Advanced Composition, Translation and Stylistics. [3-0; 3-0]

305. (3) Contemporary Italian Literature. [3-0; 3-0]

- 310. (3) Italian Literature in English Translation. [3-0; 3-0]
- 400. (3) Honours Seminar.—Bibliography, methods of research, composition. [3-0; 3-0]
- 401. (3) Italian Literature of the Middle Ages.—Dante, Petrarch, Boccaccio and the minor lyric poets. [3-0; 3-0]
- 402. (3) Italian Literature of the Renaissance.—Pulci, Boiardo, Ariosto, Machiavelli, Castiglione, Cellini, Tasso and the lyric poets from Lorenzo de'Medici to Michelangelo. [3-0; 3-0]
- 403. (3) Italian Literature from the Reformation to the Risorgimento.—Vico, Goldoni, Alfieri, Foscolo, Leopardi, Manzoni and minor poets from the Mannerists to the Romantics. [3-0; 3-0]
- 404. (3) Italian Literature from the Risorgimento to the Present.—Carducci, Pascoli, D'Annunzio, Verga, Fogazzaro and later developments in the novel, drama and lyric poetry. De Sanctis, Croce, and the evolution of literary criticism.

  [3-0; 3-0]
  - 420. (3) Italian Language and Literature.—Selected topics. [3-0; 3-0]
  - 449. (3-6) Honours Essay.

### Graduate Courses

- 500. (3) Bibliographic Survey of Italian Literature.
- 501. (3) Dante: The Minor Works.
- 502. (3) Dante: The Divine Comedy.
- 505. (3) Studies in the Literature of the Renaissance.
- 510. (3) Studies in Modern Italian Literature.
- 515. (3) History of the Italian Language.
- 520. (3) Italian Language and Literature.
- 549. (3-6) Master's Thesis.
- 649. (3-6) Ph.D. Thesis in Romance Studies.

# (ii) PORTUGUESE

300. (3) Portuguese.—Prerequisite: Completion of a course in Latin or a Romance language numbered 200 or above. [3-0; 3-0]

# (iii) Courses in SPANISH

- 100. (3) First-Year Spanish.—Grammar, composition, translation, oral practice. [3-1; 3-1]
  - 105. (6) Intensive Spanish.—Grammar, composition, reading, conversation.
    [6-0; 6-0]
- 110. (3) First-Year Spanish.—Grammar, composition, translation, oral practice. Prerequisite: Spanish 11 or its equivalent. [3-1; 3-1]
- 200. (3) Second-Year Spanish.—Grammar, composition, translation, oral practice, readings. Prerequisite: Spanish 100. [3-1; 3-1]
- 223. (3) Reading, Translation and Conversation.—May be taken concurrently with Spanish 200 for those intending to continue their study of Spanish. Prerequisite: First or second Class in Spanish 100. [3-0; 3-0]
- 300. (3) Advanced Linguistic Study.—Composition, translation, syntax, phonetics, oral practice. [3-0; 3-0]
  - 301. (3) Survey of Spanish Literature.—Origins to the modern period. [3-0; 3-0]

- 302. (3) The Generation of 1898.—With special reference to Unamuno, Baroja, Azorín, Valle-Inclán and their contemporaries. [3-0; 3-0]
- 304. (3) Modern Spanish Drama.—From neoclassicism to the present day with special emphasis on dramatists of the 20th century. [3-0; 3-0]
- 320. (3) Spanish.—An introductory course for students who have no previous knowledge of Spanish and who (a) have completed a second-year university course or its equivalent in Latin or another Romance language, or (b) are native speakers of another Romance language. [3-1; 3-1]
- 400. (3) History of the Spanish Language.—The origins and development of Spanish; study of representative texts. [3-0; 3-0]

401. (3) Mediaeval Spanish Literature.—Origins to the fifteenth century.
[3-0; 3-0]

- 402. (3) The Golden Age (I).—Lyric and Epic Poetry; the Spanish novel before Cervantes. [3-0; 3-0]
- 403. (3) The Golden Age (II).—Prose writers of the sixteenth century; Baroque writers, the age of Quevedo. [3-0; 3-0]
  - 404. (3) Spanish Drama.—Representative works from the origins to 1700. [3-0; 3-0]
  - 405. (3) Modern Spanish Poetry.—Rubén Darío to the present. [3-0; 3-0]
- 406. (3) Modern Spanish Prose.—From the time of Larra; the evolution of the novel, contemporary essays and criticism. [3-0; 3-0]
  - 407. (3) Spanish-American Literature.

[3-0; 3-0]

- 408. (3) History of Spain.—Aspects of the growth of the Peninsular societies and the expansion of Spanish civilization in Europe and the New World.
  - 409. (3) Latin-American History.

[3-0; 3-0] [3-0; 3-0]

- 415. (3) Cervantes and His Age.—The writer and the background of his work and thought. [3-0; 3-0]
  - 420. (3) Spanish Language and Literature.—Selected topics. [3-0; 3-0]
  - 449. (3-6) Honours Essay.

### Graduate Courses

- 501. (3) Problems in Spanish Linguistics.
- 502. (3) Mediaeval Studies.
- 503. (3) The Golden Age.
- 504. (3) The Eighteenth Century and Romanticism.
- 505. (3) Contemporary Spanish Literature.
- 506. (3) Latin-American Studies.
- 520. (3) Spanish Language and Literature.
- 549. (3-6) Master's Thesis.
- 649. (3-6) Ph.D. Thesis in Romance Studies.

# HISTORY

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A.

Requirements for the degree of Bachelor of Arts:\*

# Major

First and Second Years:

3 units from History 100-199, or the equivalent taken in other institutions.

Notes: (1) Students who have taken three units from History 100, 201, 202, 204, or 206 prior to the 1969-70 session are not required to take any additional first or second year history courses.

(2) Students who intend to major in history are advised to include in their programme some of the basic courses in the Social Sciences and the appropriate historical surveys of literature in the various departments of language, of thought in the Departments of Philosophy, Religious Studies, and Political Science, and of the arts in the Departments of Fine Arts, Music and Theatre.

# Third and Fourth Years:

15 units of third- and fourth-year history courses chosen in consultation with a departmental adviser.

# Honours

First and Second Years:

First- or second-class standing in 3 units from History 100-199, or the equivalent taken in other institutions.

Reading knowledge of French or a foreign language

# Third Year:

History 321, 322 and 333

3 units outside the Department

# Fourth Year:

History 421, 433 and 449

3 units outside the Department

A written comprehensive examination on the fields of specialization An oral examination on the graduating essay.

# Honours in History with International Relations

First and Second Years:

3 units from History 100-199 chosen in consultation with an adviser in the International Relations Programme.

Political Science 204

Prerequisites for courses to be taken in the upper years

# Third Year:

History 321

3 units in History

6 units selected from the following:

History 309, 422, 424, 435

Political Science 308, 409, 410, 411

Economics 300, 313, 352, 412, 452, 462

Anthropology 402, 430

Asian Studies 405, 420

Slavonic Studies 441

Geography 337, 437

Sociology 461

Fourth Year:

History 421, 433 and 449

One of History 332, 430, 432

A comprehensive written examination

An oral examination on the graduating essay and the field of specialization

Note: A brochure describing in more detail the requirements and offerings of the Department of History is available from the departmental office.

The following courses outside the Department may be counted toward the Major:

# One of:

Classical Studies 331

Classical Studies 333

Classical Studies 433

# One of:

Asian Studies 405, 417, 420

Anthropology 430

Economics 320, 321, 480, 490

Greek 306

Latin 407

Political Science 300, 400, 408, 414, 415

# Courses Offered:

100-199. (1½-3) Problems in History.—Several courses will be given each year. They will include specific topics and periods as well as comparative studies. A list of the courses to be given in the coming year is available from the office of the Department of History. One 3-unit course or two 1½-unit courses selected from the group is prerequisite for the Major or Honours programme in History. (This course is open to First- and Second-Year students only.) [2-1; 2-1]

# Medieval, Renaissance and Reformation History

304. (3) Social and Economic History of the Middle Ages.	[3-0; 3-0]
313. (3) The Renaissance.	[3-0; 3-0]
316. (3) Ideas and Institutions of the Middle Ages.	[3-0; 3-0]
413. (3) The Reformation.	[3-0; 3-0]
416. (3) France in the Middle Ages.	[3-0: 3-0]

# Modern European History

306. (3) History of France, 1461-1715.	[3-0; 3-0]
312. (3) Russia from the Ninth Century to 1689.	[3-0; 3-0]
315. (3) History of the Natural Sciences in Modern Times.	[2-1; 2-1]
319. (3) History of Poland, 1505-1921.	[3-0; 3-0]
323 (3) History of Russia — See Slavonic Studies 308. This or	hurea chould

Russia.—See Slavonic Studies 308. This course should precede History 405 if both are planned. [3-0; 3-0]324. (3) History of Non-Russian Eastern Europe. **[3-0: 3-0]** 

325. (3) German-Slav Relations form the Ninth-Century to 1945	ro o. o ot
331. (3) Diplomatic History of Early Modern Europe.	[3-0; 3-0] [3-0; 3-0]
332. (3) Diplomacy of the Great Powers to 1939.	[3-0; 3-0]
400. (3) Intellectual History of Modern Europe.	[3-0; 3-0]
405. (3) History of Imperial Russia, 1689-1917.	[3-0; 3-0]
406. (3) History of France, 1715-1939.	[3-0; 3-0]
407. (3) History of Modern Germany.	[3-0; 3-0]
408. (3) History of the Habsburg Monarchy, 1273-1918.	[3-0; 3-0]
409. (3) History of Italy, 1559-1918.	[3-0; 3-0]
412. (3) History of Spain.—See Spanish 408.	[3-0; 3-0]
425. (3) War and Society in Modern Times.	[3-0; 3-0]
432. (3) Diplomacy of the Great Powers after 1939.	[3-0; 3-0]
435. (3) Communist Movements in Eastern Europe since 1900.	[3-0; 3-0]
450. (5) Communist Wovements in Eastern Parope since 1000.	[5 0, 5 0]
British History	
317. (3) Medieval English Institutions.	[3-0; 3-0]
318. (3) England Under the Tudors and Stuarts, 1485-1688.	[3-0; 3-0]
418. (3) Great Britain, 1688-1832.	[2-1; 2-1]
419. (3) Great Britain Since 1832.	[2-1; 2-1]
History of Colonial Expansion Overseas	
305. (3) Expansion of Europe: The Atlantic Area.	[3-0; 3-0]
310. (3) British Imperial History.	[3-0; 3-0]
311. (3) Expansion of Europe: Southeast Asia and the Pacific A	
311. (3) Expansion of Europe, bounded risid that the rusine ri	[3-0; 3-0]
411. (3) History of Australia, New Zealand and South Africa.	[3-0; 3-0]
431. (3) Commonwealth and World Politics.	[3-0; 3-0]
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Canadian History	
303. (3) History of the Canadian West.	[2-1; 2-1]
326. (3) British North America, 1763-1867.	[3-0; 3-0]
329. (3) The Social Development of Canada.	[3-0; 3-0]
403. (3) French Canada.—See Economics 333.	FO O O O
420. (3) Evolution of the Canadian Constitution.	[3-0; 3-0]
426. (3) Canada After 1867.	[3-0; 3-0]
430. (3) Development of Canadian External Policy since Con-	[3-0; 3-0]
437. (3) The American Cultural Impact on Canada.	[2-1; 2-1]
American History	[3-0; 3-0]
327. (3) American Colonial and Revolutionary History.	[3-0, 3-0]
328. (3) The United States, 1789-1877.	[5-0, 5-0]
414. (3) Latin-American History.—See Spanish 409.	[3-0; 3-0]
<ul><li>427. (3) The United States since 1877.</li><li>428. (3) Intellectual History of the United States from the Col</li></ul>	
to the Present Day.	[3-0; 3-0]

429. (3) History of the American West.	[3-0;	
436. (3) Diplomatic History of the United States.	[3-0;	3-0]
Asian History		
309. (3) Far Eastern Diplomatic History, 1800-1950.	[3-0;	ვ_01
410. (3) History of India since 1526.	[2-1;	
422. (3) Modern Japanese History Since 1868.	[3-0;	
424. (3) Modern Chinese History Since 1840.	[3-0;	
434. (3) History of Southeast Asia Since 1800.	[3-0;	
See also Asian Studies 320 (History of Chinese Civilization). As	sian Sti	udies
330 (History of Japanese Civilization), and Asian Studies 340	(Histor	ry of
Indian Civilization).		
Honours Courses (For Honours students only)		
321. (6) Tutorial.	[0-2;	0-2]
322. (6) Tutorial.	[0-2;	
333. (3) Third-Year Honours Seminar.	[0-2;	
421. (6) Tutorial.	[0-2;	
433. (3) Fourth-Year Honours Seminar.	[0-2;	
449. (6) Honours Essay.	[0-2;	0-2]
Graduate Courses:		
500-504. (3) Readings in Canadian History.		
505-509. (6) Seminar in Canadian History.		
510-514. (3) Readings in American History.		
515-519. (6) Seminar in American History.		
520-524. (3) Readings in British History.		
525-529. (6) Seminar in British History.		
530-532. (3) Readings in Imperial-Commonwealth History. 533-534. (6) Seminar in Imperial-Commonwealth History.		
535-537. (3) Readings in Medieval History.		
538-539. (6) Seminar in Medieval History.		
540-542. (3) Readings in Renaissance-Reformation History.		
543-544. (6) Seminar in Renaissance-Reformation History.		
547. (3) Readings: Special Topics in History.		
548. (6) Historiography.		
549. (6) Master's Thesis.		
550-552. (3) Readings in French History.		
553-554. (6) Seminar in French History.		
555-557. (3) Readings in German History.		
558-559. (6) Seminar in German History.		
560-564. (3) Readings in Russian and East European History. 565-569. (6) Seminar in Russian and East European History.		
570-574. (3) Readings in Asian History.		
575-579. (6) Seminar in Asian History.		
580-581. (3) Readings in Intellectual History.		
584-585. (3) Readings in Economic and Social History.		
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587-588. (3) Readings in Diplomatic History.

589. (6) Seminar in Diplomatic History.

590-591. (3) Readings in Ecclesiastical History.

593-594. (3) Readings in Military History.

649. Ph.D. Thesis.

# PROGRAMME IN INTERNATIONAL RELATIONS

Students who want to do graduate work in International Relations are advised to enrol in the special Honours programmes in History (International Relations) or in Political Science (International Relations).

# Requirements for the degree of Bachelor of Arts:

# Major

First and Second Years:

History 125-Main Currents of Twentieth-Century History (3 units)

Political Science 204 (may be taken in Third Year)

Other recommended courses:

Asian Studies 205, 206, 215, Slavonic Studies 205, Economics 200 Political Science 200, 201, 202, 203 ( $1\frac{1}{2}$  units each)

Students who plan to concentrate in the Economics group in the Third and Fourth Years must take Economics 200 in Second Year. Economics 300 (or 332 with 342) is prerequisite for 400-level courses in Economics

Students planning to take courses in Anthropology should consult with their adviser in connection with prerequisites and the suitability of course content

# Third and Fourth Years:

 $16\frac{1}{2}$  units including:

Political Science 442  $(1\frac{1}{2})$  or 443  $(1\frac{1}{2})$ 

One of Political Science 308, 409, 410, 411

One of History 331, 332, 430, 432

9 units from one or two of the following groups:

### Economics

Economics 313 Economics 352  $(1\frac{1}{2})$ 

or 452 (1½)

Economics 462 (1½)

Economics 412

Anthropology 430

# Soviet and Eastern Europe

Slavonic Studies 340

Slavonic Studies 412 Slavonic Studies 441

Political Science 408

Political Science 409

Geography 494

History 405

History 435

# Asian Relations

Anthropology 402 Anthropology 430

Asian Studies 405 Asian Studies 420 General International Politics

Political Science 308 Political Science 409

Political Science 410

Political Science 411

Geography 493	History 310
Geography 496	History 331
History 309	History 332
History 422	History 407
History 424	History 425
Political Science 412	History 430
Political Science 413	History 432
Political Science 414 $(1\frac{1}{2})$	History 436
Political Science 415 $(1\frac{1}{2})$	Geography 337 (1½)
	Geography 437 (1½)
	Anthropology 430
	Sociology 461
	(by permission)
	Psychology 308

Note: Of the thirty units in Third and Fourth Years, at least six must be taken in courses other than Political Science and History.

Advisers for the Programme in International Relations are Professors Conway and Marzari (History), Holland (Asian Studies), Holsti and Zacher (Political Science).

# ITALIAN (see Hispanic and Italian Studies) JAPANESE (see Asian Studies) LATIN (see Classics)

# LINGUISTICS

The Department offers programmes of study that lead to the degrees of B.A., M.A.

# Requirements for the degree of Bachelor of Arts:

# Major

First and Second Years

Two years of a language other than English.

Third and Fourth Years

15 units of Linguistics or cognate courses.

# Honours

(Available in 1970-71).

### Courses offered:

- **300.** (3) General Linguistics.—Introduction to structural linguistic analysis and description. Phonetics, phonology, morphology, grammar (syntax), meaning. Prerequisite: completion of a foreign language, ancient or modern, at the 200-level. [3-0; 3-0]
- 319. (3) Comparative and Historical Linguistics.—The nature and development of language; the history of alphabetic writing; the synchronic, diachronic and diatopic study of language; levels of linguistic analysis; linguistic change; the classification of languages with particular stress on the Indo-European group. [3-0; 3-0]

- 320. (3) Romance Linguistics.—The Indo-European background; Classical and Vulgar Latin; the origin, development and spread of the Romance languages; their vocabulary, phonology, morphology, syntax; vernacular Latin texts and Romance texts. [3-0; 3-0]
- 400. (3) Linguistic Theory.—Theories of phonological, morphological and grammatical analysis and description; theories of linguistic meaning. Prerequisite: one of Linguistics 300, Linguistics 319, English 309. [3-0; 3-0]
  - 410. (3) Experimental Phonetics.—Introduction to experimental phonetics. [3-0; 3-0]
- 440. (3) Regional Linguistics.—Introduction to the diatopic study of language: linguistic surveys, linguistic atlases. [3-0; 3-0]

# Graduate Programme

Information concerning the Graduate Programme in Linguistics is available in a special brochure that can be obtained from the Department.

The following courses will be accepted for credit in Linguistics, subject to the approval of the Department:

Anthropology 512: Language and Culture.

Chinese 508: Problems in the History of the Chinese Language.

Education 478: Teaching English as a Second Language.

English 309: Modern English and its Background.

English 508: Studies in the History and Structure of the English Language.

French 308: History of the French Language.

French 515: Romance Philology.

German 502: History of the German Language.

German 506: Old Icelandic.

Italian 515: History of the Italian Language.

Japanese 505: Topics in the History and Structure of the Japanese Language.

Psychology 521: Psycholinguistics.

Russian 303: Introduction to Russian Linguistics.

Russian 501: History of the Russian Language.

Russian 520: Old Church Slavonic.

Spanish 400: History of the Spanish Language. Spanish 501: Problems in Spanish Linguistics.

### MATHEMATICS

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A. For information about the degree of Bachelor of Science see the Calendar of the Faculty of Science.

# Requirements for the degree of Bachelor of Arts:

Students entering the Major or Honours Programme should obtain a copy of the new undergraduate structure of Mathematics courses.

# Major

First Year.

Mathematics 100, 120, 121. These courses are offered for the first

time in 1969-1970. (Mathematics 120 may be postponed to the second year.)

(Physics 110 or 120 or 130 is recommended)

# Second Year:

Mathematics 200, 202. (For students who completed first year in 1968-69 or earlier.)

# Third and Fourth Years:

Mathematics 300

12 units chosen from:

Mathematics 301, 302, 305, 306, 307, 308, 410, 411, 412, 419 and certain Honours courses by permission

### Honours

First Year:

Mathematics 100, 120, 121. These courses are offered for the first time in 1969-1970.

### Second Year:

Mathematics 220, 221. (For students who completed first year in 1968-69 or earlier.)

# Third Year:

Mathematics 320, 321, 322

# Fourth Year:

Option I: Mathematics 400, 401, 404 Option II: Mathematics 402, 404, 406

In each option, at least 3 units in Honours courses in Mathematics numbered 400 or above

Students are advised to take one course in Physics at some time during their four years at university.

For a description of the courses offered by the Department of Mathematics see the Calendar of the Faculty of Science. The course below is designed for students in the Faculty of Arts:

204. (3) Principles of Mathematics.—Some basic concepts of number theory, modern algebra, geometry, and topology. Admission by consent of the Department. [3-0; 3-0]

# **MUSIC**

The Department offers programmes of study that lead to the degrees of M.Mus., B.Ed., B.Mus., B.A.

For a description of the programmes leading to the degrees of M.Mus. and B.Mus. see pp. 106-117.

# Requirements for the degree of Bachelor of Arts:

# Major

First and Second Years:

Music 100 and 120 (concurrently); Music 200

Third and Fourth Years:

Music 300, 320 and three additional 300- or 400-level music courses

# Courses Offered:

Note: For courses in Applied Music (which carry no credit toward the degree of Bachelor of Arts) see pp. 115, 116.

# Theory and Composition

- 100. (3) Theory of Music I.—Melodic, harmonic, contrapuntal, rhythmic and formal elements in music. [3-2; 3-2]
  - 107. (3) Composition I.—An introduction to musical composition. [3-0; 3-0]
- 200. (3) Theory of Music II.—A continuation of Music 100 with emphasis on larger forms, traditional harmony and free counterpoint. [3-2; 3-2]
  - 207. (3) Composition II.—Continuation of Music 107. [3-0; 3-0]
- 300. (3) Theory of Music III.—A continuation of Music 200 with emphasis on extended tonality, contemporary idioms, large forms and linear counterpoint. [3-2; 3-2]
- 306. (2) Conducting.—Choral and instrumental conducting techniques and practices. This course carries credit only for majors in Music. [2-0; 2-0]
  - 307. (3) Composition III.—Continuation of Music 207. [3-0; 3-0]
- 309. (2) Orchestration.—Orchestration and arranging for all instrumental and vocal ensembles. [2-0; 2-0]
- 400. (3) Theory of Music IV.—A continuation of Music 300 with emphasis on the detailed study of historical musical styles, past and present. [3-0; 3-0]

# Graduate Courses:

- 500. (4) Seminar in Analytical Techniques.—Prerequisite: Music 400 or permission.
  - 504. (3) Twentieth-Century Practices.—Prerequisite: Music 300.
- 506. (4) Seminar in Conducting, Materials and Procedures.—Prerequisite: Music 306.
  - 509. (3) Advanced Orchestration and Arranging.—Prerequisite: Music 309.
  - 549. (3) Master's Thesis.

# History and Literature of Music

- 120. (3) History of Music I.—The development of music from Greece to circa 1600. [3-0; 3-0]
- 320. (3) History of Music II.—The development of music from circa 1600 to the present day. [3-0; 3-0]
- 321. (1) Music Appreciation, Twentieth-Century.—Designed for students with little or no musical background. Not open to majors in Music. Second term only. [0-0; 2-0]
- 322. (3) Music and Civilization.—Development of music in relation to the other arts, science, philosophy, literature and history. Designed for students not proceeding to the B.Mus. [3-0; 3-0]
- 323. (3) Seventeenth- and Eighteenth-Century Music.—Detailed study of assigned aspects of this period. Prerequisite: Music 320. [3-0; 3-0]
- 324. (3) Nineteenth- and Twentieth-Century Music.—Detailed study of assigned aspects of this period. Prerequisite: Music 320. [3-0; 3-0]

- 325. (3) Literature for Strings, Woodwinds and Brasses.—An examination of music for chamber and large ensembles. [3-0; 3-0]
- 326. (3) Music Appreciation.—Designed for students with no musical background. Not open to majors in Music. [3-0; 3-0]
- **328. (3)** Introduction to Ethnomusicology.—To provide a background of information and research techniques in the field of non-European music. Prerequisite: Music 100 or permission. [3-0; 3-0]
- **420. (3)** History of Symphonic and Chamber Music.—Study of music composed for the symphony orchestra and chamber ensembles. Prerequisite: Music 320. [3-0; 3-0]
- 422. (3) History of Keyboard Music.—Development of music for organ, harpsichord, clavichord and piano to the present day. Prerequisite: Music 320 or permission. [3-0; 3-0]
- 423. (3) History of Opera.—The development of opera to the present day. Prerequisite: Music 320 or permission. [3-0; 3-0]
- 424. (3) History of Vocal Music.—The development of solo song and choral music (including oratorio) to the present day. Prerequisite: Music 320 or permission.

  [3-0; 3-0]
- 425. (3) Mediaeval and Renaissance Music.—A detailed study of early notation and musical developments. Prerequisite: Music 120. [3-0; 3-0]
  - 449. (3) Graduating Essay.

### Graduate Courses:

- **520. (4)** Seminar in Musicology.—Prerequisite: Music 320 and a course in musical history numbered 300 or above.
- **521. (3) Seminar in Performance-Practices.**—Prerequisite: Music 320 and a course in musical history numbered 300 or above.
- 522. (3) Seminar in Notation in Polyphonic Music.—Prerequisite: Music 320 and a course in musical history numbered 300 or above. (Students who have completed Music 425 should not enrol in this course.)
  - **523.** (3) Seminar in Mediaeval Music.—Prerequisite: Music 425.
  - 524. (3) Seminar in Music of the Renaissance.—Prerequisite: Music 425.
  - 525. (3) Seminar in Baroque Music.—Prerequisite: Music 323.
- **526.** (3) Seminar in Eighteenth-Century Music.—Detailed study and investigations of the development of eighteenth-century music in such centres as Mannheim and Vienna. Prerequisite: Music 323.
- **527.** (3) Seminar in Nineteenth-Century Music.—Designated projects relating to nineteenth-century music developments. Prerequisite: Music 324.
- 528. (3) Seminar in the Literature of Music.—Students in graduate programmes involving performance will be given special projects related to the history, bibliography, repertoire and teaching problems in each area. A paper will be required. Prerequisites: Music 300 and 320.
  - 549. (3) Master's Thesis.

### PHILOSOPHY

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A.

Requirements for the degree of Bachelor of Arts:

# Major

First Year:

Philosophy 100

Second Year:

Philosophy 200 (may be taken in Third Year)

Third and Fourth Years:

Philosophy 301

Philosophy 302 or 303

9 units in Philosophy (not 410)

### Honours

First and Second Years:

Philosophy 100

Philosophy 200 (the Department will sometimes allow a prospective Honours student already in Second Year to omit Philosophy 100)

# Third and Fourth Years:

Philosophy 302 or 402

15 units, including at least 6 units of tutorial work (in Philosophy 330 or 430)

There is a comprehensive examination at the end of the Fourth Year

# Courses Offered:

# Introductory Courses (no Prerequisite):

100. (3) Introduction to Philosophy.—Some influential philosophical writing and doctrines, as an introduction to the problems and methods of Philosophy.

[3-0; 3-2]

212. (3) Logic and Scientific Reasoning.—Introductory deductive logic; the grounds of empirical knowledge; scientific procedures and attitudes; practice in criticising arguments. Students who intend to do further work in philosophy, mathematics and science should take Philosophy 302 rather than 212.

[3-0; 3-0]

- 410. (3) Philosophical Problems.—Problems of methodology, knowledge, metaphysics, values and social philosophy. Primarily for fourth-year and graduate students who have had no course in Philosophy. [3-0; 3-0]
- 414. (3) Philosophy of Science.—Topics of interest to fourth-year and graduate students in Science. No previous philosophical experience will be assumed, but extensive reading will be demanded. [3-0; 3-0]
- 424. (3) Philosophy of Social Science.—Topics in the philosophy of science of special concern to the social and behavioural sciences; hypotheses and explanation; principles, theories, models; the formation of scientific concepts; the function of mathematics in social science. [3-0; 3-0]

454. (3) Russian and Soviet Scientific Thought. [3-0; 3-0]

# Second Year

200. (3) Epistemology and Metaphysics.—Topics in general philosophy: scepticism concerning the external world; mind-body problems; problems concerning perception; induction; free will. Readings in classical and contemporary texts. [3-0; 3-0]

### Third and Fourth Years

- 301. (3) Ethics.—A study of problems in ethics, based on the reading of classical texts. [3-0; 3-0]
- 302. (3) Deductive Logic.—Introduction to symbolic logic. Topics include the logic of propositions and predicates, axiom-systems, and philosophical problems raised by the results of modern logic. Primarily for students in Philosophy, Mathematics and the Sciences. [3-0; 3-0]
- 303. (3) History of Philosophy.—Each year there will be an intensive study of a philosopher or group of philosophers important to the history of philosophy.

  [3-0; 3-0]
- 313. (3) Mediaeval Philosophy.—Western philosophic thought from Augustine to Ockham; survey of the main readings in Augustine, Boethius, Anselm, Aquinas, Scotus, Ockham. [3-0; 3-0]
- 317. (3) Philosophy of Religion.—An inquiry into the nature of religion; the origin of religious belief; the relations among faith, revelation and knowledge; the problem of freedom of the will; the nature of evil; and proofs of the existence of God. [3-0; 3-0]
- 323. (3) Chinese Philosophy.—Chinese philosophic thought from the Confucian period to the end of the Empire (1911); emphasis will be on the classical period. [3-0; 3-0]
  - 400. (3) Epistemology and Metaphysics.—Advanced topics in philosophy.
    [3-0; 3-0]
  - 401. (3) Social and Political Philosophy. [3-0; 3-0]
- 402. (3) Symbolic Logic.—Systematic development of deductive logic, the foundations of mathematics and meta-mathematics. [3-0; 3-0]
- 403. (3) History of Philosophy.—Each year there will be an intensive study of a philosopher or group of philosophers important to the history of philosophy. Normally open only to those students who have taken Philosophy 303.

  [3-0; 3-0]
- 411. (3) Aesthetics.—An analysis of the aesthetic experience and its relationship to beauty, the fine arts, literature, science and morality. [3-0; 3-0]

# For Honours Students Only

330. (6-9) Honours Tutorial, Third Year.	[0-1; 0-1]
430. (6-9) Honours Tutorial, Fourth Year.	[0-1; 0-1]

449. (3) Honours Essay.

# Graduate Courses:

- 500. (3) Metaphysics and Epistemology.
- 501. (3) Moral Philosophy.
- 502. (3) Logic.
- 503. (3) Ancient Philosophy.
- 505. (3) Philosophy of Mathematics.
- 506. (3) Philosophy of Mind.
- 511. (3) Aesthetics.
- 513. (3) Mediaeval Philosophy.
- 514. (3) Philosophy of Science.
- 521. (3) Political Philosophy.
- 524. (3) Philosophy of Social Science.

530-539.  $(1\frac{1}{2})$  Problems.

549. (6) Master's Thesis

573. (3) Plato.

583. (3) Aristotle.

593. (3) Kant.

649. Ph.D. Thesis.

# PHYSICS

The course below is recommended for students in the Faculty of Arts; for other courses, see the Calendar of the Faculty of Science.

130. (3) Elements of Physics.—From Newton's mechanics to particle physics: ideas, principles, and their applications. Laboratory every second week\*. [3-3\*-0; 3-3\*-0]

# POLISH (see Slavonic Studies)

# POLITICAL SCIENCE

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A.

# Requirements for the degree of Bachelor of Arts:

# Major

Second year:

6 units from Political Science 200 (1½), 201 (1½), 202 (1½), 203 (1½), 204

Third and Fourth Years:

3 units from Political Science 300 (3), 309 (3), 310 (3), 401  $(1\frac{1}{2})$ , 403  $(1\frac{1}{2})$ 

12 additional units in courses in Political Science numbered 300 and above

### Honours

First and Second Years:

As for the Major

First or Second Class in a full course (3 units) or a First or Second-Class average in two  $1\frac{1}{2}$ -unit courses in Political Science

Third and Fourth Years:

36 units including:

Political Science 300 or 400

Political Science 341, 441, 449

- 9 additional units in Political Science (only 3 units may be offered for credit in Political Science from courses offered by other departments)
- 15 additional units, of which at least 6 must be taken in other departments

# Honours in Political Science with International Relations

# Admission:

A reading knowledge of a modern foreign language

First or Second Class in Political Science 204

Two of Political Science 200 (1½), 201 (1½), 202 (1½), 203 (1½) 3 units from History 100-199, chosen in consultation with an adviser in the International Relations Programme.

Asian Studies 205, 206, Slavonic Studies 205, Economics 200 are recommended.

# Third and Fourth Years:

36 units including

Political Science 300 or 400

Political Science 409 or 410 or 411

Political Science 308, 341, 441, 449

3 additional units in Political Science

History 430

Any two of the following

Asian Studies 405, 417

Economics 313, 352, 412, 452  $(1\frac{1}{2})$  and 462  $(1\frac{1}{2})$ 

Anthropology 412, 430

Geography 337 ( $1\frac{1}{2}$ ) and 437 ( $1\frac{1}{2}$ )

History 331, 332, 432

Psychology 308, 408

Sociology 461

### Courses Offered:

Note: The following list often does not specify whether a 1½-unit course (designated [3-0]) will be offered in the first or the second term. Consult the department before registration.

- 200. (1½) The Government of Canada.—An examination of the institutions and processes of Canadian government. [3-0]
- 201. (1½) Foreign Governments.—A comparative analysis of foreign governments, e.g., Britain, France, United States, U.S.S.R., and Japan. [3-0]
- 202. (1½) Contemporary Ideologies.—An examination of some of the major political ideologies: communism, socialism, fascism, conservatism, liberalism.
- 203. (1½) Theories and Methods of Political Science.—An introduction to the theory and methodology, including systems analysis, survey research, models, theories of behaviour, measurement. [3-0]
- 204. (3) International Politics.—Comparison of historical international systems; the formulation of foreign policies, including ideological, perceptual and historic components. Strategies of isolation, non-alignment and alliance. Techniques of wielding international influence through diplomatic bargaining, propaganda, economic aid, subversion and war. Ethical and legal restraints on behaviour in foreign policy. This course is strongly recommended for students who will later take Political Science 410. [3-0; 3-0]
- 300. (3) Development of Political Theory: Basic Concepts and Issues.— Evolution of political ideas and various basic concepts of government includ-

ing theory of the state, natural law, sovereignty, social contract, divine right of kings, common good, obligation and consent; the problem of power in the state; authority and freedom; citizens' rights and duties; liberty and equality.

[3-0: 3-0]

- 302. (3) Public Administration.—The structure and organization of the administrative branch of government, in theory and practice. Illustrations are drawn from Canada, Great Britain and the United States. Administrative powers and administrative responsibility in the modern state. The personnel policies of modern governments; the agencies of control. [3-0; 3-0]
- 304. (3) The Press and Politics.—The role of the mass media in public affairs: sources of news and means of dissemination; the organizational structure of the contemporary press; the press and governmental policy; recent theories of the mass media. Prerequisite: Political Science 200 or 201 or 203. (Not offered in 1969-70). [3-0; 3-0]
- 306. (1½) Parties and Movements.—A comparative examination of political parties and protest movements. [3-0]
- 308. (3) International Organization Since 1919.—The political functions and constitutional development of universal and regional international organizations since the appearance of the League of Nations. The major focus of study is the United Nations. The problem of political integration will be studied with special emphasis on the E.E.C. [3-0; 3-0]
- 309. (3) Quantitative Methods in Political Science.—An introduction to the application of quantitative methods to selected problems. [3-0; 3-0]
- 310. (3) Introduction to Political Behaviour.—The social, cultural and psychological contexts of political behaviour; the use of survey research. Prerequisite: Political Science 200 or 201 or 203. [3-0; 3-0]
- 314. (1½) Japanese Government and Politics.—The Japanese political system and political behaviour, with some coverage of neighbouring areas, such as South Korea, Okinawa, Taiwan, with major emphasis on the period since 1945. (Not offered in 1969-70.) [3-0; 3-0]
- 315. (1½) Communist Chinese Government and Politics.—The political system and political behaviour of mainland China with some coverage of neighbouring countries such as North Korea, Mongolia, and North Vietnam, with major emphasis upon the period since 1949. [0-0; 3-0]
- 341. (3) Honours Seminar.—An examination of the dimensions of Political Science and the major debates within the discipline. [2-0; 2-0]
- 400. (3) Modern Political Theory.—Political ideas, systems, and ideologies from Hegel to the present, including Hegelianism, utopian socialism, anarchism, Marxism, Leninist and Stalinist communism, revisionism, fascism, democratic socialism, liberalism, conservatism. Conflict between democratic and totalitarian way of life. Prerequisite: Political Science 300, or Honours or Graduate standing. [3-0; 3-0]
- 401. (1½) Legislative and Executive Processes in Canada.—Cabinet, legislatures, bureaucracies, and their interactions in the federal and provincial political systems. Prerequisite: Political Science 200 or 201. [3-0]
- 402. (1½) Canadian Parties and Political Processes.—Analysis of political mechanisms, such as parties, movements, and pressure groups, through which demands on government are generated. Prerequisite: Political Science 200 or 201 or 306. [3-0]
- 403. (1½) Federalism in Canada.—Theory and practice of federalism; cultural duality, social stresses, and problems of flexibility. The constitution and

the role of the courts. Prerequisite: Political Science 200 or special permission. [3-0]

- 404. (1½) Local Government.—A comparative study of local and regional political institutions and processes, with special reference to Canada. [3-0]
- 405. (1½) British Government.—Nature of politics and conduct of government in contemporary Britain, including the problem of governmental reform and the making of foreign policy. Development of parliamentary democracy; electoral system and political parties; the executive and its relation to the legislature; the Crown, the Prime Minister, and the Cabinet; Central departments; the Civil Service. [3-0]
- 407. (3) American Politics and Government.—The social context of American politics, voting behaviour, legislative process, executive powers, executive-legislative relations, judicial behaviour and problems of policy: labour, commerce, civil rights, etc. [3-0; 3-0]
- 408. (3) Soviet and East European Politics.—Soviet government and institutions; ideological and structural changes since World War II. Soviet foreign policy. The theory of the "People's Democracy". The impact of the Soviet model on constitutions of the satellite countries and the various "roads to socialism". The Communist "Commonwealth"; ideology and power-relations among Communist states; transformation of the bloc. [3-0; 3-0]
- 409. (3) Comparative Foreign Policies.—A number of post-1945 case-studies, such as Berlin, Korea, Suez, Cuba, Vietnam, E.E.C., nuclear proliferation. Prerequisite: Political Science 204 or 201. [3-0; 3-0]
- 410. (3) International Violence and Its Control.—Nature of international violence from guerrilla to nuclear war; philosophical, psychological, social, and economic theories of war; controlling violence through deterrence, arms-control, disarmament, law, and international organizations. Students enrolling in this course should preferably have previously taken a second-year course in a subject in the social sciences. [3-0; 3-0]
- 411. (3) Public International Law.—The nature, sources, and sanctions of international law; the notion of nationhood with particular reference to the status of the British Dominions; territorial and extra-territorial jurisdiction; diplomatic and sovereign immunities; international delinquency; treaties; settlement of disputes; international organizations. This course may not be taken for credit in both Arts and Law. [3-0; 3-0]
- 412. (3) Southeast Asian Politics.—The political systems of contemporary Southeastern Asia with major emphasis on the Philippines and Malaysia. (Not offered in 1969-70.) [3-0; 3-0]
- 413. (3) South Asian Government and Politics.—The government of South Asia with particular reference to India and Pakistan. Some attention may be given to other countries, such as Ceylon and Nepal. [3-0; 3-0]
- 414. (1½) Contemporary Japanese International Politics.—Foreign policies, foreign relations, and foreign policy decision-making process of Japan since 1945, including some neighbouring areas such as South Korea, Okinawa, Taiwan, and South Vietnam. (Not offered in 1969-70.) [3-0; 0-0]
- 415. (1½) Contemporary Chinese International Politics.—Foreign policies, foreign relations, and foreign policy decision-making process of Communist China since 1949, including some neighbouring states like North Korea, Mongolia, and North Vietnam. Policies of the Great Powers as they relate to the East Asian area, and regional and world organizations such as SEATO and the U.N. Prerequisite: Political Science 315.
  - 416. (1½) French Government.—The nature of politics and the conduct

of government in contemporary France. A reading knowledge of French is recommended for this course. [3-0]

- 420. (3) The Theory of the Soviet State.—See Slavonic Studies 412.
- 421. (3) Communist Movements in Eastern Europe since 1900.—See History 435.
  - 430. (3) Communist Movements in Eastern Asia.—See Asian Studies 405.
- 431. (3) Chinese Political Thought and Institutions.—See Asian Studies 417.
- 440. (1½) Democracy in a Changing World.—Basic principles of democracy; a model for international comparison. Survey of liberal democratic states: merits and defects of old-established systems; problems of the emergent democracies. Democratic relativism; democracy and foreign affairs; democracy and nationalism; responsibilities of the mass media; concentration of private power; future of democracy. Prerequisite: Political Science 201 or 202, or 300 or special permission. [3-0]
- 441. (3) Honours Seminar.—Research seminar in specific areas in Political Science related to the students' interest and current faculty research.
- 442. (1½) Problems in International Relations: World Communism.—An analysis of Communist parties in Western Europe and North America. Relations with the USSR and China; impact of the Sino-Soviet dispute; strategy and tactics in modern industrial societies; sources of appeal. (This seminar is open only to students in the Major Programme in International Relations.) [3-0; 0-0]
- 443. (1½) Problems in International Relations: Rich Nations, Poor Nations and International Stability.—An examination of the gap between rich and poor nations, its possible political consequences, and alternative policy approaches to meeting the problem. Special emphasis will be placed on the possible effects of economic inequalities upon international stability. (This seminar is open only to students in the Major Programme in International Relations.)
  - 449. (3) Honours Essay.

### Graduate Courses:

- 500. (3) Political Theory.
- 501. (3) Seminar in Canadian Government and Politics.
- 502. (3) Public Administration.
- 503. (3) Techniques of Political Analysis and Research.
- 504. (3) Theory of International Relations.
- 505. (3) Political Parties and Political Movements.
- 506. (3) Political Development.
- 507. (3) Comparative Western Government.
- 508. (3) Comparative Non-Western Governments.
- 509. (3) International Organization.
- 510. (3) Directed Studies.
- 511. (3) International Law Problems.
- 540. (3) Master's Seminar.
- 549. (3-6) Master's Thesis.
- 550. (3) Political Thought.
- 649. Ph.D. Thesis.

# **PSYCHOLOGY**

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A.

# Requirements for the degree of Bachelor of Arts:

# Major

First and Second Years:

Psychology 100 and 200

Third and Fourth Years:

3 units in psychology laboratory courses numbered above 300 12 units in courses numbered 300 and above

### Honours

First and Second Years:

Psychology 100 and 200

3 units of Mathematics (100 and 121 recommended)

Biology 101

Third and Fourth Years:

A minimum of 18 units including:

Psychology 316

Psychology 449

6 units in psychology laboratory courses numbered above 300

Note: Psychology 200 is prerequisite to: Psychology 306, 307, 311, 315, 316, 340, 402, 403, 404, 405, 406, 407, 408, 409, 411, 440.

Psychology 200 or 206 is prerequisite to: Psychology 301, 305, 308, 312, 400, 401, 415.

Third-year students may not take courses numbered 400 and above except where designated.

# Courses offered:

- 100. (3) Introductory Psychology.—A survey of the areas and methods of psychology with emphasis upon the basic processes in animal and human behaviour: Topics covered include learning, sensation, perception, biological bases of behaviour, personality and social psychology. [3-0; 3-0]
- 200. (3) Experimental Psychology.—The principles and methods of experimental psychology; use of elementary statistics in analysis of data; laboratory demonstrations. Prerequisite: Psychology 100. [3-0; 3-0]
- **206. (3) Dynamics of Behaviour.**—An experimental, dynamic and social approach to behavioural adjustment with special reference to applications. Prerequisite: Psychology 100. [3-0; 3-0]
- 301. (3) Developmental Psychology.—The psychological development of infants and children from birth to adolescence. Emphasis on intellectual and social developments and the development of personality. [3-0; 3-0]
- 305. (3) Theory of Personality.—Approaches to the theory of personality, principal theoretical problems, research theories of personality as represented by psychological systems. [3-0; 3-0]

- 306. (3) Conditioning and Learning.—Theories and principles. In addition to the regular laboratory assignments, each student will be required to design and carry out an individual research project. [2-3; 2-3]
- 307. (3) Motivation and Emotion.—An experimental analysis of motivational processes such as hunger, thirst, exploratory and curiosity behaviour, maternal and reproductive behaviour, fixed action patterns and complex processes involved in social motivation. [3-0; 3-0]
- 308. (3) Social Psychology.—Theory and research of individual social behaviour; social motivation; attitudes; group interaction; socialization; racial prejudice; and related topics. [3-0; 3-0]
- 311. (3) Individual Differences.—The nature and patterning of individual psychological characteristics, such as abilities, attitudes, interests and personality: their assessment and measurement by means of various psychometric instruments. [3-0; 3-0]
- 312. (3) History of Psychology.—A survey of the principal trends of psychological explanation and events in the history of psychology from the earliest times to the present. [3-0; 3-0]
- 315. (3) Sensation and Perception.—Historical origins of interest in sensation; sensory systems and processes with emphasis on hearing and vision; psychophysics and neurophysiological approaches; perceptual processes and their determinants. [2-3; 2-3]
- 316. (3) Methods in Research.—Statistical techniques in psychological research; special attention to the design of experiments. [2-3; 2-3]
- 340. (1-3) Directed Studies in Psychology.—Directed investigation of a problem, requiring a written report of the findings. Prerequisite: satisfactory standing and permission of a faculty member who is prepared to supervise the investigation.
- 400. (3) Abnormal Psychology.—The definition, history and scope of deviant behaviour with emphasis on the psychological factors that control its origins, maintenance and modification. [3-0; 3-0]
- 401. (3) Clinical Psychology.—A critical review of the theoretical and research foundations of the processes of assessment and behaviour modification in clinical psychology. [3-0; 3-0]
- 402. (3) Experimental Techniques in Personality Research.—Discussion and laboratory study of the methods used in personality research. [2-3; 2-3]
- 403. (3) Tests and Measurement.—Statistical approaches to test construction and analysis. Topics receiving special attention are: units of measurement; item analysis; validity; reliability; test standardisation and factor analysis.

  [3-0; 3-0]
- 404. (3) Principles of Comparative Psychology.—A comparative examination of animal behaviour with emphasis on ethological principles. Laboratory exercises. Prerequisite: Biology 101 or equivalent. [3-0; 3-0]
- 405. (3) Social Learning.—Classical and instrumental conditioning, cognitive learning, and learning by identification in the development of human behaviour. [3-0; 3-0]
- 406. (3) Physiological Psychology.—The relationship between the nervous system and behaviour. The physiological basis of perception, motivation, learning and memory. Those students interested in laboratory research in physiological psychology should also register for Psychology 407. [3-0; 3-0]
- 407. (1½-3) Physiological Psychology Laboratory.—Laboratory methods for studying the relation between brain and behaviour. Prerequisite: consent of instructor. [0-3; 0-3]

- 408. (3) Social Psychological Research.—A detailed examination of representative theoretical and empirical studies on such topics as attitudes, conformity, social motivation and interpersonal relations. Practice in the formulation of significant questions and the design and execution of relevant research.

  [2-3; 2-3]
- **409. (3) Cognitive Processes.**—Problem-solving, concept-formation, thinking, reasoning and their relationships to other functional processes. Third- and fourth-year students will be enrolled in separate sections. [3-0; 3-0]
- 411. (3) Introduction to Mathematical Psychology.—Foundations of measurement and the theory and method of scaling; application of mathematical models and techniques to learning, choice behaviour and perception. Mathematics 200 or 202 is desirable. [2-3; 2-3]
- 412. (3) Problems in General Psychology.—For senior and graduate students who have had no course in psychology. This course may not be counted toward a major or Honours. [3-0; 3-0]
- 415. (3) The Psychology of Work.—An examination of the substantial body of research material and theory concerning human beings at work.

  [3-0: 3-0]
- 440. (1-3) Directed Studies in Psychology.—Directed investigation of a problem, requiring a written report of the findings. Prerequisite: satisfactory standing and permission of a faculty member who is prepared to supervise the investigation.
  - 449. (3) Honours Essay.

# Graduate Courses:

- 500. (3) History of Psychology.
- 501. (3) Social Psychology.
- 503. (3) Theory of Personality.—Prerequisite: Psychology 305.
- 504. (3) Physiological Psychology.
- 505. (3) Psychometrics.
- 506. (3) Perceptual Processes.
- 507. (3) Cognitive Processes.
- 508. (3) Human Factors and Systems-Research.
- 510. (3) Verbal Learning.
- 511. (3) Developmental Psychology.
- 512. (3) Advanced Methods in Research.
- 515. (3) Psychology of Work.
- 516. (3) Advanced Experimental Psychology I.
- 517. (3) Advanced Experimental Psychology II.
- 518. (3) Topics in the Dynamics of Behaviour.
- 519. (3) Mathematical Psychology.
- 520. (3) Operant Conditioning.
- 521. (3) Psycholinguistics.
- 530. (3) Principles and Techniques of Evaluation of Personality.
- 540. (3) Principles and Techniques of Intellectual Assessment.
- 541. (3) Objective Tests in Diagnosis and Adjustment of Personality.
- 542. (3) Clinical Psychology: Seminar.
- 543. (3) Principles of Psychotherapy.

- 544. (3) Patterns of Child-Rearing.
- 545. (3) Advanced Statistics I.
- 546. (1-3) Seminar in Psychological Problems.
- 547. (1-3) Reading and Conference.
- 548. (1) Departmental Seminar.
- 549. (3-6) Master's Thesis.
- 649. Ph.D. Thesis.

### RELIGIOUS STUDIES

The Department offers programmes of study that lead to the degrees of M.A., B.A.

# Requirements for the degree of Bachelor of Arts:

# Major

Second Year:

Religious Studies 200

Third and Fourth Years:

15 units

# Honours

# Admission:

First or Second Class in Religious Studies 200

Reading knowledge of Chinese, Greek, Hebrew or Latin. With permission of the Department, this requirement may be met in the Third and Fourth Years

A reading knowledge of French or German is advised

# Third and Fourth Years:

A programme will be designed for each student consisting of 18-30 units, including a graduating essay

Note: Attention is called to the following courses in language:

Asian Studies (Sanskrit) 305, 414

Chinese 100, 200

Greek 100, 200, 325

Hebrew 100, 200

Latin 100, 110 or 120, 200, 205, 220

# (i) Courses in RELIGIOUS STUDIES

- 200. (3) Introduction to Religious Studies.—An introduction to the study of religion, including a survey of the origins, ideas and practices of the major religions. [2-1; 2-1]
- 205. (3) The History of the Christian Church.—A survey of the history of the Christian Church from the close of the period of the New Testament to the present day.

  [3-0; 3-0]
- 300. (3) The Religions of India.—The religious traditions, institutions and practices of India, from Vedic times to the present. [0-3; 0-3]

302. (3) Buddhism.—The nature and development of Buddhi	
introduction to its principal schools.	[0-2; 0-2]
304. (3) Religious Thought of the Ancient Near East.	[0-2; 0-2]
305. (3) Religious Thought of Ancient Israel.	[0-2; 0-2]
306. (3) The New Testament and Christian Origins.	[0-3; 0-3]
307. (3) History of Christian Thought.—The development of C	hristian doc-
trine from its biblical sources up to and including the Reformation	. [3-0; 3-0]
308. (3) Religious Thought of Judaism.	[0-2; 0-2]
400. (3) Contemporary European Christian Thought.	[0-2; 0-2]
401. (3) Contemporary American Christian Thought.	[0-2; 0-2]
405. (3) The Synoptic Gospels and the Historical Jesus.	[0-3; 0-3]
406. (3) The Pauline Epistles.—The literary, historical and	
aspects of the letters of Paul.	[0-3; 0-3]
407. (3) Archaeology of the Ancient Near East.—Archaeolog	
source material for the study of ancient near eastern religious t	hought.
·	[0-2; 0-2]
410. (3) Modern Hinduism.	[0-2; 0-2]
411. (3) Indian and Tibetan Mahayana Buddhism.	[0-2; 0-2]
412. (3) Chinese Mahayana Buddhism.	[0-2; 0-2]
413. (3) Contemporary Buddhist Thought and Practice.	[0-2; 0-2]
421. (3-6) Honours Tutorial.	. , ,
449. (3-6) Honours Essay.	
Graduate Courses:	
500. (3) Reading and Research.	
531. (3) Seminar in Religious Studies.	
540 (0.0) Seminal in Religious Studies.	

# (ii) Courses in HEBREW

100. (3) Elementary Hebrew (Biblical).—Elements of grammar and translation of prose. [3-0; 3-0]

**200.** (3) Intermediate Hebrew.—A second year of Biblical Hebrew with emphasis on rapid reading of prose and poetry and on exegesis. [3-0; 3-0]

300. (3) Advanced Hebrew (Biblical).—Readings in and exegesis of the Hebrew Bible with special attention to problems in textual and form criticism and tradition history. Prerequisite: Hebrew 200 or equivalent. [3-0; 3-0]

# ROMANCE STUDIES

With the consent of the Department of French and of the Department of Hispanic and Italian Studies, undergraduate and graduate programmes in Romance Studies may be arranged.

# Courses offered:

549. (3-6) Master's Thesis.

420. (3) Studies in Romance Languages and Literature. [3-0; 3-0]

519. (3) The Language and Literature of Old Provençal.—The principal literary works and the development of the language.

520. (3) Studies in Romance Languages and Literature.

RUSSIAN (see Slavonic Studies)

SANSKRIT (see Asian Studies)

SERBO-CROAT (see Slavonic Studies)

# SLAVONIC STUDIES

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A.

# Requirements for the degree of Bachelor of Arts:

# Major

### Polish

First and Second Years:

Polish 110, 210

Third and Fourth Years:

Polish 345, 445

History 319

9 units in Slavonic Studies courses numbered 300 and above

# Russian

First and Second Years:

Russian 110, 210 (or Russian 100, 200)

Third Year:

Russian 310

(Students who have taken Russian 200 must take Russian 301 instead of 310)

### Fourth Year:

Russian 400

9 additional units (6 for students who take Russian 301) in Russian courses numbered 300 and above

Courses in Comparative Philology or Slavonic Studies may be included by permission of the Department

# Slavonic Studies

Second Year:

Slavonic Studies 205

Third and Fourth Years:

To be arranged in consultation with the Department.

### Honours

# Russian

### Admission:

First or high Second Class standing in Russian 210 (or 200) and Slavonic Studies 205

Polish 110 is recommended

Third and Fourth Years:

Russian 310, 400

Slavonic Studies 308 and 310 or 340

15-18 additional units in Russian courses numbered 300 and above including an honours essay

At least 6 units in courses outside the department

Students who have taken Russian 200 must take Russian 301.

# Slavonic Studies

Consult the Department

The following courses are accepted for credit in Slavonic Studies:

Geography 494: Geography of the Soviet Union

History 312: Russia from the Ninth Century to 1689

History 319: History of Poland, 1505-1921

History 324: History of Non-Russian Eastern Europe

History 325: German-Slav relations from the Ninth Century to 1945

History 405: History of Imperial Russia, 1689-1917

History 435: Communist Movements in Eastern Europe since 1900

Political Science 408: Soviet and East European Politics

# (i) Courses in POLISH

110. (3) Basic Polish.—An introductory course. [3-1; 3-1]

210. (3) Second-Year Polish. Prerequisite: Polish 110 or equivalent.

[3-1; 3-1] **345.** (3) Survey of Polish Literature (in translation). [3-0; 3-0]

445. (3) Polish Literature from the Age of Classicism to the Modern Period. Prerequisite: Polish 210 or equivalent. [3-0; 3-0]

# **Graduate Courses:**

545. (3) Studies in Polish Literature.

549 (3-6) Master's Thesis.

649. Ph.D. Thesis.

# (ii) Courses in RUSSIAN

100. (3) Basic Russian.—Grammar, reading, oral practice. Special sections are provided for science students. [3-1; 3-1]

110. (6) Basic Intensive Russian.—Aural comprehension, oral practice, grammar. Emphasis on learning to understand the spoken language and to express oneself in it. [6-2; 6-2]

180. (6) Intensive Summer Workshop in Russian.—Equivalent to Russian 100 and 200 or 110.

200. (3) Second-Year Russian.—Special sections are provided for science students. Prerequisite: Russian 100. [3-1; 3-1]

210. (6) Second Year Intensive Russian.—Prerequisite: Russian 110.

[6-2;6-2]

300. (3) Third-Year Russian.—Prerequisite: Russian 200. [3-1; 3-1]

301. (6) Third Year Russian. Special Accelerated Course.—For students who have completed Russian 200 and wish to proceed to a Russian Major. Prerequisite: Russion 200 first or high second class) or equivalent. [6-1; 6-1]

303. (3) Introduction to Russian Linguistics.—Prerequisite: Russian 200 (or 210 or equivalent). [3-0; 3-0]

- 310. (3) Third Year Russian (Intensive Programme).—Prerequisite: Russian 210.
- 331. (3) Introduction to Russian Prose.—Pushkin, Lermontov, Gogol and Turgenev. Lectures given in English. Reading in Russian. Prerequisite: Russian 210 or 200 or special permission. [3-0; 3-0]
  - 400. (3) Advanced Russian.—Prerequisite: Russian 300, 301 or 310.

[3-0; 3-0]

- 430. (3) Russian Poetry from Pushkin to the End of the Nineteenth Century.—Deals with the main poets of the period, such as Pushkin, Lermontov, Nekrasov, Fet, Tyutchev and others. Lectures given in English. [3-0; 3-0]
- **431. (3)** The Russian Novel.—Goncharov, Tolstoy, Dostoyevsky and Salty-kov-Shchedrin. Lectures given in English. [3-0; 3-0]
- 432. (3) Russian Literature from 1880 to 1917.—Main authors and literary movements during the period. Lectures given in English. [3-0; 3-0]
- 433. (3) Soviet Russian Literature.—Literature and the Soviet Revolution; emerging poets; literature of the NEP period and Reconstruction; the organization-writer; "Zhdanovism" and "the Thaw". [3-0; 3-0]
  - 449. (3) Honours Essay.

# Graduate Courses:

- 500. (1½) Bibliography and Methods.
- 501. (3) History of the Russian Language.
- 510. (3) Russian Thought and Culture.
- 520. (3) Old Church Slavonic.
- 530. (3) Russian Drama and Theatre from the Age of Classicism to the Present.
  - 532. (3) Studies in the Russian Novel.
  - 533. (3) Russian Literature to the end of the XVIIIth century.
  - 534. (3) Modern Russian Poetry.
  - 540-44 (1½-3) Topics in Russian Literature.
  - 549. (3-6) Master's Thesis.
  - 649. Ph.D. Thesis.

# (iii) Courses in COMPARATIVE PHILOLOGY

- 402. (3) Introduction to Comparative Slavonic Philology. Comparative study of morphology and phonology of Eastern, Western and South Slavonic. [3-0; 3-0]
  - 420. (3) Indo-European Comparative Philology.

F3-0: 3-07

# Graduate Course:

502. (3) Comparative Slavonic Philology.

# (iv) SERBO-CROAT

425. (3) Serbo-Croat.—An introductory reading course. Prerequisite: three years of another Slavonic language or equivalent. [3-1; 3-1]

# (v) Courses in SLAVONIC STUDIES

Note: A knowledge of Russian is not required for the courses listed below.

205. (3) Economic History and Geography of U.S.S.R. and Eastern Europe.—Study of land, people, natural resources, industry and agriculture, systems of transportation and routes of foreign trade of Russia (Soviet and Tsarist) and of other countries of Eastern Europe. [3-0; 3-0]

306. (3) Russian Literature in Translation.—Nineteenth- and early twentieth-century Russian writers. [3-0; 3-0]

- 308. (3) History of Russia.—The antecedents of the Russian State; foundation and growth, with particular attention to colonization and expansion; evolution of political institutions; the history of the revolutionary movement and the development of Russian Marxism; the Soviet State. [3-0; 3-0]
- 310. (3) Cultural and Social History of the Slavs.—Main emphasis on the U.S.S.R. and Yugoslavia. [3-0; 3-0]
- 340. (3) The Peoples of the Soviet Union.—Past and present geographical distribution; historical background; physical and cultural anthropology with special emphasis on the non-Slavic peoples; their influence on Russian culture; national minorities; integration of national minorities. [3-0; 3-0]
- 412. (3) The Theory of the Soviet State.—The Russian background; Soviet form of society; its philosophy, development and interpretation in the light of the logic of economic planning and the official dogma. [3-0; 3-0]
- 441. (3) Problems of Soviet Economic Growth.—Soviet planning of production, distribution, formation of capital, investment and consumption. Prerequisite: Economics 313. [3-0; 3-0]
  - 449. (3) Honours Essay.

### **Graduate Courses:**

- 504. (3) Seminar in Russian History.
- 505. (3) Seminar in Soviet History.
- 514. (3) History of Russian Education.
- 541. (3) Selected Problems of Soviet Economic Development.
- 542. (3) Comparative Slavonic Literature.
- 549. (3) Master's Thesis.

# PROGRAMME IN SLAVONIC AREA STUDIES

# Requirements for the degree of Bachelor of Arts:

# Major

First and Second Years:

At least two years of Russian or Polish

Slavonic Studies 205 or 310

Students are advised to take the prerequisite courses in Anthropology, Economics, Geography, History, or Political Science, depending on which discipline they wish to emphasize within the Programme in Area Studies

# Third and Fourth Years:

Geography 494 or Slavonic Studies 340

History 324 or Slavonic Studies 308

3 units from History 312

History 319

History 325

History 405

History 408

3 units from Political Science 408

History 435

Slavonic Studies 412

Slavonic Studies 441

3 units from Polish 345

Slavonic Studies 306

Russian 331

Russian 430

Russian 431

Russian 432

Russian 433

Russian 445

Notes: Students taking Russian 100 and 200 are urged to enrol for a third year of Russian

Students who are interested in proceeding to graduate work in an aspect of Slavonic Area Studies should consult the appropriate department: for the geography of the USSR, the Department of Geography; for Soviet and Eastern European politics, the Department of Political Science; for Soviet and Eastern European economics, the Department of Economics.

Advisers for the Programme in Slavonic Area Studies are Professors Bryner, Futrell, and Ronimois (Slavonic Studies), E. Bond (Economics), North (Geography), Avakumovic, Pech, and Sinel (History).

### SOCIOLOGY

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A.

Requirements for the degree of Bachelor of Arts:

Major

The Department offers several orientations in Sociology, represented in Programmes A, B, and C, among which the student may choose his Major programme. Alternatively, in consultation with a departmental adviser, he may construct a Major that is not contained within any one programme. Such a Major, however, must include 3 units in theory and 3 units in research methods.

# Programme A:

The principal emphasis in this programme is on methodological issues. The common concern in the courses in this programme is with an approach to sociology that emphasizes (a) the construction of formalized theory which has explanatory and predictive power, from which hypotheses can be deduced, and (b) the development of research designs and measurement techniques which provide a severe test of the theoretically derived hypotheses. The concern is with a particular strategy of scientific enquiry and its application to problems of explanation of social behaviour, whether manifest in small groups, large organizations, communities, or societies.

Second Year:

Sociology 250 or Sociology 200.

Third Year:

Nine units chosen from: Sociology 351, 352, 353, 354, 355, 356, 357.

Fourth Year:

Sociology 450, 451.

# Programme B:

The common concern in this programme is an emphasis on the primacy of substantive sociological problems and the belief that concerns in methodology and theory are properly generated by coming to grips with such problems. Courses in the programme employ models of social action which emphasize interpretations of social situations. Each course attempts to delimit a fruitful topical or analytic area which translates the general programme perspective into a set of specific issues.

Second Year:

Sociology 260 or Sociology 200.

Third and Fourth Years:

The Major in Programme B comprises 15 units of third- and fourth-year courses in Sociology, to be chosen from the three categories below. The pre-requisite for each of the fourth-year courses is a third-year course in the corresponding category, or the instructor's permission, with the exception of Sociology 468 and 475, for which the only prerequisite is Sociology 260. Pre-requisites will not apply in 1969-70 but will apply in 1970-71.

Category	Third Year	Fourth Year
Institutional Analysis	Sociology 361, 362	Sociology 461, 462, 463, 464
Socio-cultural Systems	Sociology 363, 364	Sociology 465, 466, 467, 468, 469
Social Process	Sociology 365, 366	Sociology 470, 471, 472, 473, 474, 475

# Programme C (Comparative Sociology):

The emphasis in this programme is on the comparative analysis of social institutions and societies. The Major comprises Sociology 300 and 400, and 9 units of other third- and fourth-year courses in Sociology and other subjects, as indicated below.

Second Year:

One of Sociology 200, 250, 260, Anthropology 200

Third Year

Sociology 300

Additional units toward the Major, chosen from Sociology 330, 361, 363, 364, Anthropology 300, 302, and third-year courses in other departments which emphasize comparative institutions, by permission of the Department.

Fourth Year:

Sociology 400

Additional units toward the Major, chosen from Sociology 452, 461, 462, 463, 464, 465, 466, 467, 468, 469, Anthropology 402, 405, 430.

### Honours

### Admission to Third Year:

High second-class average in first and second years combined

First-class standing in one of the second-year courses offered by the Department.

# Admission or Continuation to Fourth Year:

High second-class average in the first three years and two first-class marks in courses comprising the Honours programme.

# Third and Fourth Years:

21 units, normally consisting of one of the Major programmes described above and Sociology 441 and 449. The Honours student must select his courses in consultation with his assigned tutor.

Note: Sociology 351, 352, 353, 354, 355, 356 and 357 have as prerequisites Sociology 250, Mathematics 110 or 120, or permission of the instructor.

Sociology 450 and 451 have as prerequisites (1) at least one of Sociology 351, 352, 353, 354, 355, 356, and 357, and (2) one of Mathematics 240, 250, Plant Science 321, Psychology 411, or a statistics course in another department or faculty, subject to its acceptance by the Department of Anthropology and Sociology. Prerequisites for 400-level courses will *not* apply until 1970-71.

# Courses offered:

- 100. (also Anthropology 100) (3) Elementary Problems in Anthropological and Sociological Analysis.—Analysis of selected topics concerned with social structure and processes, through lectures, discussions, readings, and research papers. This is not a survey course, but one which introduces the student to methods and points of view which are characteristic of the disciplines. (Not offered in 1969-70).
- **200.** (3) Introduction to Sociology.—A general introduction to sociological analysis of selected topics: religion, work, politics, stratification kinship, socialization, social roles. [3-0; 3-0]
- 250. (3) Introduction to Quantitative and Formal Theoretical Sociology.—In the context of selected research problems, this course is intended to develop understanding and skills in methods of research and in the formation of problems and statements in theory. (Not offered in 1969-70). [3-0; 3-0]
- 260. (3) Introduction to Socio-Cultural and Socio-Thenographic Studies.—Fundamental problems in the theory and ethnographic and historiographic treatments of social phenomena; methods for the analysis of systematic features of social organization and group interaction; emphasis on research papers in selected substantive areas. (Not offered in 1969-70). [3-0; 3-0]
- 300. (3) Comparative Sociology.—Theoretical and operational problems in comparative method, analysis of social institutions on an inter-societal basis, with emphasis upon the execution and evaluation of research projects.

  [3-0: 3-01]
- 330. (3) Population Change and Its Socio-Economic Implications.—Projection and prediction of population growth and current family planning programmes. Technique in demographic analysis. [3-0; 3-0]
- 351. (1½-3) Experimental Small Groups (Previously Sociology 410: Small Groups.—Analysis and discussion of laboratory experiments. The logic of their

design and the contribution of this type of research to theory construction.

[3-0; 3-0]

352. (1½-3) Organizations.—Theory and description of the structure process, and change of bureaucratic organizations in various settings. [3-0; 3-0]

- **353.** (3) Work and Industry.—Theoretical problems and empirical research in the meaning and social organization of work and the composition of occupational roles. [3-0; 3-0]
- 354. (1½-3) Communities.—Study of the organization of human communities; a focus upon collective activities including family, work, neighbourhood and formal and informal networks. [3-0; 3-0]
- 355. (1½-3) Societal Dynamics.—Study of relations over time among ecological, structural, and behavioural aspects of society. Attention will be given both to theoretical issues and to problems of policy formation and execution. (Not offered in 1969-70). [3-0; 3-0]
- 356. (1½-3) Social Ecology.—An examination of technological, economic, and demographic constraints upon social organization. The focus will be upon the development and organization of societies. [3-0; 3-0]
- 357. (1½-3) Evaluative Structures.—An analysis of decision-making behaviour and its underlying evaluative processes in various settings. Special attention will be given to the effects that reference groups have on these processes. Both individual and collective decision-making will be examined as well as consistencies and inconsistencies in choice behaviour. (Not offered in 1969-70). [3-0; 3-0]
- 361. (3) Social Stratification.—Tendencies toward equality and inequality; manifestations of inequality (occupation, education, ethnic groups, income, power) and their consequences caste and class features of major stratification systems; theories of social class; stratification profile of contemporary industrial societies. [3-0; 3-0]
- 362. (3) Collective Behaviour.—Basic forms of collective behaviour—crowds, riots, mass movements, and audiences—in terms of their institutional and socio-psychological contexts. [3-0; 3-0]
- 363. (3) History of Social Thought.—The history of sociological thought, with particular reference to the classical works of outstanding figures and the major trends.

  [3-0; 3-0]
- **364. (3) Sociology of Knowledge.**—An analysis of the relationship of ideas to social life in areas such as politics, science, education, religion, the professions, and the arts. [3-0; 3-0]
- 365. (3) Socialization.—Study of the acquisition of membership in childhood social structures. Conceptual treatments of the child's learning to operate as a member of a culture are derived from the analysis of speech.

  [3-0; 3-0]
- 366. (3) Principles of Social Organization.—An introduction to basic concepts for the analysis of social order. Emphasis is on description of the properties of stable interaction and the standardizing features of common culture.
- 400. (3) Sociological Research.—A seminar in which students will prepare and present for criticism a major piece of original research or an analysis already published in an area relevant to the seminar. For majors in Programme C only.

  [3-0; 3-0]
- **425.** (3) Urban Sociology.—Demographic, behavioural and organizational aspects of urban structures and of urbanization in different societies and periods. [3-0; 3-0]

- 441. (3) Honours Seminar.
- 449. (3) Honours Tutorial.—Will usually require the presentation of at least one research paper.
- **450.** (3) Theoretical Problems.—Readings, discussions, and papers in current theoretical issues and problems of theory construction. [3-0; 3-0]
- 451. (3) Problems in Research Design and Analysis.—Research projects, exercises, and papers intended to develop competence in the design, execution, and evaluation of empirical research. [3-0; 3-0]
- 461. (3) Political Sociology.—Study of the social foundations of political order and the social aspects of political processes; includes a review of various socio-political ideologies, elite formations, political parties and interest groups, political reform, reactionary and revolutionary movements, and a general examination of the relationship between social structure and political power. Prerequisite: Sociology 361, or 362, or permission. [3-0; 3-0]
- 462. (3) Social Change.—Study of the interrelationships between modernization, political thought, and social structure; comparative survey of current trends in the institutional foundations of organized human activities; theories of social change. Prerequisite: Sociology 361 or 362, or permission. [3-0; 3-0]
- 463. (3) Sociology of Religion.—Description and analysis of various religious groups: organization and leadership, relationships to the state and other institutions, religious statistics, problems of definition of "religion"; theories of religion: functionalist, Marxist, psycho-analytic. Prerequisite: Sociology 361, or 362, or permission. [3-0; 3-0]
- 464. (3) Social Movements.—A study of the sources, stages, and effects of social movements in developing and modernized societies. Prerequisite: Sociology 361, or 362, or permission. (Not offered in 1969-70). [3-0; 3-0]
- 465. (3) Sociology of the Arts.—An examination of the arts—painting, sculpture, the film, music, literature—from the standpoint of the relationships among artists, critics, and patrons and the resulting styles and systems of taste. Prerequisite: Sociology 363, or 364, or permission. [3-0; 3-0]
- 466. (3) Sociology of Education.—Contemporary trends in educational process, particularly the university setting and its relationship to community and social structure; comparative survey of educational institutions and their respective socio-economic contexts; social class biases in educational training. Prerequisite: Sociology 363, or 364, or permission. [3-0; 3-0]
- 467. (3) Sociology of Science.—The social organization of scientific institutions and activity; classical issues in the philosophy of science reformulated in terms amenable to empirical research. Prerequisite: Sociology 363, or 364, or permission. (Not offered in 1969-70). [3-0; 3-0]
- 468. (3) Issues in Sociological Theory.—Contemporary sociological thought with respect to fundamental topics in theory. Prerequisite: Sociology 260.
- 469. (3) Social Ideologies.—An enquiry into the sources, construction, and effects of ideological systems of thought in moral, political, artistic, educational, religious, economic, and professional structures. Prerequisite: Sociology 363, or 364, or permission. (Not offered in 1969-70). [3-0; 3-0]
- 470. (3) Formal Interactional Analysis.—The course provides an analytic framework for the identification of component units of interactional routines, together with the rules of combination which govern their assembly in such larger units as, for instance, conversations. Prerequisite: Sociology 365, or 366, or permission. [3-0; 3-0]

- 471. (3) Social Control.—An analytic framework for the study of the generation and control of deviant activities, with particular emphasis on societal processes directed to the recognition and organizational treatment of "deviants" as a phenomenon. Theoretical issues will be stressed rather than social problems and their remedy. Prerequisite: Sociology 365, or 366, or permission. (Not offered in 1969-70).
- 472. (3) Ethnomethodology.—The study of everyday life conceived as the outcome of the methodical procedures undertaken by members of a society for the achievement of accountable actions. Prerequisite: Sociology 365, or 366, or permission. [3-0; 3-0]
- 473. (3) Sociology of Mental Illness.—A sociological approach to the meaning of mental illness; the organization of psychiatric treatment; problems in the explanation of the distribution of mental illness in a population. Prerequisite: Sociology 365, or 366, or permission. (Not offered in 1969-70).

  [3-0; 3-0]
- 474. (3) Professions and Occupations.—A treatment of work as one of the sources of massive stability and standardization in everyday life. The properties of work-settings and their associated practices will be a prime focus for independent fieldwork by students. Prerequisite: Sociology 365, or 366, or permission.
- 475. (3) Dynamics of Interpersonal Relations.—A self-analytic seminar for the study of group interaction and social conflict processes; focus on group dynamics complemented by readings and discussion of inter-groups and social interaction. Prerequisite: Sociology 260. [3-0; 3-0]

# Graduate Courses: (Consult Department for seminar titles in 1969-70)

- A. Theory and Methods of Research
  - 501. (1-3) Seminar.
  - 502. (1-3) Seminar.
  - 503. (1-3) Seminar.
  - 504. (1-3) Seminar.
- B. Relationships Between Individuals and Groups
  - 511. (1-3) Seminar.
  - 512. (1-3) Seminar.
  - 513. (1-3) Seminar.
  - 514. (1-3) Seminar.
- C. Elements of Social Organization
  - 521. (1-3) Seminar.
  - 522. (1-3) Seminar.
  - 523. (1-3) Seminar.
  - 524. (1-3) Seminar.
- D. Institutional Areas
  - 531. (1-3) Seminar.
  - 532. (1-3) Seminar.
  - 534. (1-3) Seminar.
  - 535. (1-3) Seminar.
  - 533. (1-3) Directed Studies.
  - 540. (1-3) Graduate Seminar.
  - 545. (1-3) Graduate Research Seminar.

549. (3-6) Master's Thesis.

649. Ph.D. Thesis.

# SPANISH (see Hispanic and Italian Studies)

#### THEATRE

The Department offers programmes of study that lead to the degrees of M.A., B.A.

# Requirements for the degree of Bachelor of Arts:

# Major

First and Second Years:

Theatre 120 and 300

Third and Fourth Years:

15 units in Theatre, of which at least 6 must be chosen from

Theatre 310

Theatre 320

Theatre 410

#### Honours

#### Admission:

Theatre 120 (First or Second Class standing)

Theatre 300

#### Third and Fourth Years:

18 units including:

Theatre 310

Theatre 320

Theatre 410

Theatre 449

6 units chosen from

Theatre 400

Theatre 405

Theatre 420

Theatre 430

English 365

English 366

Creative Writing 407

Reading knowledge (by the end of the Fourth Year) of one of French, German, Italian, Spanish, Russian, Chinese, Japanese or Greek

#### Courses offered:

120. (3) Introduction to Theatre.—Theory and practice of the theatrical arts; the development of Western theatre; reading of representative plays.

[3-0; 3-0]

300. (3) Theatre Practice.—Speech and acting.

[2-2; 2-2]

- 301. (3) Children's Theatre.—The creative approach to drama with children and to theatre for children in the elementary school. For credit in the Faculty of Education. [3-0; 3-0]
  - 310. (3) History of the Theatre to 1700.

[3-0; 3-0]

- 320. (3) History of Modern Theatre.—The development of Western theatre since 1700, with emphasis upon the twentieth century. [3-0; 3-0]
  - 330. (3) History of the Film.

[2-2; 2-2]

- 333. (3) Introduction to Film Production.—Prerequisite: Theatre 330 and Instructor's consent. [2-3; 2-3]
- **340.** (3) History of the Oriental Theatre.—Third and fourth year students only. [3-0; 3-0]
  - 350. (3) Theatrical Production.

[2-3; 2-3]

- 400. (3) Direction and Staging.—Prerequisite: Theatre 300. [3-2; 3-2]
- 405. (3) Design for the Theatre.—The history, theory and practice of theatrical design. Prerequisite: Fine Arts 228. [2-3: 2-3]
- 410. (3) Forms of Theatre.—An examination in depth of a limited number of plays representative of the forms of theatre that have had the most significant and enduring influence upon the development of theatre from the Greek era to the present. Prerequisite: Theatre 310 or 320. [3-0; 3-0]
- **420.** (3) Styles in Acting.—An advanced course in acting; detailed study of the major styles in the history of acting. Prerequisite: Theatre 300.

[2-4; 2-4]

- 421. (3) Styles in Directing.—An advanced course in directing; detailed study of the major styles in the history of production. Prerequisite: Theatre 400. [2-3; 2-3]
- 430. (3) Dramatic Theory.—An advanced study of the principles of dramaturgy; extensive reading and discussion of the major writings on dramatic theory and criticism from Aristotle to the present. [3-0; 3-0]
  - 449. (3) Supervised Study and Honours Essay.

#### **Graduate Courses:**

- 505. (3) Scene Design.
- 506. (3) History and Design of Theatrical Costume.
- 510. (3) Seminar in Comparative Dramatic Literature.
- 515. (3) Seminar: Studies in Theatrical Style.
- 520. (3) Direction and Production.
- 525. (3) Seminar: Study of a Major Dramatist.
- 547. (3) Directed Studies in Theatre and Drama.
- 549. (3-6) Master's Thesis.

#### ZOOLOGY

The course below is recommended for students in the Faculty of Arts; for other courses see the Calendar of the Faculty of Science.

400. (3) Principles and History of Biology.—Lectures and seminar on the scientific revolution of the seventeenth and eighteenth centuries, and on the problem of discovery in science. No prerequisites other than clear standing in second year; Biology is not required. Mr. Harger. [3-0; 3-0]

# DEPARTMENT OF MUSIC Faculty

# Professor and Head

G. Welton Marquis, M.A. (Whitman), Ph.D. (USC).

# **Professors**

ALLEN CLINGMAN, M.Mus. (Drake), M.A., D.Ed. (Columbia).

HANS-KARL PILTZ, B.A. (Henderson), M.Mus. (Northwestern).

LLOYD H. SLIND, B.Sc. (Sask), B.Mus. (Montreal, Sask), D.Ed. (Fla), L.R.S.M. ELLIOT WEISGARBER, M.Mus. (Eastman).

#### Associate Professors

Frank Gamble, B.F.A. (Neb), M.A. (Catholic U), D.Ed. (Columbia).

Donald C. Gibbard, M.A. (Wash).

CORTLAND HULTBERG, B.S. (N. Illinois), M.Mus (Illinois, Ariz).

ROBERT MORRIS, B.Mus. (Capital), M.Mus. (Union Theological Seminary), D.V.Paed. (Indiana).

DALE REUBART, B.A. (Kansas City), M.Mus., D.M.A. (USC).

French Tickner, B.M., M.Mus. (USC).

CAMPBELL TROWSDALE, B.Mus., M.Ed., D.Ed. (Toronto), A.R.C.T.

# Assistant Professors

KATHRYN BAILEY, B.Mus. (Pacific), M.Mus. (Ind).

TERENCE BAILEY, Mus.B. (Toronto), M.F.A. (Princeton), Ph.D. (Wash.)

ROBERT BRICKER, B.Mus., M.A. (Wayne State).
PAUL DOUGLAS, B.M.E. (Central Methodist), M.Mus. (Hartford).

JOHN LOBAN, M.A. (Catholic U).

JOHN MURRAY, D.Ed. (Ore).

JAMES SHELL, B.A., B.M. (N. Texas) M.Mus. (Yale).

JOHN SWAN, B.Mus. (Toronto), M.Mus. (Yale).

Douglas Talney, B.Mus. (Lewis and Clark), M.Mus. (USC).

EUGENE WILSON, B.Mus. (USC), M.A., Ph.D. (Wash).

#### Instructors

DONALD BROWN, L.R.C.T.

JOHN CHAPPELL, B.Mus. (Brit Col), M.Mus. (Illinois).

ROBERT ROGERS, B.A. (Brit Col), M.A. (Wash), A.R.C.T., L.T.C.L.

JOHN SAWYER, B.A., B.Mus. (Brit Col), M.Mus. (Illinois).

PHYLLIS SCHULDT, A.R.C.M., L.R.S.M.

# Special Lecturers

JEAN COULTHARD ADAMS, A.T.C.M., L.R.S.M. (Composition).

HARRY ADASKIN.—Music Appreciation.

#### Lecturers

Frances Adaskin.—Piano.

Tames Coombes, Vancouver Symphony.—Trombone.

ROBERT CREECH, B.A. (Brit Col), Principal Horn, Vancouver Symphony.— Horn.

CONRAD CROCKER, B.Mus. (Cincinnati), Vancouver Symphony.—Flute.

RONALD DE KANT, Principal Clarinet, Vancouver Symphony.—Clarinet.

GLEN GEARY, B.A. (Brit. Col.).—Piano.

JOHN HAMILTON, Vancouver Symphony.—String Bass.

CAROL JUTTE, A.R.C.T., L.R.S.M., A.R.C.M..—Piano.

Douglas Kent, Curtis Institute, Vancouver Symphony.—Horn and Tuba.

HENRY OHLMAN, Vancouver Symphony.—Clarinet.

EDWARD PARKER, L.R.S.M., F.T.C.L.,—Piano.

Marie Schilder, Vienna.—Voice.

ROLAND SMALL, Principal Bassoon, Vancouver Symphony.—Bassoon.

Warren Stannard, M.Mus. (Yale), Principal Oboe, Vancouver Symphony.—Oboe.

Douglas Stewart, A.T.C.M.—Violin.

MARSHALL SUMNER, B.Mus. (Chicago).—Piano.

MARY TICKNER, B.Mu.Ed. (Evansville), M.Mus. (USC).—Piano.

BETH WATSON, A.R.C.T..—Voice.

SHERIE WILSON, B.A. (Wash).—Cello.

#### General Information

The Department of Music offers programmes of study that lead to the degrees of M.Mus., B.Ed., B.Mus., B.A. For a description of the programme leading to the degree of B.A. see pp. 78-80.

For information concerning vocations open to those holding degrees in Music, see Opportunities in Music, Bulletin No. 1 of the Department of Music.

# Requirements for the degree of Bachelor of Music:

#### Admission:

- The entering class may be limited to sixty students on the basis of tests of musical aptitude and auditions administered by the Department of Music.
- 2. Students with musical diplomas but without university credit may be given advanced standing on the basis of entrance examinations in Music.
- 3. All entering students must take certain tests that will determine their placement.

#### Fees

Total annual fee, \$573.00; first term, \$301.00, due and payable on registration in September; second term, \$272.00, due and payable on the first day of the second term in January. Students in the Final Year will be assessed an additional fee of \$7.00 (Graduating Class Fee) in the first term.

#### Financial Assistance

Most scholarships in music are awarded to students who have completed at least one year of the course, but a few are given to entering students on the basis of auditions.

# Performing Organizations

All students seeking the Bachelor of Music participate in the instrumental

and choral ensembles sponsored by the Department of Music and directed by members of the regular Faculty. Any student may, however, enter these organizations after an audition, but without credit.

# Recitals by Faculty and Students

Faculty Recitals: Members of the Faculty present formal recitals throughout the academic year, open to the public without charge. All students in the programme are expected to attend.

Collegium Musicum: The Department of Music presents regular lectureconcerts that feature unusual music from all historical periods, Each lecture is given twice, once at the noon-hour, and once in the evening. All students in the programme are required to attend one of the two performances.

Noon-Hour Recitals: On many Wednesdays, recitals feature outstanding soloists and chamber ensembles. Students in the programme may be required to attend.

Student Repertory Series: Informal recitals are held each week throughout the academic year on Wednesday afternoons at 3:30 in the Recital Hall of the Music Building. All students in the programme are required to attend and to participate as their instructors recommend.

Student Recital Series: More formal recitals are presented occasionally during the academic year. Normally two students will share one of these periods upon the recommendation of the faculty. Attendance is mandatory for students majoring in performance.

Graduation Recitals: All students of performance and composition must present full-length graduation recitals in partial fulfilment of their requirements. All students in the programme are expected to attend.

# Programme for the Degree of Bachelor of Music

# Major in Piano

All students planning to major in Piano are required to audition before the Faculty before fall registration. Students transferring from other universities will audition at the same time. Students currently registered in this course will be examined by the Faculty each spring before the end of the academic year.

The results of these auditions and examinations will determine (1) whether a student will be admitted to the Programme in Performance; (2) whether a student will be allowed to transfer credits in piano from other universities; (3) whether a student will be permitted to continue in the programme, or be allowed to advance. All students in performance are on probation during the first two years.

The first-year entrance-level in piano corresponds to the Toronto or Western Board Grade 10. However the student's acceptance is not guaranteed by the attainment of this level, or even higher levels, but is largely dependent upon the probability of subsequent rapid development.

It is possible but not recommended for the student to complete this course in three years after Grade 13 or its equivalent.

Auditions or Entrance: In general, the entering First Year student should be prepared as follows: major and minor scales and arpeggios at moderately rapid tempos; basic sight-reading skill; etudes, such as Czerny 299 or the equivalent; Two-Part Inventions of Bach; compositions of standard composers equivalent in difficulty to Beethoven's Sonata, Op. 10, No. 1. It must

be remembered, however, that the ability to perform these or more difficult works does not mean that the student will be accepted if the Faculty believe that there will not be sufficient improvement during the following years.

Performance Levels in Piano

First Year: Scales and arpeggios in rapid tempos; sight-reading of solo pieces and accompaniments of moderate difficulty; more difficult Bach inventions, suites, preludes and fugues; sonatas by Scarlatti, Haydn, Mozart and Beethoven; shorter works by Schubert, Mendelssohn, Schumann and Chopin; less difficult twentieth-century works.

Second Year: Bach's Well-Tempered Clavier; suites and partitas; concertos by Mozart and Beethoven; added sonatas and works including those by Brahms, Liszt and significant twentieth-century composers.

Third Year: Partitas by Bach; toccatas, Chromatic Fantasy, Italian Concerto; sonatas by Beethoven, op. 53 to op. 111; the more demanding works of Romantic and Impressionistic composers; sonatas and shorter works of Schoenberg, Bartok, Hindemith, Stravinsky and other significant twentieth-century composers; added concertos from all periods.

Fourth Year: a programme of wider scope directed toward the fulfilment of minimum repertory requirements; considerable ensemble-playing and accompanying experience; satisfactory sight-reading ability in all periods, including the modern; at least two full recital programmes, one of which will be presented in the afternoon Student-Recital Series, the other to the Faculty before presentation in the Graduation Recital. One concerto, subject to competition, may be played with the University Symphony Orchestra.

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First Year  (100) Theory of Musi (120) History of Mus (146) PIANO  Large Ensembl (100) English  (20) English	ic I 3 3 1 1 3 3 1 3 3 1 3 1 3 3 1 3 1 3 1	(200) (320) (247) (200)	Second Year Theory of Music II History of Music II PIANO Large Ensemble English Elective in Arts	3 3 4 1 3 3
<sup>2</sup> Elective in Arts	3		Elective in Arts	3
	16			17
Third Year	•		Fourth Year	
(300) Theory of Mus (347) PIANO (149) Accompanying (161) Piano Chamber Ensemble (422) History of Keyl Music Music Elective Electives in Art	ic III 3 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(440) (448) (249) (161)	Piano Techniques PIANO (Recital) Accompanying II Piano Chamber Ensemble Electives in Arts	2 5 1 1 6 ———————————————————————————————

<sup>&</sup>lt;sup>1</sup> Large Ensemble: Students may elect any one of Music 150 (Orchestra), Music 152 (Wind Ensembles), Music 153 (University Singers) or Music 154 (University Choral Union), with the permission of the Department.

<sup>&</sup>lt;sup>2</sup> Electives in Arts: Courses outside Music carrying credit in the Faculty of Arts, elected after consultation with the Department of Music.

# Major in Voice

Before entering this area, students must audition before the Faculty during "New Student Week" before registration, singing music of their own choice. Students currently enrolled in performance will be examined each spring to determine whether advancement will be permitted.

First Year. Tone production and diction are stressed. Song-literature from the early Italian period and from oratorio is usually emphasized. During the first year the student will be carefully evaluated in regard to voice, musicianship and physical stamina for the purpose of determining whether he or she has the combination of talents needed for successful performance.

Second Year. Technical and interpretative studies are continued. The repertory will be expanded as the student's technical facility develops. As the use of foreign language is increased, French and German songs will comprise a large share of the literature to be studied.

Third Year. Considerable vocal agility, volume, range and pleasing tone quality should be achieved in the third year. Frequent group recitals will be encouraged. Operatic and oratorio arias are a necessary part of the repertoire as well as wide-ranging choices in all languages. Ability to perform contemporary English, Canadian and American songs will be expected.

Fourth Year. The fourth year should be devoted to the interpretative aspects of singing, supported by a growing technical command. It will be assumed that the student can satisfactorily perform any of the standard repertory for his or her vocal classification. A full-length recital (no longer than one hour and fifteen minutes including intermission) will be presented after approval by the Faculty.

	First Year			Second Year	
(100)	Theory of Music I	3	(200)	Theory of Music II	3
(120)	History of Music I	3	(320)	History of Music II	3
(145)	VOICE	2	(246)	VOICE	3
(144)	<sup>1</sup> Piano	1	(244)	Piano	1
	<sup>2</sup> Large Ensemble	1		Large Ensemble	1
(100)	English	3	(200)	English	3
	<sup>8</sup> French	3		<sup>3</sup> German	3
		_			
		16			17

#### (Song Concentration)

	Third Year		Fourth Year	
(300)	Theory of Music III	3	(447) VOICE (Recital)	4
(347)	VOICE	4	Large Ensemble	1
(306)	Conducting	2	<sup>4</sup> Chamber Ensemble	1
(424)	History of Vocal Music	3	Music Elective	3
	Large Ensemble	1	<sup>5</sup> Electives in Arts	6
	<sup>4</sup> Chamber Ensemble	1		15
	<sup>3</sup> Italian	3		15

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# (Opera Concentration)

	Third Year			Fourth Year	
(300)	Theory of Music III	3	(447)	VOICE (Recital)	4
(339)	Opera Workshop I	3	(439)	Opera Workshop II	3
(347)	VOICE	4	(423)	History of Opera	3
• /	Large Ensemble	1	, ,	Large Ensemble	1
	<sup>3</sup> Italian	3		Electives in Arts	6
	<sup>5</sup> Electives in Arts	3			
					17
		17			

<sup>&</sup>lt;sup>1</sup>Piano: A minimum of two years of study regardless of entering level.

# Major in an Orchestral Instrument

The major in an Orchestral Instrument is formulated for the student who plans to become a professional performer or teacher in schools of music, conservatories or private studios.

Before entering this course, the student must audition before the Faculty during "New Student Week" before fall registration. In general, the entrance level corresponds to the Toronto or Western Board Grade X, although an entering level of approximately the ARCT or its equivalent is desirable. However, the possession of a diploma does not guarantee entrance, since there must also be the probability of great development during the required years at the University.

Students currently enrolled in this course will be examined each spring by the Faculty to determine whether there will be advancement, or whether the student may be required to withdraw.

Although solo performance is stressed in this course, all orchestral instrument-players will participate in small chamber ensembles. In the final year, a full-length graduation recital (a maximum of one hour and fifteen minutes including intermission) must be presented after approval by the Faculty.

<sup>&</sup>lt;sup>2</sup> Large Ensemble: Students will enrol in either Music 153 (University Singers) or Music 154 (University Choral Union).

<sup>&</sup>lt;sup>3</sup>Foreign Languages: In certain cases students may concentrate on one or two of the languages required, and the indicated sequence may be altered.

<sup>\*</sup>Chamber Ensemble: Students will elect either Music 155 (Chamber Singers) or Music 156 (Collegium Musicum: Vocal Ensemble).

<sup>&</sup>lt;sup>5</sup> Electives in Arts: Courses outside Music carrying credit in the Faculty of Arts, elected after consultation with the Department of Music.

# MAJOR IN AN ORCHESTRAL INSTRUMENT

	First Year			Second Year	
(100) (120) (146)	Theory of Music I History of Music I CONCENTRATION	3 3	(200) (320) (247)	Theory of Music II History of Music II CONCENTRATION	3 3
(144)	INSTRUMENT <sup>1</sup> Piano <sup>2</sup> Large Ensemble <sup>3</sup> Chamber Ensemble	3 1 1 1	(244)	INSTRUMENT Piano Large Ensemble Chamber Ensemble	1 1 1
(100)		$\frac{3}{3}$ $\frac{1}{18}$	(200)	English	$\frac{3}{16}$
		10			
(300) (347) (306) (309)	Third Year Theory of Music III CONCENTRATION INSTRUMENT Conducting Orchestration Large Ensemble Chamber Ensemble Elective in Arts	3 4 2 2 1 1 3	(448)	Fourth Year CONCENTRATION INSTR. (Recital) Large Ensemble Chamber Ensemble Music Elective Electives in Arts	$   \begin{array}{c}     5 \\     1 \\     3 \\     \hline     6 \\     \hline     16   \end{array} $
		16			

<sup>&</sup>lt;sup>1</sup>Piano: A minimum of two years must be studied regardless of entering level. <sup>2</sup>Large Ensemble: String students will enrol in Music 150 (Orchestra). Wind students will enrol in Music 152 (Wind Ensembles).

# Major in General Music

Students who wish to become directors of instrumental and choral programmes in the public schools may enter this programme. All students in his course also elect one non-musical area for a teaching major in addition o music.

This is a four-year course leading to the Bachelor of Music, to be followed by one year in the Faculty of Education at the University. (See the Calendar of the Faculty of Education for requirements.)

Graduates in General Music will be qualified to direct orchestras, bands and thoruses in all grades, and to develop instrumental and choral programmes in thementary and secondary schools. The course is so planned as to train each tudent in all these areas. The degree will also allow the student to continue work toward graduate degrees without being penalized for lack of credits.

As this is not essentially a degree in "performance", no specific entrance-examinations will be given in vocal or instrumental areas. However, each stulent is required to study for three or four years with the Faculty in a concentation of his or her own choice (excluding piano): voice, strings, woodwinds or brasses.

<sup>&</sup>lt;sup>3</sup>Chamber Ensemble: String students will enrol in Music 160 (String Chamber Ensembles). Wind students will enrol in Music 152 (Wind Ensembles).

<sup>&</sup>lt;sup>1</sup>Electives in Arts: Courses outside Music carrying credit in the Faculty of Arts will be elected after consultation with the Department of Music.

Piano may be studied as a secondary instrument, and all students in General Music must pass examinations testing proficiency in piano before graduation. In general, the instruction in piano is directed toward sight-reading, and the student may start at any level.

It is possible to complete this degree in three years if a minimum of 15 units of first-year work has been completed in another programme and receives credit in the Faculty of Arts. It is not advisable, however, to attempt to complete the programme in three years, since the courses in Music must be compressed into a shortened period that may bring great pressure on the student. Furthermore, the student would have to enrol in the Summer Session in order to complete the recommended five-course major outside music.

# MAJOR IN GENERAL MUSIC

First Year			Second Year	
(100) Theory of Music I	3	(200)	Theory of Music II	3
(120) History of Music I	3	(320)	History of Music II	3
(145) <sup>1</sup> Concentration Field	2	(245)	Concentration Field	2
(144) <sup>2</sup> Secondary Field	1	(244)	Secondary Field	1
<sup>3</sup> Large Ensemble	1	(140)	Class Strings	2
(100) English	3	,	Large Ensemble	1
<sup>4</sup> Elective in Arts	3	(200)	English	3
			<sup>4</sup> Elective in Arts	3
	16			
				18
Third Year			Fourth Year	
	3	(309)	Fourth Year Orchestration	2
(300) Theory of Music III	3 2	(309) (445)		2 2
(300) Theory of Music III	3 2 2	(309) (445) (444)	Orchestration Concentration Field	
(300) Theory of Music III (306) Conducting	2	(445)	Orchestration	2 1
<ul><li>(300) Theory of Music III</li><li>(306) Conducting</li><li>(345) Concentration Field</li></ul>	2 2	(445) (444)	Orchestration Concentration Field Secondary Field	2 1
<ul> <li>(300) Theory of Music III</li> <li>(306) Conducting</li> <li>(345) Concentration Field</li> <li>(344) Secondary Field</li> </ul>	2 2 1	(445) (444)	Orchestration Concentration Field Secondary Field Class Brasses—Percussi	2 1 on 2
<ul> <li>(300) Theory of Music III</li> <li>(306) Conducting</li> <li>(345) Concentration Field</li> <li>(344) Secondary Field</li> <li>(142) Class Woodwinds</li> </ul>	2 2 1 2	(445) (444)	Orchestration Concentration Field Secondary Field Class Brasses—Percussi Large Ensemble	2 lon 2 1 1
<ul> <li>(300) Theory of Music III</li> <li>(306) Conducting</li> <li>(345) Concentration Field</li> <li>(344) Secondary Field</li> <li>(142) Class Woodwinds</li> <li>Large Ensemble</li> </ul>	2 2 1 2	(445) (444)	Orchestration Concentration Field Secondary Field Class Brasses—Percussi Large Ensemble Chamber Ensemble	2 lon 2 1
<ul> <li>(300) Theory of Music III</li> <li>(306) Conducting</li> <li>(345) Concentration Field</li> <li>(344) Secondary Field</li> <li>(142) Class Woodwinds Large Ensemble 5Chamber Ensemble</li> </ul>	2 2 1 2 1 1	(445) (444)	Orchestration Concentration Field Secondary Field Class Brasses—Percussi Large Ensemble Chamber Ensemble Music Elective	2 ion 2 1 1 3 6
<ul> <li>(300) Theory of Music III</li> <li>(306) Conducting</li> <li>(345) Concentration Field</li> <li>(344) Secondary Field</li> <li>(142) Class Woodwinds <ul> <li>Large Ensemble</li> <li>Chamber Ensemble</li> <li>Music Elective</li> </ul> </li> </ul>	2 2 1 2 1 1 3	(445) (444)	Orchestration Concentration Field Secondary Field Class Brasses—Percussi Large Ensemble Chamber Ensemble Music Elective	2 lon 2 1 1

<sup>&</sup>lt;sup>1</sup>Concentration: Each student must earn eight units in either voice or an orchestral instrument. As this is not essentially a course in "performance", the student may start at any level.

<sup>&</sup>lt;sup>2</sup>Secondary Field: Each student must pass examinations in piano before graduation. Completion of this requirement will permit the student to continue the study of piano, or to begin the study of a second instrument or voice.

<sup>&</sup>lt;sup>3</sup>Large Ensemble: Students whose instrument is woodwind or brass will enro each year in Music 152, University Wind Ensembles, for placement in large or small groups. Thus, in the first two years, Music 152 carries 1 unit of credit during the last two years, it carries 2 units of credit. String students will enro

in Music 150, University Orchestra; sudents in voice will enrol in either Music 153 or Music 154.

<sup>4</sup> Electives in Arts: Courses outside Music chosen after consultation with the Department of Music.

<sup>5</sup>Chamber Ensembles: Each student, other than students of wind instruments, will enrol for a minimum of two years in one of the departmental chamber ensembles, depending upon the student's concentration.

# Major in Music History

This four-year programme is formulated for the student planning to continue after graduation in the area of musicology and who wishes to obtain graduate degrees in Music with the ultimate aim of teaching in a university School of Music.

The student in this area must obtain a wide theoretical knowledge, a comprehensive background in musical history, a working knowledge of piano; he must possess an intense interest in art, literature, philosophy and other musical areas. A reading knowledge of both French and German is required before graduation.

As university teachers of Music normally instruct in more than one *musical* field, a student in this course should obtain great strength in at least one additional musical area, such as performance, theory — or both. These areas will be strengthened further in graduate study.

Very few students will know whether they are suited for this programme during the first year, but the course of study in all areas is so planned as to allow a change to another area after the completion of the first year without loss of time or credit.

Although this degree leads to university teaching, students interested in careers as music journalists or librarians of music will find its training invaluable.

# MAJOR IN MUSIC HISTORY

	First Year			Second Year	
(100)	Theory of Music I	3	(200)	Theory of Music II	3
(120)	History of Music I	3	(320)	History of Music II	3
(145)	<sup>1</sup> Applied Music	2	(245)	Applied Music	2
	<sup>2</sup> Large Ensemble	1		Large Ensemble	1
(100)	English	3	(200)	English	3
	<sup>3</sup> French or German	3		French or German	3
		15			15

Third Year		Fourth Year	
(300) Theory of Music III	3	(400) Theory of Music IV	3
(306) Conducting	2	(444) Applied Music	1
(345) Applied Music	2	Chamber Ensemble	1
<sup>4</sup> Chamber Ensemble	1	Music History Electives	6
<sup>5</sup> Music History Electives	6	<sup>7</sup> Electives in Arts	6
<sup>6</sup> Political History	3		
			17
	17		

<sup>&</sup>lt;sup>1</sup> Applied Music: Students must study in some field of performance, although they must learn to use the piano at least as a teaching "tool." During the last year, the student may study a "historical" instrument, such as viol, recorder, or harpsichord.

#### Major in Composition

This four-year programme is formulated for the student with particular capabilities in creative writing.

A student will not be allowed to enrol in this course unless he or she has already demonstrated ability in composition, although it is possible to enter it in the second year if the student has demonstrated creative ability in Music 100 (Theory of Music I), during the first year of another programme.

Composers will have every opportunity to hear their works performed by ensembles of students and Faculty during their four years at the University. Before graduation, a student majoring in Composition must present a full-length programme (no longer than one and one-half hours with intermission) of original compositions approved by the Department of Music.

Two copies of each approved work must be presented to the Department of Music, for retention in the Music Library. All presentation-copies must be inked or reproduced for permanency.

<sup>&</sup>lt;sup>2</sup> Large Ensemble: Students will enrol in Music 150 (Orchestra), 152 (Wind Ensembles), 153 (University Singers), or 154 (Choral Union), depending upon the student's major performance field.

<sup>&</sup>lt;sup>3</sup>Foreign Languages: If one of these languages was studied in high school, it is recommended that the other be elected in the University.

<sup>&</sup>lt;sup>4</sup>Chamber Ensemble: To be elected depending upon the student's performing field.

<sup>&</sup>lt;sup>5</sup>Music History Electives: Among these, Music 323, 324, and 425 must be elected.

<sup>&</sup>lt;sup>6</sup>Political History: While there is no limit to the amount of political and social history the musicologist should know, the student is advised to take one or more general history courses after consultation with the Department of Music.

<sup>&</sup>lt;sup>7</sup> Electives in Arts: Courses outside Music chosen after consultation with the Department of Music and carrying credit in the Faculty of Arts. A course in the history of fine arts is strongly recommended.

# MAIOR IN COMPOSITION

	First Year			Second Year	
(100)	Theory of Music I	3	(200)	Theory of Music II	3
(120)	History of Music I	3	(320)	History of Music II	3
(145)	<sup>1</sup> Applied Music	2	(245)	Applied Music	2
` '	<sup>2</sup> Large Ensemble	1	(107)	Composition I	3
(100)	English	3	, .	Large Ensemble	1
• /	<sup>3</sup> Elective in Arts	3	(200)	English	3
		<del></del>	, .	Elective in Arts	3
		15			
					18
	Third Year			Fourth Year	
	1 nira 1 ear			L'ourtit Leur	
(300)		3	(400)	Theory of Music IV	3
(300) (207)	Theory of Music III Composition II	3 3	(400) (307)		. •
(207)	Theory of Music III Composition II		` '	Theory of Music IV Composition III (Rec	. •
(207) (345)	Theory of Music III	3	(307)	Theory of Music IV Composition III (Rec	ital) 3
(207)	Theory of Music III Composition II Applied Music Conducting	3 2	(307) (445)	Theory of Music IV Composition III (Rec Applied Music	ital) 3 2
(207) (345)	Theory of Music III Composition II Applied Music	3 2 2	(307) (445)	Theory of Music IV Composition III (Rec Applied Music Orchestration	ital) 3 2
(207) (345)	Theory of Music III Composition II Applied Music Conducting Large Ensemble	3 2 2 1	(307) (445)	Theory of Music IV Composition III (Rec Applied Music Orchestration Large Ensemble	ital) 3 2 2 2
(207) (345)	Theory of Music III Composition II Applied Music Conducting Large Ensemble Music Elective	3 2 2 1 3	(307) (445)	Theory of Music IV Composition III (Rec Applied Music Orchestration Large Ensemble Music Elective	ital) 3 2 2 1 3

<sup>&</sup>lt;sup>1</sup> Applied Music: A minimum of two years of piano must be studied, regardless of entering level. An orchestral instrument or voice may be studied after this requirement is fulfilled.

Note: For courses in Theory and Composition and the History of Music see p. F74.

Applied Music (for majors studying for the Bachelor and Master of Music).

140. (2) Class Strings.—(	Group instruction in	all stringed	instruments. [1-3; 1-3]
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141. (2) Class Brasses and Percussion. [1-3; 1-3]

142. (2) Class Woodwinds. [1-3; 1-3]

143. (1) Class Piano.—Group instruction in piano. [0-1; 0-1]

144. 244. 344. (1) Private Applied.—Private or group lessons in voice, piano and orchestral instruments. Two one-half hour lessons (or equivalent) each week with about one hour's practice each day.

[0-1; 0-1]

145. 245. 345. 445. (2) Private Applied.—Private lessons in voice and orchestral instruments. Two one-half hour lessons (or equivalent) each week with about two hours' practice each day.

[0-1; 0-1]

<sup>&</sup>lt;sup>2</sup>Large Ensemble: String students will enrol in Music 150; wind students will enrol in Music 152; vocal students will enrol in either Music 153 or 154.

<sup>&</sup>lt;sup>3</sup> Electives in Arts: Courses outside Music chosen after consultation with the Department of Music and carrying credit in the Faculty of Arts.

- 146. 246. 346. 446. (3) Private Applied.—Private lessons in voice, piano and orchestral instruments. Two one-half hour lessons (or equivalent) each week with about three hours' practice each day. [0-1; 0-1]
- 147. 247. 347. 447. (4) Private Applied.—Private lessons in voice, piano and orchestral instruments. Two one-half hour lessons (or equivalent) each week with about four hours' practice each day. [0-1; 0-1]
- 148. 248. 348. 448. (5) Private Applied.—Private lessons in voice, piano and orchestral instruments. Two one-half hour lessons (or equivalent) each week with about five hours' practice each day.

  [0-1; 0-1]
- 149. (1) Accompanying I.—Accompanying on the piano, harpsichord or organ under supervision by Faculty. [0-1; 0-1]
  - 249. (1) Accompanying II.—Continuation of Music 149. [0-1; 0-1]
- 339. (3) Opera Workshop I.—Actual participation in performances by the Department. Open also to students outside Music without credit, after audition. [2-3; 2-3]
  - 439. (3) Opera Workshop II.—A continuation of Music 339. [2-3; 2-3]
  - 440. (2) Piano Techniques.—A study of music and techniques for piano.
    [2-0; 2-0]

# Graduate Courses.

- 544. (1) Private Applied.—Private lessons in voice, piano and orchestral instruments; or in harpsichord, viola, recorder and other historical instruments. Two one-half hour lessons (or equivalent) each week with suitable practice.
  - 545. (2) Private Applied.—Same as Music 544 with additional practice.
  - 546. (3) Private Applied.—Same as Music 545 with additional practice.
  - 549. (3) Master's Thesis.—Recital.

Ensembles. (Open to non-music students outside Music without credit, after audition).

150. (1) University Symphony Orchestra.

151. (1) University Chamber Orchestra.		[0-4; 0-4]
152. (1 or 2) University Wind Ensembles.	[0-4; 0-4]	[0-8; 0-8]
153. (1) University Singers.		[0-4; 0-4]
154. (1) University Choral Union.		[0-4; 0-4]
155. (1) University Chamber Singers.		[0-4; 0-4]
156. (1) Collegium Musicum Ensemble.		[0-4; 0-4]
160. (1) String Chamber Ensembles.		[0-4; 0-4]
161. (1) Piano Chamber Ensembles,		[0-4; 0-4]

(The following ensembles, without credit, are available only to graduate students.)

- 550. University Symphony Orchestra.
- 551. University Chamber Orchestra.

- 552. University Wind Ensembles.
- 553. University Singers.
- 554. University Choral Union.
- 555. University Chamber Singers.
- 556. Collegium Musicum Ensemble.
- 560. String Chamber Ensembles.
- 561. Piano Chamber Ensembles.

#### Music Education

(For credit in the Faculty of Education only.)

- 101. (3) Elementary Theory.—Fundamentals of musicianship.
- 201. (3) Counterpoint and Harmony.—A continuation and expansion of Music 101. Prerequisite: Music 101.
- 302. (3) Instrumental Techniques.—Instruction in the playing and teaching techniques of strings, brasses, woodwinds. Prerequisite: Music 201.
- 303. (3) Choral Music.—Principles and techniques of choral music. Prerequisite: Music 201.
- 401. (3) Orchestration and Arranging.—Techniques of writing and arranging for chorus, band and orchestra. Prerequisite: Music 201.

# THE SCHOOL OF HOME ECONOMICS

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA
VANCOUVER 8 • BRITISH COLUMBIA CANADA

# The School of Home Economics calendar, 1969-70

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# Financial Assistance.

A list of Fellowships, Scholarships, Bursaries and Loans open to students in the University will be found in the publication, "Awards and Financial Assistance" which may be obtained from the Registrar's office. For details, consult this publication. In general, application must be made to the Dean of Inter-Faculty and Student Affairs.

For topics not listed above, see the General Information bulletin.

#### ACADEMIC STAFF

Melvin Lee, B.A. (U.C.L.A.), M.A., Ph.D. (Berkeley, Calif.), Professor and Director of the School.

#### **Associate Professors**

RUTH M. BLAIR, B.H.E. (Brit. Col.), M.S. (Cornell), Director of Food Services.

# **Assistant Professors**

MARGARET ARCUS, B.A. (Nebraska), M.S. (Utah State), Ph.D. (Iowa State). JOHN A. BIRKBECK, M.B., Ch.B. (Edinburgh), and Markle Scholar in Medical Science.

Winifred J. Bracher, B.Sc. (H.Ec.) (McGill), A.M. (Columbia).

Indrajit D. Desai, M.Sc. (Gujarat Univ., India), Ph.D. (Calif.).

IRENE L. McAllister, B.H.Sc. (Sask.), M.A. (Columbia).

GORDON S. MYERS, B.A. (Wyoming), D.D.S. (Wash.), Ph.D. (Calif.) (Hon.).

ELEANORE R. VAINES, B.Sc. (Wash.), M.S. (Cornell).

#### Instructors

CLARE N. DAEM, B.H.E. (Brit. Col.).

JOYCE NETTLETON, B.H.Sc. (Guelph), M.N.S. (Cornell).

RÉJEANNE REYBURN, B.Sc. (Laval), M.S. (Columbia).

# SCHOOL OF HOME ECONOMICS

# Statement of Purpose

The School of Home Economics has a two-fold function; first, to educate for professional competency and second, to encourage a spirit of intellectual inquiry.

The School offers three programmes: general; foods and nutrition (including specializations in nutrition and dietetics); and an honours programme in nutrition. In each area the Home Economics subjects are interrelated with the arts, humanities, social, physical and biological sciences. The foods and nutrition programme and the honours nutrition programme involves concentration in the physical and biological sciences. The general programme involves broad exposure to all areas of Home Economics and the choice of appropriate electives in supporting disciplines.

# Professional Opportunities

Home Economics as a profession is concerned with the ways in which it can benefit both the individual and the family. Graduates of the foods and nutrition programme may be employed in hospitals, health clinics, national and international agencies, or food companies. Graduates of the honours programme most often will continue on for advanced degrees, in order to teach and carry out research in universities and research organizations.

#### Admission

Students may gain admission direct from secondary school or on transfer from a recognized university or college.

A student of a British Columbia Secondary School, following Grade 12, will be admitted if he obtains an average of at least 60% on recommended grades from an accredited senior secondary school, or on a combination of school grades and gradings on examinations conducted by the Department of Education and is considered by the Senate Admissions Committee to give promise of success in university studies.

A student who has completed appropriate studies with satisfactory standing beyond Grade 12 may be considered for admission and the granting of advance credit. Credit on transfer is restricted to the first year following Grade 13 or to First and Second Year following junior college. An applicant holding a Grade 12 certificate of another Canadian province will not be granted advance credit for subjects of Grade 12.

A student presenting documents issued by educational institutions outside the province of British Columbia must submit a \$10 fee to accompany the Application for Admission form.

The University reserves the right to reject applicants for admission on the basis of their overall academic records even if they technically meet entrance requirements and to limit enrolment if its facilities and resources are inadequate.

# GENERAL PROGRAMME

# Entrance Requirements from Secondary School Programme: Mathematics 11 or 12 Chemistry 11 Physics 11 Chemistry 12, suggested Biology 11, suggested As many Home Economics courses as possible. First Year English 100 3 units Mathematics 130 or 100 and 121 \_\_\_\_\_\_\_\_3 Physics 110 or 130 ..... Home Economics Orientation 15 Second, Third, and Fourth Years I. Required courses: Home Economics 340 and 341—Human Development Home Economics 342 and 343—Family Relations Home Economics 360—Decision-making and Management 11/2 in the Family ..... Home Economics 362—Consumer Problems 101/2 II. Chemistry 230 and Economics 200 are also required courses. Plus: III.

- A minimum of 131/2 units of additional Home Economics courses to bring a minimum total of Home Economics courses to 24 units. Students will be responsible for selecting the remaining required units of Home Economics courses, the prerequisites, plus additional electives, under the guidance of a faculty advisor.
- IV. Minimum number of units required for the B.H.E. degree is 60 units.

Suggested Social Science Electives in Psychology, Anthropology, Sociology, Social Psychology.

# FOODS, NUTRITION AND DIETETICS PROGRAMME

# Entrance Requirements from Secondary School Programme:

Mathematics 12

Chemistry 11

Physics 11

Chemistry 12, suggested

Biology 11, suggested

As many Home Economics courses as possible.

First Year		Second Year	
	Units		Units
Chemistry 110 or 120	. 3	Chemistry 230	. 3
Mathematics 100	2	Microbiology 200	. 3
Mathematics 121	. 1	Home Economics 205	. 11/2
English 100	. 3	Statistics	11/2
Biology 101	. 3	Home Economics 201	. 3
Physics 110	. 3	Elective	. 3
<del></del>	15	_	15

# FOODS AND NUTRITION MAIOR PROGRAMME

Th: V		77 -1 37	
Third Year	Units	Fourth Year	Units
Biochemistry 410	3	Home Economics 401	11/2
Biochemistry 411	11/2	Home Economics 403	$1\frac{1}{2}$
Zoology 303	3	Home Economics 405	11/2
Home Economics 305	11/2	Home Economics 466	$1\frac{1}{2}$
Home Economics 340	11/2	Electives	9
Electives			
	15	<del></del>	15

# NUTRITION HONOURS PROGRAMME

Third Year		Fourth Year	
	Units		Units
Biochemistry 410	. 3	Home Economics 403	11/2
Biochemistry 411	11/2	Home Economics 405	. 11/2
Physiology 301 OR		Zoology 302	. 3
Zoology 303	. 3	Thesis	
Chemistry 205	. 3	Electives	. 9
Home Economics 305	. 11/2		
Home Economics 340	$1\frac{1}{2}$		
Electives	$4^{1}/_{2}$		
	18		18
		Total	66

#### DIETETICS PROGRAMME

Third Year		Fourth Year	
Biochemistry 410	3	Home Economics 401	$1\frac{1}{2}$
Biochemistry 411	$1\frac{1}{2}$	Home Economics 403	$1\frac{1}{2}$
Zoology 303	3	Home Economics 405	$1\frac{1}{2}$
Home Economics 301	$1\frac{1}{2}$	Home Economics 407	$1\frac{1}{2}$
Home Economics 305	$1\frac{1}{2}$	Home Economics 450	$1\frac{1}{2}$
Home Economics 340	11/2	Home Economics 421	3
Home Economics 341	$1\frac{1}{2}$	Commerce 359	2
Elective	$1\frac{1}{2}$	Elective	3
***************************************	15		15½

# FIVE-YEAR PROGRAMME FOR B.ED. DEGREE (SECONDARY FIELD)

# (1) Home Economics—Concentration

Students electing the Home Economics Concentration must include in their programme a first year course in Mathematics (Mathematics 130 or 100 and 121, (120, 1968-69 or earlier)), and Chemistry (Chemistry 103, 110, 120), and Chemistry 230.

# First and Second Years-

Home Economics 201 (3)

Home Economics 202  $(1\frac{1}{6})$ 

Home Economics 220  $(1\frac{1}{2})$ 

Home Economics 210 (1)

plus 11/2 more units of Home Economics of their choosing.

#### Senior Years—

Home Economics 203  $(1\frac{1}{2})$ 

Home Economics 205  $(1\frac{1}{2})$ 

Home Economics 310  $(1\frac{1}{2})$ 

Home Economics 360  $(1\frac{1}{2})$ 

Home Economics 362

Economics 200

# (2) Home Economics-Major

Students electing the Home Economics major must include in their programme a first year Mathematics course (Mathematics 130 or 100 and 121 (120, 1968-69 or earlier)), and a first year Chemistry course (Chemistry 103, 110, 120), Chemistry 230, and Economics 200.

#### Home Economics courses-

Home Economics 201 (3)

Home Economics 202  $(1\frac{1}{2})$ 

Home Economics 203  $(1\frac{1}{2})$ 

Home Economics 205  $(1\frac{1}{2})$ 

Home Economics 210 (1)

Home Economics 220  $(1\frac{1}{2})$ 

Home Economics 310	$(1\frac{1}{2})$
Home Economics 342	$(1\frac{1}{2})$
Home Economics 343	$(1\frac{1}{2})$
Home Economics 360	$(1\frac{1}{2})$
Home Economics 362	$(1\frac{1}{2})$
	17½ units

plus at least 41/2 additional units of Home Economics.

#### **GUIDE FOR STUDENTS**

In this section of the calendar an attempt is made to describe how some of the business of the Faculty of Arts is discharged. What follows is not a set of immutable rules and regulations; the Faculty decides academic questions as they arise and reserves the right to deal as it sees fit with the academic problems of individual students.

# Registration

The General Information Bulletin of the University of British Columbia describes how to apply for admission and how to register.

Please note that

- a) Applications for admission to the Winter Session must reach the Office of the Registrar before the first day of August.
- b) Once registered, a student must report in person to the Office of the Registrar to make any change in his programme of study.
- c) A student may take only courses for which he has registered.
- d) When a student drops a course without obtaining permission to do so, a failing mark is recorded.
- e) All changes in a programme of study must be made before the end of the second week of lectures.

#### Fees

Consult the General Information Bulletin of the University of British Columbia for details about the assessment and payment of fees. Fees are subject to change without notice. An application fee of \$10 is assessed application presenting educational documents issued outside British Columbia.

#### Full Course\*

Fees for the Winter Session, in the amount of \$457.00, may be paid in September at the time of registration.

A student who prefers to settle his account term by term must pay \$243.00 in September at the time of registration, and \$214.00 in January on or before the first day of lectures of the second term. A student who chooses this method of payment should mail a cheque to the Finance Department with a note giving his name in full, registration number and current address.

#### Partial Course\*

Fees for a partial course, which must be approved by the Faculty, are assessed at \$30.00 a unit for more than 6 units, otherwise at \$100 for each 3-unit course.

\*The fee for the Alma Mater Society is \$29.00 for a full course and is included in the fee of \$243.00 for the first term; for a partial course of six units or fewer the fee is \$19.00, for a partial course of seven units or more the fee is \$29.00.

# Financial Help

Consult Awards and Financial Assistance, a bulletin published by the University of British Columbia,

#### Withdrawal

A student who decides to withdraw must present a statement of clearance, signed by the Dean or his representative, to the Office of the Registrar. The Registrar will then grant him *Honourable Dismissal* and decide whether or not he is entitled to a refund of fees. The term Honourable Dismissal has nothing to do with academic standing. It simply means that, at the time of withdrawal, the student's account was clear and his conduct good.

The Senate of the University reserves the right to require any student to withdraw, at any time, if that is in the best interests of the student or of the University.

# Graduation

Before the fifteenth day of March of his final year every candidate for a degree must make application to be graduated. The Office of the Registrar provides a form for the purpose.

# Transcript of Academic Record

The transcript of academic record is a confidential document that shows the complete record of a student at the University of British Columbia. It is usually issued only at the request of the student himself.

On withdrawal or on graduation a student may obtain for his own use, a transcript of academic record marked UNOFFICIAL.

At the request of a student, a transcript of his academic record marked OFFICIAL will be mailed to any university, agency or institution, or it can be handed to him in an envelope bearing the mention VALID ONLY IF THE SEAL IS UNBROKEN. A small charge is made for uttering and mailing a transcript of academic record; a week's notice is required.

# Requirement of Residence

The student who enters the Faculty of Arts after completing Grade XII must spend four Winter Sessions at the University of British Columbia to qualify for a degree and the student who enters after completing Grade XIII three. Extra courses, taken with the permission of an academic advisor in the Winter Session or in the Summer Session, may, if appropriate, be used to shorten the requirement of residence.

Some students (chiefly teachers in service) are permitted to pursue degrees largely by way of the Summer Session; these students are advised to attend at least one Winter Session, preferably that of the final year.

Students who transfer to the Faculty of Arts from other universities must take all their remaining work in the University of British Columbia, where the minimum requirement of residence is two Winter Sessions.

The maximum credit allowed for work done in one Summer Session is six units.

#### Attendance

A student who cannot attend his classes should notify his instructors in writing.

#### Examinations

A student who misses an examination in December or in April should, as promptly as possible, mail a medical certificate to the University Health Service. If injury or illness did not cause the absence, he should write an explanation of the circumstances to the Dean.

When unusual circumstances arise and a student believes that it would be reasonable for the Faculty to make a concession or a special ruling in his fayour, he should appeal in writing to the Dean.

The results of the sessional examinations that are held in April are mailed to students in their fourth year shortly before Congregation and to other students by mid-June.

# Satisfactory Standing

Students who take fifteen or eighteen units of work and obtain not less than 50% in each course are declared to be in good standing. The Faculty places students in the following categories:

First Class means an average of 80% or higher;

Second Class means an average of 65 to 79%;

Pass means an average of 50 to 64%.

A student who takes fewer than nine units of work must obtain passing marks in all his courses or get credit for none.

A student who takes nine units or more of work during a Winter Session must obtain passing marks in at least three courses (nine units of work) or get credit for none.

A student may repeat, only once, any course for which he failed to obtain credit; but the restriction does not apply to English 100 and 200.

# Unsatisfactory Standing

A student who receives failing marks in more than three units of work may not register in a higher year, except that a deficiency of six units is allowed in the Fourth Year. The Faculty may permit him to take a programme of study that includes the courses that he failed or it may recommend substitutes for them.

A student who, for academic reasons, was required to withdraw from another Faculty or another university may enter the Faculty of Arts only if, upon appeal to the Dean, he obtains written permission to register.

A student in the First Year who fails may not return to the University to repeat the same programme of study. Re-admission will be considered on the basis of the equivalent of First Year completed at another institution.

A student in the Second Year who gets passing marks in only six units out of fifteen will be re-admitted on probation. If his work continues to be unsatisfactory he may, at any time during the Winter Session, be required to withdraw.

A student who fails Second Year with passing marks in fewer than six units may not re-enrol the following Winter Session.

A student in any year who fails for the second time will be required to withdraw.

# Supplemental Examinations

A student may be granted the privilege of one supplemental examination if he

a) writes the sessional examination in April, or the Summer Session examinations in August, and earns a mark of at least 40% in the subject concerned.

#### and if he

b) earns twelve units of credit in the Winter Session or three units of credit in the Summer Session. A student in his final year may be allowed the privilege of two supplementals if he is no more than six units short of graduation.

In the computation of the average of a student, a passed supplemental examination is calculated as 50%.

The fee for writing a supplemental examination at the University of British Columbia is \$7.50; it is \$10.00 for writing one in

Cranbrook Powell River Dawson Creek Prince George Kamloops Prince Rupert Kitimat Trail Ocean Falls Victoria Penticton Whitehorse

The fee for writing a supplemental examination, by special arrangement, in some town or city not mentioned above is \$20.00.

Application for the privilege of a supplemental examination must be made by a student in the Winter Session before the end of the first week of July and by a student in the Summer Session before the end of the first week of September. The fee is payable when the application is made.

# Review of Assigned Standing

A request for the review of an assigned grade must reach the Office of the Registrar before the end of the fourth week after marks have been announced. A student may not request the Faculty to review the grades of more than two courses (six units of work).

The fee for reviewing the grade assigned to a course is \$5.00, which will be refunded if the standing is raised.

#### TERMS AND ABBREVIATIONS

- Numbering of courses: In general the number of a course indicates the first year in which it may be taken: 100—first year; 200—second year; 300—third year. In many instances, however, courses numbered 400 may be taken by third-year students; if in doubt consult the departmental descriptions below.
- Units of credit: Credits are described in units, shown in parenthesis immediately following the course-number. Thus 201 (3) under Home Economics indicates that Home Economics 201 is a three-unit course.
- Hours of instruction: The notations appearing in square brackets at the end of a course-description indicate the number of hours assigned each week, during both terms, to lectures (first digit) and to laboratory, discussion or tutorial sessions (second digit); e.g.:
  - [3-0; 3-0] three lecture-hours each week, both terms.
  - [3-0; 3-2] three lecture-hours each week, first term; three lecture-hours and two hours of laboratory, discussion or tutorial each week, second term.

#### COURSES OF INSTRUCTION

- 201. (3) Foods.—Composition, structure and properties of foods. Effect of physical and chemical environment. Laboratory work applies scientific principles and theories to practical problems of food preparation. The approach is experimental in nature, incorporating research methods. Prerequisite or concurrent: Chemistry 230. [3-3; 3-3]
- 202. (1½) Introductory Textiles.—A study of the historical and contemporary significance; physical, chemical, microscopic, and biologic properties; fibre, yarn and fabric characteristics of the major natural and man-made nonthermoplastics and thermoplastics; problems in consumership. Prerequisite or concurrent: Chemistry 230. [3-0; 0-0]
- 203. (1½) Elementary Nutrition.—A basic nutrition course for students in the general programme and for other students not majoring in Home Economics. A consideration of the role nutrients (proteins, lipids, carbohydrates, minerals, vitamins, and water) play in the diet and of the underlying biochemical and physiological processes involved in their utilization. Students cannot receive credit for both H.E. 203 and H.E. 305-405. Prerequisites: Chemistry 103 or 110, Chemistry 230. F3-0: 0-01
- 205. (1½) Community and Public Health Nutrition.—A consideration of the food and nutrition situation in Canada and in the under-developed countries. Attention will be given to community and public health surveys, and to the assessment of nutritional status. ro-o: 3-01
- 210. (1) Comparative Clothing Construction.—Investigation and application of clothing construction principles on traditional and newly developed fabrics. Two-week workshop scheduled immediately following Spring term examinations. Prerequisite: H.E. 202.
- 220. (11/2) Design Fundamentals.—A study of the basic visual elements and the fundamental principles and concepts of design; purposes of design. [2-3 or 2-3]
- 301. (1½) Food Planning and Diet Formulation.—The basic structure of normal diets is examined as well as the manner in which diets and meal patterns are varied in order to accomplish particular objectives. Prerequisite: Home Economics 203 or 205 and 201. [2-3; 0-0]
- 303. (1½) World Problems in Nutrition.— Ecological factors contributing to malnutrition and to nutritional problems as they exist today, particularly in underdeveloped areas. The laboratory will illustrate the assessment of nutritional problems in human populations. Prerequisite: Home Economics 205. [2**-**3; 0-0]
- 305. (1½) Human Nutrition I.—Nutrition is approached from a cellular and organismal point of view, with an emphasis on the biochemical and physiological roles of nutrients and their inter-relationships. Credit cannot be obtained for both 203 and 305-405. Prerequisites: Biochemistry 410, a course in Physiology, and H.E. 205. [0-0; 3-3]
- 310. (1½) Clothing: Relationship to Human Needs and Behavior.—A study of human needs, cultural, and economic factors which influence clothing consumption and use. Application of sociological and psychological theories that give understanding to the clothing behavior of an individual, as a unique being and as a member of a group. Prerequisite or concurrent: H.E. 220, 340; 3 units in Social Science. [0-0; 2-1]

- 312. (1½) Clothing Design.—A study of aesthetic theories and personal needs which influence the design of clothing. Designing of clothing accomplished by flat pattern and draping techniques. A brief investigation of the fashion industry and prominent designers. Prerequisites: H.E. 220, H.E. 210 prerequisite or concurrent, H.E. 340. [2-3; 0-3]
- 322. (1½) Textile Design.—Advanced study of design elements, principles and concepts with application to textile design. Prerequisite: H.E. 220.

  [1-3; 0-0]
- 340. (1½) Human Growth and Development I.—A study of psychological growth and adjustment throughout the life cycle; the process of socialization from the point of view of the individual. [3-0; 0-0]
- 341. (1½) Human Growth and Development II.—A continuation of Home Economics 340, emphasizing creative personal behaviour and the development of personal styles in human relationships. [0-0; 3-0]
- 342. (1½) The Contemporary Family I.—The study of families as living units, with emphasis on contemporary Canadian families. [3-0; 0-0]
- 343. (1½) The Contemporary Family II.—A continuation of Home Economics 342, with emphasis on preparation for marriage and foundations for healthy family living.

  [0-0; 3-0]
- 360. (1½) Decision-Making and Management in the Family.—The study of decision-making as a social process in family management. The course includes consideration of factors affecting decision, elements of decision, approaches to decision-making and the focus and function of home management. Prerequisite or concurrent: 6 units of social science. [3-0; 0-0]
- 362. (1½) Consumer Problems.—A study of the role and function of the consumer in the market economy; the nature of the economic system and the place of the consumer in the economic cycle; forces back of consumer demand as custom-made wants, conspicuous consumption and emulation and producer-made wants as advertising; organizations and laws that affect the interests of consumers. Prerequisites: H.E. 360; Economics 200. [0-0; 3-0]
- 364. (1½) Housing For the Family.—A study of the physical, social and economic aspects of housing. The course includes: housing as an economic asset; national housing needs and conditions; personal and social needs of families; housing and the family income; government's role in housing; community planning. Prerequisite or concurrent: Sociology 200. [3-0; 0-0]
- 401. (1½) Advanced Foods.—Advanced study of carbohydrates, lipids, proteins and colloidal systems in foods. Also the effects of food processing methods and chemical additives. Prerequisite: H.E. 201. [3-0; 0-0]
- 402. (1½) Advanced Textiles.—A study of the comparative properties of textile fibres, yarns, and fabrics with emphasis on laboratory measurement of physical properties in addition to study of molecular structure and chemical behavior at fibre level. Relationship and significance to consumership. Prerequisites: H.E. 202; Chemistry 230. [0-0; 3-2]
- 403. (1½) Foods and Nutrition Seminar.—Presentation and discussion of current developments in the area of foods. Prerequisite: H.E. 201, 401. [0-0; 0-2]

- 405. (1½) Human Nutrition II.—A continuation of course 305, with laboratory and demonstrations illustrating discussions of energy and nutrient balance, assessment of nutritional status, and nutrient inter-relationships. Prerequisite: H.E. 305. [3-3; 0-0]
- 407. (1½) Nutrition and Disease.—A study of the pathologic physiology of nutritional disease and the effects of nutrition therapy. Nutritional control of cellular metabolism is the focus. Prerequisites: H.E. 305, H.E. 405; Biochemistry 410. [0-0; 2-3]
- 409. (1½) Principles of Infant Nutrition.—This course will review the metabolic peculiarities of the late fetal, neonatal and postnatal periods. The consequent specific nutritional requirements will be discussed, and the means whereby these may be met, studied. Common disturbances of nutrition at this period of life and their management will be surveyed briefly. Prerequisites: Home Economics 305 and 405. Γ0-0; 2-21
- 416. (1½) History of Costume.—A survey of the aesthetic, economic, cultural, social and political significance of costume in history from ancient Egypt to contemporary times. (It is suggested that a History of Fine Arts [0-0; 2-0] courses would aid the student in this course.)
- 420. (1½) Elements of Housing Design.—A study of housing design and of the following influential factors: fundamental design principles, architectural design concepts, human physical and psychological needs, certain sociological factors, technology. Prerequisites: H.E. 220, 364. [0-0; 2-2]
- 421. (3) Institution Administration.—A study of the planning, organization and management of the institution food service. Prerequisite: Fourth-Year standing in Dietetics major.
- 450. (1½) Communications.—The first term of this course is an introduction to some of the research and theory in this field. Factors effecting expression, non-verbal communication and levels of human interaction will be explored. Some implications of mass communication will be covered. The second term, students will be directed to participate in practical activities that stress specific skills that relate to their professional outlet. The ability and freedom to express ideas orally both extemporaneously and in planned presentations will be one of the major purposes. Student must have Fourth-Year standing.
- 462. (1½) Problems in Family Finance.—A study of major financial alternatives available to families during the various stages of the family life cycle. The course is concerned with material levels of living of families and with the possibilities for increasing the total welfare of families. Included in this course is a consideration of factors affecting use of income, patterns of spending family income, use of credit; providing security from economic hazards; provision of health care; approaches to the concept of social welfare. Prerequisites: H.E. 362; Economics 200. TO-0: 3-01
- 464.  $(1\frac{1}{2})$  Management Laboratory.—A three-week residence laboratory in which the problems of money and time management, social decision-making and group dynamics are explored on experimental and theoretical levels. Married students must consult faculty advisor before admission to this course will be granted. Prerequisite: H.E. 360.
- 466. (1½-3) Special Problems.—Presentation and discussion of current topics in a specific area of Home Economics.

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# THE SCHOOL OF LIBRARIANSHIP

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA
VANCOUVER 8 • BRITISH COLUMBIA CANADA

# The School of Librarianship calendar, 1969-70

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# ACADEMIC STAFF

# Professor and Director of the School:

SAMUEL ROTHSTEIN, M.A. (Brit. Col.), B.L.S. (Calif.), Ph.D. (Ill.).

# Associate Professors:

Miss Shella A. Egoff, B.A. (Toronto), Dip. in Librarianship (London), F.L.A.

MISS MARION GILROY, M.A. (Toronto), B.L.S. (Columbia).

RONALD A. HAGLER, B.A. (Ottawa), A.M.L.S., A.M., Ph.D. (Michigan). George Piternick, A.B., B.L.S. (Calif.).

# Assistant Professors:

RICHARD BERNARD, B.A. (U.C.L.A.), M.A., B.L.S. (Berkeley).

Mrs. Anne Brearley, B.A. (Manchester), A.L.A.

Mrs. Barbara Gibson, B.A., B.S.N., B.L.S. (Brit. Col.).

Peter Simmons, A.B. (San Francisco State College), M.S. (Pratt Institue)

# Lecturer:

Mrs. Margaret Burke, B.A., B.L.S. (Brit. Col.), L.R.S.M.

# Part-time Lecturers:

COLIN WILLIAM FRASER, B.A., B.L.S. (McGill).

Peter Grossman, B.A. (Brit. Col.), Lib. Cert. (Calif.).

ROBERT M. HAMILTON, B.A., B.L.S. (McGill).

WALTER LANNING, B.A. (Brit. Col.), B.L.S. (Columbia).

MISS ANNA LEITH, B.A. (Brit. Col.), M.S. in L.S. (Wash.).

DAN MATHER, B.A., M.L.S. (Wash.).

WILLIAM J. WATSON, B.J. (Carleton), B.L.S., M.A. (McGill).

# Visiting Lecturers, 1968-69

MR. L. F. ASHLEY, Assistant Professor, Faculty of Education, U.B.C.

Mr. Gilles Bergevin, Assistant Librarian, University of Victoria, Victoria, B.C.

Mr. Neil Brearley, Information Retrieval Specialist, Simon Fraser University Library.

Mrs. Margaret Brunette, Co-ordinator of Adult Services, Vancouver Public Library.

MISS RITA BUTTERFIELD, Head, Circulation Division, U.B.C. Library.

DR. ROY DANIELLS, University Professor of English, U.B.C.

Dr. J. P. Danton, Professor, School of Librarianship, University of California.

MR. TED DOBB, Assistant Director, Computer Services, Simon Fraser University.

MISS G. DOBBIN, Systems and Information Science Librarian, U.B.C.

Mrs. S. C. Dodson, Head, Government Publications Division, U.B.C. Library.

Miss Shirley Ellison, Head, Children's Department, New Westminster Public Library, New Westminster, B.C.

Mr. J. M. Elrod, Head, Cataloguing Division, U.B.C. Library.

Mrs. ALIXE HAMBLETON, Supervisor, Public Schools Library Department, Toronto Board of Education, Toronto, Ontario.

Mrs. Norma Hawkins, Children's Librarian, Kitsilano Branch, Vancouver Public Library.

Dr. Robert Hayes, Director, Institute of Library Research, University of California, Los Angeles.

MR. STEPHEN JOHNSON, Head, Serials Division, U.B.C. Library.

Miss Adele Languedoc, Assistant National Librarian, National Library of Canada, Ottawa.

Dr. Ellsworth Mason, Director of Libraries, Hofstra University, New York.

Mr. Nicholas Omelusik, Head, Acquisitions Division, U.B.C. Library.

Mrs. Susan Port, Humanities Division, U.B.C. Library.

DR. ROBERT SHACKLETON, Bodley's Librarian, Oxford University.

Mr. Roy Stokes, Director, School of Librarianship, Loughborough, England.

MR.BASIL STUART-STUBBS, University Librarian, U.B.C.

Miss Aileen Tuffs, Head, Business and Economics Division, Vancouver Public Library.

Mr. B. L. Wimble, Assistant Director, Hunter College Library, New York, N.Y.

Mr. Alan Woodland, Reference Librarian, New Westminster Public Library, New Westminster, B.C.

# Council of the School of Librarianship

JOHN H. YOUNG, A.F.C., M.A. (Queen's), Ph.D. (Cantab.), Professor and Acting Dean of the Faculty of Arts.

Roy Daniells, B.A. (Brit. Col.), Ph.D. (Toronto), LL.D. (Queen's, Toronto), F.R.S.C., University Professor of English Language and Literature.

R. L. Davison, B.A., B.L.S., Superintendent, B.C. Library Development Commission.

GEORGE M. HOUGHAM, M.A., Ph.D., Associate Professor and Director of the School of Social Work.

Walter H. Gage, M.A., LL.D., Professor and Dean of Inter-Faculty and Student Affairs.

PETER GROSSMAN, B.A., Lib. Cert., Director, Vancouver Public Library.

DEAN W. HALLIWELL, M.A., B.L.S., Head Librarian, University of Victoria.

W. E. IRELAND, B.A., M.A., Provincial Librarian and Archivist.

F. HENRY JOHNSON, M.A., D.Paed., Professor and Director of Elementary Teacher Education, Faculty of Education.

WALTER LANNING, B.A., B.L.S., Associate Professor, Faculty of Education.

M. F. McGregor, M.A., Ph.D., F.R.S.C., Professor and Head, Department of Classics.

MISS MARGARET A. ORMSBY, M.A., Ph.D., LL.D., Professor and Head, Department of History.

Basil Stuart-Stubbs, B.A., B.L.S., University Librarian.

Members of the Faculty of the School.

# THE SCHOOL OF LIBRARIANSHIP

# History of the School

The School of Librarianship has had a long history and a brief existence. Recommendations for the establishment of a school at the University go as far back as 1921 and the proposal was under active discussion during the 1940's.

In 1957 a study sponsored by the Public Library Commission of British Columbia\* considered the growing need for professional librarians in Western Canada and urged "the establishment of a graduate library school at the University of British Columbia within the next three years".

In the spring of 1960, the University Senate approved the establishment of a graduate library school as part of the Faculty of Arts and Science. The School opened on September 6, 1961, and graduated its first class in May, 1962.

In February, 1963, the School of Librarianship was accredited by the Committee on Accreditation of the American Library Association. It is thus recognized by the American and Canadian Library Associations as fully meeting accepted standards for graduate education in librarianship and it is officially listed with the American library schools which grant the M.L.S. (5th year) degree.

# The Nature of Librarianship

Libraries today are a fundamental part of the educational process; they are a basic resource for formal education at all levels, the chief means of selfeducation, and indispensable for scholarship and research. The task of librarians is to raise the value of print to its highest power. Librarians promote reading by making available a wide selection of materials; by organizing and describing the collections so as to facilitate their use; by stimulating and guiding reading for pleasure; by assisting and participating in the many-sided pursuit of information. Librarians must know and appreciate books and they must know how to make books effective.

# Purpose of the School

The purpose of the School of Librarianship is to give a selected group of university graduates the understanding, motivation, skills and knowledge to make libraries most useful to our society and thus promote the ends which reading serves.

# Teaching Programme—Bachelor of Library Science

The School of Librarianship offers a one-year course for university graduates, leading to the degree of B.L.S. (Bachelor of Library Science).

The teaching programme of the School, while not ignoring the need for instruction in the technical aspects of librarianship, gives chief emphasis to developing in its students the understanding, motivation and bibliographical knowledge by which to make libraries most useful to our society. A close knowledge of books and the sources of information for their effective use is the primary aim, and a semi-tutorial approach, by which faculty members work closely with students in small groups, is the basic teaching method. Admission Requirements

Requirements for admission to the School of Librarianship are as follows: 1. The student must present an acceptable Bachelor's degree from a recognized university. There will normally be no limitation in respect of

Training Professional Librarians for Western Canada; Report of the Special Committee on Library Education of the Public Library Commission. Victoria, Public Library Commission, 1957, p. 24.

the Faculty or Department in which the degree has been earned unless in the opinion of the School the individual's preparation appears unsuitable for success in library work.

2. The applicant must show promise of satisfactory ability to do scholarly work, as evidenced principally by at least second class standing in the final two years of undergraduate study.

3. Students whose native language is not English must give satisfactory evidence of facility in English as determined by personal interview, academic credentials and/or special examination.

4. A working knowledge of more than one language is of the greatest benefit in the professional work of the librarian. The School requires that the applicant demonstrate his understanding of materials in at least one language other than English. This may be accomplished in one of the following ways:

(a) Presentation of transcripts showing at least the equivalent of six units of credit after junior matriculation in the study of a language, within the past seven years (the School may, in particular circumstances, accept three units of credit in each of two languages). It may be noted that some language departments of this university now offer six-unit intensive courses for the beginner in a language.

(b) Undertaking a directed programme of reading, followed by successful completion of a reading test, both administered by the School and formulated to meet the particular needs of the applicant who cannot satisfy the requirement in (a).

This language requirement must be satisfied before the applicant can be admitted to the School, although provisional admission may be granted pending the completion of the requirement before the beginning of classes.

5. It is the policy of the School of Librarianship to accept only students whose personal and academic qualifications will fit them for successful practice in the library profession. Personal interviews will ordinarily be required of all students and in some cases students may be asked to take academic or aptitude tests prior to admission.

6. Applications for admission (forms available from the School) should be addressed to the Director of the School of Librarianship. Since enrollment in the School is limited, early application is advised, preferably by May 1 for the following September. Normally, applications received after July 31 cannot be considered for the following September.

A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is

non-refundable and is not applicable to tuition.

7. The School of Librarianship has a limited enrollment. Since the number of qualified applicants may considerably exceed the number of places available, not all candidates meeting the above requirements are necessarily assured of admission.

8. The School admits students only for a full-time programme of studies. Courses are not offered in the evening or in the summer session.

# Undergraduate Preparation

Undergraduate students who are considering librarianship as a career should consult the School about their courses. Interviews may be arranged at any time.

A broad cultural background is expected of all prospective librarians, and students should therefore, in the first and second years, select for electives courses which will give them some acquaintance with the humanities, sciences, and social sciences. In the work of the third and fourth years, the student should seek to gain special competence in at least one field of knowledge related insofar as can be foreseen to his special area of interest within librarianship. For example, students contemplating careers in public libraries would do well to take courses in government, public administration and the like.

A reading knowledge of foreign languages is useful in all areas of library work and essential in many. Students are advised to acquire a working knowledge of at least two foreign languages, preferably French, German,

Russian, or Latin.

A large part of the work done in the School of Librarianship is normally submitted in typewritten form and students are therefore urged to develop some facility in typing before entering the School.

# Student Advisors

Each student in the School of Librarianship is assigned to a member of faculty who is responsible for helping the student plan his programme and for advising him in other matters.

# The School Year

The school year is divided into two terms. The first extends from September 3 until Christmas; the second from January 5 until May 1. Most courses are of one term's duration. Examinations take place in December and May, with field work (or special project) scheduled for a two-week period in the second term; the second term examinations begin on April 22 and end on May 1.

# Requirements for the Degree of B.L.S. and Organization of the Course

The School of Librarianship offers a one-year graduate programme for students who already hold an acceptable Bachelor's degree. Candidates for the degree of Bachelor of Library Science (B.L.S.) must complete at least

fifteen units of course work plus appropriate field work.

The programme for each student is to be arranged in consultation with his advisor. The normal programme for the B.L.S. degree calls for at least the minimum of units shown below to be taken within each area of study. Students may arrange to take additional courses within the School or in other departments of the University, and in exceptional cases may be permitted to substitute the latter for courses in librarianship. Field trips, field work as appropriate, and the seminars are also required but carry no credit.

The following is the usual plan of work:

# First Term

Required: Book selection and evaluation; cataloguing and classification (A); reference work and bibliography (B); fields and functions of library service (D); introduction to publishing and the book trade; introduction to children's literature (E); colloquium (F).

Optional: Publishing and the book trade or children's and young people's literature (E).

Second Term

Required: Cataloguing and classification (A); automation in libraries (F); field work or special project.

The unit value assigned to courses at The University of British Columbia is determined by the number of classroom hours per week. For example, a three-unit course is one which entails 3 hours of lectures per week for the year.

Optional: Four courses are to be selected from the following list. Normally

the student is to take courses from at least three different groups.

Advanced cataloguing and classification; technical services (A); advanced reference work and government publications; reading and readers' advisory services (B); literature and bibliography of the sciences and technology; literature and bibliography of the humanities and social sciences (C); college, university and research libraries; municipal, regional and provincial libraries; library work with children and young people; school libraries; special libraries (D); history of the book (E); directed study (G).

# Description of Courses

- A. Formation, Organization and Bibliographic Description of Library Collections.—Criteria for evaluation and factors in the selection of the book stock; principles and basic methods of classification and subject analysis; cataloguing and descriptive bibliography; special problems in cataloguing and classification; operation of technical services.

  4½-6 units\*
- B. Sources of Information and Readers' Advisory Services.—Bibliographies and reference books and their use in gathering information; reader interest and needs; reading guidance; the library's role in adult education.

 $3-4\frac{1}{2}$  units

- C. Literature and Bibliography of Special Fields.—Detailed consideration of library resources and services in special fields (sciences and technology; humanities and social sciences); development, scope and present trends in scholarship; forms and agencies of publication; outstanding titles and authorities; sources of information for specialized reference work in these fields.

  11/2-3 units
- D. Role and Administration of Libraries.—Objectives and functions of libraries; basic information about the principal fields of library service; detailed consideration of problems in the organization and operation of various types of libraries; college, university and research libraries; municipal, regional and provincial libraries; school libraries; special libraries; library work with children and young people.
  3-6 units
- E. Background of Librarianship.—History of libraries from earliest times to the present, with special attention to Canada; history of the manuscript and printed book, including the development and present status of publishing and the book trade; history of children's and young people's literature.

  1½-3 units
- F. Seminar: Trends and Issues in Librarianship.—A series of discussion meetings on current issues of major concern in librarianship, such as censorship, copyright, interlibrary cooperation, "bibliographical control", mechanization of library services, research in librarianship, etc. (no credit)
- G. Directed Study.—With the approval of the faculty, selected students may substitute a programme of directed study for one of the elective courses of the second term.
  1½ units

# Examinations, Credit and Standing

- 1. Examinations in the School of Librarianship will be held at the end of each of the two terms. These examinations are obligatory for all students.
- 2. A student, in order to qualify for the B.L.S. degree, must obtain an average of not less than 65% on the work of the year. Courses will be graded as follows: 1st class: 80% or over; 2nd class: 65% to 80%; Pass: 60% to 65%; Fail: below 60%.
- 3. Any student whose average in the examinations of the first term is less than 60% may be required to withdraw. Similarly, where at any time

the overall performance of the student indicates that he does not have the personal and academic qualifications for successful practice in the library profession, the School may, with the concurrence of Senate, require his withdrawal.

- 4. The School may grant supplemental examinations in the courses failed provided that (1) the student's attendance and performance in other respects have been satisfactory and (2) he has obtained an average of at least 65% in the work of the year, including the courses failed. The passing mark in supplemental examinations is 60%. A student who fails a supplemental examination may, at the discretion of the School, be allowed to remove this deficiency by repeating the course failed or by taking an acceptable alternative course. In either such case the pass mark will be 65%. With approval of the faculty, students may be permitted to take a programme of remedial studies in lieu of a formal supplemental examination. Such programmes are to be supervised by a member of the faculty and are to be conducted in the month immediately following the term in which the deficiency occurred.
- 5. Field trips and field work, as may be called for, are considered integral parts of the B.L.S. programme and satisfactory participation in each is required of all students.
- 6. Term essays and examination papers may be refused a passing mark if they are noticeably deficient in English.
- 7. Results of the sessional examinations in May are mailed to students about the time of Congregation. Any student who must meet an application date for another institution prior to June 15 should inform the transcript clerk in the Registrar's office in order that arrangements may be made to meet the deadline.
- 8. Reviews of Assigned Standing are governed by the following regulations: Any request for the review of an assigned grade, other than for a supplemental examination (in which a request for a review will not be granted), must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each course concerned which will be refunded only if the mark is raised.

Each applicant for a review must state clearly why he believes the course deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a second time before results are announced. For this reason an applicant granted a supplemental should prepare for the examination since a change in the original mark is unlikely and the result of the review may not be available before the end of the supplemental examination period. A review will not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.

Reviews will not be permitted in more than two courses (6 units) in the work of one academic year.

# Fees (Subject to change without notice)

First Term Fees, \$266 (includes A.M.S. fee of \$29), payable in full at the time of registration. However, students may pay full fees of \$503 at time of registration.

Second Term Fees, \$237, payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Finance Department before this date with a note showing name and registration number.

# Expenses

Students are responsible for expenses incurred during field trips and field work. The estimated overall expense for the year, exclusive of room and board, would be:

Field trips *Field work	***************************************	30.00
		25.00
		\$633.00

# Graduation

Before the fifteenth day of March of his final year every candidate for a degree must make application to be graduated. The Office of the Registrar provides a form for the purpose.

# Attendance

A student who cannot attend his classes should notify his instructors in writing.

### Withdrawal

A student who decides to withdraw must present a statement of clearance, signed by the Director or his representative, to the Office of the Registrar. The Registrar will then grant him Honourable Dismissal and decide whether or not he is entitled to a refund of fees. The term Honourable Dismissal has nothing to do with academic standing. It simply means that, at the time of withdrawal, the student's account was clear and his conduct good.

The Senate of the University reserves the right to require any student to withdraw at any time, if that is in the best interests of the student or of the University.

# Transcript of Academic Record

The transcript of academic record is a confidential document that shows the complete record of a student at the University of British Columbia. It is usually issued only at the request of the student himself.

On withdrawal or on graduation a student may obtain, for his own use, a transcript of academic record marked UNOFFICIAL.

At the request of a student, a transcript of his academic record marked OFFICIAL will be mailed to any university, agency or institution, or it can be handed to him in an envelope bearing the mention VALID ONLY IF THE SEAL IS UNBROKEN. A week's notice is required. A small charge is made for uttering and mailing a transcript of academic record.

# General Information

Location.—The School of Librarianship is located on the top floor of the North Wing of the University Library.

Field Work.—The field work comprises a period of two to three weeks. It gives the student directed experience under actual operating library conditions.

<sup>•</sup> If field work is done outside Vancouver provision should be made for additional costs depending upon distance and living expenses. The Librarianship Division of the Alumni Association, University of British Columbia, has established a loan fund to assist students in the matter of travel expenses for field work. Applications for such loans are to be made to the Director of the School.

Libraries in British Columbia and elsewhere cooperate in offering students such opportunities. Students with considerable experience in library work may be permitted to choose a special project in lieu of field work.

Field Trips.—Field trips are arranged within the Session. For the most part these are one-day visits of observation in the libraries in the vicinity of the School and in Vancouver Island. Students are advised, however, that field trips of two or three days' duration may be required.

Courses Taken in Other Library Schools.—Some credit for courses taken in other library schools may be granted in cases where such courses are equated with those in the School of Librarianship. Applications for such transfer of credit should be addressed to the Director.

Placement.—The School of Librarianship does not guarantee positions to its graduates, but makes every effort to place them in positions suited to their aptitudes and interests. In general there is a steady demand for qualified graduates in Canada.

Age.—The School of Librarianship places no absolute stipulations with respect to age of applicants. However, preference in admissions is given to applicants under thirty-five years of age and to those who have been actively engaged within recent years in library work, teaching, academic studies or some similar intellectual pursuit.

Academic Load.—The B.L.S. programme calls for a minimum of eighteen hours per week of lectures and laboratories, plus field trips, colloquia and field work. Most students spend two or three hours on readings and assignments for each hour of class. The normal academic load is therefore estimated at about 60 hours per week.

Opportunity for Specialization.—The first term emphasizes the core curriculum and consists almost wholly of required courses. In the second term students are given opportunity to select courses in the fields of their special interest. Faculty advisors will assist students in the choice of appropriate courses for their preferred professional interest.

Certification of the Province of British Columbia.—Upon graduation, students of the School of Librarianship may, on application to the Board of Examiners, receive the Certificate of Professional Librarianship for the Province of British Columbia.

Library Resources.—Students in the School of Librarianship have at their disposal, for use and observation, a fine range of libraries and library systems in the Lower Mainland of B.C.

The University of British Columbia Library is the largest in Western Canada. Its total resources comprise over 1,000,000 volumes, with special strength in bibliographies, reference works and serials. The collection in the field of library science alone now numbers over 9,000 titles, and children's books are available in two other special collections.

The University of Victoria Library in Victoria and the Simon Fraser University Library in Burnaby present excellent examples of fast-developing academic libraries. The City of Vancouver has a large and growing urban system, while Victoria, New Westminster and Burnaby illustrate the services offered by good medium-sized public libraries in new and modern buildings.

Two large regional systems, in the Fraser Valley and on Vancouver Island, are within two hours travel and provide examples of service to rural populations. The Provincial Library and the Provincial Archives are among the best of their kind in Canada. The British Columbia Library Development Commission provides an interesting combination of direct and consultative services to libraries, to groups and to individuals. Special libraries to be found in the area include those of the B.C. Hydro and Power Authority, the B.C. Telephone Company, the B.C. Medical Library Service, the Departments of Agriculture, Fisheries and Forest Pathology (housed on the University campus), the Crease Clinic of Psychological Medicine in Riverview, the Pacific Press and the B.C. Research Council. The Vancouver Schools' System provides an opportunity for a practical look at school libraries.

Housing.—Information and applications for residence in University-owned housing may be obtained by writing directly to the Office of the Housing Administrator, the University of British Columbia, Vancouver 8, B.C. University-owned housing includes a number of residence halls and some apartments for married students. Since such housing is limited, students are urged to apply early.

Off-campus housing is also available, but there is a heavy demand for accommodation near the campus. The Housing Coordinator, Alma Mater Society, Brock Hall, U.B.C., maintains a listing of off-campus facilities, including rooms with board, housekeeping rooms, apartments, and houses which are available to University students.

Part-Time Work.—University policy limits full-time students to ten hours work per week in campus jobs. Students should note that the academic load of the School of Librarianship is heavy; most students are advised to give full time to their studies, at least during the first term. All inquiries for part-time work at the University should be directed to the Office of Personnel Services.

Affiliated Organizations.—The Librarianship Division of the University of British Columbia Alumni Association brings together graduates who are interested in furthering the work of the School. The Division contributes funds for the assistance of students, sponsors programmes of continuing education, and serves as a medium of liaison between the School and the library profession.

The Pre-Librarianship Club, an undergraduate society at the University of British Columbia, enrolls students who are considering careers in professional librarianship. With the cooperation of members of the School faculty, the Club conducts a regular series of discussion meetings, lectures, film showings and library visits.

# Awards and Financial Assistance (Subject to change)

Full corrected statement for the year 1969-70 will appear in the publication "Awards and Financial Assistance."

The complete list of scholarships and prizes in each Faculty, and bursaries and loans open to students in all faculties, is available in the section of the Calendar entitled "Awards and Financial Assistance". This section, which may be obtained on request from the Registrar's office, should be consulted by all students who wish to obtain fuller information or to submit applications. It should be noted that most awards do not require the submission of an application, and further, that the following partial list is subject to amendment. Applications for bursaries must be submitted by July 15 to the Dean of Inter-Faculty and Student Affairs, on forms obtainable from his office.

The attention of students is drawn especially to the following general awards and financial assistance: Government of British Columbia Scholarships, Government Bursaries, Canada Loan Fund. Students should note that a limited number of scholarships and grants-in-aid for study at any accredited library school are offered by the National Research Council of Canada and the Civil Service Commission. Application forms for the former may be obtained from the Scholarship Officer, Awards Office, National Research Council of Canada, Ottawa 7. Application forms for the Public Service Commission "librarians-in-training" programme (form PSC367-401) are available from the nearest Public Service Commission Office, Post Office, Canada Manpower Centre or University Placement Office. Other scholarships, loans and bursaries available on the national and provincial level for the study of librarianship are listed in the leaflet Financial Aid for Study in the Field of Library Science, published by the Canadian Library Association/Association Canadienne de Bibliothèques, 63 Sparks Street, Ottawa 4, Ontario. This leaflet may also be obtained in most university and public libraries.

# Bursaries

British Columbia Library Association Bursaries—One or more bursaries, given by the British Columbia Library Association, are available annually for students intending to adopt librarianship as a profession. To be considered, an applicant must be eligible for acceptance in an accredited school of librarianship. The recipient will be selected on the basis of scholarship, personality, ability to work with others, aptitude for library work, physical fitness and financial need. It is to the student's advantage to have had some library experience. Application forms and further information may be obtained from the Director of The School of Librarianship, U.B.C., or the Chairman, Bursary-Loan Committee, British Columbia Library Association, c/o The School of Librarianship, The University of British Columbia, Vancouver 8, B.C.

The Fryer Book Binding, Ltd. Bursary—A bursary of \$250, gift of Fryer Book Binding Ltd., Burnaby, is offered annually to a student in the School of Librarianship. It will be awarded to a student with a good academic record who shows promise in the field of library science and needs financial assistance.

The Helen Gordon Stewart Bursary—A bursary of \$100, the gift of the Fraser Valley Regional Library, is offered annually to a student beginning studies in the School of Librarianship. The award will be made to a student

with good academic standing who shows promise in the field of librarianship and needs financial assistance. In offering this bursary, the Fraser Valley Regional Library pays tribute to Dr. Helen Gordon Stewart for her manifold leadership in the development of British Columbia libraries and particularly for her pioneering efforts in the establishment of regional library service in the Fraser Valley. Application forms may be obtained from the Dean of Inter-Faculty and Student Affairs, The University of British Columbia.

#### Loans

British Columbia Library Association Loan Fund—This loan fund is available to students who wish to attend an accredited school of librarianship. The recipient will be selected primarily on the basis of financial need and aptitude for library work. Application forms and further information may be obtained from the Director of the School of Librarianship, U.B.C., or from the Chairman, Bursary-Loan Committee, British Columbia Library Association, Mr. T. J. Shorthouse, Law Library, University of B.C., Vancouver 8, B.C.

# Prizes and Medals

Ruth Cameron Medal for Librarianship—This medal, honouring the memory of Miss Ruth E. Cameron, for many years Chief Librarian of the City of New Westminster, is offered annually by the Board of the New Westminster Public Library. It will be awarded to the student whose record in the course for the degree of B.L.S., is, in the opinion of the School of Librarianship, most outstanding.

Marian Harlow Prize in Librarianship—A cash prize of approximately \$25 will be awarded to a student in the graduating class of the School of Librarianship. The prize will not necessarily be awarded annually. It will be given to that student who has demonstrated leadership and academic or research ability in studies relating to special librarianship.

Neal Harlow Book Prize—Awarded in conjunction with the British Columbia Library Association to an outstanding graduating student of the School of Librarianship. The award is given in honour of Neal Harlow, University Librarian from 1951 to 1961, in recognition of his outstanding contribution to the development of the University Library and of his work as one of the founders of the School of Librarianship.

The Gladys Ledingham Award—A cash award of \$75, gift of the Victoria and District Parent-Teacher Council, is offered to students who have graduated from the University of Victoria, the University of British Columbia, or Simon Fraser University. It will be awarded to a student selected by the School of Librarianship, University of B.C., who has been accepted for the Bachelor of Library Science degree. The winner will be selected by the School of Librarianship on the basis of need and scholastic ability. Application should be made on the University Bursary Form by July 15.

# Scholarships

The H. W. Wilson Scholarships—One or more scholarships, given by the H. W. Wilson Foundation Inc., New York, are available for students of librarianship. The winners will be selected by the School on the basis of academic record, ability, financial need, and the promise of success in the field of librarianship.

# THE SCHOOL OF SOCIAL WORK

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA
VANCOUVER 8 • BRITISH COLUMBIA CANADA

# The School of Social Work calendar, 1969-70

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For topics not listed above, see the General Information bulletin.

# Financial Assistance

A list of Fellowships, Scholarships, Bursaries and Loans open to students in the University will be found in the publication "Awards and Financial Assistance" which may be obtained from the Registrar's office. For details consult this publication. In general, application must be made to the Dean of Inter-Faculty and Student Affairs.

# Administrative Staff

Director of the School
Coordinator of Admissions
Coordinator of Field Instruction
Administrative Assistant to the
Director and Assistant Coordinator of Field Instruction

Coordinator of Extension Courses

School Secretary School Librarian Dr. George M. Hougham Mrs. Clare N. McAllister Mr. Harold G. Goodwin Mr. P. Ross McClelland

Mr. Ben Chud

Mrs. Louise M. Mathews Mr. George Freeman

# **ACADEMIC STAFF**

### **Professors**

GEORGE M. HOUGHAM, B.A., M.A. (Toronto), Ph.D. (Pennsylvania) Mrs. Helen McCrae, B.A. (Toronto), M.S.W. (Brit. Col.)

# Associate Professors

JOHN A. CRANE, B.A. (Manitoba), M.S.W. (McGill), Ph.D. (Minnesota)

DONALD G. FINLAY, B.A., M.S.W. (Toronto), Ph.D. (Chicago)

JOHN V. FORNATARO, B.A., B.S.W. (Toronto), M.S.W. (Brit. Col.)

MISS ANNE FURNESS, B.A. (McGill), M.S.W. (Brit. Col.)

MISS FRANCES A. McCubbin, B.A., M.S.W. (Brit, Col.)

WILLIAM M. NICHOLLS, B.A. (Toronto), M.Sc. (Springfield)

#### Assistant Professors

Andrew Armitage, B.Sc. (London), B.A. (Cambridge), M.S.W. (Brit. Col.)

MISS ELLEN BATEMAN, B.A., M.S.W. (Brit. Col.)

BEN CHUD, B.A. (Queen's), M.S.W. (Brit. Col.)

HAROLD G. GOODWIN, B.A. (Mount Allison), M.S.W. (Brit. Col.)

DENNIS T. GUEST, B.A., M.S.W. (Brit. Col.), Ph.D. (London)

Mrs. Clare N. McAllister, B.A., Diploma in Education, M.S.W. (Brit. Col.)

P. Ross McClelland, B.A., B.Com. (Queen's), M.S.W. (Toronto)

JOHN A. MACDONALD, B.A., LL.B., B.S.W. (Brit. Col.)

Mrs. Elaine Stolar, M.A., M.S.W. (Brit. Col.)

Mrs. Mary Tadych, B.A. (Manchester), M.S.W. (Brit. Col.)

### nstructors

ROBERT C. GILLILAND, B.A., M.S.W. (Brit. Col.)

HENRY KROEKER, B.Ed. (Alta.), M.S.W. (Toronto)

Mrs. Erna Laanemae, B.A., M.S.W. (Brit. Col.)

ANTONY J. LLOYD, B.A., M.S.W. (Brit. Col.)

MISS MARY A. McGrath, B.A. (Sask.), M.S.W. (Ottawa)

MISS MITZI MONTGOMERY, B.Sc. (Brit. Col.), M.S.W. (Michigan)

Mrs. Joyce E. Preston, B.A. (W. Ontario), B.S.W. (Brit. Col.), M.A. (Chicago)

# Part-Time Lecturers

MRS. JEAN ASSIMAKOS, B.A. (Brit. Col.), M.S. (Columbia)

LAWRENCE I. BELL, B.A. (Brit. Col.), M.A. (Loyola)

Mrs. Estelle Chave, B.A., M.S.W. (Brit. Col.)

Mr. Richard Nann, B.A., B.S.W. (Brit. Col.), M.S.W. (Columbia)

# Part-Time Field Instructors

MR. MAXIMILIAN BECK, B.A., M.S.W. (Brit. Col.)

MRS. LORNA GARRETT, B.A. (Sask.), M.S.W. (Brit. Col.)

MRS. MARY HILL, B.A. (Brit. Col.), M.Sc. (Columbia)

Mrs. Edna Lawrence, B.A., B.S.W. (Brit. Col.)

Mrs. Phyllis Robinson, B.A. (Ohio Wesleyan), M.Sc. (Western Reserve)

# **Agencies Offering Field Instruction**

# After-Care Unit, Provincial Mental Health Centre

Mrs. E. Davis

Mrs. R. Varwig

# Boys' Club of Vancouver

Mr. Brian Robinson

# **B.C.** Youth Development Centre

Mr. A. Chapple

MISS D. COOMBE

Miss R. Paul

# Catholic Family and Children's Services

Miss B. Brown

Mr. T. D'Aquino

Mrs. L. Garrett (Faculty)

MISS M. WRIGHT

# Child Health Programme, U.B.C.

MISS E. BRADLEY

# Children's Aid Society of Vancouver

MISS M. ANDERSON

Mrs. A. Fahrig

Mrs. T. Kaufmann

Mrs. E. Laanemae (Faculty)

Miss McGrath (Faculty)

Miss I. Moore

# Family Service Centres of Greater Vancouver

Mrs. J. Assimakos

Mrs. I. HOLLICK-KENYON

MRS. M. JESSUP

Mr. W. Moir

# Forensic Clinic—Provincial Mental Health Centre

Mr. R. Whitelaw

# Haney Correctional Institute

Mr. J. MacDonald (Faculty)

# Inner-City Service Project

Mr. Max Beck (Faculty)

# Lions Gate Hospital

Mr. H. Kroeker (Faculty)

# Mental Health Centre

Mr. C. Akin

MISS J. BRYENTON

MISS E. KOLODINSKI

Miss M. Montgomery (Faculty)

# Narcotics Addiction Foundation

Mr. J. Symons

# National Parole Board

Mr. R. GILLILAND (Faculty)

# North Shore Neighbourhood House

Mrs. P. Robinson (Faculty)

# Research Unit-School of Social Work, UBC

Dr. John A. Crane (Faculty)

# Sechelt School District

Mr. B. MacKenzie

# G. F. Strong Rehabilitation Centre

Miss L. Vicelli

# Social Welfare Department: Abbotsford

Mr. A. Bingham

# Social Welfare Department: Vancouver

Mrs. E. Lawrence (Faculty)

# Social Welfare Department: West Vancouver

Mrs. M. Hill (Faculty)

# **United Community Services**

Mr. A. LLOYD (Faculty)

Mr. Brian Robinson

# Vancouver General Hospital

MISS E. BATEMAN (Faculty)

Mr. A. Morrison

# White Cross Centre

MR. BEN CHUD (Faculty)

# I 6 SOCIAL WORK

Woodlands School

Mr. I. Campbell

Mrs. J. Preston (Faculty)

Mrs. M. Russell

Young Women's Christian Association

MISS G. GENTLEMAN



# THE SCHOOL OF SOCIAL WORK

The School of Social Work, a part of the Faculty of Arts, offers work leading to the degree of M.S.W. The School is accredited by the Council on Social Work Education, the authorized professional accrediting body for graduate social work education.

# Objectives of the School

The School's M.S.W. programme, proceeding from a base of academic knowledge integrated by field instruction practice, is designed:

- 1. To prepare graduates for responsible entry to the social work profession in the role of direct service to individuals, groups and communities.
- 2. To lay the foundation for the graduate, after suitable experience, to assume roles in one or more of the following areas of practice; supervision, administration, teaching, and research.
- To lay the foundation for graduates to enter advanced programmes of social work education.

# Admission to the School

- 1. Application for entrance should be made on forms obtained from the School. Since it takes time to secure the data on which decisions are based, preference will be given to applications post-marked not later than March 15 for the academic year beginning September of the same year.
- Choice among applicants for admission will be made on the basis of review of the following factors:

# (a) Academic preparation

- i. Course Content. Candidates will usually present a B.A. degree, but those with other undergraduate degrees will be considered. Students are advised to complete an introductory course in statistics in their undergraduate programmes. A preference will be given to students whose major concentration of undergraduate studies has been in the social sciences and/or the humanities. However, applicants with other concentrations may be admitted where other attributes taken into account in the admissions process outweigh the lack of courses in the humanities and/or the social sciences. Undergraduate students who are considering social work as a career, may consult the School about their programmes.
- ii. Academic Standing. Preference is given applicants with the equivalent of Second Class standing of this University (65% average). Better academic standing will enhance the possibility of admission.

# (b) Personal Qualifications

Because maturity is an important factor, students are advised to wait until they are at least 21 years of age before beginning professional education.

Personal suitability will be assessed through: the applicants personal statement attached to his application; review of references; review of relevant work experience, both volunteer and/or paid. Normally, the admissions process no longer includes a personal interview with the applicant. However, when deemed desirable, the School may request that a personal interview be arranged with a member of Faculty (or, for distant applicants, with a person designated by the School) to explore more fully selected aspects of the application.

# Occasional Students

In conformity with general University policy the School recognizes the category of Occasional Student, open to mature persons without an undergraduate degree. Such admission will be exceptional. It will be open to persons active in the field of welfare services who have been carrying an advanced clinical, supervisory or administrative role, and who show clear promise of continuing leadership in the field, given training. Tests with the Office of Student Services may be required as part of the evaluation process in determining the capacity of such applicants to profit from courses designed for those who have completed an undergraduate degree.

Occasional Students cannot be granted the M.S.W. degree itself. Instead, the School can provide such students with an official statement attesting to successful

completion of the programme.

# Fees-Subject to change without notice

First Term Fees, \$266, 1st year; \$243, 2nd year (includes A.M.S. fee of \$29), payable in full at the time of registration. However, students may pay full fees (1st year \$503; 2nd year \$457) at time of registration.

Second Term Fees, \$237, 1st year; \$214, 2nd year, are payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Finance Department before this date with a note showing name and registration number.

Partial course: (Consult the General Information bulletin for further details). Fees for a partial course are assessed at \$34 per unit; the A.M.S. fee is \$19

for 6 units or less, otherwise \$29.

A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.

# Organization of Educational Programme

The Master's programme covers a period of two academic years and provides students with (1) a broad knowledge of the organization and administration of the social services (public and private); (2) an understanding of human behaviour as related to helping people with problems in social functioning; and (3) skill in a social work method.

The programme during the first year of study is generic in character, with all students following a common programme which includes courses in each of the three direct service methods—casework, group work, and community organization. During the first year field work placement, every effort is made

to give the student some familiarity with each method.

During the second year, students select, in consultation with members of faculty, one of the three direct service methods for concentrated study. Selected students are permitted to pursue specialized study in social work research related to one of the three direct service methods. The second year programme further requires that all students participate in one of a number of research projects designed to enhance understanding of the scientific method as applied to social research.

The School Year—Students are advised that the school year is divided into two terms, the first extending from September to Christmas and the second from January to May.

# Field Instruction

The purpose of field instruction is to enable students to acquire and test knowledge and to develop appropriate attitudes and skills in the practice of social work. The field instruction sequence is designed to integrate theory and practice, through supervised work in the provision of direct service to

individuals, groups and communities.

Although field instruction is generally taken concurrently with the lecture programme throughout the academic year, the School on occasion provides summer block placements. In the concurrent programme the student is in the field two days a week throughout the School year. Summer blockplacements are approximately four months in length.

Field instruction is given by either a member of the faculty or an agency staff member, both of whom are chosen because of particular skill and interest in field teaching. The field instruction sequence is directly related to the educational objectives of the School.

With the increased demand for enrolment in this School it is necessary to place students in agencies throughout the Lower Mainland area. Students must assume the transportation costs involved in travelling to and from the

agency to which they are assigned.

Considerable planning goes into the individual placement of students in the field instruction sequence with a view to providing an educational experience which will be profitable. The first year is designed to provide the student with a broad range of learning experiences and to familiarize him with the basic methods of working with people. In the second year emphasis is placed upon developing competence in the method of concentration of the student's choice—social casework, social group work or community organization. In addition there is more opportunity to focus work in a particular field of practice: medical, psychiatric, family, child welfare, corrections, etc. Arrangements may be made for selected second year students to have placements n research.

# Orientation Programme

The School provides a brief orientation programme immediately folowing registration. Detailed information will be provided at the time of egistration. Participation in the programme is required for all first year tudents.

# Degree Requirements

In the past the School offered a Bachelor of Social Work degree after one year of postgraduate study. As only the degree of Master of Social Work is now granted, the School expects that applicants for admission are planning a two-year continuum. Completion of the degree requirements through partime study extending over more than two years may be permitted in special circumstances. In either case a minimum of Second Class standing in both class and field in the first year is a prerequisite of enrolment in the second

First year courses at the School are numbered 500 and up; second year courses are in the 600 group (see below-Courses in Social Work).

In the first year all full time students take the same academic programme, namely all courses in the 500 group. In the second year the student elects one lirect method course (601, 602 or 603). All second year students are required o take the courses numbered 604, 605, 606, 608, 609 and 612. Selected tudents are permitted to take advanced work in social research as an alternative to second year field instruction in a direct method; such students are equired to take an advanced course in social research (630) in lieu of Social Work 606. As curriculum planning proceeds and faculty resources permit, the school may require second year students to take an additional course or courses rom a range of designated electives.

Persons who in the past completed either the B.S.W. or the first year of the M.S.W. programme with at least Second Class standing, and who wish to complete the current requirements for the Master's degree, *must* seek readmission to the School within five years after completion of the first post graduate year. Otherwise they will be required to undertake additional course work as a prerequisite to second year admission. Work references will be taken on all such applicants, and an interview may be required with a School admissions officer.

# UNIVERSITY REGULATIONS AND INFORMATION

# Graduation

Every candidate for a degree must make formal application for graduation. Application for graduation must be made not later than March 15. Special forms for this purpose are provided by the Registrar's office. The Hood is lined with Magenta.

# Attendance

Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments may be excluded from the final examinations. Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes.

Students, who because of illness are absent from a December or April examination, must submit a certificate, obtained from a doctor, to the University Health Service as promptly as possible.

# Withdrawal

Any student who after registration decides to withdraw from the University must report to the Registrar's office. He will be required to obtain clearance from the University, to the satisfaction of the Registrar, before being granted *Honourable Dismissal* or recommended, where applicable, for refund of fees. (See the General Information bulletin.)

The School may, with the approval of Senate, require the withdrawal of a student when, in the opinion of the Faculty, his performance indicates that he is an unsatisfactory candidate for professional education in Social Work

The Senate of the University may require a student to withdraw from the University at any time for unsatisfactory conduct, for failure to abide by regulations, for unsatisfactory progress in his programme of studies or training, or for any other reason which is deemed to show that withdrawal is in the interests of the student and/or the University.

#### **Examination Results**

Results of the sessional examinations in April are mailed to students in the graduating classes about the time of Congregation, and to students in the lower years by approximately June 15. Any student who must meet an application date for another institution prior to June 15 should inform the transcript clerk in the Registrar's office in order that arrangements may be made to meet the deadline.

# Review of Assigned Standing

Reviews of Assigned Standing are governed by the following regulations:

1. Any request for the review of an assigned grade other than for a supplemental examination (in which a request for a review will not be granted)

must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each paper which will be refunded only if the mark is raised.

- 2. Each applicant for a review must state clearly why he believes the course concerned deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a second time before results are announced. For this reason an applicant granted a supplemental should prepare for the examination since a change in the original mark is unlikely and the result of the review may not be available before the end of the supplemental examination period. A review will not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.
- 3. Reviews will not be permitted in more than two courses (6 units) in the work of one academic year, and in one course (3 units) in a partial course of 9 units or less or in the work of one summer session.

# Supplemental Examinations

Supplemental examinations may be written in August at the following centres:

Cranbrook, Dawson Creek, Kamloops, Kitimat, Ocean Falls, Penticton, Powell River, Prince George, Prince Rupert, Trail, Victoria; and at Whitehorse, Y.T. Other centres outside of British Columbia are restricted to universities or their affiliated colleges.

In unusual circumstances, a student working in a remote area may be permitted to write supplemental examinations at a special centre if satisfactory arrangements can be made. Since permission is contingent on completion of arrangements, only early applications will be considered.

The fee for each supplemental examination written at the University is \$7.50; at a regular outside centre, \$10.00; at a special centre, \$20.00. In the event that a candidate does not appear for an examination the refund will be \$5.00 only.

Applications for supplemental examinations in respect of the winter session examinations, accompanied by the necessary fees, must be in the hands of the Registrar by July 8.

# Transcript of Academic Record

A transcript of a student's academic record will, on request of the student, be mailed direct to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the inscription "official transcript only if presented with seal unbroken." On graduation or withdrawal a student may obtain for his own use a copy of his record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of mid-term examinations.

Student records are confidential. Transcripts are issued only at the request of students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made arrangements satisfactory to the Finance Department to meet any outstanding indebtedness.

Granted Honourable Dismissal indicates that the student is in no disciplinary difficulty at the time the transcript is issued; the term has no reference to scholastic status.

Application for a transcript should be made at least one week before the document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

# COURSES IN SOCIAL WORK

Except by arrangement between the School and other University Departments, the following courses are open only to students who have made application and have been accepted for admission to the School of Social Work. First Year courses (post-graduate) are numbered 500 and up, Second Year courses 600 and up. All courses run both terms, Fall and Spring, unless otherwise noted.

- 499. (2) Introduction to Social Work.—Not offered in 1969-70.
- 500. Orientation Programme.—Introduction to the philosophy, concepts and practice of Social Work.
- 501. (2) Social Casework.—The course involves examination of social casework as a process for the restoration, maintenance or enhancement of individual and family social functioning. Relevant components are the determinants of problems in social functioning, the personality variables affecting outcome, the auspices and conditions under which help can be offered and the principles inherent in the helping process. These components are identified and examined in increasing depth and breadth.
- 502. (2) Social Group Work.—The problem-solving approach in social group work practice. Following initial exploration of selected and interacting dimensions of small group functioning, emphasis is placed upon basic modes of intervention in enabling the individual and the group as a whole to realize selected goals.
- 503. (2) Community Organization.—Introduction to theory and practice of community organization in social work; concepts relevant to understanding the community and community problem-solving processes; the role of the professional worker in community organization; typical structures and programmes for community problem-solving and health and welfare planning; key trends and issues, such as community organization and community development; community decision-making; impact of new social science concepts; relationship to other aspects of social work practice.
- 504. (2) Human Behaviour and the Social Environment.—This course examines the factors that underlie an individual's social functioning. The emphasis is upon understanding adaptive social functioning and the factors which are basic to an assessment of potential for problem-solving and effective behaviour. The interaction between person and situation and signifi-

cance of such concepts as ego identity, ego functioning and environmental stress are examined in the first term. In the second term personality growth and development in relation to the major integrative tasks at each period are traced. Emphasis is placed throughout the course on the implications for realizing social work objectives of maintaining, restoring or enhancing functioning.

- 505. (2) The Social Services.—The present scope of public welfare and the social services: a comparative review of Canada, United States, and Great Britain. The development of social thought and social policy in regard to public provision for social welfare. Implications for social work. An examination of current issues in selected social problem areas.
- 506. (2) Social Research.—The functions of research in social work; problem formulation; research design; sources and methods of data collection; data analysis; sampling; measurement; selected statistical tools; other research techniques.
- 507. (1) Social Work and the Law.—Principles of the law with which the social worker must be familiar; structure of the court system; problems of judicial administration and law and their relationship to social work practice; legal responsibility of social workers in various social agencies. Fall term only.
- 508. (3) Field Instruction.—Beginning social work practice under supervision in selected social agencies. Two days a week throughout the School year.
- 601. (2) Casework.—The purpose of this course, in progression from S.W. 501, is to develop greater skill in social assessment, in casework planning as related to this assessment, and in treatment skills using the casework process with both adults and children. The development of knowledge, skills and attitudes in the use of relationship as an essential tool in working with clients; its application in settings where casework services are offered as all or part of the agency programme.
- 602. (2) Social Group Work.—The problem-solving approach in social group work practice. In progression from S.W. 502 the focus is upon differential factors in modes of intervention to enable the realization of individual and group goals; differential use of relationship, differential individual and group needs according to problem and field of practice. The final portion of the course is focused upon work with administrative groups, work with volunteers and the organization of group services.
- 603. (2) Methods in Community Organization.—This is an advanced course in community organization methods in social work designed to extend and deepen the student's knowledge of, and skill in, performing tasks and implementing roles related to the community organization process. Emphasis is given to community problem-solving methodology and techniques; applications in specific settings such as community development, health and welfare planning; social power, social conflict, community decision-making and their influence on participation of citizens, special interest groups, governmental and voluntary agencies; relationship to administration and research processes; financing and its relationship to social planning.
- 604. (2) Human Behaviour and Social Environment.—This course is designed to broaden and deepen the basic knowledge gained in S.W. 504, continuing the holistic approach to the study of man's efforts to adapt to his social environment, Emphasis is upon deviant adaptation to this environment and the cultural and personality factors which produce this, together with the

perceptions and responses of this environment to deviance in behaviour and personality structure. All students will cover the same material in the first term. In the second term students may elect to study either conditions of individual deviance and familial involvement in such deviance, or group and community process in the creation and control of social problems.

- 605. (1) Issues in Social Policy.—This course, designed as a progression from S.W. 505, examines the determinants of social policy, national and local, and the relationships between social policy and social work, lay and professional. Spring term only.
- 606. (2) Social Research.—The formulation and planning of social welfare studies. Relation of research to concepts and professional literature; collection of data; methods and strategy of data analysis; report writing. Seminar, supplemented by individual or group consultations, for M.S.W. thesis or equivalent research project. Fall term only.
- 608. (3) Field Instruction.—Supervised social work practice of more advanced character in appropriate social agencies. Two days a week throughout the School year.
- 609. (1) Process and Management in Social Welfare Administration.—An introduction to the meaning and the functions of administration, especially in social welfare agencies. Content includes examination of: processes and social factors which are influential in organizational behaviour; significant concepts and principles of administrative theory; the main methods and procedures employed in administration. Spring term only.
- 612. (1) M.S.W. Tutorials.—Each student is assigned to a member of the School Faculty who serves as tutor for the academic year. The tutorials are devoted to a variety of topics which do not fall within the boundaries of any one course.
- 613. (1) The Theory of Social Work.—A series of seminars, examining social work as an institution, designed to round off the professional understanding of social work for the M.S.W. graduate. The generic functions of social work; determinants, and formal characteristics; the nature of vocation and profession; the traditions of social work; the profession of social work as a value system, the radical ethic; the impact of bureaucracy; public images of social work.
- 625. (1) Methods and Use of Supervision.—An advanced course for students with appropriate experience and qualifications.
- 626. (1) Social Work Methods, IV.—Advanced study in casework, group work or community organization, for senior or special students.
- 627. (1) Human Growth and Behavior, V.—Advanced study of developmental theory applied to specialized material.
- 628. (1) Problems of Social Welfare Administration.—For appropriate students with experience or special needs in this area.
- 629. (1) Contemporary Issues in Corrections.—Advanced course on contemporary trends in correctional treatment and administration.
- 630. (2) Social Research.—An advanced course in social work research methods, designed for students who elect research as their area of concentration. The course includes a review of fundamentals and exploration of selected topics related to the research projects being undertaken by the students.

# THE FACULTY OF COMMERCE AND BUSINESS ADMINISTRATION

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA

VANCOUVER 8 • BRITISH COLUMBIA CANADA

# The Faculty of Commerce and Business Administration calendar, 1969-70

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# Financial Assistance

A list of Fellowships, Scholarships, Bursaries and Loans open to students in the University will be found in the publication "Awards and Financial Assistance" which may be obtained from the Registrar's office. For details, consult this publication. In general, application must be made to the Dean of Inter-Faculty and Student Affairs.

## ACADEMIC STAFF

- PHILIP H. WHITE, M.Sc. (Est. Man.) (London), F.R.I.C.S., Professor and Dean of the Faculty.
- COLIN C. GOURLAY, B.Com. (Brit. Col.), M.Com. (Toronto), Professor and Assistant Dean of the Faculty, Chairman of the Division of Policy and Administration.
- DONALD B. FIELDS, B.Com. (Brit. Col.), M.B.A. (Toronto), F.C.A., Professor.
- NOEL A. HALL, B.Com. (Brit. Col.), M.B.A. (Calif.), D.B.A. (Harvard), Professor and Chairman of the Division of Industrial Administration.
- RALPH R. LOFFMARK, M.L.A., B.A. (Toronto), M.B.A. (Pennsylvania), C.A., Graduate Osgoode Hall, Professor.
- James C. T. Mao, B.Sc. (St. John's, Shanghai), M.B.A., Ph.D. (Northwestern), Professor.
- RICHARD V. MATTESSICH, Diplomkaufmann (Vienna School of Economics), Dr. rer. Pol. (Hochschule fuer Welthandel, Vienna), C.A., Professor.
- RICHARD U. RATCLIFF, B.A. (Wisconsin), M.B.A., Ph.D. (Michigan), Professor and Chairman of the Division of Urban Land Economics.
- MICHAEL E. BEESLEY, B.Com., Ph.D. (Birmingham, England), Visiting Pro-
- LORING G. MITTEN, B.S. (Drexel Inst. of Technology), M.S. (M.I.T.), Ph.D. (Ohio), Visiting Professor.
- KARL M. RUPPENTHAL, A.B., LL.B. (Kansas), M.B.A. (Berkeley), Ph.D. (Stanford), J.D. (Kansas), Visiting Professor.
- CARL E. SARNDAL, M.B.A. (Michigan), Ph.D. (North Carolina), Visiting Pro-
- ARTHUR BEEDLE, B.Com. (London), F.C.A., Associate Professor and Chairman of the Division of Accounting.
- EARL R. BLAINE, B.Com. (Brit. Col.), M.B.A. (Calif.), C.A., Associate Professor.
- BRIAN E. BURKE, B.Com. (Brit. Col.), M.A., D.B.A. (Washington), C.G.A., Associate Professor.
- Trevor D. Heaver, B.A. (Oxon.), M.A., Ph.D. (Indiana), Associate Professor and Acting Chairman of the Division of Transportation.
- J. F. Helliwell, B.Com. (Brit. Col.), M.A., D.Phil. (Oxon.), Associate Professor (Research).
- ROBERT H. HEYWOOD, M.A. (Brit. Col.), Associate Professor and Chairman of the Division of Teacher Education (Commercial).
- ROBERT F. KELLY, B.C. (Auburn), M.B.A. (Tulane), D.B.A. (Harvard), Associate Professor.
- Peter A. Lusztig, B.Com. (Brit. Col.), M.B.A. (W. Ontario), Ph.D. (Stanford), Associate Professor and Chairman of the Finance Division.
- GIANDOMENICO MAJONE, M.S. (Carnegie Inst. Tech.), Ph.D. (Calif.), Associate Professor.
- C. L. MITCHELL, B.Com. (Toronto), M.B.A. (Brit. Col.), C.A., Associate Professor.
- VANCE F. MITCHELL, B.S. (Maryland), M.B.A. (George Washington), Ph.D. (Calif.), Associate Professor.
- STANLEY M. OBERG, B.Com. (Brit. Col.), M.B.A., D.B.A. (Washington), Associate Professor.

James B. Warren, B.A. (Wash.), M.B.A. (Calif.), Associate Professor and Chairman of the Division of Marketing.

FREDERICK A. WEBSTER, B.S., M.B.A., Ph.D. (Calif.), Associate Professor and Chairman of the Graduate Studies Committee.

Hugh C. Wilkinson, B.Com. (Brit. Col.), M.B.A. (Wash.), Dip. A.E. (College of Aeronautics, Cranfield), Associate Professor.

JAMES D. FORBES, B.S. (Washington State), M.B.A. (Harvard), Ph.D. (Calif.), Assistant Professor.

MICHAEL A. GOLDBERG, B.A. (Brooklyn College), M.A., Ph.D. (Berkeley), Assistant Professor.

GEORGE GORELIK, B.Com. (London), M.B.A. (Brit. Col.), C.G.A., Assistant Professor.

JAMES D. MAXWELL, B.A., Dip. H.A. (Toronto), Assistant Professor.

LARRY F. MOORE, B.S. (Wyoming), M.B.A., D.B.A. (Colorado), Assistant Professor.

DENNIS P. NEILSON, B.Com. (New South Wales), M.B.A., Ph.D. (Berkeley), Assistant Professor.

ROBERT E. G. NICOL, B.Econ. (Sydney), M.B.A. (Calif.), Assistant Professor.

CHARLES A. PRENTICE, B.Com. (Brit. Col.), Assistant Professor.

Bernard Schwab, B.S., M.S. (Tech. U. of Munich), M.B.A., Ph.D. (Calif.), Assistant Professor.

JOHN W. SUTHERLAND, B.S., M.S., Ph.D. (Calif.), Assistant Professor.

Peter Tsong, M.S. (Chicago), Assistant Professor.

HARMUT J. WILL, Bacc.B.A., M.B.A. (Free University of Berlin), Ph.D. (Illinois), Assistant Professor.

WHATARANGI WINIATA, B.Com. (Victoria U. of Wellington), M.B.A., Ph.D. (Michigan), Assistant Professor.

WILLIAM T. ZIEMBA, B.S.Ch.E. (U. of Mass., Amherst), M.B.A. (Berkeley), Assistant Professor.

ALLAN H. ANDERSON, B.A.Sc. (Brit. Col.), M.B.A. (Harvard), Visiting Assistant Professor.

LORNE R. BOLTON, B.Com. (Brit. Col.), C.A., Instructor.

IRWIN DAVIS, B.A. (Toronto), Barrister-at-Law, Lecturer and Real Estate Coordinator.

Daniel R. Dolphin, B.A.Sc. (Brit. Col.), M.B.A. (Berkeley), Lecturer.

Melbourne S. H. Foster, M.B.A. (Western), C.A., Lecturer.

STANLEY W. HAMILTON, B.Comm. (Sask.), M.B.A. (Brit. Col.), Lecturer.

JAMES B. HOLLOWAY, M.B.A., B.A.Sc. (Brit. Col.), Lecturer.

WILLIAM D. MATHIESON, B.Comm. (Brit. Col.), M.B.A. (Colorado), Lecturer.

GEORGE MORFITT, B.Com. (Brit. Col.), C.A., Part-time Lecturer.

HUGH D. W. NEY, M.A.Sc., M.B.A. (Brit. Col.), Lecturer.

H. L. PURDY, B.A. (Brit. Col.), M.A. (Washington), M.A. (Hon.) (Dartmouth College), Ph.D. (Chicago), Lecturer.

GORDON J. CHAPMAN, B.S., B.A. (Missouri), D.S.C., D.B.A. (Indiana), Honorary Lecturer in Marketing.

RICHARD A. MAHONEY, B.A. (Man.), M.B.A. (Harvard), Honorary Lecturer.

E. Cecil Roper, B.Sc. (Alta.), M.B.A. (Brit. Col.), Honorary Lecturer.

- Division of Accounting: A. Beedle, Chairman; R. E. Blaine, B. E. Burke, L. R. Bolton, M. S. H. Foster, R. V. Mattessich, C. L. Mitchell, D. P. Neilson, R. E. G. Nicol, C. A. Prentice, H. J. Will.
- Division of Urban Land Economics: R. U. Ratcliff, Chairman; M. A. Goldberg, S. W. Hamilton.
- Division of Finance: P. A. Lusztig, Chairman; A. H. Anderson, R. R. Loffmark, C. C. Gourlay, J. F. Helliwell, J. B. Holloway, J. C. T. Mao, E. Moore, H. D. W. Ney, W. Winiata.
- Division of Industrial Administration: N. A. Hall, Chairman; G. Majone, W. D. Mathieson, J. D. Maxwell, V. F. Mitchell, L. G. Mitten, L. F. Moore, B. Schwab, J. Swirles, P. E. W. Tsong, H. C. Wilkinson, W. T. Ziemba.
- Division of Marketing: J. B. Warren, Chairman; J. D. Forbes, D. R. Dolphin, M.S.H. Foster, R. F. Kelly, S. M. Oberg, F. A. Webster.
- Division of Policy and Administration: C. C. Gourlay, Chairman; I. Davis, R. H. Heywood, R. R. Loffmark, H. L. Purdy, J. W. Sutherland.
- Division of Teacher Education (Commercial): R. H. Heywood, Chairman.
- Division of Transportation & Utilities: T. D. Heaver, Chairman; M. E. Beesley, K. M. Ruppenthal.
- Diploma Division: P. H. White, Chairman; A. Beedle, I. Davis, R. H. Heywood, P. Lusztig, J. B. Warren.

# Members of Faculty from Other Departments

J. D. Boyd, B.A., M.A., Ph.D.; J. T. English, B.Com., LL.B., LL.M.; D. S. M. Huberman, B.A., LL.B., LL.M.; J. M. MacIntyre, B.Com., LL.B., LL.M.

# Lecturers — Non-Faculty:

H. G. Aqua, B.Com., B.S.F., C.G.A.; A. K. Baak, C.A., R.I.A.; M. Barbour, B.A.; P. R. Beckman, B.Com., LL.B.; V. H. Chadwick, C.A.; R. A. Cradock, B.A.; P. R. Beckman, B.Com., Ll.B.; V. H. Chadwick, C.A.; R. A. Cradock, B.Com., R.I.A.; A. L. Dartnell, B.Com., M.A., Ph.D.; R. M. Devji, B.Sc. (Econ.), M.B.A.; F. Dimian, M.A., D.B.A.; D. A. Downey, C.A.; L. Dyer, B.Com., R.I.A.; T. M. Dyer, B.Com., C.A.; M. Edwards, C.G.A.; G. M. Ferguson, B.Com., C.A.; J. B. Ferguson, C.A.; L. Ferguson, B.Com., M.B.A.; F. L. Gruen, B.Man.Eng.; J. D. Kell, B.Com., C.G.A.; P. Knowles, B.A.; H. M. Loomer, B.Com., LL.B.; T. D. Nicholls, B.Com., LL.B.; F. H. Olsen, B.Com., C.G.A.; R. Pearson, C.G.A.; R. Pickerill, C.G.A.; M. A. Pierce, C.A.; J. Roberts, C.G.A.; D. W. Robertson, B.Com., C.A.; J. E. Rowcroft, B.Sc., M.Sc.; W. A. Sherwin, B.Com., C.A.; G. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.A., M.A., B.Ed.; R. E. Tulk, B.Com., C.A.; J. W. Sparling, B.C., M. Sparling C.A.; J. Weiss, B.Com., R.I.A.; S. Weston, A.P.A., R.I.A.; D. Weyman, C.A.

# THE FACULTY OF COMMERCE AND BUSINESS ADMINISTRATION

The Faculty of Commerce and Business Administration offers courses leading to the degree of:

- 1. Bachelor of Commerce (B.Com.), after First Year Arts or Science.
- 2. Bachelor of Commerce (B.Com.), combined programme with C.A.
- Bachelor of Commerce, Bachelor of Laws (B.Com., LL.B.), combined degree with Faculty of Law, option 8. (See the Faculty of Law calendar.)
- 4. Master of Business Administration (M.B.A.), for graduates of an approved university and with academic standing which meets the admission requirements of the Faculty of Graduate Studies.
- 5. Doctor of Philosophy (Ph.D.).

The B.Com. hood is light grey with black and grey cord; the M.B.A. hood is the same but lined with the distinctive colour.

# Courses Leading to the Degree of B.Com.

After First Year Arts or Science or Grade 13 or equivalent

This five-year programme, consisting of First Year Arts or Science and four years in the Faculty of Commerce and Business Administration, is intended for students interested in one of the specialized fields of administrative practice.

The first three years are devoted to laying a foundation in the related sciences and the humanities, and to introducing the student to basic business problems, principles, and practices.

The professional aspects of the curriculum are largely concentrated in the last two years. Because of the breadth and variety of techniques and practices involved, it has been found necessary to specify a "core" of courses which all students must take, and then to arrange a series of carefully selected and integrated programmes, known as "options", in one of which a student must register.

For each option, the necessary prerequisites are specified in the pre-Commerce Year, First Year and Second Year Commerce programmes. Few electives are provided within the option and no deviation from the prescribed course of studies in the field of concentration is allowed unless approved by the Dean.

# Admission to B.Com. Courses

- (1) The general requirements for admission to the University are given in the General Information bulletin.
- (2) For regulations regarding admission to the Faculty of Commerce and Business Administration see page J12.
- (3) Admission with advance standing: students will be admitted with such advance standing as is approved by the Dean, subject to the general rule that all candidates for the degree of Bachelor of Commerce must be in residence and registered in Commerce for a minimum of two winter sessions
- (4) Students in First Year Arts or Science who are considering enrollment in the Faculty are advised to consult the Dean during their first year at the University.

(5) Graduates of Grade 12 in any Canadian province are not admissible directly to the Faculty. Applicants with such standing should apply for admission to a pre-Commerce year of study if they are residents of B.C., otherwise they should complete a pre-Commerce year in their own provincial university.

# Transfers from Applied Science to Commerce

- (1) Students who have spent one or two years in Engineering may be admitted to advance standing with some credit if there is evidence from their records that they will profit by training in the Faculty. They will require at least three years to complete any option in the Faculty.
- (2) Students who have obtained full First Year standing in the B.A.Sc. Course will be admitted to First Year Commerce with 9 units of advance credit.
- (3) Students who have obtained full or partial Second Year in the B.A.Sc. Course may be given up to 18 units of advance credit towards a B.Com. degree.
- (4) Students who wish to transfer should make application in writing to the Dean before the registration period, giving details of standing obtained in courses.

# Optional Programmes

Students who complete the course of studies in any one of the following options will receive the degree of Bachelor of Commerce (B.Com.):

- 1. Accounting
- 2. Marketing
- 3. Industrial Administration
- 4. Finance
- 5. Transportation and Utilities
- 6. Commerce and Economics
- Commerce and Actuarial Science
- 8. Commerce and Law (for combined degrees)
- 9. Industrial Relations
- 10. Urban Land Economics

(Students who were registered in Commerce and Public Administration, Commerce and Science, or Commerce and Teaching should consult with the Assistant Dean to arrange their programme.)

# COMBINED PROGRAMME FOR C.A. AND DEGREE OF B.COM. (Option 1)

# I. Students Eligible for Programme

- (a) No new enrolments will be accepted in this programme during the 1969-70 session.
- (b) Students will be eligible to register for the Combined Programme only if:
  - (i) they have completed all the requirements for admission, without condition, to the accounting option in First Year Commerce; (ii) they are registered with the Institute of Chartered Accountants of British Columbia and are proceeding with the "Uniform Course" conducted by the Institute; (iii) they are recommended by the Institute and are approved by the Faculty of Commerce and Business Administration; (iv) they undertake, while registered at the University, to devote full time to the University part of the programme.

- (c) Students in the combined B.Com., C.A. programme are expected to register for 9 units during each of the combined spring and summer sessions.
- (d) Students who at any time discontinue the "Uniform Course" will be ineligible to proceed with the Combined Programme.

# 2. Course Requirements for the B.Com. Degree in the Programme

- (a) Except where exemptions in certain specified subjects are granted as in (b) below, students taking the Combined Programme must complete all the course requirements announced in the Calendar for regular students in the accounting option.
- (b) At the discretion of the Faculty, students taking the Combined Programme may be granted exemptions up to 18 units, including the following courses:

Commerce 151 (1½ units)—Fundamentals of Accounting; Commerce 252 (3 units)—Intermediate Accounting; Commerce 353 (1½ units)—Advanced Accounting; Commerce 450 (1½ units)—Accounting Problems; Commerce 455 (3 units)—Auditing; Commerce 331 (3 units)—Commercial Law; Commerce 432 (1½ units)—Statute Law; Commerce 356 (1½ units)—Accounting Systems. Exemption will be withdrawn, however, in the case of students who do not satisfactorily complete the "Uniform Course" of the Institute or who do not satisfy all other requirements of the University.

# 3. Attendance Requirements for Students in the Programme

- (a) Students will not be eligible to receive the B.Com. degree unless they have attended the University as full-time students for at least one regular winter session.
- (b) Students must take all course work by attendance as full-time students in regular winter sessions or in spring and summer sessions at the University.
- 4. Members of the provincial institutes of chartered accountants in Canada who wish to proceed to the degree of B.Com., accounting option, and who have completed, without condition, all the requirements for admission to the Faculty, may be granted the same course exemptions as defined in 2 (b) above. They must be in full-time attendance for a minimum of two winter sessions. Chartered accountants contemplating this programme should file with the Dean a full statement of qualifications before registering with the University.

# THE DEGREE OF B.COM. COMBINED WITH THE DEGREE OF LL.B.

Completion of the pre-Commerce year, of the first three years in the Commerce and Law option in the Faculty of Commerce and Business Administration, and of three complete years in the Faculty of Law, at this University, are required for the combined degrees B.Com., LL.B. Students must meet the admission requirements of the Faculty of Law. Courses in Commerce may not be taken concurrently with courses in Law. The B.Com. degree will be awarded on completion of the Second Year in the Faculty of Law at this University.

# FEES (Subject to change without notice)

First Term Fees are payable in full at the time of registration. However students may pay full fees at that time.

Second Term Fees are payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Accounting Office before this date with a note showing name and registration number.

	First Term	Second Term	Total
First Year (B.Com.)	\$243*	\$214	\$457
Second, Third and Fourth Years	\$282*	\$253	\$535
(B.ComC.A.) Spring Term	\$119*		\$119

Fourth Year students are assessed an additional \$7 to cover the graduating fee.

Students who fail to complete the graduation essay, Commerce 490, will be required to register for it in a subsequent session (Summer or Winter). The fee assessed will be \$50 plus S.S.A. or A.M.S., unless they were not previously registered for it, in which case they will pay fees on a per unit basis.

A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.

# REGULATIONS REGARDING COMMERCE COURSES

- (1) 15 units constitute a full course in First Year Commerce and 18 units constitute a full course in each of the remaining three years of the B.Com. programme.
- (2) Not later than the end of the First Year in Commerce, students are expected to choose their field of concentration and thereafter follow the prescribed course of studies. Students are expected to consult the Chairman of the Division in which they intend to study to plan their specific programme. Transfers from one option to another may be made at the end of the Second Year, with the approval of the Dean.
- (3) Students may be required to undertake field work in the business community.
- (4) A small charge may be made for mimeographed material supplied by the Faculty for use in classes.
- (5) A graduating essay is required, embodying the results of independent investigation. The topic selected requires the approval of the Dean. Before April I of the Third Year a proposal for the essay must be submitted, and the essay topic approved.
- (6) Students are advised to plan summer work, for at least part of their course, in the field of their option.
- (7) All Second Year students are required to attend and complete, to the satisfaction of the Dean, a course in public speaking provided by the Faculty of Commerce and Business Administration.
- (8) Courses in Commerce are reserved for students registered in a degree programme in Commerce. However, there are exceptions to this general rule.
  - (a) Special arrangements have been made for students registered in Forestry, Pharmacy, Home Economics and Education. (See appropriate calendar)
  - (b) Other students who wish to take a course in Commerce should apply to the Dean in writing.

Includes A.M.S. fee.

# Examinations

Examinations are held in December and in April. December examinations are held in all subjects of the First and Second Years, and are obligatory for all students. December examinations in subjects of the Third and Fourth Years, except in those subjects that are completed before Christmas, are optional with the Dean.

# **Examination Results**

Results of the sessional examinations in April are mailed to students in the graduating classes about the time of Congregation, and to students in the lower years by approximately June 15. Any student who must meet an application date for another institution prior to June 15 should inform the transcript clerk in the Registrar's Office in order that arrangements may be made to meet the deadline.

# Review of Assigned Standing

Reviews of Assigned Standings are governed by the following regulations:

- 1. Any request for the review of an assigned grade, other than for a supplemental examination (in which a request for a review will not be granted), must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each course concerned which will be refunded only if the mark is raised.
- 2. Each applicant for a review must state clearly why he believes the course deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a second time before results are announced. For this reason an applicant granted a supplemental should prepare for the examination since a change in the original mark is unlikely and the result of the review may not be available before the end of the supplemental examination period. A review will not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.
- 3. Reviews will not be permitted in more than two courses (6 units) in the work of one academic year, and in one course (3 units) in a partial course of 9 units or less or in the work of one summer session.

# Standing and Credit

- (1) Candidates in order to pass must obtain at least 50 per cent. in each subject; in a course which comprises both lecture and laboratory work, they will be required to pass in both the written examinations and laboratory work before standing in the course is granted. The grades are as follows: First Class, an average of 80 per cent. or over; Second Class, 65 to 80 per cent.; Pass, 50 to 65 per cent.
- (2) Standing at graduation is determined by the average of the marks obtained in all courses of the Third and Fourth Years.

# Supplementals

(1) If a student's general standing in the final examinations of any year is sufficiently high, the Faculty may grant him supplemental examinations in a maximum of 3 units. Students who have failed in more than 3 units but not more than 6 units normally will not be granted a supplemental in the subjects failed. Notice will be sent to all students to whom supplementals have been granted.

- (2) Students who have failed in more than 6 units of a required year's work will be considered to have failed in the work of the year, and will not receive credit for any of the courses passed in that year.
- (3) Supplemental examinations, covering the work of both the first and second terms, will be held in August, in respect of winter session examinations, and in December, in respect of summer school examinations.
  - (4) Supplemental examinations may be written at the following centres:

Cranbrook, Dawson Creek, Kamloops, Kitimat, Ocean Falls, Penticton, Powell River, Prince George, Prince Rupert, Trail, Victoria; and at Whitehorse, Y.T. Other centres outside of British Columbia are restricted to universities or their affiliated colleges.

In unusual circumstances a student working in a remote area may be permitted to write supplemental examinations at a special centre if satisfactory arrangements can be made. Since permission is contingent on completion of

arrangements, only early applications will be considered.

The fee for each supplemental examination written at the University is \$7.50; at a regular outside centre, \$10.00; at a special centre, \$20.00. In the event that a candidate does not appear for an examination a refund will be authorized only if, within 10 days after the scheduled examination, the candidate submits to the Registrar an adequate explanation for the failure to write the examination; if such refund is made it will be \$5.00.

Applications for supplemental examinations in respect of the winter session examinations, accompanied by the necessary fees, must be in the hands of the Registrar by July 8.

#### Unsatisfactory Standing

- (1) A student at any level of University study who fails for a second time, whether in repeating a year or in a later year, will be required to withdraw from the University; he may be re-admitted after a period of at least one year if his appeal to Senate is supported by the Committee on Admissions of the Faculty and upheld by Senate.
- (2) Any student whose academic record, as determined by the tests and examinations of the first term, is found to be unsatisfactory may be required to discontinue attendance at the University for the remainder of the session.

#### Transcript of Academic Record

A transcript of a student's academic record will, on request of the student, be mailed direct to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the inscription "official transcript only if presented with seal unbroken". On graduation or withdrawal a student may obtain for his own use a copy of his record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of mid-term examinations.

Student records are confidential. Transcripts are issued only at the request of students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made arrangements satisfactory to the Accountant's Office to meet any outstanding indebtedness.

Granted Honourable Dismissal indicates that the student is in no disciplinary difficulty at the time the transcript is issued; the term has no reference to scholastic status.

Application for a transcript should be made at least one week before the document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

#### Graduation

Every candidate for a degree must make formal application for graduation. Application for graduation must be made not later than March 15. Special forms for this purpose are provided by the Registrar's Office.

#### Attendance

Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments may be excluded from the final examinations. Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes.

Students, who because of illness are absent from a December or April examination, must submit a certificate, obtained from a doctor, to the University Health Service as promptly as possible.

#### Withdrawal

Any student who after registration decides to withdraw from the University must report to the Registrar's Office. He will be required to obtain clearance from the University, to the satisfaction of the Registrar, before being granted Honourable Dismissal or recommended, where applicable, for refund of fees.

The Senate of the University may require a student to withdraw from the University at any time for unsatisfactory conduct, for failure to abide by regulations, for unsatisfactory progress in his programme of studies or training, or for any other reason which is deemed to show that withdrawal is in the interests of the student and/or the University.

## OPTION REQUIREMENTS Pre-Commerce

Students who have completed First Year Arts or First Year Science or the equivalent, prior to 1969-70, with standing in 15 units, including English 100 and Mathematics 110 or 120, will be admitted with full standing. Students who have completed 12 units, including English 100 and Mathematics 110 or 120, with an average of at least 60 per cent in the courses passed, may petition the Dean for admission to First Year Commerce.

Students who apply to enter the Faculty of Commerce and Business Administration in 1970-71 must have completed 15 units, including English 100 and either Mathematics 130 or Mathematics 100 and 121.

#### First Year Commerce

The First Year programme will consist of Commerce 110, 151, 190; Economics 200; and 6 units of electives.

The Second Year programme will consist of Commerce 210, 221, 252, 261, 271; Economics 300; and 3 units of electives. All students are required to complete a non-credit course in Public Speaking.

#### Third and Fourth Year Option Programmes

Students registering either in Third or Fourth Year in 1969-70 will follow the programme described below. The new Fourth Year programme which will be introduced in the 1970-71 session will, in general, consist of Commerce 490, 492, 494, option requirements, and electives.

Normally electives in the Third and Fourth Years shall be chosen from courses numbered 300-level or above. Up to 3 units may be selected from courses at the 200-level. No courses of the 100-level may be chosen as electives in the Third or Fourth years.

# Accounting Option 1

#### Third Year

Commerce 322, 331, 353, 354, 356 units of electives

#### Fourth Year

Commerce 450, 451, 454, 455, 490, 492 3 units of electives

Students are referred to J28 for the requirements of the professional accounting associations.

# Marketing Option 2

#### Third Year

Commerce 322, 331, 362, 363, 364, 365 7½ units of electives

#### Fourth Year

Commerce 467, 490, 492 3 units from Commerce 462, 463, 465, 466, 468 6 units of electives

## Industrial Administration Option 3

Third Year Commerce 321, 322, 331, 383 7½ units of electives

#### Fourth Year

Commerce 422, 483, 490, 492 6 units of electives

Students may elect to specialize in the field of Operations Research if they have completed certain mathematics requirements in the first and second years. Those interested should consult the Chairman of this Division.

#### Finance Option 4

#### Third Year

Commerce 322, 331 Economics 310 4½ units from Com. 307, 309, 370, 371, 374, 376, 378, or 379 6 units of electives

#### Fourth Year

Commerce 376, 490, 492 4½ units from Com. 407, 408, 471, 472, 475, 476, 477, 410, or 411 6 units of electives, 3 outside Commerce

# Transportation and Utilities Option 5

#### Third Year

Commerce 322, 331, 341, 343 Economics 484 7½ units of electives

#### Fourth Year

Commerce 444, 445, 446, 490, 492 7½ units of electives

#### Commerce and Economics Option 6

#### Third Year

Commerce 322, 331
9 units of Economics including
Economics 308
4½ units of electives

#### Fourth Year

Commerce 490, 492
3 units from any 300 or 400 level Commerce courses
9 units from Economics 300 or 400 level courses

#### Commerce and Actuarial Science Option 7

#### Third Year

Commerce 322, 331, 378, 379
Mathematics 301
7½ units from any 300 or 400 level courses in Commerce, Economics, or Mathematics

#### Fourth Year

Commerce 374, 475, 490, 492 Mathematics 302 or 305 6 units from any 300 or 400 level courses in Commerce, Economics, or Mathematics

#### Commerce and Law Option 8

#### Third Year

Commerce 322, 492
Commerce 494 or 355, 370
3 units from any Political Science
300-level courses
7½ units of electives
(Commerce 331 and 337 are not allowed for credit)

#### Fourth Year and Fifth Year

Courses prescribed for First and Second years in the Faculty of Law of the University of British Columbia (See Faculty of Law calendar for admission requirements.)

# Industrial Relations Option 9

#### Third Year Commerce 321, 322, 324, 331 7½ units of electives

Fourth Year Commerce 422, 425, 490, 492 6 units of electives

#### Urban Land Economics Option 10

# Third Year Commerce 307, 309, 322, 337 Economics 308 or 310 7½ units of electives

# Fourth Year Commerce 407, 408, 409, 490, 492 Economics 310 Architecture 425 3 units of electives

#### Courses

The number of units assigned to a course is given in round brackets immediately following the course number. Thus 252 (3) under Accounting indicates that Accounting 252 is a three-unit course.

The hours assigned for laboratory, lectures and tutorials in a course are indicated as follows:

2 lectures and 2 hours laboratory per week, both terms.	[2-2; 2-2]
1 lecture and 2 hours laboratory per week, first term.	[1-2; 0-0]
1 lecture and 2 hours laboratory per week, second term.	[0-0; 1-2]

Note.—For descriptions of those courses taken outside the Faculty of Commerce, students should consult calendars of other Faculties.

#### Undergraduate Courses in Commerce

#### Urban Land Economics

- 307. (1½) Urban Land Economics.—Economic characteristics of urban real estate market; nature of urban land use; city growth and development; locational factors in determination of land use; types of interest in land; government regulations affecting land ownership.
- 309. (1½) Real Estate Finance.—Investment policies in respect of freehold and leasehold urban property; institutional mortgage investments and characteristics of mortgage markets; economic aspects of building design. [0-0; 3-0]
- 407. (1½) Real Estate Valuation.—Purposes of market value estimation; definitions of value; valuation as economic prediction; probability qualifications in valuation; productivity analysis; macro market analysis; micro market analysis; market simulation; methods of statistical inference; critique of the "Three Approaches to Value". [3-0; 0-0]
- 408. (11/2) Real Estate Investment Analysis.—Investment and urban growth; investor objectives and motivations, measurement of investment productivity; fixed features and discretionary variables; processes of investment analysis; analytical models; special investment situations.
- 409. (1½) City Growth and Structure.—Urban economics; economic base analysis; communication systems; social, political and geological factors; land use controls; spatial assignment of activities; cohesion of functions; anatomy of land use; land use succession; dynamics of location; locational productivity analysis; urban planning; urban renewal. **[0-0: 3-0]**

#### Ouantitative Methods

- 110 (3) Probability and Statistics.—Descriptive statistics, probability in finite sample spaces, random variables and probability distributions, including Binomial, Poisson, and hypergeometric. Value calculations. Elementary decision theory. Sampling distributions, normal distributions. Estimation, tests of hypotheses. Elementary correlation and regression. Applications to business problems. Г3-0: **3-**01
- 210. (3) Quantitative Analysis for Business.—Linear Algebra, linear programming, elementary inventory models, queuing. Introduction to simulation. Scheduling with CPM and PERT. [3-0: 3-0]
- 310. (1½) Simulation Models in Business Decision-Making.—Computer simulation, simulation languages. Typical business applications in financial

planning, waiting line problems and other operating problems. [3-0: 0-0]

315. (1½) Statistics.—(For Graduate students only.) An introduction to statistical methods. Probability and probability distributions. Statistical inference. Simple linear regression analysis.

- 316. (3) Management Science.—(For Graduate students only.) Statistical decision theory. Topics from management science: linear programming, critical path analysis, PERT, queuing problems, inventory models, introduction to simulation. Applications to business problems.
- 317.  $(1\frac{1}{2})$  Introduction to Data Processing.—(For Graduate students only.) The structure and use of digital computers. Introduction to programming. Typical applications to numerical and non-numerical problems. The emphasis will be on giving the student a knowledge of the potential and limitations of computers, and on providing the necessary background to communicate intelligently with computer specialists.

410. (1½) Problem Solving Methods.—Heuristics, recursion, simple dynamic programming examples. Superposition — breaking down large problems, decomposition and synthesis. Problem solving under uncertainty.

[0-0; 3-0]

411. (1½) Selected Topics in Quantitative Methods.—Topics will vary from year to year and depend upon the interests of the students and the availability and interest of the faculty. Examples of topics that might be discussed are: Optimization Theory; Multivariate Statistics for Business; Forecasting and Time Series Analysis; Bayesian Decision-Making. [3-0; 0-0]

#### Industrial Relations

- **221.** (2) Organizational Behaviour.—An introductory examination of the managerial function in industrial and commercial enterprises. Emphasis will be placed on the behavioural analysis of managerial problems, including the following: division of labour and specialization, technological change, motivation and leadership, informal group behaviour, line and staff relationships, and evaluative and control processes. Γ4-0: 0-01
- 321. (3) Organizational Behavior and Administration.—A study of theory and practise in the effective design of organizational structures and problems of effective administration. The course will examine problems of work environment, motivation and morale and their influence on productivity. [3-0; 3-0]
- 322.  $(1\frac{1}{2})$  Labour Relations.—An examination of the impact of trade unions on the management of industrial and commercial enterprises. This course will develop for the student of business administration an understanding of trade unions in Canada, their aims and objectives. Problems of public policy in the regulation of labour-management relations will be examined in detail. [3-0; 0-0]
- 323. (1½) Introduction to Administrative Studies.—(For Graduate students only.) A study of complex organizations and administration; administrative control; communications systems and networks; centralization and decentralization; administrative goals and conflict; decision-making; group
- 324. (3) Personnel Administration.—An examination of problems and analytical tools involved in maintaining an efficient workforce, with particular emphasis on manpower planning and policy, employee selection, job analysis and evaluation, employee development and appraisal, wage and salary ad-[3-0; 3-0]ministration, and manpower research methodology.

- 422. (3) Collective Bargaining.—The study of labour-management relations in the negotiation and administration of the collective agreement. The course will examine trends in collective bargaining; changing patterns of labour-management relations in adjusting to social, environmental and economic forces. Case materials will be used to develop an understanding of the bargaining processes and the administration of collective agreements.
- 425. (3) Management of Human Resources.—The examination of decisions, plans and policies formulated to ensure maximum development and utilization of human resources. Special attention will be given to problems of motivation and morale associated with changing technology. Materials will be drawn from a wide spectrum to provide a detailed understanding of diverse approaches to problems of manpower management. [3-0; 3-0]

#### Commercial Law

- 331. (3) Commercial Law.—Introduction to the law of contracts, with particular reference to contracts for the sale of goods (Sale of Goods Act) and related law of personal property; negotiable instruments (Bills of Exchange Act); elementary principles of agency; partnership (Partnership Act) and company law (B.C. Companies Act); examination of selected legal and commercial documents. [3-0; 3-0]
- 337. (3) Land Law.—Elements of law of contract as related to the sale of land; introduction to the law of land including the nature of land ownership; landlord and tenant; mortgages; governmental powers. [3-0; 3-0]
- 432. (1½) Statute Law.—Examination of selected statutes. (Not offered in 1969-70.) [3-0; 0-0]

#### Transportation and Utilities

- 341. (3) Business Logistics.—The nature and interaction of the physical distribution functions are examined with special attention given to the characteristics of transportation. Methods of integrating and controlling the functions are studied with emphasis upon warehouse location, and the techniques of inventory control and linear programming. [3-0; 3-0]
- 342. (1½) Transportation Policy. (For Graduate students only.)—A study of the economic and institutional setting of transportation as a basis for examining policy development within transportation companies and government, and as a background to the role of transportation in business logistics.
- 343. (1½) Public Utilities.—A study of the special problems of government owned and government controlled businesses, with special reference to managerial, economic and regulatory aspects. Methods of organization, control of competition and price determination. [0-0; 3-0]
- 444. (1½) Air Transportation.—Development of Canadian air transport and public policy; airline management, air law and regulation; airline economics, with special reference to cost behaviour and demand for air transport; pricing. International Associations and agreements on factors affecting economical operations. [3-0; 0-0]
- 445. (1½) Water Transportation.—A study of the economic characteristics of ocean and inland water transportation. Special attention is given to the problems of government involvement in the shipping industry and to the problems of ocean shipping and its effects upon international trade.

  [0-0; 3-0]
- 446. (1½) Highway Transportation.—Development of highway transport, and selected topics of motor carrier economics and management. Problems in

the regulation of motor carriers. Evaluation of highway plans and methods ro-o: 3-01 of highway finance.

#### Accounting

- 151. (1½) Fundamentals of Accounting.—The analysis and communication of financial events and an examination of the accounting postulates underlying the preparation and presentation of financial statements. [0-0: 2-2]
- 252. (3) Management Accounting.—The basic concepts of management accounting, income tax and financial statement analysis. The role of accounting in the creation and application of the historical and projective data used by decision-makers in the management of the enterprise. [3-0; 3-0]
- 351. (1½) Income and Other Taxes.—A study of special income tax problems; consideration of tax provisions and tax burdens in selected foreign countries; an examination of the federal sales tax, and selected B.C. taxing statutes. [0-0; 3-0]
- 352. (3) Managerial Accounting. (For Graduate students only.)—The use of figure data in making decisions and in appraising actual operating results of business enterprises. The course will include a study of fundamental accounting postulates, as applied in financial accounting, cost accounting, [3-2; 3-2] and budgeting.
- 353. (11/2) Advanced Accounting.—Intermediate. An examination of accounting as a means of measurement and as an information system for [3-0; 0-0] external reporting purposes.
- 354. (3) Cost Accounting.—Cost accounting as a management tool and [3-0; **3**-0] means of cost control within economic entities.
- 355. (1½) Income Taxation.—A study of income tax from the standpoint of business enterprise. **13-0: 0-01**
- 356. (1½) Accounting Systems.—Accounting information systems including the automated processing of data within economic entities. [0-0; 3-0]
- 357. (2) Accounting and Finance. (Primarily for Forestry students.)—This course will give a foundation in basic accounting principles and elements of [2-0; 2-0] business finance.
- 358. (2) Elements of Accounting. (For Pharmacy students only.)—Accounting systems suitable for druggists' use; inventory records; departmental accounting; branch accounting; computation of losses and gains; elementary tax problems. [2-0; 2-0]
- 359. (2) Accounting and Food Control. (For Home Economics students only.)—An introduction to general accounting procedures, followed by application to particular problems encountered by the dietitian. (Given in 1969-70 and alternate years. [2-0; 2-0]
  - 450. (1½) Advanced Accounting Topics I.—Selected areas in accounting. [3-0; 0-0]
  - 451. (1½) Advanced Accounting Topics II.—Selected areas in accounting. [0.0; 3.0]
- 453. (1½) Financial Accounting: Advanced.—An examination of specialized topics of advanced financial accounting. (Not offered in 1969-70).
- [3-0; 0-0] 454. (3) Planning and Control Systems.—An integrating course to synthesize accounting as a means of planning, control and furnishing of information in economic entities.

- 455. (3) Auditing.—Internal control, legal and professional, responsibilities of the auditor; accepted auditing standards and procedures; preparation and presentation of reports and statements. [3-0; 3-0]
- 458. (2) Cost Accounting. (For Forestry students only.)—Principles of cost [2-0; 2-0] accounting and their use in the forest industry.
- 459. (3) Introduction to Accounting.—Introduction to accounting for business organizations; interpretation of financial statements; underlying problems of valuation; forms and uses of business organizations; cash flow; elements of internal control; importance of accounting data in decision-making in the firm. (For non-Commerce students only.) rs-0: 3-01

#### Marketing

- 261. (2) Fundamentals of Marketing.—A study of the basic considerations affecting the domestic and international marketing of goods and services. [2-0; 2-0]
- Merchandising and Distribution.—(For Graduate students only.) A study of the methods used in the marketing of goods and services. Problems in merchandising, selection of channels of distribution, sales promotion, and pricing.
- 362. (1½) Management of Promotion.—An analysis of buyer behaviour; planning, controlling, and coordinating of the promotional functions of the firm. [3-0; 0-0]
- 363. (11/2) Marketing Institutions.—A study of the concepts of product flow which form the bases for the development of intermediate marketing institutions in Canada; including a critical examination of institutional growth, change and operational management. [0-0; 3-0]
- 364. (1½) International Marketing.—An analysis of the bases of trade, international commercial policy, and other environmental factors which affect international marketing; followed by an investigation of the problems peculiar to the development and implementation of marketing strategy to serve international markets. [3-0; 0-0]
- 365. (1½) Marketing Analysis. A study of quantitative methods of analysis applicable to the investigation of marketing problems; sources of market data; market tests; consumer research. [0-0; 3-0]
- 366. (1½) Research Methods.—The research process; methods of primary [3-0; 0-0]research; the formulation of a research design.
- 369. (3) Drug Store Retailing. (For Pharmacy students only.)—Principles and practices involved in the organization and operation of the chain and independent drug store. Retail mathematics, credit, advertising, display, [3-0; 3-0] selling, public relations, personnel training.
- 462. (11/2) Promotion Problems.—Campaign strategy; planning, organizing, and controlling an advertising programme. Advertising research and analysis. [3-0; 0-0]
- 463. (1½) Institutional Marketing Problems.—An investigation of current developments in both retailing and wholesaling fields and their application to marketing institutions.
- 465. (11/2) Marketing Research Problems.—The application of research methods to problems in marketing; a study of selected techniques of measurement and analysis; the use of behavioural and quantitative models in marketing investigations. [3-0; 0-0]
  - 466. (11/2) Industrial and Resource Marketing Problems. Managerial

problems involved in marketing Canadian industrial commodities and basic resources; an examination through problem analysis of producer goods and the specialized channels of distribution through which they flow. [3-0; 0-0]

467. (3) Marketing Management.—A study of managerial decision-making with particular emphasis on product planning and market analysis; distribution policies, methods and procedures; pricing and sales policies; and govern-[3-0; 3-0] mental regulation of marketing processes.

468. (11/2) International Marketing Management.—An analysis of the scope and significance of contemporary international business operations with particular reference to the marketing management problems encountered by firms with multi-national branches and subsidiaries. [0-0; 3-0]

#### **Finance**

- (2) Business Finance.—Introduction to problems of financial analysis, planning and control, including capital budgeting, valuation and cost of capital, capital structures and dividend policy; financial strategies for growth [0-0; 4-0] including mergers.
- 370. (1 $\frac{1}{2}$ ) Tax and Estate Planning.—Income tax and succession duty laws are examined against the background of a number of cases designed to illustrate current estate planning practice. The value of life insurance and alternative investments is considered and several forms of property interests are discussed in detail. [0-0; 3-0]
- 371. (1½) Financial Management.—Advanced problems of financial management from internal point of view. Debt policy and capital structure planning; capital costs and capital budgeting, dividend policy, valuation, [0-0; **3-**0] mergers and acquisitions; public policy.
- 373. (1½) Business Finance. (For Graduate students only.)—Types of business organization; problems of financing; provision of short-term and long-term capital; expansion and combination; public policy.
- 374. (11/2) Security Analysis.—Analytical techniques for the appraisal of corporate and government securities; security price movements; sources and interpretation of information; technical characteristics of stock markets. f3-0: 0-01
- 375. (3) Personal and Business Finance. (For Education students only).— An examination of the instruments of business and personal finance and a study of the methods of presenting these topics to high school students. Forms and instruments of business finance, life insurance, banking, investments, general [3-0; 3-0] insurance, real estate. Special project assignments. Field trips.
- 376. (1½) Financial Institutions I.—An introduction to the capital market in Canada; a study of the policies and practices of institutions engaged in mobilizing funds for medium and long-term investment. [3-0; 0-0]
- 378. (1½) Life Insurance and Personal Risk.—The study of the nature and application of life insurance and annuities; life contingencies; mortality tables; legal aspects. Health, group benefits, pensions and social security. [3-0; 0-0]
- 379. (11/2) Insurance and Risk Management.—Nature of risk and uncertainty; methods of meeting risk; the insurance mechanism; legal problems of insurance; various types of contracts and carriers. [0-0; 3-0]
- 471. (11/2) Theory of Finance.—A study of the theory of resource allocation in the firm. The problems of applying models to financial planning. [3-0: 0-0]
  - 472. (1½) Quantitative Analysis of Financial Decisions.—Application of

- 475. (1½) Investment Policy.—The management of security portfolios for individual and institutional investors; relation of investment policy to money markets and business fluctuations. [0-0; 3-0]
- 476. (1½) Financial Institutions II.—The analyses of financial intermediation in the money and capital markets in Canada; emphasis on the dynamics of these markets through analyses of hypothesized links between the major participants in these markets and other sectors of the Canadian economy.

  [0-0: 3-01]
- 477. (1½) International Financial Institutions.—A study of the policies and practices of the leading international financial institutions which have emerged since World War II, such as: the International Bank for Reconstruction and Development, International Monetary Fund, International Finance Corporation, and the International Development Association. [0-0; 3-0]

#### Industrial Administration

- 381. (1½) Industrial Organization. (For Graduate students only.)—A survey of the management functions involved in establishing and operating a business with particular reference to manufacturing.
- 382. (1½) Materials Control.—A detailed study of the principles and practices involved in establishing standards and procedures for the control of quantity and quality of materials in manufacturing processes. [0-0; 3-0]
- 383. (3) Production Analysis.—A study of industrial systems and of the relevant techniques of data collection and analysis. There will be special emphasis on the development and use of mathematical models of the production situation.

  [3-0; 3-0]
- 384. (2) Industrial Management. (For Forestry and Agriculture students only.)—A survey of industrial management principles, problems, practices, and procedures. [2-0; 2-0]
- 483. (3) Planning and Control Problems.—Advanced problems in planning and controlling work operations with special emphasis on quantitative analysis. Case and field work problems. [3-0; 3-0]

#### Management and Policy

- 190. (1½) Fundamentals of Business.—Introduction to the basic concepts and techniques of business functions and organization. [3-0; 0-0]
- 490. (3) Essay.—Students will be required to submit an essay on a selected business topic.
- 492. (3) Policy and Administration.—Case diagnosis and remedial measures. In this course the student is expected to apply the principles and techniques acquired in the basic courses to comprehensive problems. Extensive references. Verbal and written reports. [3-0; 3-0]
- 494. (3) Government and Business.—An examination of federal and provincial regulation of the economic system. Critical analysis of combines investigation legislation, price maintenance, loss leaders, patent policy, industrial and corporate concentration, measurement and maintenance of competition.

  [3-0; 3-0]

#### Graduate Courses in Commerce

#### **Urban Land Economics**

507. (1½) Seminar in Contemporary Land Investment Problems.—Real estate investment analysis for both equity and mortgage investments, invest-

ment theory and urban growth, investment behavior in the real estate market, applications of investment decision theory, role of appraisal procedures, feasibility studies, Ellwood analytical model, computer-aided impact models for investment analysis.

- 508. (1½) Seminar in Government Policy in Relation to Urban Land Ownership.—Community planning and its implementation, police power regulation, housing policies, urban renewal, mortgage money, policies, taxation, expropriation, landlord-tenant legislation.
- 509. (11/2) Seminar in Mortgage Financing.—Advanced problems arising in the mortgage money market. Emphasis on contemporary problems of flow of mortgage funds. Comparative study of government and institutional policies.
- 510.  $(1\frac{1}{2})$  Economics of Location.—Location theory; industrial location; regional growth and locational equilibrium; locational distribution of urban activities.

#### Industrial Relations

- 520. (1½) Organizational Behavior and Administration.—An examination of problems and issues in the administration of human resources in business organizations. The course will concentrate on specific behavioral and attitudinal problems which face the practicing manager. Concepts, theory and research from various social sciences will be presented in analyzing determinants of and possible solutions to the problems.
- 521. (1½) Theory, Research and Methodology in the Study of Organizational Behavior.-An attempt to identify and integrate various theoretical frameworks utilized in the study of behavior in business organizations. Major empirical research findings will be reviewed in the light of the theoretical viewpoints discussed. Concomitantly, key methodological approaches and problems in behavioral research in business organizations will be illustrated.
- 522. (1½) Selected Problems in Labour Relations.—An examination of contemporary problems of labour relations, with particular emphasis on public policy issues, conciliation, and arbitration procedures, the process of labour-management accommodation to technological change, the status of unions in society and their impact on the management of industrial and commercial enterprises.
- 523. (11/2) Seminar in Labour Relations.—An examination of major research findings in selected areas of labour relations with particular reference to the growth and potential of labour unions, their impact on management, disputes settlement, public policy issues in labour-management relations, and internal union structure.
- 625. (11/2) Seminar in Organizational Behaviour.—Theoretical and research contributions from the social and administrative sciences relevant to behaviour in business organizations. Emphasis will be placed on evaluation and synthesis of theories and related empirical evidence in the field.
- 626. (1½) Seminar in Manpower Management.—Problems of manpower management at the local, regional and national levels. Emphasis will be placed on the integration of man-machine systems, development of manpower resources and the application of quantitative and computerized methods and research.
- 628. (1½) Organizational Behaviour Research.—A study of the process and methods of research in organizational behavior. The course will concentrate

on the design and execution of ongoing experiments, field studies and survey research, the selection or development of measuring instruments, problems of data collection and the qualitative and quantitative analysis of results.

#### Transportation and Utilities

- 544. (1½) Seminar in Transportation.—Studies of recent conditions and problems affecting domestic and international transportation costs and service.
- 545. (1½) Seminar in Transportation Economics.—A study of transportation requirements in economic development, including benefit-cost analysis, user cost recovery and transportation planning.

#### Accounting

- 551. (1½-3) Advanced Accounting Seminar.—The examination of selected areas in accounting.
- 552. (1½) Seminar in Income Determination.—An examination of the essential characteristics of business income, and the various unsettled issues in its calculation.
- 553. (1½) Seminar in Accounting Standards.—An examination of the accounting standards recommended by professional accounting bodies in Canada, the United States, and the United Kingdom—a comparison of the recommendations and a study of their impact on accounting practice and theory.
- 554.  $(1\frac{1}{2})$  Seminar in the Controllership Function.—The place of the controller in the business enterprise and his responsibility for financial planning and control.
- 555. (1½) Seminar in Data Processing.—The processing of business data; manual, tabulating, and the electronic data-processing systems.
- 556. (1½) Seminar in Advanced Managerial Accounting. Studies of managerial tools of budgeting, costing for decision-making.
- 557. ( $1\frac{1}{2}$ ) Seminar in Taxation.—A study of taxation as it affects business entities.

#### Marketing

- 562. (1½) Marketing Strategy.—A course emphasizing the strategic considerations of marketing management decision-making. Attention is given to those variables within the control of management of a given firm; the impact of the actions of a firm's competitors on that firm's decision outcomes; and environmental variables and constraints.
- 563. (1½) Marketing Planning.—This course requires students to apply institutional, and analytic, concepts to the marketing problems of the firm; the outcome of which is a set of marketing plans consistent with resources and marketing opportunities.
- 564. (1½) Seminar in Market Analysis.—The economic and social determinants of demand, sales forecasting; market research methodology; the use of sampling, questionnaire design, and statistical inference in marketing investigations; sources of market data, the design of marketing investigations and the analysis of information for marketing management.
- 566. (1½) Seminar in International Marketing.—A study of the management of international marketing activities as performed by the individual firm. The seminar will deal with the foreign marketing of exported products and/or the products of overseas affiliates. Emphasis is placed on the policy

and strategy formulation for the firm's international marketing efforts, and on the organization and administration of the firm's resources for accomplish-

ing its international marketing objectives.

568. (11/2) Seminar in International Business.—A comparative study of the business and marketing systems employed in selected nations of the world. The seminar will deal with the relationships between business and marketing practice and the socio-economic environments of these nations.

- 660. ( $1\frac{1}{2}$ ) Research Seminar in Marketing.—A study of the research process and the methodological problems in undertaking research in marketing. Particular attention will be given to sampling problems, the design of measuring instruments, the design of experiments, problems of data collection, and the analysis of experimental results.
- 661. (1½) Seminar in Marketing Systems.—An investigation of the structure of the marketing system and the institutions that contribute to the distribution of goods and services; the constraining effect of the social, legal, competitive, and economic environment on marketing variables.
- 662. (11/2) Seminar in Buyer Behaviour.—Analysis of the factors influencing buyer behaviour. Methods of influencing demand are evaluated in relation to specific marketing objectives.

#### Finance

- 571. (1½) Seminar in Optimal Financing Decisions.—This course presents a systematic application of financial theory to the problem of the firm's financing decisions. It assumes an understanding of basic corporate finance, statistics and economics. Topics to be examined include: the problem of capital structure, including the relation of price to leverage, the basis for risk aversion and the concept of utility in financing decisions; mergers.
- 572. (1½) Seminar in Financial Management.—This course is concerned with the development of decision criteria for asset management under uncertainty from the corporate viewpoint. Particular emphasis will be directed to capital expenditure decisions-forecasting funds flow, and the economic management of current assets.
- 574.  $(1\frac{1}{2})$  Seminar in Security Analysis.—Studies of recent research in principles and techniques of security analysis; valuation of securities; analysis of investment risks; use of statistical techniques in security selection. Review of theories on security price movements.
- 575. (11/2) Seminar in Investment Management.—Policies and practices of institutional investors. Quantitative analysis of security and real estate investments. Market behaviour.
- 576. (1½) Seminar in Financial Institutions.—A study of the functional processes of monetary and non-monetary financial institutions participating in the market for financial assets. The seminar will deal with the implemental aspects of monetary policy and be concerned with the various attempts made to develop a theory of financial institutions.
- 577. (1½) Seminar in International Finance.—The organization and functioning of the international financial system; financial decision-making and planning of multinational firms.
- 579. (11/2) Seminar in Insurance and Risk Management.—Studies of the theory of risk, risk bearing and insurance within the framework of management decision-making. Specific topics to be dealt with will include: risk analysis; methods of meeting risk with attention given to special problems, e.g. those arising out of consolidations and foreign operations; employee

- 671. (3) Advanced Topics in Finance.—This seminar is concerned with advanced topics in valuation, capital structure, cost of capital, capital budgeting, working capital management, portfolio selection and financial markets, with particular emphasis on the theoretical foundations. Key concepts and issues will be developed through study of the literature, class discussion and written reports.
- 672. (1½) Research Seminar in Finance.—This seminar is designed to bring together on a regular basis, doctoral candidates and faculty members interested in the field of finance. Focus will be on the current research of faculty and doctoral candidates in the several areas of finance. The seminar will provide opportunities for the presentation, discussion and criticism of research work, including thesis proposals.

#### Industrial Administration

- 580. (1½) Seminar in Production.—Readings and research in new techniques in manufacturing and production control.
- 581. (1½) Seminar in Management Science.—A course in the application of mathematical programming to business problems; linear programming, variations on simplex method, post-optimal analysis; non-linear programming, integer and dynamic programming, standard model formulation. Generally, where applicable, computer package programmes will be used.
- 582. (1½-3) Seminar in Simulation Models in Business.—A study of computer simulation used as a management tool; simulation models of the total firm and of subsystems of the firm.
- 583. (1½) Advanced Statistics.—Multiple correlation and regression analysis. Analysis of variance. Factorial experiments. Non-parametric statistics.

#### Management and Policy

- 590. (1½-3) Research in Business Administration.—Directed research in a selected area of business administration. Admission on the recommendation of the students' advisory committee and on the approval of the Dean of the Faculty of Commerce and Business Administration.
- 591 ( $1\frac{1}{2}$ ) Seminar in Business Policy.—A study of policy-making in business, government, and social fields.
- 592. (1½) Seminar in Business Administration. An examination of present-day thinking and research in the field of business administration.
- 593. (1½) Seminar in Research Methodology (of Business Administration).—An introduction to problems of logic and epistemology peculiar to the management sciences. Empirical inference, theory construction and hypotheses testing especially under the impact of small confidence ranges. The philosophic background of modern decision theory. Economic problems of computerized knowledge creation etc.
- 549. (3-6) Master's Thesis.—A comprehensive treatment of some theoretical or institutional problem.

#### PROFESSIONAL ASSOCIATIONS

- I. Institute of Chartered Accountants of B.C.
  - (a) Graduates of the Accounting Option will be exempted from the Inter-

mediate Uniform Examinations of the Institute. The candidates enter the Fourth Year course of the Institute and are required to serve two years under Articles.

- (b) Graduates with the degree of B.Com. other than in the Accounting Option are exempted by the Institute from the Primary Examination of the Institute and are required to serve three years under Articles. They are eligible to write the Intermediate Uniform Examination within a year from the commencement of training with the Institute.
- (c) A programme of intermittent employment of university undergraduates with practising chartered accountants has been approved by the Institute. Providing the necessary registration has been made with the Institute of Chartered Accountants prior to the commencement of employment, a reduction of one year in the period of articles in 1(a) and (b) above will be allowed for sixteen months of intermittent employment. Such intermittent employment must be in periods of not less than four months each. The Director of Education of the Institute of Chartered Accountants of B.C. at 530 Burrard Street (681-3264) will assist students in contacting firms who would be willing to employ students under this programme, and will advise on details of registration.
- (d) Commencing January 1, 1970 the minimal educational requirement for admission into articles with a firm of chartered accountants in B.C. will be an undergraduate degree from a recognized University.
- (e) Combined programme for Chartered Accountants and degree of B.Com. See page J11.

#### 2. Certified General Accountants Association of B.C.

- (a) Graduates of the five-year B.Com. programme will be granted exemption from the First and Second Year examinations of the Association and the period of required practical experience will be reduced to thirty-six months.
- (b) Graduates with the degree of B.Com., Accounting Option, will be granted exemption from the First, Second, and Third Year examinations of the Association. The period of required practical experience will remain at thirty-six months.

#### 3. Society of Industrial and Cost Accountants of B.C.

- (a) Graduates of the five-year B.Com. programme, Accounting Option, will be granted exemption from the following courses of the Society's programme of studies leading to the R.I.A. designation: Accounting I, Accounting II, Accounting III, Fundamentals of Cost Accounting, Managerial Statistics, and Industrial Organization and Management. They will be required to take the following courses: Advanced Cost Accounting, Report-Writing and Industrial Legislation.
- (b) Graduates of the five-year B.Com. programme, any option (other than accounting), will be granted the following minimum exemptions: Accounting I, Managerial Statistics, and Industrial Organization and Management. Additional exemptions will be granted, upon application to the Society, to the extent that comparable courses have been completed at the University.
- (c) A period of practical experience is required to qualify as a registered member of the Society.

#### 4. Real Estate Institute of B.C.

Graduates of the B.Com. programme, Urban Land Economics Option (option 10), will be admitted to the professional membership division without further examination and the period of required practical experience will be reduced from five years to two years.

#### PROFESSIONAL AND DIPLOMA COURSES

The Faculty organizes and operates programmes in a number of professional and technical fields, as set out below. Each programme requires detailed study over a period of several years, regular attendance at classes (or correspondence lessons, where specified), completion of assignments, and annual examinations in the subject matter of the year.

Admission requirements vary from programme to programme. Registration is limited to residents of this Province. Requests for information should be addressed to the Director of Continuing Education for Business.

- Certified General Accountants. A five-year programme, designed to meet the academic requirements for the C.G.A. Certificate of British Columbia. Lectures and Correspondence.
- 2. Chartered Accountants. A five-year programme designed to meet the academic requirements for membership in the Institute of Chartered Accountants of British Columbia. Lectures and Correspondence.
- 3. Registered Industrial Accountants. A five-year programme designed to meet the academic requirements for the R.I.A. Certificate. Lectures.
- 4. Junior Management. A three-year programme. Lecture courses in Marketing, Industrial Organization, and Finance.
- Municipal Administration. A four-year programme for persons employed in Municipal Administration. Correspondence lessons and Spring Institute. Junior Diploma on completion of First and Second Years; Senior Diploma on completion of Third and Fourth Years.
- Administrative Management Society. A three-year programme, designed to meet the academic requirements for the C.O.A. Certificate of British Columbia. Lectures.
- Real Estate and Appraisal. A three-year programme given by correspondence and lectures.
- 8. Sales Management. A three-year programme. Lectures.

# THE FACULTY OF DENTISTRY

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA
VANCOUVER 8 • BRITISH COLUMBIA CANADA

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# FACULTY OF DENTISTRY ACADEMIC STAFF

S. Wah Leung, B.Sc., D.D.S. (McGill), Ph.D. (Rochester), F.A.C.D., Professor of Oral Biology and Dean of the Faculty.

#### Department of Oral Biology

- S. WAH LEUNG, B.Sc., D.D.S. (McGill), Ph.D. (Rochester), F.A.C.D., Professor.
- LEON KRAINTZ, A.B. (Harvard), M.A., Ph.D. (Rice Inst.), Professor. (Leave of absence Dec. 1, 1968-Nov. 30, 1969.)
- JOHN D. SPOUGE, M.D.S. (Sheffield), F.D.S., R.C.S. (Eng.), M.R.C.S. (Eng.), L.R.C.P. (London), Professor.
- CARL F. CRAMER, M.S. (New Mexico), Ph.D. (Calif), Associate Professor.
- Joseph Tonzetich, B.S.A. (Brit. Col.), Ph.D. (Cornell), Associate Professor and M.R.C. Research Associate.
- GORDON S. MYERS, B.S. (Wyoming), D.D.S. (Wash.-St. Louis), Ph.D. (Calif.), Assistant Professor.
- C. Paul Osmanski, D.D.S. (Buffalo), M.S., Ph.D. (Illinois), Assistant Professor.
- LAWRENCE J. HEPPLER, D.D.S. (Alta.), Part-time Assistant Professor.
- RICHARD H. PEARCE, B.Sc., M.Sc., Ph.D. (Western Ont.), Honorary Associate Professor.
- JANICE JONEJA, B.Sc., Ph.D. (Birmingham), Honorary Assistant Professor.
- Cranleigh O. Parkes, B.Sc., M.Sc. (Cardiff), Ph.D. (Alta.), Honorary Assistant Professor.
- DONALD E. MACFARLANE, D.M.D. (Man.), Part-time Instructor.
- SERGE VANRY, D.M.D. (Man.), Part-time Instructor.

#### Department of Oral Medicine

- GILBERT J. PARFITT, F.D.S., R.C.S. (Eng.), M.R.C.S., L.R.C.P. (Guy's), D.M.D. (Alabama), F.R.C.D.(C), Professor and Head of the Department.
- FRED W. MUSAPH, "Tandarts" (Utrecht), D.M.D. (Tufts), Assistant Professor.
- IAN W. McQuillan, B.D.S. (Otago), Instructor.
- ROLAND W. LAUENER, M.D. (Brit. Col.), F.R.C.P.(C), Assistant Professor (Part-time).
- Neil Basaraba, D.D.S. (Alta.), M.S.D. (Wash.), Part-time Associate Professor.
- MATTHEW J. WATERMAN, B.Sc. (Sask.), D.D.S. (McGill), Part-time Assistant Professor.
- WILFRED A. JEFFRIES, D.M.D. (Oregon), Part-time Instructor.
- A. Lewis Kelland, D.D.S. (Dalhousie), Part-time Instructor.
- J. Frederick Reid, D.D.S. (McGill), Part-time Instructor.

#### Department of Oral Surgery

- DAVID T. ZACK, D.M.D. (Oregon), M.S.D. (Northwestern), Assistant Professor, Acting Head of the Department and Acting Clinic Director.
- R. Keith Lindsay, D.D.S. (Toronto), M.S. (Michigan), F.R.C.D.(C.), Parttime Instructor.

STANLEY J. FISHER, D.D.S. (Toronto), F.R.C.D.(C.), Part-time Instructor. Roger E. Meyer, D.D.S., M.S.D. (Washington), Part-time Instructor.

#### Department of Orthodontics

CLEMENT S. C. LEAR, B.D.S. (New Zealand), D.M.D. (Harvard), Associate Professor and Head of the Department.

CHARLES E. CRAIG, D.D.S. (Toronto), M.S. (Illinois), F.R.C.D.(C), Part-time Assistant Professor.

JOHN G. RYAN, D.D.S. (Toronto), M.S. (Michigan), F.R.C.D.(C), Part-time Assistant Professor.

ROBERT N. HICKS, D.D.S. (Alberta), M.S. (Northwestern), Part-time Instructor.

#### Department of Public and Community Dental Health

Douglas J. Yeo, D.D.S. (Toronto), M.P.H. (Michigan), Associate Professor and Head of the Department; Director, Programme of Dental Hygiene.

MARGARET M. E. ROBINSON, R.D.H. (Oregon), B.Sc. (Wash.), M.Sc. (Iowa), Assistant Professor and Supervisor, Programme of Dental Hygiene.

H. KNOWLTON BROWN, D.D.S. (Alta.), D.D.P.H. (Toronto), LL.D. (Alta.), F.A.C.D., Lecturer.

J. C. Lewis, D.D.S. (Alta.), Part-time Lecturer.

MARIAN J. ALEXANDER, R.D.H. (Oregon), Part-time Instructor.

GERALDINE E. FRASER, R.D.H. (Alberta), Part-time Instructor.

W. Josephine Gardner, R.D.H. (Oregon), Part-time Instructor.

DOROTHY F. MAYERS, R.D.H. (Oregon), Part-time Instructor.

Susan R. Tick, R.D.H. (Man.), Part-time Instructor.

Marjorie J. Weich, R.D.H. (Alta.), Part-time Instructor.

W. R. UPTON, D.D.S. (Alta.), Honorary Lecturer.

W. J. WALLACE, Q.C., LL.B. (Osgoode, Toronto), Honorary Lecturer.

#### Department of Restorative Dentistry

TREVOR J. HARROP, L.D.S. (Glasgow), D.D.S. (Dalhousie), M.S., Ph.D. (Iowa), Assistant Professor, and Head of the Department.

RICHARD H. ROYDHOUSE, B.D.S. (New Zealand), M.S. (Rochester), Associate Professor.

S. L. KHANNA, B.A., B.D.S. (Punjab), D.M.D. (Man.), M.S. (Rochester), Assistant Professor.

ALAN S. RICHARDSON, D.D.S., M.Sc. (Alberta), Assistant Professor.

ROSEMARY LEAR, B.D.S. (Belfast), Instructor.

JUNE F. WILLIAMS, B.D.S. (London), L.D.S., R.C.S. (Eng.), Instructor.

CLIFFORD AMES, D.D.S. (Alberta), F.R.C.D.(C), Part-time Associate Professor.

NORMAN C. FERGUSON, D.M.D. (North Pacific), Part-time Assistant Professor.

LORIN O. LIND, D.D.S. (Toronto), Part-time Assistant Professor.

Maurice M. Chechik, D.D.S. (Alberta), Part-time Instructor.

CLAUDE W. GARDNER, D.M.D. (Oregon), Part-time Instructor.

#### Department of Anatomy\*

Sydney M. Friedman, B.A., M.D., C.M., M.Sc., Ph.D. (McGill), F.R.S.C., Professor and Head of the Department.

JOSEPH A. M. HINKE, M.D. (Brit. Col.), Professor.

JOSEPH M. ODIORNE, Ph.D. (Harvard), Associate Professor.

WILLIAM A. WEBBER, M.D. (Brit. Col.), Associate Professor.

CONSTANCE L. FRIEDMAN, M.Sc., Ph.D. (McGill), Research Associate Professor.

KENNETH R. DONNELLY, B.A., M.D. (Brit. Col.), Assistant Professor.

CARL T. FRIZ, Ph.D. (Minnesota), Assistant Professor.

CHARLES E. SLONECKER, D.D.S., Ph.D. (Washington), Assistant Professor.

ARTHER W. SPIRA, B.S. (New York), M.S., Ph.D. (Michigan), Assistant Professor.

#### Department of Biochemistry\*

MARVIN DARRACH, M.A. (Brit. Col.), Ph.D. (Toronto), Professor and Head of the Department.

CHARLES T. BEER, D.Phil. (Oxon.), A.R.I.C., F.R.I.C. (M.R.C. Associate), Professor.

GORDON HENRY DIXON, B.A. (Cantab.), Ph.D. (Toronto), Professor.

VINCENT J. O'DONNELL, B.Sc., Ph.D. (McGill), Professor.

WILLIAM J. POLGLASE, M.A. (Brit. Col.), Ph.D. (Ohio State), Professor.

GORDON M. TENER, B.A. (Brit. Col.), M.S., Ph.D. (Wisc.), (M.R.C. Associate), Professor.

SIDNEY H. ZBARSKY, B.A. (Sask.), M.A., Ph.D. (Toronto), Professor.

Albert F. Burton, B.Sc. (Man.), M.Sc. (West. Ont.), Ph.D. (Sask.), Associate Professor.

JAMES F. RICHARDS, M.A. (Queen's), Ph.D. (West. Ont.), Associate Professor.

MICHAEL SMITH, B.Sc., Ph.D. (Manchester), Associate Professor (Part-Time).

PHILIP D. BRAGG, B.Sc., Ph.D. (Bristol), (M.R.C. Scholar), Assistant Professor.

#### Department of Pathology\*

HAROLD E. TAYLOR, M.D., C.M. (Dalhousie), F.R.C.P. (Edinburgh), F.R.C.P. (C), Professor and Head of the Department.

Paris Constantinides, M.D. (Vienna), Ph.D. (Montreal), Professor.

P. S. Vassar, M.B., B.S. (London), F.C.A.P., M.C. Path. (Eng.), Professor.

W. H. CHASE, B.Sc., M.D., C.M. (McGill), Associate Professor.

WILLIAM L. DUNN, B.Sc., M.D. (West Ont.), Ph.D. (London), Associate Professor.

R. H. PEARCE, M.Sc., Ph.D. (West. Ont.), Associate Professor.

RALPH SPITZER, A.B. (Cornell), Ph.D. (Cal. Tech.), M.D. (Man.), Associate Professor. (part-time)

DAVID HARDWICK, M.D. (Brit. Col.), Assistant Professor.

Philip E. Reid, B.Sc. (Bristol), M.Sc., Ph.D. (Queen's), Assistant Professor and Medical Research Council of Canada Scholar.

DONALD B. RIX, B.A., M.D. (West Ont.), Assistant Professor.

C. F. A. CULLING, F.I.M.L.T. (London), Instructor.

#### Department of Pharmacology\*

JAMES G. FOULKS, B.A. (Rice), Ph.D. (Johns Hopkins), M.D. (Columbia), Professor and Head of the Department.

GEORGE I. DRUMMOND, B.Sc., M.Sc. (Alta.), Ph.D. (Wisc.), Professor.

THOMAS L. PERRY, A.B. (Harvard), B.A. (Oxon.), M.D. (Harvard), Professor.

GORDON E. DOWER, M.R.C.S. (England), L.R.C.P., M.B., B.S. (London), F.A.C.C., Associate Professor.

Morley C. Sutter, B.Sc., M.D., Ph.D. (Manitoba), Associate Professor.

RUDOLF VRBA, Ing. Chem., Dr. techn. Sc., C.Sc. (Prague), Associate Professor.

FLORENCE PERRY, B.Sc., M.Sc. (Dalhousie), Ph.D. (Toronto), Asisstant Professor.

Harvey D. Sanders, B.S.P., M.S.P. (Brit. Col.), Ph.D. (Manitoba), Assistant Professor.

ESTHER R. ANDERSON, B.Sc. (Toronto), Ph.D. (Glasgow), Instructor.

#### Department of Physiology\*

D. HAROLD COPP, B.A., M.D. (Toronto), Ph.D. (Calif.), F.R.S.C., Professor and Head of the Department.

HUGH MCLENNAN, M.Sc., Ph.D. (McGill), Professor.

CARL F. CRAMER, M.S. (New Mexico), Ph.D. (Calif.), Associate Professor.

RALPH KEELER, B.Sc., Ph.D. (Birmingham), Associate Professor.

JOHN R. LEDSOME, M.B., Ch.B., M.D. (Edinburgh), Associate Professor.

JOHN C. Brown, B.Sc. (Durham), Ph.D. (Newcastle), Assistant Professor.

Franco Lioy, M.D. (Rome), Ph.D. (Minnesota), Assistant Professor.

C. OWEN PARKES, B.Sc., M.Sc. (Wales), Ph.D. (Alta.), Assistant Professor. James A. Pearson, B.Sc. (Durham), Ph.D. (Newcastle), Assistant Professor.

#### Lecturers from Other Departments

Donald O. Anderson, B.A., M.D. (Brit. Col.), S.M. in Hyg. (Harvard), F.R.C.P. (C), Associate Professor and Head, Department of Health Care and Epidemiology.

RALPH M. CHRISTENSEN, B.A., M.D. (Brit. Col.), Assistant Professor, Department of Surgery.

<sup>\*</sup>Departments of the Faculty of Medicine.

#### FACULTY OF DENTISTRY

The Faculty of Dentistry was established in 1962 as the result of two detailed surveys of the need for dental education facilities in the Province of British Columbia, conducted in 1955 and 1961 by Dr. John B. Macdonald. The reports of these surveys have been published under the titles, "A Prospectus on Dental Education" and "Dental Education in British Columbia", respectively. These reports clearly demonstrated the need for a Faculty of Dentistry in the Province and strongly recommended that such a Faculty be established at the University of British Columbia. The Dean of the new Faculty was appointed in July, 1962, and a small class of undergraduate dental students was admitted in September, 1964. For three years instruction and administration was carried out in temporary facilities but in July, 1967, the Faculty moved into the new and modern John Barfoot Macdonald Building (Dental Health Sciences).

The teaching facilities have been designed as part of a developing Health Sciences Centre to promote integrated teaching of a health services team. Instruction in the basic health sciences is provided by the appropriate basic science departments, under the joint administration of the Faculty of Medicine and Faculty of Dentistry. Dental and medical students receive instruction together. Library facilities are provided in the new Woodward Biomedical Library.

The teaching of preclinical dental sciences and clinical dentistry is carried out in modern facilities in the Macdonald Building. These have been designed to reflect the newest concepts in educational methodology and the provision of patient care. Closed circuit television and extensive research facilities have been incorporated into the building. Provision has also been made for eventual introduction of continuing education and graduate and postgraduate programmes.

#### **Objectives**

The undergraduate dental programme consists of four years of professional study, leading to the degree of Doctor of Dental Medicine (D.M.D.).

The specific objective of the academic programme is to prepare dentists who will be able to practise their profession with a high degree of technical skill and competence based upon a sound understanding of the fundamental principles of basic biological sciences which underlie the practice of dentistry, and possessed of a deep insight into their social, professional and ethical responsibilities to the community at large. It is intended that the graduating dentist shall have the necessary scientific and technological foundation to begin the practice of modern dentistry, but not that he should be completely knowledgeable in all phases of dental science and dental art. It is hoped to impart to students the concept that graduation is but a beginning step in their professional education and that this educational process must be continued throughout their professional careers through graduate study, postgraduate and continuing education courses, and programmes of self-study.

#### Admission Requirements

Admission to the Faculty of Dentistry is based primarily on academic ability and personal qualities as evidenced by predental scholastic records, aptitude tests, letters of recommendation, and personal interviews. Since facilities for pre-clinical and clinical instruction are limited, enrolment must, of necessity, be restricted to those who, in the opinion of the Faculty, are best qualified to meet the mental and physical demands of the curriculum

and most likely to be able to complete successfully the full course of study. The fulfilment of the minimum requirements for admission should not be regarded as assurance that the applicant will automatically be accepted.

Application forms and information regarding predental requirements, tuition and fees may be obtained from the office of the Dean, Faculty of Dentistry, The University of British Columbia, Vancouver 8, B.C.

#### Predental Requirements

The requirements listed below apply to the student taking his predental work in the Faculty of Arts or the Faculty of Science at the University of British Columbia. An applicant from another university must submit evidence of having successfully completed equivalent prerequisite courses: English 100 (Literature and Composition); Mathematics 100 (Calculus I) and Mathematics 121 (Introduction to Vectors and Matrices) (120, 1968-69 or earlier); Chemistry 103 or 110 or 120 (General), Chemistry 200 (Analytical, Inorganic and Physical), or Chemistry 205 (Inorganic and Analytical), Chemistry 203 or 230 (Organic); Physics 110 or 120 or 130 (Elementary); Biology 101 (General).

The student should select other courses to conform with the requirements for a baccalaureate degree. It is strongly recommended that there be a fair representation of courses in the Humanities and Social Sciences in the student's programme of study.

Candidates for admission to the Faculty of Dentistry should have completed the equivalent of three academic years in the Faculty of Arts or Faculty of Science at the University of British Columbia. A minimal scholastic average of 65% or Second Class standing, based upon the system of grading used at The University of British Columbia, is required.

#### Aptitude Testing

Prospective applicants should take the Canadian Dental Association Dental Aptitude Test (or the American Dental Association Aptitude Test). Information and application forms are available from the Director of Student Services, U.B.C., or the Dean, Faculty of Dentistry or Dental Aptitude Test Programme, Canadian Dental Association, 234 St. George Street, Toronto 5, Ontario. Inquiries concerning the American Dental Association tests should be addressed to the Division of Educational Measurements, Council on Dental Education, American Dental Association, 211 East Chicago Avenue, Chicago, Illinois 60611. At the time of the test the student should request that the scores be sent to the Admissions Committee, Faculty of Dentistry, University of British Columbia, Vancouver 8, B.C.

#### Deposit

The successful applicant is required to submit a deposit of \$100 withir four weeks of notification of his acceptance by the University if notified prior to April 15 and within two weeks if notified after that date. This deposition is non-refundable and shall be applied toward the tuition of the first term of the session for which the student had been accepted.

#### Combined B.Sc. degree and D.M.D. degree programme

Students who have completed three years in the Faculty of Science and th first year in the Faculty of Dentistry at this university, and who have completed all the course requirements for the B.Sc. degree, including up to 1

units of course work in the Faculty of Dentistry recognized for credit (Page T67) in the Faculty of Science, may on application and with approval of the Dean of Science receive the appropriate B.Sc. degree.

Students registered in the first year of the Faculty of Dentistry who have already obtained satisfactory standing in Biochemistry 400 (or the equivalent) and Physiology 400 (or the equivalent) may with approval of the Dean of Dentistry substitute equivalent units of other course work. Students expecting to qualify for an Honours B.Sc. degree in Biochemistry, Physiology or other science department must, in addition, meet the Honours requirement of that department and obtain the prior approval of the head of the science department concerned.

#### Admission of Students to Advanced Standing

- A. Students from an accredited Canadian or American dental school seeking transfer to this Faculty
- 1. Students who have been required to withdraw from any other dental school for academic or other reasons are not eligible for admission.
- 2. Students who have successfully completed one or more years at an accredited dental school and seek admission,
  - (a) must fulfil the predental admissions requirements of this University,
  - (b) must have successfully completed courses equivalent to those offered in this Faculty for the years below that into which transfer is being sought,
  - (c) may be required to pass special placement or other examinations set by this Faculty,
  - (d) may be required to repeat the year most recently completed at the former institution,
  - (e) shall not be eligible for admission into the fourth year.

## B. Dental graduates of other than accredited Canadian and American schools seeking admission to advanced standing

- 1. The applicant must pass the Science Achievement Test administered by the American Dental Association. (Information concerning these tests may be obtained from the Division of Educational Measurements, Council on Dental Education, American Dental Association, 211 East Chicago Avenue, Chicago 11, Illinois 60611).
- 2. The application must be supported by official transcripts, proof of graduation, or such other documents as may be requested by the Admissions Committee.
- 3. The applicant must satisfy the University's English requirements for students from other countries.
- 4. The applicant, if accepted, may be granted admission into either the second year or the third year. Those admitted into the second year and whose performance during that year, in the judgement of the Promotions Committee, was of exceptional quality and gave evidence that the student is capable of more advanced clinical work, may be promoted to the fourth year following completion of the second year.

#### C. Students not previously enrolled in a dental school

Students who have not previously enrolled in a dental school but who have fulfilled the predental admissions requirements of this University and, in addition, have successfully completed courses equivalent to those of the first year dental curriculum at U.B.C. may, upon the recommendation of the Admis-

sions Committee and with the approval of the Faculty, be admitted into the second year dental programme, excepting as noted in "D" below.

#### D. Students enrolled in the Faculty of Medicine at U.B.C.

The number of qualified applicants seeking admission to the Faculty of Dentistry and the Faculty of Medicine at the University of British Columbia generally exceeds the normal class capacity of these Faculties. A student who gains admission to one of these Faculties with the intent of eventually transferring with advanced standing to the other Faculty may be depriving another qualified student of the opportunity to obtain a dental or medical education. For this reason applications for transfer between the Faculties of Medicine and Dentistry are discouraged by the University and will be entertained only in the light of special circumstances.

#### Registration

The academic year of the Faculty of Dentistry begins on the Tuesday after Labour Day. Candidates who have been accepted for admission to the Faculty of Dentistry will be notified by mail of the time and place of registration. Failure to complete registration on the designated day will render the student liable for a late registration fee of \$25.00. No student will be allowed to register after the first day of instruction in the term, nor will he be admitted to any class after its first meeting, except by permission of the Dean.

A successful applicant who is taking his pre-dental requirements at the University of British Columbia is required to pass a physical examination at the University Health Service preceding admission. A successful applicant from another institution must submit, prior to registration, a medical certificate from his own physician, on the form provided by the University Health Service. Immunization against smallpox is required.

#### Fees-Subject to change without notice

First Term Fees, \$351 (includes A.M.S. fee of \$29), payable in full at the time of registration. However, students may pay full fees of \$673 at time of registration.

Second Term Fees, \$322, are payable in full on or before the first day of lectures in the second term. Students should mail cheques for the second term fees to the Accounting Office before this date with a note showing name and registration number.

A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.

#### Instruments and Supplies

Information regarding textbooks will be given by the instructor in each course. Not less than \$100 per year should be available for purchasing textbooks and expendable supplies.

The following instruments and supplies will be required during the four years of instruction. It is recommended that no purchases be made until details are furnished by the departments concerned.

	Approximate Price	
Instruments for anatomy and physiology Laboratory coats (4)		

Dental Instruments—First Year	\$ 50.00
-Second Year	
—Third Year	\$ 350.00
-Fourth Year	\$ 250.00

#### Attendance

- 1. Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments may be excluded from the final examinations. Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes.
- 2. Students, who because of illness are absent from a December or April examination, must submit a certificate, obtained from a doctor, to the University Health Service as promptly as possible.
- 3. Unavoidable absence of one day or less for reasons other than sickness must be explained to the instructor or instructors concerned when the student returns to classes. If the absence is for longer than one day, he must arrange for readmission through the Dean's office.
- 4. A student planning to be absent from classes for any reason must obtain previous permission from the Dean's office.

#### Withdrawal

Any student who after registration decides to withdraw from the University must report to the Registrar's office. He will be required to obtain clearance from the University, to the satisfaction of the Registrar, before being granted *Honourable Dismissal* or recommended, where applicable, for refund of fees.

The Faculty reserves the right to require a student to withdraw from the Faculty at any time if, in the opinion of the Faculty he is unsuited because of academic or other reasons, to proceed with the study or enter the profession of dentistry.

#### Examinations

- 1. Examinations in the Faculty of Dentistry may be held at various times throughout the year. These examinations are obligatory for all students.
- 2. Should a student find that he will be unavoidably absent from a sessional examination, he or someone familiar with his situation must notify the Dean's office of the facts in the case before the end of the period during which the examination is scheduled. Failure to observe this rule may result in a failure being recorded in the course.
- 3. When a sessional examination has been missed through illness or some other justifiable cause, application for deferred examination or special consideration must be made in writing to the Dean as soon as possible after the close of the examination period. If the absence was for reasons of health, a physician's certificate indicating the nature and duration of the illness must be submitted to the University Health Service.
- 4. A student may be denied the privilege of writing a sessional examination in any subject because of unsatisfactory work or attendance, and in this case he will be considered to have failed in the course.
- 5. In any course which involves both laboratory work and written examinations, a student is required to make satisfactory standing in both parts. If the course is repeated, no exemption will ordinarily be granted from the work in either part.

- 6. Term essays and examination papers may be refused a passing mark if they are illegible or noticeably deficient in English.
- 7. The passing mark in the Faculty of Dentistry is 60%. Examinations will be graded as follows: First Class, 80% or over; Second Class, 65%; Pass, 60%.
- 8. All results of final examinations will be passed by the Promotions Committee and approved by Senate. Release will be made by the Registrar. Final examination results will not be communicated through any other channel.

#### Advancement

- 1. The Faculty will determine the student's fitness for promotion at the end of each session. No student with defective standing will be promoted.
- 2. A student whose academic standing is unsatisfactory may be required either to withdraw from the Faculty or to repeat the entire work of the year.
- 3. If the progress of a student has been unsatisfactory in any given session, the Faculty may permit a supplemental examination in the subject failed provided: (i) his attendance has been satisfactory; (ii) he has not failed in more than two subjects; and (iii) he has an average of at least 60% in the work of the year including the failed subjects. The department or departments concerned may direct such work as will be necessary to prepare for the supplemental examination. It is the responsibility of the student to consult the heads of the departments concerned about such arrangements. If the student satisfies the requirements of the departments concerned and passes each supplemental examination with a mark of at least 65% he will be promoted. All supplemental examinations must be taken at the University.
- 4. A student in the First Year who fails to be promoted will not be permitted to repeat the year except under special circumstances.
- 5. A student who fails for a second time in University studies is required to withdraw.

#### **Examination Results**

Results of the sessional examinations in April are mailed to students in the graduating classes about the time of Congregation, and to students in the lower years by approximately June 15. Any student who must meet an application date for another institution prior to June 15 should inform the transcript clerk in the Registrar's office in order that arrangements may be made to meet the dead-line.

#### Review of Assigned Standing

Review of Assigned Standings are governed by the following regulations:

- 1. Any request for the review of an assigned grade, other than for a supplemental examination (in which a request for a review will not be granted), must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each course concerned which will be refunded only if the mark is raised.
- 2. Each applicant for a review must state clearly why he believes the course deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a second time before results are announced. For this reason an applicant granted a supplemental should prepare for the examination since a change in the original

mark is unlikely and the result of the review may not be available before the end of the supplemental examination period. A review will not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.

3. Reviews will not be permitted in more than two courses (6 units) in the work of one academic year, and in one course (3 units) in a partial course of 9 units or less in the work of one summer session.

#### Graduation (Requirements for the degree of D.M.D.)

- 1. A candidate for the D.M.D. degree must have fulfilled all the requirements for entrance to the Faculty of Dentistry and have attended the courses of instruction which comprise the dental curriculum. No one will be admitted to candidacy for the D.M.D. degree who has not been in attendance for at least two years at the University of British Columbia, the final year of which must be in the Faculty of Dentistry.
- 2. Each candidate for graduation must have passed all examinations in subjects comprising the dental course or must have received satisfactory standing in courses where specific marks are not assigned.
- 3. The Faculty will recommend to Senate the granting of the D.M.D. degree to a student who has completed satisfactorily the academic requirements and who, in addition, is recommended by the Faculty to be a suitable person to practise Dentistry.
- 4. Every candidate for a D.M.D. degree must make formal application for graduation. Application for graduation must be made not later than March 15. Special forms for this purpose are provided by the Registrar's office.

#### Regulations Regarding Licence to Practise Dentistry

The possession of a D.M.D. degree does not automatically confer the right to practise dentistry in any province in Canada. Each province has a licensing body which grants a licence to practise dentistry within its own borders. Inquiries concerning registration and licensing should be directed to the Registrar, College of Dental Surgeons of B.C., 925 West Georgia Street, Vancouver 1, B.C., or to his counterpart in other provinces. Most provinces will accept for registration the certificate issued by the National Dental Examining Board. Information concerning National Dental Examining Board examinations may be obtained from The Registrar-Secretary, National Dental Examining Board, 225 Metcalfe Street, Ottawa, Ontario, Canada.

#### Transcript of Academic Record

A transcript of a student's academic record will, on request of the student, be mailed by the Registrar direct to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the inscription "official transcript only if presented with seal unbroken". On graduation or withdrawal a student may obtain for his own use a copy of his record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of Christmas or mid-term examinations.

Student records are confidential. Transcripts are issued only at the request of students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made

arrangements satisfactory to the Accountant's Office to meet any outstanding indebtedness.

Granted Honourable Dismissal indicates that the student is in no disciplinary difficulty at the time the transcript is issued; the term has no reference to scholastic status.

Application for a transcript should be made at least one week before the document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

#### Courses of Instruction

The following courses are required of students in the First Year:

#### Anatomy

400, 401. Human Anatomy (Dentistry).—A correlated course of study of the structure of the human body including gross, microscopic and radiological anatomy and embryology for students of Dentistry.

#### **Biochemistry**

400. General Biochemistry.—A laboratory and lecture course dealing with the chemical and physical chemical phenomena underlying the functioning of the normal human body. Both terms.

#### Oral Biology

410. Dental Morphology.—A lecture and laboratory course dealing with the form, structure and function of the human dentition.

#### **Physiology**

400. Human Physiology.—A lecture and laboratory course on body function with particular reference to human physiology. The functions of muscle, nerve, central nervous system, special senses, metabolism, circulation, respiration, excretion, digestion, and the endocrines are dealt with.

#### Health Care and Epidemiology

400. Introduction to Statistics in the Health Sciences.—A 16 hours survey course by lecture and demonstration of the fundamentals, function and limitations of statistical methods as applied to the Health Sciences. The emphasis is upon statistical principles and research design rather than on statistical arithmetic.

#### Restorative Dentistry

411. Methods and Materials.—A lecture and laboratory course introducing the methods and materials used to restore and replace tooth structure and function.

The following courses are required of students in Second Year:

#### Anatomy

425. Elements of Neuroanatomy.—An introduction to the structure of the human nervous system. First term. Textbooks: Ransom, Clark. Anatomy of the Nervous System or Strong, Elwyn, Human Neuroanatomy. Given only in conjunction with Physiology 425.

Microbiology

425. Medical Microbiology.—Morphologic and cultural characteristics of bacteria, viruses and fungi pathogenic for man. Offensive properties of microorganisms and defensive mechanisms of the body. Disinfection and sterilization. Chemotherapeutic agents. Discussion of epidemiologic features, sources of infection, modes of transmission, prevention, specific treatment and laboratory diagnostic procedures of human infectious diseases.

#### Oral Biology

- 420. Principles of Occlusal Function and Articulation.—A course of lectures, demonstrations and laboratory exercises concerned with the function of the teeth and associated structures, and the principles of articulation and occlusal function as a basis for clinical treatment.
- 423. Pathology of the Oral Tissues.—Lectures, laboratory and demonstrations emphasizing the gross and microscopic changes occurring in the structures of the oro-facial region associated with diseases of the soft and hard tissues. During the first nine weeks, students will attend classes in Human Pathology 425 in the Faculty of Medicine, covering the basic principles of general pathology. The dental students will also participate in autopsy demonstrations and clinical pathological conferences.

#### Oral Medicine

425. Oral Medicine and Diagnostic Procedures.—Lectures and clinics on the recognition of and treatment planning for diseases affecting the oral structures.

#### Oral Surgery

426. Principles of Oral Surgery and Anaesthesiology.—Lectures and clinics emphasizing the principles underlying common procedures in minor oral surgery, and the associated use of local anaesthetics.

#### Orthodontics

429. Introduction to Orthodontics.—The course is designed to expose the student to broad, basic biological concepts underlying the orthodontic science.

#### **Pharmacology**

425. Medical Pharmacology.—A lecture and laboratory course covering the fundamental pharmacological actions of drugs.

#### Physiology

425. Elements of Neurophysiology.—An introduction to the functions of the nervous system: First Term. Given only in conjunction with Anatomy 425.

#### Public and Community Dental Health

427. Professional Development.—This course will trace the development of Dentistry as a health profession, and identify the major contributors to the science, art, and principles of professional service, and the nature and significance of their contribution. Emphasis will be placed on the changing concepts of dental health and dental practice, particularly as these relate to professional and ethical attitudes and responsibilities.

#### Restorative Dentistry

421. Methods and Materials.—A course using programmed instruction, seminars and technical exercises in methods and materials used to restore and replace tooth structure and function.

422. Introduction to Clinical Restorative Dentistry.—Lectures and clinical demonstrations of the principles and methods used to restore oral tissues to proper function.

The following courses are required of students in the Third Year:

#### Medicine

435. General Medicine.—Systematic lectures and clinics covering medical disorders and the correlation of disordered function and anatomical changes with symptoms and signs, with particular emphasis on medical conditions related to dentistry. Application of basic medical sciences to clinical medicine is stressed.

#### Oral Biology

430. Oral Biology.—Lectures, seminars and laboratory demonstrations designed to illustrate and emphasize the relation between the biomedical sciences and clinical practice.

#### Oral Medicine

- 434. Periodontology.—A series of lectures on structure, function and diseases affecting the periodontal tissues; diagnosis, prevention and treatment. Clinical instruction is given in diagnostic procedures and surgical techniques. The underlying principles of treatment are stressed.
- 435. Oral Medicine and Oral Diagnosis.—Systematic lectures and clinics dealing with those diseases which affect the oral structures including neoplasms and developmental, hormonal, metabolic and nutritional disorders.

A series of lectures on the diagnosis of oral disease: the diagnostic procedures of history-taking, clinical examination, x-ray examination and interpretation, laboratory procedures, drugs and pharmaceuticals used in dentistry, and the role of biomedical sciences in the understanding of the clinical condition.

As clinical clerk, the student will receive instruction and gain experience in the taking of case histories, the examination of patients, the use and interpretation of x-rays and laboratory tests.

#### Oral Surgery

436. Oral Surgery.—Lectures, demonstrations and clinical instruction in the basic principles of oral surgery and the use of local anesthetics. Students will participate in performing oral surgery of a minor nature, including simple exodontia.

#### Orthodontics

439. Interceptive Orthodontics.—The course is designed to explore with the student the multiplicity of development events and growth factors which determine the broad spectrum of morphological pattern and physiological characteristics of cranio-facial complex, with a special emphasis on dental occlusion. The classification, etiology, diagnosis and treatment of malocclusion are studied on selected orthodontic cases. Simple orthodontic appliances are constructed and inserted.

#### Public and Community Dental Health

437. Community Dentistry I.—A lecture course designed to introduce the concept of community dentistry. After initial orientation to the general field of public health, the course will stress the specific field of dental public health and related material in preventive dentistry.

Restorative Dentistry

431. Restorative Dentistry and Pedodontics.—Lectures, clinical demonstrations and supervised clinical practice in operative, prosthetic and endodontic treatment. Additional instruction will be given in procedures used in the dental treatment of children.

Surgery

435. General Surgery.—A series of lectures and clinics designed to illustrate the basic surgical principles and diagnoses will be given by the Department of Surgery. Special reference will be made to surgical conditions most frequently encountered by the dentist.

The following courses are required of students in the Fourth Year.

#### Medicine

445. General Medicine.—A continuation of systematic lectures and clinics on medical conditions related to dental and oral disease. Individual instruction is given to small groups in medical wards and outpatient departments.

#### Oral Biology

440. Oral Biology.—Lectures, student seminars and directed laboratory investigations designed to familiarize the student with contemporary research in the biomedical sciences related to dentistry.

#### Oral Medicine

- 444. Periodontology.—Lectures, clinics and seminars in advanced techniques in the treatment of periodontal disease. Prognosis is discussed. Practical experience in the treatment of patients with periodontal disease is undertaken.
- 445. Oral Medicine and Oral Diagnosis.—A continuation of systematic lectures and clinics on diseases which affect oral structures. Treatment, including Pharmacotherapeutics, is discussed. Practice in prescription-writing is given.

#### **Oral Surgery**

446. Oral Surgery.—Lectures, clinical demonstrations and supervised clinical practice in oral surgery.

#### Orthodontics

449. Clinical Interceptive Orthodontics.—Diagnosis and treatment of selected orthodontic cases and clinical conferences; the course is designed to prepare the student for the task of management of simple orthodontic problems in general practice.

#### Public and Community Dental Health

447. Community Dentistry II.—A lecture and seminar course dealing with the socio-economic aspects of dentistry. Included in the course will be ethics, jurisprudence, practice management and intra and interprofessional relationships.

#### Restorative Dentistry

441. Restorative Dentistry.—Lectures, clinical demonstrations and supervised clinical practice in operative, pedodontic, prosthetic and endodontic treatment.

#### Surgery

445. General Surgery.—Lectures and clinics in the basic principles of surgical diagnosis and surgical techniques. Special reference is made to surgical conditions most frequently encountered by the dentist.

#### THE PROGRAMME OF DENTAL HYGIENE

In November 1966, the Senate of the University of British Columbia approved a proposal for a Programme of Dental Hygiene to be offered by the Faculty of Dentistry. The first class was enrolled in the fall of 1968.

#### Objectives.

The programme of dental hygiene consists of two years of specialized education leading to a diploma in Dental Hygiene. It is offered under the direction of the Department of Public and Community Dental Health of the Faculty of Dentistry. This programme is planned and organized to provide the education and training necessary for the specialized responsibilities of the dental hygienist in preventive dental health services.

The specific objective of the academic programme is to prepare dental hygienists to practise their technical and professional skills with a high degree of competence. It is intended that the graduating hygienist will have a scientific understanding of the biological sciences upon which the profession is based and will ethically assume professional and social responsibilities in society. It is desired that the graduating hygienist be imbued with the concept of continuing education through postgraduate and refresher courses and constant self-study.

#### Admission Requirements

- 1. Completion of first year in the Faculty of Arts or the Faculty of Science at the University of British Columbia, or its equivalent. Recommended subjects are: English, Mathematics, Chemistry (if Chemistry 12 not taken previously), Biology (if Biology 12 not taken previously) and Physics (if Physics 11 not taken previously).
- 2. A minimal scholastic average of 60% based on the system of grading at the University of British Columbia is required.
- 3. Application forms. All inquiries relating to admission to the programme of dental hygiene should be addressed to: The Supervisor, Programme of Dental Hygiene, Faculty of Dentistry, University of British Columbia, Vancouver 8, B.C. Completed application forms should be returned to this office not later than April 15, in the year for which the student is applying for admission. The following credentials must be submitted:
  - (a) Application on an official form, copies of which will be supplied on request by the Supervisor of the programme. (The Supervisor should be notified of any change in address or marital status).
  - (b) An official transcript of all high school and college work completed at the time of application. (If the applicant is still in school, the transcript should cover one-half of the present year's work).
  - (c) A recent photograph (at least 2" x 2") endorsed on the back with the applicant's name and date photograph was taken.
  - (d) A successful applicant who is taking pre-dental hygiene requirements at the University of British Columbia is required to pass a physical examination at the University Health Service preceding admission. A successful applicant from another institution must submit, prior to registration, a medical certificate from the applicant's own physician, on the form provided by the University Health Service. Immunization against smallpox is required.
  - (e) A dental examination record with all dental treatment completed before entrance.

# (f) Completed recommendation forms.

An interview by the Supervisor and Admissions Committee is required. If the applicant finds this impossible because of geographical distance to Vancouver, a request for a waiver should be submitted to the Admissions Committee, stating the reason, as soon as the need for a waiver is apparent.

The fulfilment of the minimum requirements for admission should not be regarded as assurance that the applicant will be automatically accepted.

Applicants are notified of acceptance or non-acceptance by the Dental Hygiene Admissions Committee. For further information write to The Supervisor, Programme of Dental Hygiene, University of British Columbia, Vancouver 8, B.C.

4. Deposit. Successful applicants are required to submit a deposit of \$50 within two weeks of notification of their acceptance by the University. This deposit is non-refundable and shall be applied toward the tuition of the first term of the session for which the students have been accepted.

# Registration

Registration for first year students in dental hygiene will take place on the Wednesday afternoon following Labour Day. Candidates who have been accepted for admission to the programme of dental hygiene will receive instructions by mail concerning time and location of registration. Failure to complete registration on the designated day will render the student liable for a late registration fee of \$25 for the first day (plus \$5 per diem on and after the prescribed date). No student will be allowed to register after the first day of instruction in the term nor be admitted to any class after its first week except by permission of the Supervisor of the programme of dental hygiene.

# Fees—Subject to change without notice

First Term Fees \$282 (includes A.M.S. fee of \$29) are payable in full at the time of registration.

Second Term Fees \$253 are payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Accounting Office before this date with a note showing name and registration number.

# Instruments and Supplies

Approximate Price

l.	*Uniforms (3), caps, laboratory coats (2), white	
	stockings, white Oxfords	\$ 75.00
2.	Instruments	200.00
3.	Textbooks	150.00

\*Purchase of these items will be arranged through the school after registration.

Appropriate instruments must be purchased by students at the beginning of the programme. The arrangements for this will be made through the school at the time of registration.

Information regarding textbooks will be given by the instructor in each course.

Estimates for Room and Board may be obtained from the General Information section of the University Calendar.

Financial Assistance—Loans and bursaries are available for those in financial need. See "Awards and Financial Assistance" section of the University Calendar.

Attendance—Consistent with the policy of the University of British Columbia, and with the nature of the subject matter offered, students are expected to attend all meetings of classes in which they are registered.

Advancement—In order to be advanced from the first year to full standing in the second year in dental hygiene, all courses in the first year must be satisfactorily completed.

#### Courses of Instruction

The following subjects are required of students in the First Year: Dental Hygiene

- 201. (4) Gross, Oral and Dental Anatomy—A lecture, demonstration and laboratory course to provide a general knowledge of human anatomy. Emphasis will be placed on the structures of the head and neck and the morphology of teeth as well as the embryology and microscopic anatomy of oral structures.
- 202. (3) Human Biology.—A lecture, laboratory and demonstration course designed to provide an understanding of the normal functions of the human body—emphasizing the principles of human biology, including body functions, physiological chemistry and nutrition of man.
- 203. (1½) Microbiology.—A lecture and laboratory course on the general principles involved in the study of microorganisms and their relation to dental health. The epidemiology of disease and measures to prevent the transmission of communicable disease will also be emphasized.
- 204. (1) Dental Health Education.—A series of lectures on the principles of education and the psychology of learning as well as the fundamentals of oral communication—public speaking, seminars, panel and study group discussions.
- 205. (1½) Dental Materials and Methods.—A lecture and laboratory course dealing with the properties and uses of selected materials in restorative dentistry.
- 206. (1) Dental Practice.—A survey course designed to familiarize dental hygiene students with the various phases and specialties of dentistry. It will include orientation lectures by and observation of the various departments in the dental school.
- 207. (4) Preclinical and Clinical Dental Hygiene.—Lectures, laboratory exercises and clinical practice in all aspects of dental hygiene. Included will be a lecture course dealing with radiography.
- 100. (3) Introductory Psychology.—A survey of the areas and methods of psychology with emphasis upon the basic processes in animal and human behaviour: Topics covered include learning, sensation, perception, biological bases of behaviour, personality and social psychology. (Offered by the Faculty of Arts).

The following subjects are required of students in the Second Year:

# Dental Hygiene.

- **200.** (3) Sociology.—Introduction to Sociology with an introduction to the scientific point of view in the study of group life, social institutions and processes.
- 301. (1) Pathology.—General and Oral.—A lecture course with demonstrations emphasizing the general principles of Pathology and the gross and microscopic changes occurring in the oro-facial region associated with diseases of the soft and hard tissues.

- 302. (4) Oral Medicine.—Diagnostic procedures, Periodontology and Pharmacology. A lecture course on the diagnostic procedures of oral disease, history-taking, clinical examination and interpretation, laboratory procedures, drugs and pharmaceuticals used in dentistry. Emphasis will be placed on diseases as they affect the periodontal tissues with the clinical application of treatment and prevention.
- 303. (2) Community Dentistry.—A lecture course designed to introduce the concept of community dentistry, the changing concepts of dental health and dental practice as they relate to professional and ethical attitudes with related material in preventive dentistry.
- 304. (2) Dental Health Education.—A continuation of 204 with field experience in the public school system, a hospital clinic or a public health department.
- 307. (4) Dental Hygiene.—A clinical seminar course with specific case histories relating to applied techniques for patients with special needs. A continuation of 207 with increasingly complex techniques of treatment.



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#### Awards and Financial Assistance

(Subject to change. Full corrected statement for the year 1969-70 will appear in the publication "Awards and Financial Assistance.")

The complete list of scholarships and prizes in each Faculty, and bursaries and loans open to students in all faculties, is available in the section of the Calendar entitled "Awards and Financial Assistance". This section, which may be obtained on request from the Registrar's Office, should be consulted by all students who wish to obtain fuller information or to submit applications. It should be noted that most awards do not require the submission of an application, and further, that the following partial list is subject to amendment. Applications for bursaries must be submitted by July 15 to the Dean of Inter-Faculty and Student Affairs, on forms obtainable from his office.

The B.C. Dental Association Bursaries—The B.C. Dental Association offers annually three bursaries of \$250, each, open to residents of British Columbia who are enrolled in the Faculty of Dentistry at the University of British Columbia. These bursaries will be awarded to students with good academic records, who, in the opinion of the Committee, need, and are deserving of, financial assistance. The winners will be required to assume a moral (but not a legal) obligation to reimburse the Fund after completion of their training. Applicants for bursaries must complete the University Bursary application form and submit it to the University not later than July 15.

The Robert D. Sheret Memorial Scholarship (B.C. Dental Association)—As a memorial to Robert D. Sheret and to mark the esteem and affection in which he was held, the B.C. Dental Association offers annually a scholarship of \$250. This scholarship is open to residents of British Columbia who are enrolled in the Faculty of Dentistry at the University of British Columbia. It will be awarded to the student who, in the opinion of the Scholarship Committee, has the most outstanding academic record.

The British Columbia Dental Supply Co. Limited Scholarship—A scholarship of \$200, the gift of The British Columbia Dental Supply Co. Limited, is open to students proceeding to dentistry. It will be awarded to the student in attendance at the University who has completed the pre-dental requirements, has been accepted by an approved school or college of dentistry, and in the opinion of the Scholarship Committee, is best qualified in terms of academic standing, personal qualities, and promise in dentistry. Applications must be submitted not later than April 30th.

Vancouver B'nai B'rith Hillel Foundation Scholarship—A scholarship of \$300, established by the Vancouver B'nai B'rith Hillel Foundation, is offered annually to a student entering the Faculty of Dentistry at the University of B.C. This scholarship will be awarded on the recommendation of the Faculty to the student whose qualifications and promise in the field of Dentistry are the most outstanding.

American College of Dentists Scholarship—This scholarship of \$100, gift of the American College of Dentists (Washington-British Columbia Section), is offered to students completing the second year of dentistry. It will be awarded by the Faculty of Dentistry, in consultation with the Scholarship Committee of the University, on the basis of character and academic record during the irst two years of Dentistry.

The C. V. Mosby Company Scholarship Book Award in Dentistry.—Five prizes, each consisting of the choice of a book up to the value of \$30, are offered

annually by the C. V. Mosby Company of St. Louis, Missouri, to dental students who show excellence or promise in their studies as determined by the Faculty.

The College of Dental Surgeons of B.C. Scholarship.—This scholarship of \$100, gift of the College of Dental Surgeons of British Columbia, will be awarded annually to the sudent who obtains the best academic record in First Year and who is proceeding to the Second Year in the Faculty. Selection will be made by the Faculty of Dentistry, in consultation with Scholarship Committee of the University.

International College of Dentists Scholarship—This scholarship of \$100, gift of the International College of Dentists (Canadian Section), is offered to students completing the Third Year of Dentistry. It will be awarded by the Faculty of Dentistry, in consultation with the Scholarship Committee of the University, on the basis of character, participation in extra-curricular activities, and academic record in the Third Year.

The Margaret Merrell Memorial Scholarship.—As a memorial to Margaret Merrell, and in tribute to the affectionate esteem in which she was held by all who knew her, this scholarship has been established by her husband, Dr. J. H. Merrell. In the amount of \$100 annually, it will be awarded by the University to a student in the Dental Hygiene programme. In selecting the winner consideration will be given to academic standing, personal qualities, character, and need.

The College of Dental Surgeons of British Columbia Scholarship—This scholarship of \$100 will be awarded annually to the student who obtains the best academic record in First Year and who is proceeding to the Second Year in the Faculty. Selection will be made by the Faculty of Dentistry, in consultation with the Scholarship Committee of the University.

The Max M. Waterman Prize—This prize of \$25, established by Dr. M. J. Waterman in honour of his father, is to be awarded annually to the Second Year student who demonstrates the best performance in Dental Morphology (Oral Biology 410 and 420).

The College of Dental Surgeons of British Columbia Gold Medal—A gold medal, presented by the College of Dental Surgeons of British Columbia, will be awarded to the student graduating in the Faculty of Dentistry with the most outstanding record in the four-year course.

The B.C. Dentist Wives Association Bursary—A bursary or bursaries to the total of \$2000, the gift of the B.C. Dentist Wives Association, are offered annually to pre-dental and dental students proceeding in the fall to an approved Faculty or School of Dentistry. They will be awarded to worthy and deserving students at the University who have completed all pre-dental requirements, have good academic standing, and need financial assistance. Applications, on the University Bursary Form, must be received at the University by August 1st. The winners are asked to assume a moral obligation, if and when circumstances permit, to reimburse this bursary fund.

Fraser Valley Dental Society Bursary—The Fraser Valley Dental Society offers annually a bursary to a student beginning or continuing studies in the Faculty of Dentistry. The Bursary will be awarded by the University to a student who needs financial assistance, has a satisfactory academic record and whose home is in the Fraser Valley. The recipient of this bursary is asked to assume a moral obligation to reimburse the fund when he has completed his training.

Interior Dental Society Bursary—A bursary of \$250, gift of the Interior Dental Society, is offered to students in the Faculty of Dentistry. It will be awarded by the University to a student with a good academic record who needs financial assistance. Preference will be given to a student from the Interior.

The E. S. H. Winn Memorial Bursary in Dentistry—To honour the memory of E. S. H. Winn Esq., Q.C., and his wife, Agnes Winn, to pay tribute to their fine personal qualities, and to give recognition to the lifelong encouragement and assistance which they gave to students, this bursary has been established by Dr. Ronald Waddell. In the amount of \$100 annually, it will be awarded to a student who has completed the pre-dental requirements at the University of British Columbia and is proceeding to an approved School or Faculty of Dentistry. The award will be made to a student worthy and deserving of financial aid.

The M. M. Waterman Bursary—This bursary of the annual value of \$50, the gift of Mr. M. M. Waterman of Vancouver, will be awarded to a student in the Faculty of Dentistry who has good scholastic standing and is in need of financial assistance.

Prince George and District Dental Society Bursary—The Prince George and District Dental Society offers a bursary of \$200 to a graduate of the Prince George Senior Secondary School who has begun a career in dentistry at an accredited dental school. Application may be made to the Prince George and District Dental Society and the recipient of this bursary will be judged primarily on his or her financial need and scholastic standing.

The Robert D. Sheret Memorial Bursary.—To honour the memory of Robert D. Sheret, and to pay tribute to the respect and affection in which he was held by those with whom he was personally and professionally associated, his friends, colleagues, and members of the dental profession have established a fund. From this fund a bursary of \$100 will be awarded annually to a student in Dentistry who has good academic standing and needs financial assistance.

The W. K. Kellogg Foundation Loan Fund (Dentistry)—A grant from the W. K. Kellogg Foundation, Battle Creek, Michigan, provides a fund for loans to undergraduates in Dentistry.

American Dental Trade Association Student Loan Fund.—The A.D.T.A. makes available annually to each Canadian and United States dental school \$700 for loans to third and fourth year students. These loans are administered by the A.D.T.A. and are made upon the recommendation of the Dean. Additional information may be obtained from the Dean's Office.

The Margaret Merrell Memorial Scholarship—As a memorial to Margaret Merrell, and in tribute to the affectionate esteem in which she was held by all who knew her, this scholarship has been established by her husband, Dr. J. H. Merrell. In the amount of \$100 annually, it will be awarded by the University to a student in the Dental Hygiene programme. In selecting the winner consideration will be given to academic standing, personal qualities, character, and need.

The College of Dental Surgeons of B.C. Loan Fund for Dental Hygiene—Loans up to \$500 each are offered annually by the College of Dental Surgeons of B.C. to women students with at least University Entrance standing who are residents of British Columbia and have been accepted or are continuing at an approved school or faculty in a course leading to certification in British Colum-

bia as dental hygienists. Selection of recipients will be made on the basis of academic standing and need for financial assistance. Loans will be interest free until completion of the course, after which they will bear interest at the rate of 5% per annum. Recipients may make arrangements to repay the loans in regular monthly instalments over a two-year period following graduation. The promissory note covering the loan will require the signature of the applicant and of her parent or guardian (or other adult satisfactory to the University). A candidate must apply by letter to the Dean of Inter-Faculty and Student Affairs University of B.C. The letter of application must be accompanied by evidence of acceptance by an approved school or faculty and a transcript of the candidate's academic record. The candidate will also be required to complete a University loan application form.



# FACULTY OF EDUCATION

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA

ANCOUVER 8 • BRITISH COLUMBIA CANADA

# The Faculty of Education calendar, 1969-70

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#### **ACADEMIC STAFF**

- NevILLE V. SCARFE, B.A. (Hons.), M.A. (London), Professor and Dean of the Faculty.
- C. E. Smith, B.Sc. (London), M.A., D.Paed. (Toronto), LL.D. (Man.), F.Brit.Psych.Soc., Professor and Associate Dean.
- K. F. Argue, B.A. (Alta.), M.A. (Oxon.), Ed.D. (Columbia), Professor of Philosophy of Education.
- WILFRED H. AULD, B.A. (Brit. Col.), Ed.M. (Oregon State), Professor and Director of the Summer Session.
- SAM BLACK, R.S.W., D.A. (Glasgow), A.T.D. (London), Professor of Art Education.
- Miss Sadie M. Boyles, M.A. (Brit. Col.), Professor and Assistant Director of Secondary Education.
- C. J. Brauner, A.B. (Mich.), A.M. (Columbia), Ph.D. (Stanford), Professor of Philosophy of Education.
- ENOCH B. BROOME, M.A., B.Ed. (Brit. Col.), Professor Emeritus, Lecturer.
- G. M. Chronister, B.S., M.Ed., Ed.D. (Missouri), Professor of Reading Education, and Director of Graduate Studies.
- A. E. CLINGMAN, B.Mus., M.Mus. (Drake), D.Ed. (Columbia), Professor of Music Education.
- HAROLD M. COVELL, B.A. (Sask.), B.Ed. (Man.), M.A., Ed.D. (Florida), Professor of Reading Education and Assistant Director of Elementary Education.
- Miss Charlotte David, B.A. (Texas), M.A. (Columbia), Ph.D. (Portland), Professor of Special Education.
- Francis C. Hardwick, M.A. (Brit. Col.), Professor of Social Studies Education.
- RICHARD JEAN HILLS, B.S.Ed. (Black Hills), M.A. (Wyoming), Ph.D. (Michigan State), Professor of Educational Administration.
- F. HENRY JOHNSON, M.A. (Brit. Col.), D.Paed. (Toronto), Professor and Director of Elementary Education and Professor of History of Education.
- RONALD JONES, B.A., M.A. (Virginia), D.Ed. (New York State), Ph.D. (Buffalo), Professor of Educational Foundations.
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- DAVID KENDALL, M.A. (Cantab.), Ph.D. (Manchester), Professor of Special Education.
- AMES A. S. MACDONALD, Dip (V.S.A.) Associate of the Institute of Education, London, Professor of Art Education.
- OHN McGechaen, M.A. (Brit. Col.), Professor of English Education.
- <sup>2</sup>. C. Marsh, B.Sc. (London), M.A., Ph.D. (McGill), Professor of Educational Sociology.
  - RANTON McIntosh, B.A., M.Ed. (Sask.), Ph.D. (Columbia), Professor and Director of Secondary Education.
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- TEW ROBERTS, B.A. (Hons.) (West Australia), B.A. (Hons.), M.A. Dip. Ed. (Oxon.), Visiting Professor of Adult Education.

- LLOYD H. SLIND, B.Sc. (Sask.), B.Mus. (Montreal; Sask.), Ed.D. (Florida), L.R.S.M., Professor of Music Education.
- G. A. Smith, Dip. (V.S.A.), A.R.C.A., Professor of Art Education.
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- G. H. CANNON, B.A., B.Ed., M.Sc. (Brit. Col.), Ed.D. (Washington State) Associate Professor.
- B. R. CLARKE, B.A. (Melbourne), Ph.D. (Manchester), Associate Professor.
- JERROLD R. COOMBS, B.S., M.A. (Kent State), Ph.D. (Illinois), Associat Professor.
- Miss Mollie Cottingham, M.A. (Brit, Col.), Associate Professor and Assi: tant Director of Student Teaching.
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- F. Gamble, B.F.A. (Nebraska), M.A. (Catholic U. of A.), D.Ed. (Colum bia), Associate Professor.
- Donald C. Gibbard, M.A. (Washington), Associate Professor.
- Mrs. A. Gouldstone, A.T.D., Associate Professor.
- R. F. Gray, B.A., M.Ed. (New Hampshire), Ph.D. (Calif.), Associate Pro fessor.
- Miss Emma Harris, B.A., M.A. (Columbia), Associate Professor.
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- T. A. Howitz, B.S., M.S. (N. Dakota), Ph.D. (Minn.), Associate Professo
- Miss A. Jean Kilgour, M.A. (Brit. Col.), Associate Professor.
- WALTER LANNING, B.A. (Brit. Col.), B.L.S. (Columbia), Associate Professor MISS RUTH McCONNELL, M.A. (Brit. Col.), Ph.D. (Calif.), Associate Profe
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- MRS. HILDA M. MACKENZIE, B.A. (Brit. Col.), A.R.C.T., Associate Professi
- B. C. Munro, B.A., B.Ed. (Sask.), M.Ed., Ph.D. (Alta.), Associate Professo
- T. D. M. McKie, B.Sc. (Bristol), B.Ed. (Man.), M.A. (Brit. Col.), Ph.D. ( linois), Associate Professor.

- E. MacPherson, B.A., M.A. (Brit. Col.), Ph.D. (Washington State), Associate Professor.
- MISS MYRNE NEVISON, B.A. (Brit. Col.), Ph.D. (Minn.), Associate Professor.
- D. A. Oldridge, B.A., B.D. (Pasadena), Ed.D. (S. Calif.), Associate Professor.
- L. R. Overing, B.A. (Sir George Williams), M.A. (McGill), Ph.D. (Utah), Associate Professor.
- VIRS. D. RIZER, B.A. (U.S.C.), M.A. (Central Washington), Associate Professor.
- W. Schwahn, B.Sc., M.A., Ph.D. (Wisc.), Associate Professor.
- D. C. SMITH, B.A., B.Ed. (Brit. Col.), D.Ed. (Calif.), Associate Professor.
- . N. SUTHERLAND, M.A. (Brit. Col.), Associate Professor.
- TROWSDALE, B.Mus., Ph.D. (Wash.), M.Ed., D.Ed. (Toronto), A.R.C.T., Associate Professor.
- LARENCE W. TRUAX, B.A., B.Ed. (Brit. Col.), Associate Professor and Director of Student Teaching.
- .. WALTERS, B.A. (St. John's), M.A., Ph.D. (Minn.), Associate Professor.
- J. WATT, B.P.E. (Brit. Col.), M.S., Ed.D. (Oregon), Associate Professor and Associate Director of Summer Session.
- 'ORY I. WESTERMARK, B.Ed. (Alberta), M.Ed., D.Ed. (Oregon), Associate Professor.
- R. WHITINGER, B.E. (St. Cloud State Teachers' College), Associate Professor.
- T. Young, M.A., B.Ed. (Brit. Col.), Associate Professor and Assistant Director of Secondary Education.
- E. Allison, B.A., M.Ed. (Brit. Col.), Ph.D. (Southern California), Assistant Professor.
- . F. Ashley, B.Ed., M.Ed. (Brit. Col.), Assistant Professor.
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- ). BAIN, M.A. (Toronto), Assistant Professor.
- . BARCLAY, B.A. (Brit. Col.), A.T.C.M., Assistant Professor.
- . BATES, B.Sc. (London), M.Ed. (Brit. Col.), Assistant Professor.
- E. Bertram, B.A., B.Ed. (Brit. Col.), M.A. (Wash.), Assistant Professor.
- 1. BOLDT, B.A., B.Ed., M.A. (Brit. Col.), Assistant Professor.
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- IISS MARGARET BROWN, B.Ed. (Brit. Col.), M.A. (Calif.), A.T.C.M., Assistant Professor.
- Brough, B.S. (Utah), M.S. (Seattle), Assistant Professor.
- RS. JULIANNE L. CONRY, B.A., M.S., Ph.D. (Wisc.), Assistant Professor.
- DBERT F. CONRY, B.A. (San Jose), M.S., Ph.D. (Wisc.), Assistant Professor.
- K. Curtis, B.S. (Abilene), M.A. (Texas), M.Ed. (Brit. Col.), Assistant Professor.
- RGEN DAHLIE, B.Ed. (Brit. Col.), Ph.D. (Washington State), Assistant Professor.
- B. Daniels, B.A., M.A. (Brit. Col.), Ph.D. (Illinois), Assistant Professor.
- DAY, B.S. (Colorado), M.N.S. (S. Dakota), Assistant Professor.
- . DYCK, B.A. (Brit. Col.), M.A., Ph.D. (Stanford), Assistant Professor.
- D. Dennison, M.P.E. (Brit. Col.), Ed.D. (Washington State), Assistant Professor.

- E. G. Fiedler, B.A., B.S. (Wash.), M.Ed. (Western Washington), Ph.D (Chicago), Assistant Professor.
- Mrs. M. Forster, B.Sc. (McGill), M.Ed. (Brit. Col.), Assistant Professor.
- M. I. Foster, B.Ed. (Brit. Col.), M.A. (Wash.), Assistant Professor.
- J. D. FRIESEN, B.A., M.Ed. (Brit. Col), Ph.D. (Alberta), Assistant Professor.
- D. CRAIG GILLESPIE, B.Sc. (West. Ont.), M.A. (Pasadena), M.N.S. (Arizona) Assistant Professor.
- F. A. GORNALL, B.A., B.Ed. (Brit. Col.), Assistant Professor.
- J. Gray, B.Ed. (Brit. Col.), M.Ed. (Western Washington), Assistant Professor.
- A. Gunn, B.Ed., M.A. (Brit. Col.), Assistant Professor.
- R. Jobling, B.A. (Liverpool), Assistant Professor.
- Mrs. Peggy Ray Koopman, B.A. (Purdue), M.S. (Illinois), Ed.D. (Brit. Col.) Assistant Professor.
- W. A. Krayenhoff, M.A. (Leyden), B.A. (Brit. Col.), Assistant Professor.
- R. J. LEDUC, B.Ed. (Alta.), M.S. (Oregon), Assistant Professor.
- I. D. McGann, M.A. (Conn.), Ed.D. (Boston), Assistant Professor.
- S. S. Lee, B.A., M.A. (Seoul), Ph.D. (Calif.), Assistant Professor.
- Miss D. Livingstone, B.A., B.Ed. (Alberta), M.Ed. (Brit. Col.), Assistant Professor.
- J. D. McWhannel, B.A. (Man.), M.A. (Oxon.), B.Ed. (Alberta), Assistar Professor.
- Miss Joyce McRae, B.Ed. (Brit. Col.), M.A. (Western Washington), Assistar Professor.
- MISS KATHLEEN L. MEREDITH, B.A. (Western Ont.), Assistant Professor.
- J. R. MITCHELL, B.P.E., B.Ed. (Brit. Col.), M.S., D.Ed., (Oregon), Assistar Professor and Assistant Director of Student Teaching.
- Miss P. Montgomery, B.P.H.E. (Toronto), M.S. (Wisconsin), Ph.D. (Ir diana), Assistant Professor.
- J. MURRAY, B.A. (Brit. Col.), M.Mus., D.Ed. (Oregon), Assistant Professo MISS SHIRLEY NALEVYKIN, B.A. (Sask.), B.Sc. (McGill), M.S. (Mich. Assistant Professor.
- J. A. Niemi, B.A. (Mich.), M.Ed. (Alaska), Ed.D. (U.C.L.A.), Assistant Professor.
- Mrs. Muriel Tomkins Niemi, B.A. (Sir George Williams), M.S. (Wisc. Ed.D. (Harvard), Assistant Professor.
- P. G. Olley, B.A., M.Ed. (Brit. Col.), Assistant Professor.
- A. V. PARMINTER, B.A., M.A. (Brit. Col.), M.A. (Stanford), Assistant Professor
- G. Pennington, B.A. (Seattle), M.Sc. (Wash.), Assistant Professor.
- ROBERT M. POUTT, B.A., M.Ed. (Central Washington), Assistant Professor Mrs. Sterling Price, A.B. (Kentucky), M.A. (Peabody), Visiting Assista Professor.
- MRS. M. RALSTON, B.Ed. (Brit. Col.), Assistant Professor.
- DENIS C. ROGERS, B.A., B.Ed. (Acadia), M.Ed. (Alberta), Ph.D. (Torontc Assistant Professor.
- M. Rose, B.S.A. (Brit. Col.), M.A. (Western Washington), Assistant Professor. L. A. Rousseau, B.A. M.Ed. (Brit. Col.), Assistant Professor.

- MISS JEAN ROXBURGH, B.A., B.Ed. (Brit. Col.), M.A. (Columbia), Assistant Professor.
- W. RONALD F. SEAL, B.Ed. (Brit. Col.), Assistant Professor and Chairman, Division of Industrial Education.
- [. Shaw, B.S. (New York), M.A. (Denver), Ph.D. (Wayne), Assistant Profes-
- Mrs. N. Sinclair, B.Ed., M.A. (Alberta), Assistant Professor and Assistant to the Director of Elementary Education.
- Kenneth Slade, B.A., M.Ed. (Brit. Col.), Ph.D. (Oregon), Assistant Professor. R. STEELE, B.A., B.Ed. (Sask.), Assistant Professor.

  Miss J. STEVENSON, L.R.A.M., A.L.A.M., L.G.S.M., Assistant Professor.
- G. T. Stubbs, Mus.B. (Manchester), B.L.S., M.A. (Brit. Col.), Assistant Pro-
- Mrs. M. Thomson, B.A. (Alta.), M.S.W. (Brit. Col.), Assistant Professor.
- MISS ANNE TILLEY, B.A. (McMaster), M.Ed. (Birmingham), Assistant Profes-
- MRS. F. VEY, B.Ed. (Brit. Col.), Assistant Professor.
- I. A. Wallin, B.Ed., M.Ed. (Alberta), Ph.D. (Calif.), Assistant Professor.
- 3. Walsh, B.A. (Sheffield), B.Ed., M.Ed., D.Ed. (Brit. Col.), Assistant Pro-
- Miss Dorothy Washington, B.A. (Brit. Col.), M.A. (Western Reserve) Assistant Professor.
- AISS JEAN MARIE WEAKLAND, B.S., M.A. (Colorado State), M.F.A. (Indiana), Assistant Professor.
- R. D. Wild, B.Sc., M.Ed. (Brit. Col.), Assistant Professor.
- ARS. C. I. WILLIAMS, B.P.E., M.P.E. (Brit. Col.), Assistant Professor.
- OHN D. WILSON, B.A. (Western Ontario), M.A. (Toronto), Ph.D. (Western Ontario), Assistant Professor.
- . R. Wolforth, B.Sc. (Sheffield), M.A. (Brit. Col.), Assistant Professor.
- IRS. J. E. WOODROW, B.Sc., M.Sc. (Brit. Col.), Assistant Professor.
- L. Yazui, B.Ed. (Alta.), M.S., Ph.D. (Oregon), Assistant Professor.
- ). Casperson, B.Ed. (Brit. Col.), Instructor.
- OHN C. CAWOOD, B.Ed. (Brit. Col.), Instructor.
- . K. Lee, B.Ed. (Brit. Col.), M.Ed. (San Jose), Instructor.
- . C. Lewis, B.Ed. (Brit. Col.), Instructor.
- IISS AUDREY LINNES, B.S.A. (Brit. Col.), Instructor.
- V. J. P. LOGAN, B.Ed. (Brit. Col.), Senior Instructor.
- F. MERRIAM, B.Ed. (Brit. Col.), Instructor.
- Iss C. Overall, Dip. Phys. Ed. (London), Instructor.
- VILLIAM TODD ROGERS, B.Sc., M.A. (Brit. Col.), Instructor. IRS. MARIE SLATER, B.H.E., M.A. (Brit. Col.), Instructor. SMITH, B.A.Sc. (Brit. Col.), Instructor.
- . TRANT, B.Ed. (Brit. Col.), Instructor.
- . DE COURSEY, B.S., M.Mus. (Oregon), Lecturer.
- MES SMITH, B.A., B.Ed. (Brit. Col.), Lecturer.
  M. WILLIAMS, B.Ed., M.Ed. (Brit. Col.), Lecturer.
- IRS. E. NESBITT, B.A. (Brit. Col.), Assistant to the Dean.
- H. Wallis, M.A. (Brit. Col.), Academic Assistant to the Dean.

#### ecturers from other Faculties, etc.

- . P. Harshenin, M.A. (Brit. Col.), Assistant Professor, Arts.
- . H. Heywood, M.A. (Brit. Col.), Associate Professor, Commerce.
- . B. LAITHWAITE, D.D., Dip. in Physical Education (Carnegie Physical Training College), M.S. (Oregon), Associate Professor, Physical Education.

Mrs. E. Vaines, B.S. (Wash.), M.S. (Cornell), Assistant Professor, Home Economics.

MRS. K. STRIKE, B.Comm. (Brit. Col.), (from School System).

D. Todd, B.A. (Brit. Col.), (from School System).

H. Tonne, B.A. (Brit. Col.), M.A. (Oregon), (Vancouver City College).

Part-time Assistants, 1969-70:

Miss A. Barker, C. Barton, W. R. T. Brooks, Miss I Brown, Mrs. R. Chadwick, Mrs. K. Chamberlain, J. D. Davy, Dr. G. Dickinson, Mrs. M. R Fisher, J. E. Gibbard, Mrs. P. Gray, Mrs. H. Grier, Mrs. C. Halliday, Mrs. D Hunt, Miss S. Innes, D. Jones, Miss C. Johnson, Mrs. Wanda Justice, Mrs I. Lyttle, Dr. D. C. McGann, Mrs. D. J. Macpherson, Mrs. P. Marner, Mrs F. Mitchell, J. R. Mitchell, Mrs. E. Morris, R. Muir, Miss E. O'Connor Mrs. C. Parminter, Mrs. R. Plant, Mrs. H. Polowy, Mrs. E. Pryce, Mrs. H Smith, Mrs. Dagney Swanson, B. W. Taylor, Mrs. L. Taylor, I. Thomas A. Watson, Mrs. M. Weston, Mrs. A. B. Wilson, Mrs. M. Wilton, T. Wood cock

Members of Faculty representing other Departments:

Dean W. H. Gage, Dean V. Okulitch, Dean M. Shaw, Dean P. White Dean J. Young, Dr. K. L. Erdman, Dr. L. G. Harrison, Dr. R. F. Scagel Mrs. W. V. Allester, Dr. R. J. Rowan, Mr. E. S. W. Belyea, Dr. J. L. Robinson Dr. D. C. Murdoch, Dean I. McTaggart-Cowan, Dr. M. Lee, Dr. R. A. F. Robson, Dr. J. Winter, Dr. M. McGregor, Dr. S. Rothstein, Dr. G. N. Towers Dr. J. R. Adams, B. Stuart-Stubbs, Dr. A. J. Renney.

The Joint Board of Teacher Education of the Province of British Columbi Representing the University of British Columbia:

The President or his nominee, Dr. G. G. S. DUTTON.

The Dean of the Faculty of Education, N. V. SCARFE.

The Senate nominee, DEAN W. H. GAGE, Chairman.

# Representing the University of Victoria:

The President or his nominee, Dr. A. Kratzmann.

The Dean of the Faculty of Education, Dr. F. TYLER.

The Senate nominee, Professor G. A. Brand.

# Representing Simon Fraser University:

The President, or his nominee, Professor F. F. Cunningham.

The Dean of the Faculty of Education, Dr. A. R. MACKINNON

The Senate nominee, Dr. W. VIDAVER.

# Representing the Provincial Department of Education:

The Deputy Minister, Dr. G. N. Perry.

The Superintendent, F. P. LEVIRS.

The Registrar, E. A. KILLOUGH.

The Coordinator of Teacher Recruitment, P. J. KITLEY.

#### Representing the B.C. School Trustees' Association:

J. M. CAMPBELL.

F. M. REDER.

#### Representing the B.C. Teachers' Federation:

C. D. Ovans.

J. W. KILLEEN.

Secretary: J. E. A. PARNALL, Registrar of the University of British Columbia.

# FACULTY OF EDUCATION

#### **PROGRAMMES**

The Faculty of Education offers programmes leading to an undergraduate degree in Education, granted by the University, in the fields of elementary and secondary teacher education. The degree granted is Bachelor of Education (B.Ed. — the hood is white with cord of University blue). Programmes leading to the University Diploma in Education for University graduates are offered by the Departments of Adult Education, Counselling, Special Education, and Early Childhood Education. Graduate programmes leading to a Master's or Doctor's degree in Education are offered in the Faculty of Graduate Studies. Students are accepted into the Faculty of Education up to the limit of available instructional facilities.

# Undergraduate Degree Programmes

# A. In the Elementary Teaching Field

(1) A four-year programme from Secondary School Graduation (University Programme), leading to the degree of B.Ed. in the elementary teaching field. Students registering for this (A1) programme may leave to teach on completion of Third Year, if prior arrangements have been made with the Director to modify the Third Year Programme. Completion of the full degree programme is, however, preferable. The B.Ed. degree qualifies students for an interim Professional Certificate in British Columbia.

(2) Transfer programmes enabling students with credit in other faculties or universities, Normal Schools or Teachers Colleges to make up deficient

courses and proceed toward the B.Ed. degree.

(3) A one-year teacher-training programme (A3) for graduates of a faculty other than Education who are interested in elementary school teaching. After successful completion of this year, the student would normally be eligible for the interim Professional Certificate in British Columbia.

(4) An Honours programme (A5) for the B.Ed. (Elementary) degree. Students interested in this should consult the Director of the Elementary

Division on completion of second year.

(5) A fifth year programme (A6) for graduates with the B.Ed. (Elementary) degree.

# B. In the Secondary Teaching Field

- (1) A five-year programme from Secondary School Graduation (University Programme), leading to the degree of B.Ed. in the secondary teaching field and meeting the course requirements for the interim Professional Certificate.
- (2) Programmes enabling elementary teachers with the first three years of credit toward the degree of B.Ed. in the elementary field to complete, by winter or summer sessions, the remaining two years of training leading to the degree of B.Ed. in the secondary field and to the interim Professional Certificate.
- (3) A one-year teacher-training programme enabling graduates, with an acceptable bachelor's degree from a faculty other than Education, to meet the requirements for the interim Professional Certificate.

# Diploma Programmes.

# 1. Diploma Programme in Adult Education

The Faculty of Education and the Department of University Extension

jointly offer a Diploma in Adult Education. This programme is designed for persons who wish to acquire the skills and knowledge required to organize, conduct, evaluate and generally administer programmes in adult education but who, for a variety of reasons, do not wish to pursue a graduate degree.

# 2. Diploma in Counselling

The Faculty of Education offers a thirty-unit graduate diploma in counselling designed to prepare counsellors for work in school systems, colleges, and government and community agencies. Admission is based on an acceptable academic record (usually a bachelor's degree), relevant work experience, desirable personal qualities and, for those desiring a position in a school system, a teaching certificate.

# 3. Diploma in Education of the Deaf

The Faculty of Education offers a one-year diploma programme for teachers of the deaf. Admission is based upon an acceptable degree (B.A., B.Sc., or B.Ed.) from a recognized university. The diploma programme consists of one year of full-time study (twelve units and an extensive practicum). Successful completion of the diploma programme may partially satisfy requirements for teacher certification in British Columbia. Prospective candidates must be accepted by the Director of the Elementary Division and by the Department of Special Education. (See page L23.)

# 4. Diploma in Education of the Mentally Retarded

The Faculty of Education offers a one-year diploma programme for teachers of the mentally retarded. Admission is based upon an acceptable degree (B.A., B.Sc., or B.Ed.) from a recognized university. The diploma programme consists of one year of full-time study (twelve units and an extensive practicum). Successful completion of the diploma programme may partially satisfy requirements for teacher certification in British Columbia. Prospective candidates must be accepted by the Director of the Elementary Division and by the Department of Special Education (See Page L23.)

# 5. Diploma in Education of Children with Learning Disorders.

The Faculty of Education offers a one-year programme for teachers of children with learning disorders. Admission is based upon an acceptable degree (B.A., B.Sc., or B.Ed.) from a recognized university. The Diploma consists of one year of full-time study (twelve units and an extensive practicum). Successful completion of the diploma programme may partially satisfy requirements for teacher certification in British Columbia. Prospective candidates must be accepted by the Director of the Elementary Division and by the Department of Special Education. (See Page L23.)

# 6. Diploma in Education of Young Children

The Faculty of Education offers a one-year programme for teachers o young children. Admission is based upon an acceptable degree (B.A., B.Sc. or B.Ed.) from a recognized university. The diploma consists of one yea of full-time study (twelve units and an extensive practicum). Successfu completion of the diploma programme may partially satisfy requirements fo teacher certification in British Columbia. Prospective candidates must b accepted by the Director of the Elementary Division and by the Departmen of Education for Young Children. (See Page L23.)

#### TEACHING CERTIFICATES

Since sole authority to issue teaching certificates rests with the Provincial Department of Education, Victoria, B.C., a degree or diploma from the University is not a licence to teach. The standing of candidates who successfully complete any of the above programmes will be reported by the University to the Department of Education. (See sections on Transcript of Academic Record and application for British Columbia Teacher's Certificate.)

#### ADMISSION REQUIREMENTS

Applicants for admission to the Faculty must meet the general requirements of the University. The Faculty reserves the right, however, to reject applicants for admission on the grounds of physical or health assabilities, or for other reasons, including unsatisfactory academic record. Applicants who fail to meet the minimum required standards in the Speech Clearance Test or the Written English Test will be automatically rejected.

Students in B.C. Secondary schools planning to enter the Faculty should be guided by the following information. The Faculty of Education accepts graduates of the Academic and Technical Programmes with any of the specialties offered. It is advised that students thinking of entering Elementary Education should include courses in Art, Music, and Theatre. These elective courses provide the cultural background and skills desirable for all Elementary teachers. For those students intending to specialize as teachers of Art, Music, or Theatre, at any level, these courses are of prime importance.

A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.

Special additional requirements for admission to the one-year postgraduate course are listed below:

# For the One-Year Programme for Graduates in the Elementary Division, A(3) above:

Candidates will be admitted who hold a degree from a recognized university in which they have obtained an average of 65% or higher in the last two years, or in which they have obtained a 65% or higher average in one acceptable major.

# For the One-Year Programme for Graduates in the Secondary Division, B(3) above:

#### (a) Candidates will be admitted who:

hold a degree from a recognized university with academic concentrations of appropriate content (9 units of work in the two senior years), in two of the following subjects: Art (with adequate studio courses), Biological Sciences (Biology, Botany, Zoology, including at least one approved course in each of Botany and Zoology), Chemistry, Commerce, English, French, Geography, German\*, History, Home Economics, Latin\*, Library, Mathematics, Music (with adequate courses), Physical Education, Physics, Psychology\*, Russian\*, Spanish\*, Theatre\*, and have obtained an average of at least 65% in those courses of the two senior years which go to make up each of these academic concentrations.

have completed an Honours or a Master's degree, or a degree with one major of at least 21 units and of appropriate content, in Biological Sciences (including at least one approved course in each of Botany and Zoology), Chemistry, Commerce, English, French, Geography, Home Economics, History, Mathematics, Music or Physics, and have obtained an average of at least 65% in those courses of the two senior years which go to make up the major.

Applications must be received by the Registrar prior to August 1.

Note I: Students planning to enter teaching would be well advised to consult the section on "Academic Concentrations and Majors for Secondary Teachers." (pp. L30-L40.)

Note II: Subjects marked with an asterisk are not widely taught in B.C. Schools. Candidates who have completed either a major in one of these or academic concentrations in two of these must, in addition, have completed at least 9 units of senior work in a subject widely taught in B.C. schools.

Note III: Students may be required to make up deficiencies in their teaching fields before being recommended for a teaching certificate and before having their standings reported to the Department of Education.

# Admission with Advanced Standing

- (a) Students with Full First Year Arts or Science or their equivalent will be admitted to the Second Year of either programme leading to a degree in Education.
- (b) Students from other universities and from other countries are referred to the General Information bulletin.
- (c) Students who are completing work for a degree in another faculty may transfer to the Faculty of Education. Credit will be given for those courses, already completed, which meet the requirements of the major or of the programme selected.
- (d) No student will be admitted to the Faculty of Education who has failed the work of the last year he spent as a student in another Faculty.
- (e) Students transferring from the degree programme in the elementary field to the degree programme in the secondary field, or from one academic concentration or major to another within a programme, will be given credit for those courses already completed which meet the requirements of the newly selected programme. No application for transfer will be approved when the student has failed the previous year's work. No credit will be granted to Elementary transfers to the secondary division for the professional courses of the second year of the Elementary programme unless all the professional work of the first two years has been successfully completed at the time of transfer.
- (f) A student who has completed courses at another university may submit to the Registrar a transcript of his record to be evaluated toward the requirements for a degree in Education at the University of British Columbia. Once registered in the Faculty, however, the candidate may expect credit for courses subsequently taken elsewhere only when prior permission has been obtained from the Director of Elementary or Secondary Education. Credit from non-university institutions will normally be applied to first and second years only. No student may be given more than 30 units of credit toward the B.Ed. degree for work taken in non-university institutions such as senior matriculation or the equivalent, junior college, art school, music conservatory, and Normal School and/or in a combination of such institutions. All students must complete at least two years (30 units) at this university in order to obtain a degree. All courses in these two years must ordinarily be numbered

"300" or above. Exceptions must be authorized by the Director. Students are expected to take the last two years toward the B.Ed. degree in regular attendance at the University.

(g) The Faculty of Education has no programme leading to a B.Ed. degree for those who already hold a degree from another Faculty. Such students may enrol in the A(3) Programme, that is the one-year programme in elementary teacher education, or the parallel B(3) Programme in secondary teacher education. (See page L11.) If they are eligible later to enter the Faculty of Graduate Studies, they could then undertake graduate work.

# Inquiries Regarding Admission

Students who plan to enroll in the Faculty for the first time should write to the Registrar, The University of British Columbia, Vancouver 8, B.C., before August 1. Needless delay will be avoided if the following information is provided:

(a) name in full;

(b) two copies of official transcripts of high school and university records;

(c) a "transfer of credits" statement from the Registrar, Department of Education, Victoria, B.C., if applicant holds a B.C. Teacher's Certificate;

(d) statement as to the Division (Elementary or Secondary) desired. Where this involves the upper years of the Elementary Division the major (academic or professional) or the subject for honours should be indicated. Where this involves the Secondary Division the two fields of academic concentration or the one subject preferred for a major or honours programme should be stated.

#### Late Registration and Transfers

The regulations for late registration and transfers are as follows:

- (a) No student is admitted to the Faculty who has failed to register in the University by 5:00 p.m. on the Wednesday of the first week of lectures in September.
  - (b) All students must pay late registration fees as set by the University.
- (c) No transfers from other Faculties or within the Faculty of Education are accepted after 4:30 p.m. on the Friday of the first week of lectures in September.

#### Fees and Expenses-Subject to change without notice

First Term Fees: \$243 (includes A.M.S. fee of \$29), payable in full at the time of registration. However, students may pay full fees of \$457 at time of registration. Students in their final year are assessed an additional \$7 to cover the Graduating Class fee.

Second Term Fees: \$214, payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Accounting Office before this date with a note showing name and registration number.

Expenses: Students should allow from \$50 to \$100 for books and equipment. A similar amount should be available to cover the cost of travel to schools for practice teaching throughout the regular winter session. In addition, students taking Education 297, 397, 497, 498, 499 must allow for living expenses for the post-sessional period in parts of the Province other than the major metropolitan areas. These students are reminded that their year is not completed until approximately the middle of May.

#### Graduation

Every candidate for a degree must make formal application for graduation.

Application for graduation in the spring must be made not later than March 15. Special forms for this purpose are provided by the Registrar's office.

Students who complete course requirements for a degree at a Summer Session will be given a statement to this effect. These students must apply for graduation as part of their registration in the Summer Session.

The Congregation ceremony for the conferring of degrees will be held once only during each year, in late May.

#### Attendance

Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments, may, on the recommendation of a Director, be excluded by the Dean of the Faculty from the final examinations. Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes.

Students, who because of illness are absent from a December or April examination, must submit a certificate, obtained from a doctor, to the University Health Service as promptly as possible.

#### Withdrawal

Any student who after registration decides to withdraw from the University must report to the Registrar's Office. He will be required to obtain clearance from the University, to the satisfaction of the Registrar, before being granted *Honourable Dismissal* or recommended, where applicable, for refund of fees.

The Senate of the University may require a student to withdraw from the University at any time for unsatisfactory conduct, for failure to abide by regulations, for unsatisfactory progress in his programme of studies or training, or for any other reason which is deemed to show that withdrawal is in the interests of the student and/or the University.

#### Re-Admission

- (a) A student who fails the first year of University following Grade 12 will not be permitted to re-enrol at the University to repeat the studies of that year. Consideration will be given to re-admitting a student in this category following his satisfactory completion of first year junior college or its equivalent.
- (b) A student in the first year who obtains credit for only 9 units on a full programme will be re-admitted on probation but during the subsequent session may be required to withdraw for unsatisfactory progress.
- (c) A student who passes in fewer than 6 units in the second year of University following Grade 12 will not be permitted to re-enrol at the University to repeat the studies of that year. Consideration will be given to re-admitting a student in this category upon receipt of evidence of his satisfactory completion of studies equivalent to two years of junior college.
- (d) A student at any level of University study who fails for a second time, whether in repeating a year or in a later year, will be required to withdraw from the University; he may be re-admitted after a period of at least one year if his appeal for permission to re-enrol is supported by the Committee on Admissions and upheld by Senate.

#### **Examinations and Advancement**

#### Examinations

1. Examinations for the winter session are held in April and at such

other times as the instructors may decide. These examinations are obligatory for all students.

- 2. Applications for special consideration on account of illness (supported by medical certificates) or domestic affliction must be submitted in writing to the Dean as soon as possible after the close of the examination period
- 3. In any course which involves both laboratory work and written examinations, students will be required to make satisfactory standing in both parts

# Standing and Credit

- 1. (a) Candidates taking at least 15 units of work, and obtaining at least 50% in each subject, will be graded as follows: First Class, an average of 80% or over; Second Class, 65 to 79%; Pass, 50 to 64%.
- (b) In those years in which Student Teaching is a pre-certification requirement (Education 499 in Secondary, Education 297, 397 or 497 in Elementary) the student's final standing is determined as follows: Academic and professional courses—two-thirds; Student Teaching—one-third of total evaluation. Students are recommended for certification only after achieving satisfactory standing both in teaching practice and in the academic and professional courses.
  - (a) A student taking 9 or more units in the winter session will not receive credit for any course unless he successfully completes 9 units.
    - (b) A student taking fewer than 9 units in the winter session will receive credit for a course only if, as a result of the final examinations of that session, he passes in all his courses.
- 3. Courses for which credit has not been obtained must be repeated, or permissible substitutes taken, in the next regular session attended. In the winter session the total of all courses taken may not exceed 18 units.
- 4. Essays and examinations will be refused a passing mark if they are deficient in English.
- 5. To be eligible for the Bachelor of Education degree the candidate must normally have earned:
  - (a) A mark of at least 50% in each of the courses comprising the degree programme;
  - (b) An average of not less than 60% in the senior courses of each of the academic concentrations or the major which constitute the candidate's programme.
- 6. A student who meets the minimum requirements for passing in a given year but whose standing is nevertheless considered by the Faculty to be unsatisfactory will be placed on probation for the following year. At the end of his probationary year he may be re-instated or, if there has been insufficient improvement, he will not be permitted to proceed to the next highest year. Generally speaking, probation will follow (a) in the 1st and 2nd years—failure to earn an average of 55% in the 15 units of work. (b) in the 3rd and 4th years—failure to earn an average of 60% in the
- (b) in the 3rd and 4th years—failure to earn an average of 60% in the work taken in each of his major subjects.

Regulations concerning probationary standing also apply to students of the Faculty undertaking course work in the Summer Session, Extra-sessional classes or by correspondence.

- 7. Except in special cases, no student may repeat a course more than once.
- Any student who completely fails all courses during a session (or all but one) may be required to withdraw from the Faculty.

# Supplementals

- 1. In the winter session a student will be granted the privilege of writing supplementals in not more than three units of courses taken during that session provided that
  - (a) he has obtained during that session at least 12 units of credit;
  - (b) he has written the final examination in the subject concerned and has obtained a final grade of at least 40%.
- 2. In the summer session, a candidate will be granted a supplemental in a subject which he has taken during that session provided (i) he has written the final examination and has obtained a final mark of not less than 40% and (ii) he has obtained 3 units of credit in that session.
- 3. In an extra-sessional or correspondence course, a student will be granted a supplemental in a subject in which he has obtained a final mark of not less than 40%.
- 4. The Faculty may, at its discretion, grant supplemental privileges in a further 3 units to a student whose course work during a full winter session is in excess of 15 units.
- 5. At the discretion of the Faculty, arrangements may be made in certain cases for a further trial period of practice teaching.
- 6. In all but the Final Year a candidate who has been granted a supplemental may write it once only. If he fails, he must repeat the course or take a permissible substitute. In the Final Year he may write it twice (subject to the limitation in section 3 under "Standing and Credit").
- 7. Supplemental examinations, covering the work of both the first and second terms, will be held during August in respect of winter session examinations. Supplemental examinations for summer session students will be held in December at the University. Supplemental examination privileges will not be granted to students who fail the laboratory work of science or Industrial Education courses or studio courses in Art.
- 8. If a student, because of exceptional circumstances, is permitted to postpone a supplemental beyond the first regular supplemental examination period, he will be responsible for the content of the course as currently offered. If the course is discontinued, the supplemental privilege may be cancelled. Attention is also drawn to section 3 under "Standing and Credit".

# Practice Teaching, Laboratory and Seminar Requirements

All students in Education who are engaged in observation and practice teaching, will be assigned to a regularly held seminar under the direction of a faculty adviser.

Student participation in school activities, whether it be observation, teaching practice, demonstration lessons, or field trips, will become the basis for discussion in these seminar groups. Laboratory note books are required.

The granting of a degree or teaching certificate is dependent upon satisfactory performance in these laboratory courses. No units are awarded.

#### **Examination Results**

Results of the sessional examinations in April are mailed to students in the graduating classes about the time of Congregation, and to students in the lower years by approximately June 15. Any student who must meet an application date for another institution prior to June 15 should inform the transcript clerk in the Registrar's Office in order that arrangements may be made to meet the dead-line.

# Review of Assigned Standing

Reviews of assigned standing are governed by the following regulations:

- 1. Any request for the review of an assigned grade other than for a supplemental examination (in which a request for a review will not be granted), must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each course concerned which will be refunded only if the mark is raised.
- 2. Each applicant for a review must state clearly why he believes the course deserves a grade higher than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a second time before results are announced. For this reason an applicant granted a supplemental should prepare for the examination since a change in the original mark is unlikely and the result of the review may not be available before the end of the supplemental examination period. A review will not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.
- 3. Reviews will not be permitted in more than two courses (6 units) in the work of one academic year, and in one course (3 units) in a partial course of 9 units or less or in the work of one summer session.

# Transcript of Academic Record

A transcript of a student's academic record will, on request of the student, be mailed direct to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the inscription "official transcript only if presented with seal unbroken". On graduation or withdrawal a student may obtain for his own use a copy of his record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of midterm examinations.

Student records are confidential. Transcripts are issued only at the request of students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made arrangements satisfactory to the Finance Department to meet any outstanding indebtedness.

Granted Honourable Dismissal indicates that the student is in no disciplinary difficulty at the time the transcript is issued; the term has no reference to scholastic status.

Application for a transcript should be made at least one week before the document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

# Application for British Columbia Teacher's Certificate

The teacher, the University and the Department of Education are all concerned in the process of upgrading the teacher's certificate. The

teacher plays his part by choosing a degree programme, by selecting courses from the University calendar to meet regulations of this programme and by applying at the appropriate times during his university work for a change of certificate.

For students registered in the Winter Session the University sends to the Department of Education in June a statement of the standing of all students in the Faculty of Education who might qualify for a teacher's certificate. At the same time that students are mailed their individual marks they are given application forms to be completed and mailed to the Department of Education carrying the request for the issuance of a particular certificate. If the University's statement and the teacher's request agree, the Department issues the certificate. If the statements disagree the Department asks the University for a reassessment of standing. Students who, during the Winter Session, have been in any faculty other than Education or students who complete an Extra Sessional or Correspondence Course, must not only request the Department for a change of certificate but also ask the Records Office of the Faculty to send a statement of standing to the Department.

In the Summer Session these two steps are combined. An applicant completes a card in his registration envelope which is a request for a change of certificate; at the end of the Summer Session the student's standing is noted on this card and the card is forwarded to the Department. In any case where the student's evaluation of his position differs from the University evaluation the student is so informed. It is hoped that teachers' claims can be checked during the Summer Session so that apparent conflicts can be resolved.

If the above procedures are followed the student will seldom find it necessary to have a transcript of record sent to the Department of Education of this province.

#### **ELEMENTARY DIVISION**

# A (1)—The Bachelor of Education (Elementary) Degree Programme

Students may, if they wish, have their standings reported to the Department of Education for certification on completion of Third Year, although the Faculty would much prefer them to complete the four-year degree before accepting a teaching appointment.

Students may enter this programme either from Grade 12 or from Grade 13 or first year junior college or from first year in another faculty.

First Year* English 100	Units 3
A course in History, Geography or other Social Science	
A first year laboratory science: such as Biology 101, Chemistry 103 or 110 or 120, Geography 101, Physics 110 or 120 or 130, Geology 105 (Students planning to major in Elementary Science Education should refer to the course outline of this Major on page L26 before selecting their first year laboratory science.)	•
Two of: F.A. 101 or Music 320, Music 101, first year of a language other than English, Mathematics 130 or 100 and 121, P.E. Activity Courses, Psychology 100	

(F.A. 101 is prerequisite for an Art major in Third and Fourth Years; Music 101 is prerequisite for a Music major; P.E. Activity Courses are prerequisite for a P.E. major.)	
Education 197—(Counselling, orientation, and observation)	0
	15
Second Year*	Jnits
English 200	3
Prerequisite for Academic major (or elective if no prerequisite needed)	3
**An academic elective, preferably in History or Geography	3
Education 303 or 304—Curriculum and Instruction in the Language Arts	3
Mathematics 370	11/2
Education 371	$1\frac{1}{2}$
Education 297—(Seminars, classroom experience and post-sessional practicum)	0
	15
*Note: Students who have taken more than 15 units in each of the first two years will not be permitted credit for such extra units for a more advanced year.	
Third Year	Jnits
(Note: Students planning to leave, to accept teaching positions at conclusion of this year, must postpone to the fourth year acad courses not designated for Education students only and replace with courses of the Professional Major as these students will requ February as well as an April-May practicum. Such students who also to take Education 472/473 are advised to take these courses in third year.)	emic them ire a
English 303—Composition	3
Courses of the Academic and/or Professional Major (single or double)	6
Education 321, 322—Curriculum and Instruction in Science and Social Studies	3
***Education 310 (Growth and Development), and Education 311 (Nature and Measurement of Learning) or a course of the Pro-	
fessional Major	3
Education 323, 324, 325—Curriculum and Instruction in Art, Music, and Physical Education	3
Education 397—(Seminars and post-sessional practicum)	0
	18
	Jnits
***Education 310/311 or a course of the Professional major (whichever alternative not taken in Third Year)	3

Courses of the Academic and/or Professional Major (single or double) 9
Free elective (academic or professional)3
Education 400 (Philosophy of Education) or Education 430 (History of Education) or Education 470 (Educational Sociology) 3
Education 497 (Seminars and post-sessional practicum) 0
18
**In the case of double majors, a course of the major would be substituted for these 3 units and an academic elective, preferably in History or Geography, taken later in place of a third year course of the major.
***Students taking the major in Young Children (Kindergarten) may substitute Ed. 331 for 310/311. Students planning to teach at the end of the third year are advised to take Education 310/311 during the third year.
Programmes for Students Transferring From Other Faculties, Colleges, or Grade 13 to the Faculty of Education.
Transferring to Second Year
Students with full Grade 13 or first year in another faculty or college will take the regular A1 second year as specified above.
If the first year is incomplete, they will take the full second year programme and complete the deficient first year courses in the following summer session.
Transferring to Third Year
Students with two full years in another faculty will normally take the following programme:
Education 321/322

# Tran

Education 321/322	3
Education 303 or 304	3
Education 323 ,324, 325	3
Mathematics 370	$1\frac{1}{2}$
Education 371	11/2
Education 310/311	3
English 303 or Education 400 or Education 430	3
Education 397	0
	—
	18
To complete their degree they would take in Fourth Year	

# To complete their degree they would take in Fourth Year

English 303, if not taken in third year; if taken, one of Education 400 or Education 430	3
Completion of one major, professional or academic	9
Electives	6

18

# Transferring to Fourth Year

Students with three full years credit in another faculty transferring to Education will normally be credited with a maximum of forty-two unit

towards a B.Ed. (Elementary) degree. They may complete the remain twenty-four units in a winter and the following summer session. In winter session they will take the following eighteen unit programme.	ning the
Education 321/322	3
Education 303 or 304	3
Education 323, 324, 325	3
Education 310/311	3
	$1\frac{1}{2}$
	$1\frac{1}{2}$
Education 400 or 430	3
Education 497	0
	<del></del>
To the fellowing Common Costs of State 6 with the fellowing	18
In the following Summer Session they will take 6 units to complete academic major or other requirements of the B.Ed. degree. (Only us special circumstances would a fourth year transfer be permitted take a professional major. Normally he will complete an acade major begun in his third year.)	nder l to mic
Students who are graduates of a recognized Canadian, British or o Normal School or Teachers College, who also have first year or equiva standing recognized by the Registrar's Office of this university for transfe a degree programme at this institution, will be granted credit as transtudents toward the B.Ed. degree as follows:	lent r to
Grade 13 or first year university or equivalent, to a maximum of 1 Professional training: Education 297/397/497, Education 321, 322, 303 or 304, 323, 324, 325, 310, 311, 371, Mathematics 370 to a maximum of	
Grade 13 or first year university or equivalent, to a maximum of 1 Professional training: Education 297/397/497, Education 321, 322, 303 or 304, 323, 324, 325, 310, 311, 371, Mathematics 370 to a	5
Grade 13 or first year university or equivalent, to a maximum of 1 Professional training: Education 297/397/497, Education 321, 322, 303 or 304, 323, 324, 325, 310, 311, 371, Mathematics 370 to a maximum of	5 ents
Grade 13 or first year university or equivalent, to a maximum of I Professional training: Education 297/397/497, Education 321, 322, 303 or 304, 323, 324, 325, 310, 311, 371, Mathematics 370 to a maximum of	5 ents
Grade 13 or first year university or equivalent, to a maximum of I Professional training: Education 297/397/497, Education 321, 322, 303 or 304, 323, 324, 325, 310, 311, 371, Mathematics 370 to a maximum of	5 ents ents, the
Grade 13 or first year university or equivalent, to a maximum of I Professional training: Education 297/397/497, Education 321, 322, 303 or 304, 323, 324, 325, 310, 311, 371, Mathematics 370 to a maximum of	5 ents ents, the
Grade 13 or first year university or equivalent, to a maximum of I Professional training: Education 297/397/497, Education 321, 322, 303 or 304, 323, 324, 325, 310, 311, 371, Mathematics 370 to a maximum of	5 5 ents ents, the nits 3
Grade 13 or first year university or equivalent, to a maximum of	5 ents ents, the
Grade 13 or first year university or equivalent, to a maximum of	5 5 ents ents, the nits 3
Grade 13 or first year university or equivalent, to a maximum of I Professional training: Education 297/397/497, Education 321, 322, 303 or 304, 323, 324, 325, 310, 311, 371, Mathematics 370 to a maximum of	5 5 ents ents, the nits 3
Grade 13 or first year university or equivalent, to a maximum of I Professional training: Education 297/397/497, Education 321, 322, 303 or 304, 323, 324, 325, 310, 311, 371, Mathematics 370 to a maximum of	55 5ents ents, the nits 3 3 9
Grade 13 or first year university or equivalent, to a maximum of I Professional training: Education 297/397/497, Education 321, 322, 303 or 304, 323, 324, 325, 310, 311, 371, Mathematics 370 to a maximum of	55 55 ents nts, the nits 3 3 3 9 nnits
Grade 13 or first year university or equivalent, to a maximum of I Professional training: Education 297/397/497, Education 321, 322, 303 or 304, 323, 324, 325, 310, 311, 371, Mathematics 370 to a maximum of	5 5 5 the nits 3 3 3 9 nits 3

# 1 (3)—Programme in Elementary Education for graduates of other faculties.

Students with a Bachelor's degree from another faculty who desire to ecome elementary teachers will take the following programme:

	Units
Education 310 and 311	3
One of Education 400 or 430 or 470 or 519	3
Education 323, 324, 325—or for students with sone of Ed. 305, Ed. 307 or Ed. 308. Consent cerned is required.	of department con-
Mathematics 370	
Education 371	1½
Education 497 (Graduates)	
For the remaining 6 units students may choose following groups A, B, or C	e one of the 6
	18
(A) Recommended for students who have taken co work in the sciences:	nsiderable undergraduate
Education 409 (Graduate Section)	
Education 406	

(B) Recommended for students who prefer teaching the Primary Grades (Kindergarten to Grade 3):

Education 303

Education 322

Education 321

(C) Recommended for students who prefer teaching the Intermediate Grades:

Education 304

**Education 322** 

Education 321

The requirements for the interim Professional Certificate are normally satisfied by this programme. For permanent certification the teacher must meet requirements as stipulated in the regulations on teacher certification administered by the Department of Education, Victoria.

# A (5)—Honours Programme for the B.Ed. (Elementary) Degree:

A student may proceed to the B.Ed. degree (Elementary field) in a Single Honours course in certain academic fields. The following regulations govern these courses:

1. The student must have at least a second class average in his second year and a second class in the prerequisite or prerequisites of the subject

in which he is contemplating taking Honours.

2. He must have the consent of the Director of the Elementary Division and of the Department which offers the Honours courses.

3. He must maintain a second class average or better in each of his

Third or Fourth Years.

- 4. At least 18 units in Third and Fourth Years must be taken in the Honours subject. The student should consult the Department concerned to discover which courses are required by that Department. The Department may require the candidate to present a graduating essay which may counfrom 3 to 6 units.
- 5. The degree will require an additional 6 units of credit in Third and Fourth Years which may be completed by Summer Session. Aside from this the Honours Programme requires attendance in regular session for third and fourth years.

# A (6)—Fifth Year Programme for Graduates with the Bachelor of Education (Elementary) Degree:

Graduates of the four-year programme in the Elementary Field may undertake a fifth year of study with Elementary teaching or administration in mind. Such a Fifth Year is also required for entry to a Master's programme. (See page L51). For admission to the Programme and selection of courses consult the Director of the Elementary Division.

# A (7) Diplomas in Education.

Students who are graduates of a recognized university may enrol in a one-year full-time Diploma in Education programme in the fields of Special Education or Education for Young Children. They must first be accepted for the Programme by the Director of the Elementary Division and by the Department of Special Education or of Education of Young Children. Candidates who wish to satisfy requirements for teacher certification in this province, and who are not eligible for certification upon enrolment, may complete these requirements by taking, subsequent to the Diploma year, three units of courses in Educational Psychology and three units in Philosophy of Education, History of Education or Educational Sociology. The Diploma will normally be awarded upon successful completion of one of the following programmes:

- (a) Education of the Deaf—Twelve units from: Education 422, 441, 442, 443, 444, 445, 497, (minimum 180 hours of practical teaching). Three units must be chosen from Education 423, 446, 447, Linguistics 300, Linguistics 319.
- (b) Education of the Mentally Retarded—Twelve units from: Education 403, 417, 418, 420, 429, 431, 436, 472, 477, 509, 513, 561.

Practicum: Education 497.

Prerequisite: Education 407 or its equivalent.

(c) Education of Children with Learning Disorders—Twelve units from: Education 403, 417, 431, 436, 437, 472, 477, 509, 561, 568.

Practicum: Éducation: Education 497.

Prerequisite: Education 407 or its equivalent.

(d) Education of Young Children—Twelve units from: Education 331, 333, 334, 336, 438, Education 497—Practicum 180 hours of practical teaching in the Child Study Centre and other selected schools.

#### Professional and Academic Majors for Elementary Teachers

Students on the regular A1 programme are required to complete two majors, one academic (courses are chosen from offerings in the Faculties of Arts and Science) and one professional (courses offered in the Faculty of Education).

In Art Education, Music Education and Science Education students may substitute a *double major* for the two majors, academic and professional, described above.

Successful completion of the Bachelor of Education degree requires an average of 60 per cent in the senior courses of the major or majors.

Students completing the degree on the former A2 Programme, and transferring into Education after two or three years in another faculty, are required to complete only one major. Students on the third or fourth year of the A2 programme have twenty-one units in which they are required to take either an academic or a professional major together with approved senior electives. If an academic major is chosen, the electives should be senior education courses; if professional, the electives should be senior academic courses.

# Academic Majors

On the Al Programme an academic major consists of nine units of senior Arts or Science courses in a particular field plus any first or second year prerequisite courses. Full details of each of these majors may be obtained from the office of the Elementary Division and from the Student Handbook of the Elementary Division. Such academic majors are offered in the following Departments of the Faculties of Arts or Science: Anthropology, Asian Studies, Biology, Chemistry, Classical Studies, Economics, English, Fine Arts, French, Geography, Geology, German, History, Mathematics, Philosophy, Physics, Political Science, Psychology, Religious Studies, Slavonic Studies, Sociology, Spanish, Theatre, and Zoology.

It is not the primary function of the academic major in the Elementary Division to prepare a teacher in the field of the major, but rather to give each student an opportunity to develop an intellectual interest to some depth. Therefore students are perfectly free to choose an academic major regardless of whether this subject is taught in the school system.

#### **Professional Majors**

These majors consist in the main of courses offered by the Faculty of Education and are intended to prepare teachers as specialists in certain subject areas or grade levels. Following are the details of the professional majors offered:

#### Art Education

Ist year

F.A. 101 (if possible).

2nd year

F.A. 300 (in place of academic elective).

3rd year

F.A. 101 (if not previously taken) and ONE of the following: F.A. 303, F.A. 305, F.A. 307, F.A. 401.

4th vear

Ed. 305 (in lieu of Ed. 310/311) and F.A. 301 or F.A. 302. Art majors are advised to choose, for the free elective, an advanced art course following their third year choice.

#### Intermediate Education\*\*

Education 472 and 473; English 311 or General Science 309 (a student who has not taken a laboratory science other than Geography 101 must take General Science 309); 3 units of senior Education courses.

# Language Arts\*\*

One of English 311, 321, Theatre 301; Education 472/473; one of English 351, English 309, Linguistics 300, Education 478.

#### Librarianship

Education 390, 491, 492. Recommended elective: English 311 or Education 414.

N.B. Education 390 must be taken previous to or concurrently with Education 491, and Education 492 following or concurrently with Education 491.

(C - NT - 0)

 $\overline{12^{1/2}}$  units

#### Music Education

1st vear

Music 101.

3rd and 4th years

Music 201, Music 320 or F.A. 101 in place of Ed. 310/311, Music 302, Music 303, Ed. 307 in place of free elective, Music 401 or two of Music 140, 141, 142 (2 units each).

# Physical Education

# Activity Courses

*P. E. 230	I (See Note	2)
*P. E. 201 or 202		,
P. E. 240 or 241	1	
Selection from area V	1	
Selection from area IV or VI		
	5	5
Theory Courses		
*P. E. 260	11/2	
P. E. 262	$11/_{2}$	
One other required	$1^{1/2}$	
•	$\frac{72}{4!/2}$	$\overline{4}\overline{1/2}$
Electives—Theory or Activity	3	3

Notes: \*1. These courses should be taken in 1st or 2nd year.

- 2. Swimming—P.E. 230. Students who can demonstrate satisfactory standards in swimming may select an optional course in lieu of P. E. 230, provided written permission has been obtained from the Director of the School of Physical Education and Recreation.
- 3. Students are advised that an extra three (3) units of P. E. course work can be taken as the "free elective" in Fourth Year. It is recommended strongly that students take advantage of this opportunity.
- 4. Students should refer to School of Physical Education calendar for course descriptions and area listings.

# Education of Young Children

Education 333, 334, 336. The Child Study Centre, 2855 Acadia Road, is available for observation, research, and participation in working groups of young children for students enrolled in the courses of the major.

#### Primary Education

Education 405, English 311; one elective from Education 305, 306, 307, 308, 333, 336, 414, 419, 472/473, Theatre 301, General Science 309.

#### Reading Education\*\*

Education 472/473, 475/476, English 311.

#### Special Education

Education 407; 6 units of Education 403, 408, 417, 419, 420, 421, 422, 423, 424, 429, 431, 436, 437, 441, 442, 443, 444, 445, 446, 447.

Students wishing to complete requirements for teachers of the deaf in the fifth year beyond the B.Ed. degree should take the following sequence of courses to constitute this major:

Education 407; 6 units from Education 422, 423, 441, 442, 443, 444, 445, 446, Linguistics 319, Linguistics 300. Students wishing to take a professional major in Special Education with emphasis on speech-handicapped children will take the following course sequence: Education 407, 419, 422 and one elective from Education 423, 424, Theatre 301.

For information on Diploma in Education see pages L9 and L10.

#### Science Education

Ist Year Prerequisite. At least 3 units in Biology, Chemistry, Geology, or Physics.

Third and Fourth Years. General Science 309, Ed. 409, and 3 units chosen from a science field not previously taken.

Note: Students are advised to take as an elective an additional science course, preferably in second year.

\*\*Intermediate, Language Arts, and Reading Education majors planning to teach at the end of the third year are advised to take Education 472/473 in the third year.

# Double Majors in Art, Music, or Science

(Open to students on Programme A (1) only)

#### Art Education

First Year—F.A. 101 (If F.A. 101 is not taken in First Year it can be included among the 6 units of electives offered in the Fourth Year.)

Second Year—F.A. 300, 301.

Third Year-F.A. 302 and one of F.A. 303, 305, 307, 401.

Fourth Year-Education 305 and one of F.A. 402, 403, 405, 407.

Fine Arts electives (6 units).

#### Music Education

First Year—Music 101 (recommended) or F.A. 101 or Music 320.

Second Year-Music 201 or Music 101, F.A. 101 or Music 320.

Third Year—Music 201 if not taken previously, otherwise Music elective. Music 302, Music 303.

Fourth Year—Music 401, Education 307. Two of Music 140, 141 and 142 (2 units each).

#### Science Education

First and Second Years—At least 6 units chosen from at least two of Biology, Chemistry, Geology and Physics.

Third and Fourth Years—General Science 309; Education 409; three units chosen from one of the Sciences named above and not previously taken; nine units of approved elective science courses. Geophysics 310 is recommended.

#### SECONDARY DIVISION

# The Bachelor of Education (Secondary) Degree Programme

Three types of degree programmes are offered:

- 1. The Bachelor of Education (Secondary) General Programme indicating that the graduate is prepared to teach two high school subjects and has successfully completed two appropriate academic concentrations. For details, see pp. L30 and following:
- 2. The Bachelor of Education (Secondary) Major Programme indicating that the graduate has completed a more concentrated study of the subject named in the degree. For details see pp. L35 and following:
- 3. The Bachelor of Education (Secondary) Honours Programme indicating that the graduate has completed an honours course in the subject named in the degree. For details see p. L39.

#### Acceleration

The standard Secondary Programme ordinarily requires attendance at *five winter sessions*. Permission to accelerate may be granted by the Director at the end of the Second Year if the student has achieved at least Second Class standing in the work of the first two years, and if he can complete the required amount of practice-teaching. No credit will be given for courses taken for the purpose of acceleration unless prior permission is obtained from the director.

First Year	Units
English 100	. 3
Electives and courses required for academic concentrations or major	· 12
Note: Students may elect the Arts I programme and be credited wunits including English 100. (For further information see Arts calenda	/ith 9 r.)
Second Year	Units
Education 200	. 3
English 200	. 3
Electives or courses required for academic concentrations or major	9
Education 298	. 0
Third Year	Units
Education 332	. 3
Courses required for academic concentrations or major	. 9
Academic Elective*	. 3
Fourth Year	Units
English 303 or 304	. 3
Education 301 (1½), 302 (1½)	. 3
Courses required for academic concentrations or major	
Academic or Professional Elective*	. 3

Education 498	0
*Academic Electives of the third and fourth years should ordinarily be numbered 300 or above. Attention is drawn to the possibility of using these electives to develop an additional academic concentration.	
Fifth Year	Units
One of Education 400, 430, 470	3
Education 404 relating to academic concentrations $(1\frac{1}{2}+1\frac{1}{2})$ or major $(1\frac{1}{2})$	11/2-3
(Every student is strongly urged to audit an additional course in Education 404)	
Education 413	$1\frac{1}{2}$
One of Education 401, 435, 481, 482, 483 6-7½ units chosen from Education 400, 401, 407, 408, 412, 414, 416, 418, 426, 427, 430, 435, 460, 461, 470, 472, 474, 481-2, 490; or one of the above Education courses and one academic elective approved by the Director. (See note below.)	, -
Education 499*	0
*Education 499 is weighted one-third in determining overall standing. (See Section 1(b) p. L15.)	
NOTE: The student planning to proceed to a Master's degree in Educ following completion of his undergraduate degree work is advised to one of the following from the above list according to his intended fie specialization:	elect
Education 400 (for Philosophy of Education)	
Education 407 (for Special Education)	
Education 414 (for Audio-Visual Education)	
Education 426, 427 (for Guidance and Counselling)	
Education 412 (for Adult Education) Education 430 (for History of Education)	
Education 460 (for Administration)	
Education 461 (for Curriculum and Instruction)	
Education 470 (for Educational Sociology)	
Education 472/474 (for Reading Education)	
Education 481-2 (for Educational Psychology)	
Other Programmes - Secondary Field	
I. One-Year Programme (Secondary) for Graduates	
The requirements for the Interim P.B. Certificate are satisfied by this gramme for students holding acceptable degrees and admitted without ctions.	pro- ondi-
1	Units
Education 301 (1½), 302 (1½)	3
0 [7] . 400 400 470	_

One of Education 400, 430, 470

Education 404 (relating to academic concentrations $\begin{bmatrix} 1\frac{1}{2}+1\frac{1}{2} \end{bmatrix}$ or major) $\begin{bmatrix} 1\frac{1}{2} \end{bmatrix}$
Education 413
$4\frac{1}{2}$ -6 units chosen from Education 400, 401, 407, 408, 412, 414, 416,
418, 426, 427, 428, 430, 432, 460, 461, 470, 472/474, 481-2, 483,
4904½-6
Education 499*

\*Education 499 is weighted one-third in determining overall standing. Students are recommended for certification only after achieving satisfactory standing both in practice teaching and in the academic and professional courses. (See Section 1(b), page L15.)

# 2. B.Ed. Secondary for Teachers Holding a Teaching Certificate:

Candidates must have completed English 200 as part of the first two years.

Third Year (see Note 1 below)	Units
Courses required for academic concentrations or major	. 18
Fourth and Fifth Years (see note 1 below)	Units
English 303 or 304 (see Note 2 below)	3
Courses required for academic concentrations in two teaching subjects or a major or honours in one teaching subject	
One of Education 400, 430, 470	3
Education 432 (or 332)	-
trations $[1\frac{1}{2}+1\frac{1}{2}]$ or to the major) (see notes 3 and 4 below)	3
TOTAL	.48-51

Students who hope to complete all or part of this programme by summer session, correspondence or extra-session are warned that courses are not always available when required and that graduation may have to be delayed for this reason.

#### NOTES:

- 1. Where the student's programme permits electives, these should ordinarily be chosen from the academic subjects. Only three units of Education courses other than those which are required may be counted for degree credit. Courses relating to teaching in the elementary school including Mathematics 203 and 303 will not be accepted for credit. Any one of the following courses will carry credit: Education 400, 401, 407, 408, 412, 414, 416, 418, 426, 427, 428, 430, 432, 460, 470, 472, 474, 481, 482, 483, 490.
- 2. All students planning a concentration or a major in English must complete English 304 or 309 instead of English 303.
- 3. Where appropriate to the student's academic concentration or major, Education 305, 307 or 490 may be substituted for the Education 404 course in the corresponding subject matter field.
- 4. A student in attendance at a Winter Session will be required to take Education 498 (Professional Section). All holders of Professional Teaching Certificates will be given the opportunity of meeting together in a special seminar and of participating in individually arranged field work in the Senior Secondary Schools of the Vancouver area.
- 5. Students who choose academic concentrations in Agriculture, Art, Creative

Writing, German, Guidance, Latin, Music, Spanish, Russian or Theatre are warned that they will not be able to complete their work entirely by Summer Session.

# 3. Fifth Year for Students Holding a B.Ed. (Elementary) Degree:

Graduates of the four-year degree programme in the Elementary field who wish to prepare themselves for teaching in the Secondary schools may fulfil requirements by completing an appropriate fifth year of study under the guidance of the Director of the Secondary Division. By the end of this fifth year the student must have completed two academic concentrations or one major of the Secondary Division with an average of at least 60% in each such concentration or in the major.

# ACADEMIC CONCENTRATIONS, MAJORS AND HONOURS FOR SECONDARY TEACHERS

#### A. THE GENERAL DEGREE COURSE CONCENTRATIONS

Candidates must complete academic concentrations in two of the following subjects. One of these must be in a subject widely taught in the Secondary Schools. Courses not widely taught are indicated by an asterisk.

Agriculture*	French	Mathematics
Art	Geography	Music
Biological Science	German*	Physical Education
Commerce (Business)	Guidance	Physics
Commerce (Secretarial)	History	Russian*
Chemistry	Home Economics	Spanish*
Creative Writing*	Latin*	Theatre*
English	Library	

An average of 60% at least is required in the senior courses of each of the academic concentrations which constitute a candidate's programme.

Only with the prior permission of the director of Secondary Education may exceptions be granted in any of the requirements in the following academic concentrations:

#### 1. Agriculture Concentration

First and Second Years: Mathematics 100 and 121, Chemistry 103 or 110 or 120, Physics 110 or 120 or 130; Biology 101, Agriculture 100 (1) and 3 units chosen from Animal Science 200 ( $1\frac{1}{2}$ ), Horticulture 200 ( $1\frac{1}{2}$ ), Soil Science 200 ( $1\frac{1}{2}$ ), Dairying 200 ( $1\frac{1}{2}$ ), Poultry Science 200 ( $1\frac{1}{2}$ ), Agricultural Economics 200 ( $1\frac{1}{2}$ ), Agronomy 200 ( $1\frac{1}{2}$ ). Geology 105 is recommended. It may be deferred until Third or Fourth year.

Senior Years: Agriculture 300 (1), 6 units in the 200-level courses named above and not chosen previously, and 6 units of approved senior Agriculture courses.

Note: The requirements of Agriculture 300 are completed by participation in the one-week field trip just prior to the registration week of the Fourth or Fifth Year.

This major cannot be completed entirely by Summer or Extra Session.

#### 2. Art Concentration

First and Second Years: Fine Arts 101, 300.

Senior Years: Fine Arts 301, 302 and one of the following groups of two: Fine Arts 401, 402; Fine Arts 303, 403; Fine Arts 305, 405: Fine Arts 307, 407

# 3. Biological Sciences Concentration

First Year:

Biology 101; Chemistry 103 or 110 or 120; Mathematics 100 and 121; Physics 110 or 120 or 130.

Second, Third and Fourth Years:

At least 12 units of Biological Science including one or both of Biology 200 ( $1\frac{1}{2}$ ) and 201 ( $1\frac{1}{2}$ ), at least one of Botany 209 ( $1\frac{1}{2}$ ), 210 ( $1\frac{1}{2}$ ), 302, 303, 304, 305; at least one of Zoology 203 ( $1\frac{1}{2}$ ), 204 ( $1\frac{1}{2}$ ), 301, 415, 416; at least one of Biology 321 ( $1\frac{1}{2}$ ) and 322 ( $1\frac{1}{2}$ ), one of Botany 330, Zoology 303 or 307 and 308, and the remaining units chosen from Biology 334 ( $1\frac{1}{2}$ ) or 335 (offered in Summer Session), Microbiology 200 or any of the courses listed above not previously taken or other approved course in Biology, Botany or Zoology.

Note. Geology 105 is strongly recommended.

Only one of English 200 or 303 need be taken.

# 4. Chemistry Concentration

First and Second Years: Chemistry 103 or 110 or 120; and 205 or 210 or 220; Mathematics 100 and 121; Physics 110 or 120 or 130; Biology 101; Mathematics 202 is required if Chemistry 304 or 305 is to be elected.

Senior Years: Chemistry 230, 310 (2) with lab 315 (2) or 320 (1) and three additional units chosen from Third or Fourth Year Chemistry courses. Chemistry 304 or 305 is strongly recommended.

Note: Geology 105 is strongly recommended.

Only one of English 200 or 303 need be taken.

#### 5. Commerce (Business) Concentration

First and Second Years: Mathematics 130 or 100 and 121, Commerce 151-190, Economics 200.

Senior Years: Commerce 252, 331, 375. Strongly recommended: Three units chosen from: senior Commerce courses or Computer Science.

Note: All students are required to demonstrate competence in typewriting before being awarded a certificate. Instruction will be provided on campus without credit.

# 6. Commerce (Data Processing) Concentration

First and Second Years: Mathematics 130 or 100 and 121, Commerce 151/190, Commerce 110 or Mathematics 212.

Senior Years: Commerce 252, Computer Science 200  $(1\frac{1}{2})$ , Commerce 356  $(1\frac{1}{2})$ , Commerce 375.

Strongly recommended: Economics 200 and Commerce 331.

Note: All students are required to demonstrate competence in typewriting before being awarded a certificate. Instruction will be provided on campus without credit.

## 7. Commerce (Secretarial) Concentration

First and Second Years: Two of Economics 200, Geography 102, Computer Science 200 and 201, Commerce 151/190.

Senior Years: \*Education 375, Commerce 375. Strongly recommended: three additional units of senior Commerce work.

\*Skills in shorthand and typewriting are prerequisite to Education 375. Instruction is provided on the campus without credit. Students should arrange for instruction, beginning in the first year.

# 8. Creative Writing Concentration

First and Second Years: English 100, 200, and Creative Writing 201 or 202.

Senior Years: English 304; two of Creative Writing 407, 409 and 410; the third course of the foregoing sequence or a senior academic elective approved by the Department of Creative Writing.

Note: One of French, Spanish, Italian, German, Russian, Latin, or Greek to the 200-level is required. Linguistics 300, 319 and 400 may be used to replace 3 or 6 units of the language requirement.

This major cannot be completed entirely by Summer or Extra Session.

# 9. English Concentration

First and Second Years: English 100, English 200.

Senior Years: English 304 or 309, one of English 331, 360, 365, 366; one of English 321, 370, 375, 380, 389, 390, 391, 392, 393; one of English 300, 320, 340, 420, 429, 440, 450, 454.

Note I: One of French, Spanish, Italian, German, Russian, Latin or Greek to the 200-level is required. Linguistics 300, 319 and 400 may be used to replace the language requirement.

Note II: Education 472/474 is recommended in the fifth year.

#### 10. French Concentration

First and Second Years: French 120 (or 110 and 115), 202 and 220 (either of these may be taken in the Third Year.

Third and Fourth Years: French 302 and at least 6 additional units in courses numbered 300 and above (excluding 301, 400 and 401).

Recommended courses: French 306 and a course in Linguistics.

Recommended professional elective: Education 414.

#### 11. German Concentration

For students wishing to major in German and a second language other than English, French is strongly recommended.

First and Second Years: German 100, (110 or 120), German 200 (210), German 223.

Senior Years: German 310, 323, or 411, plus one additional senior course in German Literature (German 350 is strongly recommended).

Note: Election of an additional course in German is strongly advised and election of one course in Latin. Greek. another modern language, or linguistics, is recommended.

This major cannot be completed entirely by Summer or Extra Session.

#### 12. Guidance Concentration

The Guidance concentration prepares teachers for the guidance courses in secondary schools and normally forms the undergraduate prerequisite for admission to a graduate programme in counseling. The guidance teacher must be knowledgeable in such areas as educational and vocational planning, human development, and the opportunities and problems of the contemporary society. Students may complete this concentration following either plan A or B\*. Education 426  $(1\frac{1}{2})$  and 427  $(1\frac{1}{2})$  are recommended electives. All students wishing to prepare this concentration must first consult a member of the Guidance Department.

Plan A: Sociology 250 or 260; Anthropology 200 or Economics 101 or Economics 200 and nine units of senior course work in Sociology or Psychology.

Plan B\*: An individual programme utilizing courses, readings, research projects, and work with youth groups developed in consultation with a faculty advisor.

\*It may not be possible to implement Plan B for the 1960-70 Session. Note: Students seeking admission to senior courses in Psychology who do not have the Psychology Department's prerequisites must have permission of the course instructor before registering.

# 13. Home Economics Concentration (courses to be taken in sequence)

Note: Students electing the Home Economics Concentration must include in their programme a first-year course in Chemistry (Chemistry 103, 110, 120), and Chemistry 230.

First and Second Years: Home Economics 201 (3), Home Economics 202 ( $1\frac{1}{2}$ ), Home Economics 220 ( $1\frac{1}{2}$ ), Home Economics 210 (Workshop) (1), plus a  $1\frac{1}{2}$  unit Home Economics elective.

Senior Years: Home Economics 203 ( $1\frac{1}{2}$ ), Home Economics 205 ( $1\frac{1}{2}$ ), Home Economics 310 ( $1\frac{1}{2}$ ), Home Economics 360 ( $1\frac{1}{2}$ ), Home Economics 362 ( $1\frac{1}{2}$ ), Economics 200.

#### 14. Latin Concentration

First and Second Years: Latin 120 (or 110) and 220; or Latin 100 and 205.

Senior Years: Latin 410 plus 9 units of Latin courses numbered above 300.

Note: Election of Classical Studies 331 is strongly advised and Greek 100 is recommended.

This major cannot be completed entirely by Summer or Extra Session.

# 15. Librarianship Concentration

Education 390, 490, 491, 492.

Recommended: 3-6 units of Education 472-4, Education 414.

#### 16. Mathematics Concentration

First and Second Years: Mathematics 100, 120, 121, 200, and 202.

Note: First year students who intend to concentrate in mathematics should obtain a copy of the revised course structure from the Mathematics Department or the Mathematics Education Department.

Senior Years: Mathematics 300, 306, and one of 307, 308. Recommended: that both Mathematics 307 and 308 be taken.

#### 17. Music Concentration

Prerequisite: Previous music training satisfactory to the Faculty of Education.

First and Second Years: Fine Arts 101 or Music 320; Music 101, 201.

Senior Years: Music 302, 303, 401.

Strongly recommended: Two of Music 140, 141, 142,

# 18. Physical Education Concentration

Activity Courses—9 units to consist of: P.E. 230 (See Note) P.E. 201 or 202 P.E. 240 or 241 1 1 Selection from Section V Selection from Section VI  $\frac{41}{2}$  or 5 Electives 9 Theory Courses—6 units as follows: Second Year—P.E. 260

P.E. 262 Third and Fourth Years two of: P.E. 360; 361; 362; 363; 380; 460; 462; 470

3 6 15 units

3

#### Notes:

- 1. Students are encouraged to register for an additional three (3) units from the courses listed in the Physical Education calendar. Written approval must be obtained from the Director of the Secondary Division in the Faculty of Education.
- 2. Swimming—Physical Education 230. Students who can demonstrate satisfactory standards in swimming may select an optional course in lieu of P.E. 230, provided written permission has been obtained from the Director of the School of Physical Education and Recreation.
- Students should refer to School of Physical Education calendar for course descriptions and area listings.

# 19. Physics Concentration

First and Second Years: Physics 110 or 120 or 130 and 200 (2) and 219 (1): Mathematics 100 and 121 and 202; Chemistry 103 or 110 or 120.

Senior Years: Physics 300 (2) and 319 (1), 308 (2) and 318 (1), 316 (3); Biology 101.

Note: Only one of English 200 or 303 need be taken. Geology 105 is strongly recommended.

#### 20. Russian Concentration

For students wishing to major in Russian and a second language other than English, French is strongly recommended.

First and Second Years: Russian 110 and 210 or 100 and 200.

Senior Years: Russian 310 or 301, 400 and a course in modern Russian Literature.

Recommended: An additional course in Russian Literature, and Linguistics 300 or English 309.

This major cannot be completed entirely by Summer or Extra Session.

# 21. Social Studies Concentration (Emphasis on Geography)

First and Second Years

- (a) Any six units of courses offered by or acceptable to the Department of Geography for first and second year credit.
  - (b) Any 3 units of first or second year History.

(c) 3 units of first or second year course work in Anthropology, Fine Arts or Music (with an emphasis on the history of Art or Music), Economics, Political Science or Sociology.

Third and Fourth Years:

9 units of senior courses in Geography chosen on the basis of 3 units from Group B, 3 units from Group C, and 3 units from Groups A, B, or C.

Notes: (1) Students are advised to elect an additional 3 units senior courses in Anthropology, Fine Arts or Music (with an emphasis on the history of Art or Music), Economics, History, Political Science or Sociology.

(2) In the total programme at least 3 units must have emphasis on Canada.

# 22: Social Studies Concentration (Emphasis on History)

First and Second Years:

- (a) Any 3 units of courses offered by the Department of History for first and second year credit.
- (b) Any 3 units of course work offered by the Department of Geography for first and second year credit.
- (c) 3 units of first or second year course work in Anthropology, Fine Arts or Music, (with an emphasis on the history of Art or Music), Economics, Political Science or Sociology.

Third and Fourth Years:

Any 6 units of senior History courses and 3 units of senior History or other senior courses acceptable for credit in the History Department.

Notes: (1) In the total programme at least 3 units must have an emphasis on Canada.

(2) Students are advised to elect an additional 3 units of senior courses in Anthropology, Fine Arts or Music (with an emphasis on the History of Art or Music), Economics, Political Science, Sociology or Geography.

# 23. Spanish Concentration

For students wishing to major in Spanish and a second language other than English, French is strongly recommended.

First and Second Years: Spanish 100 or 110 and 200; Third and Fourth Years: Spanish 300 and six units in Spanish courses numbered 301 or higher. Portuguese 300 may be substituted for one advanced course in Spanish.

This major cannot be completed entirely by Summer or Extra Session.

# 24. Theatre Concentration

First and Second Years: Theatre 120 and 300.

Senior Years: Theatre 400, one of Theatre 310, 320, and one of Theatre 301, 350, 410, 420 (chosen in consultation with the Department of Theatre).

This concentration cannot be completed entirely by Summer or Extra Session. Recommended: 3-6 additional units of Theatre courses.

## B. THE MAJOR DEGREE COURSE

Candidates must complete a major in one of the following subjects:

Art English Industrial Education

Biology French Mathematics
Botany Geography Physics
Commerce History Zoology

Chemistry Home Economics

An average of 60% at least is required in the senior courses of the candidate's major.

Only with the prior permission of the Director of Secondary Education may exceptions be granted in any of the requirements in the following majors:

#### I. Art Major

First Year: Fine Arts 101, 300.

Second Year: Fine Arts 301, 302 and 401.

Senior Years: Fine Arts 402, 425, and one of the following groups of three: Fine Arts 303, 403, 413; Fine Arts 305, 405, 415; Fine Arts 307, 407, 417.

Note: Education 449 must be taken in the fifth year.

# 2. Biology Major

First Year: Biology 101; Chemistry 103, 110 or 120; Mathematics 100 and 121; Physics 110 or 120 or 130.

Second, Third and Fourth Years: Biology 200 ( $1\frac{1}{2}$ ) and 210 ( $1\frac{1}{2}$ ); Geology 105; Chemistry 230; at least 15 units of Biological Science including Microbiology 200; at least three units from Botany 209 ( $1\frac{1}{2}$ ), 210 ( $1\frac{1}{2}$ ), 302, 303, 304, 305; at least three units from Zoology 203 ( $1\frac{1}{2}$ ), 204 ( $1\frac{1}{2}$ ), 301, 415, 416; one of Botany 330, Zoology 303 or 307 ( $1\frac{1}{2}$ ) and 308 ( $1\frac{1}{2}$ ); or Biology 334 ( $1\frac{1}{2}$ ) or 335, (offered in Summer Session); at least one Ecology course (Biology 321 ( $1\frac{1}{2}$ ), 322 ( $1\frac{1}{2}$ ), Zoology 401, or Botany 425).

Additional recommended course: Mathematics 202 or 205 or Plant Science 321 (1½) and 322 (1½).

Note: Only one of English 200 or 303 need be taken.

#### 3. Botany Major

First and Second Years: Biology 101, 200 ( $1\frac{1}{2}$ ) and 201 ( $1\frac{1}{2}$ ); Chemistry 103 or 110 or 120; Mathematics 100 and 121; Physics 110 or 120 or 130; one of Botany 209 ( $1\frac{1}{2}$ ) and 210 ( $1\frac{1}{2}$ ), 302, 303, 304 or 305; Chemistry 230.

Senior Years: Geology 105, 15 units of biological science including Biology 334 ( $1\frac{1}{2}$ ) or 335 (offered in Summer Session); Botany 330; one of Zoology 203 ( $1\frac{1}{2}$ ) and 204 ( $1\frac{1}{2}$ ), 301, 415, or 416; at least three additional units in Botany or Biology including some Ecology; at least three additional units in Botany, Biology, Microbiology or Zoology.

Additional Recommended Course: Mathematics 202 or 205 or Plant Science 321  $(1\frac{1}{2})$  and 322  $(1\frac{1}{2})$ .

Note: Only one of English 200 or 303 need be taken.

#### 4. Chemistry Major

First Year: Chemistry 103, 110 or 120; Mathematics 100 and 121; Physics 110 or 120 or 130; Biology 101.

Second, Third and Fourth Years: Geology 105; Chemistry 205 or 210 or 220;

230; 304 or 305; 310 (2) with lab., 315 (2) or 320 (1) and 6 additional units in Chemistry; Mathematics 202.

Mathematics 300 is recommended.

Note: Only one of English 200 or 300 need be taken.

# 5. Commerce Major

First and Second Years: Mathematics 130 or 100 and 121; Commerce 151-190; Economics 200; Geography 102; Commerce 110 or Mathematics 212.

Senior Years: Commerce 252, 331, 375; and either Education 375\* or Commerce 356  $(1\frac{1}{2})$  and Computer Science 200  $(1\frac{1}{2})$ ; three additional units of senior Commerce courses.

Note: Skills in shorthand and typewriting are prerequisite to Education 375. Instruction is provided on the campus without credit. Students who do not elect Education 375 are required to demonstrate competence in typewriting.

## 6. English Major

First and Second Years: English 100, English 200.

Third and Fourth Years: 18 units consisting of (a) English 304 or 309; (b) English 300 or 320. Choose four of the following groupings, and select ONE course from each:

- (c) English 350 or 355
- (d) English 331 or 360 or 365 or 366
- (e) English 370 or 375 or 380 or 389
- (f) English 340 or 390 or 391 or 392 or 393
- (g) English 420 or 429 or 440 or 450 or 454

Note II: One of French, Spanish, Italian, German, Russian, Latin or Greek to the 200 level is required. Linguistics 300, 319 and 400 may be used to replace 3 to 6 units of the Language requirement.

Note II: Education 472/474 is recommended in the fifth year.

# 7. French Major

First and Second Years:

French 120 (or 110 and 115), 202 and 220 (either of these may be taken in the third year)

Third and Fourth Years:

French 302, 306 and at least 9 additional units in courses numbered 300 and above (excluding 301, 400 and 401).

Recommended courses: French 304 and a course in Linguistics.

Recommended professional elective: Education 414.

#### 8. Home Economics

Note: Students electing the Home Economics major must include in their programme a first-year Chemistry course (Chemistry 103, 110, 120), Chemistry 230, and Economics 200.

#### Home Economics Courses:

Home Economics 201	3	Home Economics 310	$1\frac{1}{2}$
Home Economics 202	$1\frac{1}{2}$	Home Economics 342	$1\frac{1}{2}$
Home Economics 203	$1\frac{1}{2}$	Home Economics 243	$1\frac{1}{2}$
Home Economics 205	$1\frac{1}{2}$	Home Economics 360	$1\frac{1}{2}$
Home Economics 210	l (workshop)	Home Economics 362	$1\frac{1}{2}$
Home Economics 220	$1\frac{1}{2}$	Home Economics Electives	$4\frac{1}{2}$
			22

## 9. Industrial Education Major

Academic Phase: English 100, 200, 303; Physics 103 or 110 or 120 or Chemistry 103 or 110, or 120; Mathematics 100 and 121; two academic electives.

Professional Phase: 24 units of education courses required of all Bachelor of Education candidates; student teaching. (F.A. 405 may be elected with permission of the Director in place of one of the education electives of the 5th

Technical Phase: Offered in the Division of Industrial Education, 3650 Willington Avenue, Burnaby 2, B.C.: Education 230, 252, 350, 351, 353, 360 and one of the following specialties:

- (a) Construction Specialty: Education 357, 450, 458(c), 459 and six units from Education 359, 452, 463, 464, 465.
- (b) Electrical Electronic Specialty: Education 356, 361, 458(a), 459 and six units from Education 355, 358, 456, 465, 466.
- (c) Metal and Mechanics Specialty: Education 354, 451, 458(b), 459 and six units from Education 453, 454, 457, 465, 467.

#### Regular Schedule:

First Year—English 100; Physics 103 or 110 or 120, or Chemistry 103 or 110 or 120; Mathematics 100 and 121; two academic electives.

Second Year—at 3650 Willingdon Avenue, Burnaby 2, B.C. Education 230, 252, 350, 351, 353, 360, 298.

Third Year-at 3650 Willingdon Avenue, Burnaby 2, B.C. Specialty (a), (b) or (c); 404, 499.

Fourth and Fifth Years—remainder of academic and professional courses required of all Bachelor of Education Secondary candidates.

Accelerated Schedule: Students may, with the permission of the Dean and the Chairman of the Division of Industrial Education, follow an accelerated schedule:

Summer Session: July - August, Education 200 and 332. Winter Session: September - April, 3650 Willingdon Avenue, Burnaby 2, B.C. Education 230, 252, 350, 351, 353, 360, 298.

Spring Session: May - June, 3650 Willingdon Avenue, Burnaby 2, B.C. Education 404 and 3 prescribed units from a Specialty.

Summer Session: 6 prescribed units from a Specialty. Remainder of Bachelor of Education Secondary programme by Summer Session.

All students who plan to enter Industrial Education should arrange an interview with the Chairman of the Division of Industrial Education, 3650 Willingdon Avenue, Burnaby 2, B.C., before March 31 of the year preceding the technical phase. Enrolment is restricted.

Note: No student may enrol in a second Spring Session, after a regular Winter Session at the University.

# 10. Mathematics Major

First and Second Years: Mathematics 100, 120, 121, and either Mathematics 200 and 202, or Mathematics 220 and 221.

Note: First year students who intend to major in mathematics should obtain a copy of the revised course structure from the Mathematics Department or the Mathematics Education Department.

Senior Years: (1) Mathematics 300, 306, one of 307, 308. (Mathematics 320, 321, 322 may be substituted for the foregoing.) (2) 6 additional units in Mathematics chosen in consultation with the Mathematics Education Department.

# 11. Music Major

First and Second Years: Music 101, 201, and two of Music 140, 141, 142 plus two one-unit ensemble courses.

Third and Fourth Years: Music 302, 303, 320, 401.

Note: Election of three additional units in Music is recommended.

# 12. Physics Major

First and Second Years: Physics 110 or 120 or 130 and Physics 200 (2) and 219 (1); Mathematics 100 and 121 and 202; Chemistry 103 or 110 or 120; Biology 101.

Senior Years: Geology 105; Physics 300 (2) and 319 (1), 308 (2) and 318 (1), 316 and 6 additional units in Physics, including 419 (2) or 429 (3). Mathematics 300 is recommended.

Note: Only one of English 200 or 303 need be taken.

# 13. Social Studies Major (Emphasis on History)

First and Second Years:

- a. Any 3 units of courses offered by the Department of History for first and second year credit.
- b. Any 3 units of course work offered by the Department of Geography for first and second year credit.
- c. 3 units of first or second year studies in Anthropology, Fine Arts or Music (with an emphasis on the history of Art or Music), Economics, Political Science, or Sociology.

Third and Fourth Years:

9 units of senior History courses and 6 units of senior History or other senior courses acceptable for credit in the History Department.

- Notes: (1) In the total programme at least 3 units must have an emphasis on Canada.
  - (2) Students are advised to elect an additional 3 units of senior courses in Anthropology, Fine Arts or Music (with an emphasis on the History of Art or Music), Economics, Political Science, Sociology or Geography.

# 14. Social Studies Major (Emphasis on Geography)

First and Second Years:

- a. Any six units of courses offered by or acceptable to the Department of Geography for first and second year credit.
  - b. Any 3 units of first or second year History.

c. 3 units of first or second year course work in Anthropology, Fine Arts or Music (with emphasis on the history of Art or Music), Economics, Political Science or Sociology.

Third and Fourth Years:

15 units of senior courses in Geography chosen in accordance with the major requirements in the Department of Geography. Arts calendar.

- Notes: (1) Students are advised to elect an additional 3 units of senior courses in Anthropology, Fine Arts or Music, (with an emphasis on the History of Art or Music), Economics, History, Political Science or Sociology.
  - (2) In the total programme at least 3 units must have an emphasis on Canada.

# 15. Zoology Major

First and Second Years: Biology 101, 200 ( $1\frac{1}{2}$ ) and 201 ( $1\frac{1}{2}$ ); Zoology 203 ( $1\frac{1}{2}$ ) and 204 ( $1\frac{1}{2}$ ); Chemistry 103 or 110 or 120; Physics 110 or 120 or 130; Mathematics 100 and 121; Chemistry 230.

Senior Years: Geology 105; 15 units of Biological Science including Zoology 307 and 308; Biology 334 ( $1\frac{1}{2}$ ) or 335 (offered in Summer Session); three units from Botany 209 ( $1\frac{1}{2}$ ) and 210 ( $1\frac{1}{2}$ ), 302, 303, 304 or 305; at least one of Zoology 301, 415, 416; and  $4\frac{1}{2}$  additional units in Zoology, Biology, Botany or Microbiology including a course in Ecology (Biology 321 ( $1\frac{1}{2}$ ), 322 ( $1\frac{1}{2}$ ), Zoology 401 or Botany 425).

Note: Only one of English 200 or 303 need be taken.

#### C. THE HONOURS DEGREE COURSE

Candidates who have the required standing at the end of the second year may, with the consent of the Director, complete an honours course in one of the following subjects. At least 84 units of work will be required in the five years of the programme.

Biology French Zoology

Botany Geography

Chemistry History Mathematics

English

Details of such a programme must be arranged in consultation with the Head of the department in Arts or Science concerned.

#### UNDERGRADUATE COURSES IN EDUCATION

The number of units assigned to a course is given in parentheses immediately following the course number. Thus 200 (3) under Education indicates that Education 200 is a three-unit course.

The hours assigned for laboratory, lectures and tutorials in a course are indicated as follows:

2 lectures and 3 hours laboratory per week, both terms. [2-3; 2-3]

1 lecture and 2 hours laboratory per week, first term. [1-2; 0-0]

1 lecture and 2 hours laboratory per week, second term. [0-0; 1-2]

- 2 lectures, 3 hours laboratory and 2 hours tutorial or discussion per week, both terms. [2-3-2; 2-3-2]
- 197. (0) Programme A (1) Seminar and Student Teaching.—Seminars to be arranged. Counselling and orientation to teaching. Observation, demonstration lessons and field trips as arranged.
- 200. (3) Introduction to Secondary Education.—The nature and purposes of secondary education, and appropriate methods, techniques, and organization. Education 200 and 298 are combined for final evaluation, but a passable standard in each is required. [3-0; 3-0]
- 230. (3) Electricity in Industrial Education I.—D.C. fundamentals and circuits; D.C. motors and generators; signal circuits; electro-chemical devices; D.C. measurement; residential wiring circuits. [3-3; 3-3]
- 252. (3) Principles of Technical Drawing.—Lettering; descriptive geometry; orthographic projection; sections; auxiliary views; sketching; technical illustrating; fastenings; methods of drawing reproduction; surface development. [2-4; 2-4]
- 297. (0) Programme A (1) Seminar and Student Teaching.—Seminars to be arranged. Half day per week classroom experience during the year. Post-sessional practicum. (Minimum two weeks.)
- 298. (0) Seminar and Practice Teaching.—Seminars as arranged. Half days observation and participation in junior secondary schools at regular intervals throughout the year. Demonstration lessons and field trips as arranged. Individual assistance from faculty adviser.
  - 301. (1½) Introduction to Education Psychology. [2-0; 0-0]
  - 302. (1½) Introduction to Educational Evaluation. [0-0; 2-0]
- 303. (3) Curriculum and Instruction in the Language Arts, and Integrated Subjects of the Primary Grades.—A study of (a) the curriculum organization; (b) techniques of instruction in these grades. [3-0; 3-0]
- 304. (3) Curriculum and Instruction in the Language Arts.—A study of (a) the curriculum organization in the language arts particularly in the intermediate grades; (b) techniques of instruction in these subjects and grades.

  [3-0; 3-0]
- 305. (3) Art Education.—A study of the growth and development of art education; discussion and use of various art media; the function and purpose of art in school and society; practical studio activities; modern methods and curricula in art education. Prerequisite: Education 323 (or equivalent).
- [1-3; 1-3] 306. (3) Modern Health Concepts and the Teacher.—A functional approach to matters related to the total health of the child, motivation for health behaviour, development of attitudes to personal and community health, health education in schools, deviations from normal health, social problems, controversial issues, community health and safety concepts; need for close working relationships between home, school, and community; public health agencies, world health organizations. [3-0; 3-0]
- 307. (3) Music Education.—A study of modern methods, materials, objectives, and philosophy pertaining to the teaching of music in elementary schools. Prerequisite: Education 324 or equivalent. [3-0; 3-0]
- 308. (3) Physical Education.—Theory and practice of dance, games and gymnastics for the elementary school. This course may not be taken as part of a major in physical education. [2-2; 2-2]
  - 310. (11/2) Growth and Development.—Research as it applies to the

- elementary school child. Not open to students who have taken Education 331. [3-0; 0-0]
- 311. (1½) The Nature and Measurement of Learning.—A study of learning and the techniques of evaluation as they apply to the elementary school child. Not open to students who have taken Education 331. [0-0; 3-0]
- 321.  $(1\frac{1}{2})$  Curriculum and Instruction in Elementary Science.—A Study of (a) the curriculum organization in science and health for the elementary grades; (b) techniques of instruction in science for these grades. [0-0; 3-0]
- 322. (1½) Curriculum and Instruction in History and Geography.—A study of (a) the method and structure of geography and history as disciplines; (b) the materials, skills, and content required for teaching history and geography in the elementary school. [3-0; 0-0]
- 323. (1) Curriculum and Instruction in Art.—A study of (a) the curriculum organization in art for the elementary grades; (b) techniques of instruction in art for these grades. [2-0; 2-0]
- 324. (1) Curriculum and Instruction in Music.—A study of (a) the curriculum organization in music for the elementary grades; (b) techniques of instruction in music for these grades. [1-0; 1-0]
- 325. (1) Curriculum and Instruction in Physical Education.—A study of (a) the curriculum organization in physical education for the elementary grades; (b) techniques of instruction in physical education for these grades. [2-0; 2-0]
- 331. (3) Human Development.—Consideration of the interaction of genetic and environmental factors as they influence personality, acquisition of language, motor, social and cognitive learning with implications for the organization, administration, and teaching in schools for young children.
  - 332. (3) Psychology of Adolescence.—Development and Adjustment. [3-0; 3-0]
- 333. (3) Curriculum and Instruction for Young Children.—Planning and developing an educational programme for young children, consideration being given to learning experiences, resources, materials, teaching, and guidance procedures:

  [3-0; 3-0]
- 334. (3) The Role of the Teacher in Home and Community.—An investigation of the problem of parent-teacher co-operation and techniques for developing this; a survey of community services and organizations for children. [3-0; 3-0]
- 336. (3) Modern Theories of Education for Young Children.—A critical examination of the resources and impacts which are reflected in present educational practice. [3-0; 3-0]
- 350. (3) Technology of Woodworking I.—Fundamentals of bench and machine woodwork; design and layout; hand and machine tool maintenance.

  [2-4; 2-4]
- 351. (3) Technology of Metalworking I.—An introduction to bench metalwork and light machine work; lathe and shaper operations; heat treatment of carbon steel; forging; founding; welding and related metallurgy; project planning; teaching aids and shop management. [2-4; 2-4]
- **353.** (3) Design in Industrial Education. Functional, structural and aesthetic aspects of design applied to Industrial Education projects.
- [2-4; 2-4] **354.** (1½) Oxyacetylene and Arc Welding.—(a) Oxyacetylene; fusion welding mild steel; flame cutting; testing and inspection of welds; bronze welding;

silver alloy brazing, aluminum welding. (b) Arc: practice in common types of weld in mild steel; bronze welding. [1-2; 1-2]

- 355. (3) Electricity in Industrial Education II.—Single and polyphase circuit analysis; alternating current machinery and controls; generation and distribution of electrical energy. Prerequisite: Ed. 230. [3-3; 3-3]
- 356. (3) Electronics in Industrial Education I.—Fundamental circuits; vacuum tubes and semi-conductor devices as applied amplifiers and power supplies; measurements. Prerequisite: Education 230. [3-3; 3-3]
- 357 (1½) Industrial Coatings.—Theory and practice of applying industrial finishing materials; manual and mechanical application to wood, metal and synthetic surfaces. Prerequisites: Ed. 350, 351. [1-2; 1-2]
- 358. (3) Electronics in Industrial Education II.—Data generation, transmission, and receiving systems; principles of HF, VHF, UHF, and microwave communication systems. R.F. measurements. Prerequisite: Ed. 356.

  [3-3; 3-3]
- 359. (3) Millwork Theory and Practice.—Furniture and fixture design; layout and production; custom and mass production methods; prefabrication techniques. Prerequisite: Ed. 350. [2-4; 2-4]
- 360. (3) Power Mechanics Theory and Practice.—Heat engines internal and external combustion types; fuels; mechanical and hydraulic power transmission; power control. [3-3; 3-3]
- 361. (1½) Measurement Theory and Practice.—Principles and practices of electrical measurements; design and construction of measurement devices. Prerequisites: Ed. 230, 356. [1-2; 1-2]
- 375. (3) Office Organization and Secretarial Practice.—Office organization, planning and production problems; educational requirements; personnel practices; records management; reports and correspondence; changes resulting from introduction of new equipment; the development of advanced typewriting, shorthand, and transcription skills; field trips.

  [2-4; 2-4]
- 390. (3) The Library in the School.—The objectives, functions and administration of libraries in elementary and secondary schools. [3-0; 3-0]
- 397. (0) Programme A (1) Seminar and Student Teaching.—Seminars throughout the year as arranged. A minimum of two weeks post-sessional practicum required.
- 397. (0) Programme A (1) Transfer Seminar and Student Teaching.—Seminars as arranged. Periods of teaching practice in fall and spring terms plus a minimum of two weeks post-sessional practicum. Demonstration lessons and field trips as arranged. Individual assistance from faculty adviser.
- 400. (3) Philosophy of Education.—An introductory course in which consideration is given to the philosophical foundations of education and to the practical bearings of theory upon curriculum content and classroom practice in our schools. [3-0; 3-0]
- 401. (1½) Programmed Instruction.—A course dealing with the principles and techniques of programmed instruction, programme writing and the critical evaluation of existing programmes. [2-0; 0-0]
- 403. (1½) Mental Retardation.—Characteristics of mentally retarded children: classification; overview of medical, legal, educational, and social provisions for the mentally retarded.
- 404. (3) Curriculum and Instruction in Specific Secondary School Subjects.—Students are required to take one Education 404 course corresponding to their major ( $1\frac{1}{2}$  units) or two Education 404 courses corresponding to their academic concentrations ( $1\frac{1}{2}+1\frac{1}{2}$ ).

- 405. (3) Curriculum and Instruction in the Primary Grades—Advanced.
  —Current research findings; trends and problems dealing with personality development, classroom management, and the programme of instruction in grades one, two, and three, with reference to readiness in the kindergarten.

  [3-0; 3-0]
- 406. (3) Curriculum and Instruction in English and Social Studies for the Intermediate Grades. (Offered only to students in the A (3) Programme electing Option A.) [3-0; 3-0]
- 407. (3) Introduction to the Study of Exceptional Children.—A course covering all groups of exceptional children in diagnosis, classification, treatment. [3-0; 3-0]
- 408. (1½) Teaching the Mentally Superior.—The characteristics, needs, and abilities of mentally superior and specially talented children; identification, classification, educational research; planning suitable educational programmes at both elementary and secondary levels; methods of teaching.
- 409. Science Education.—Advanced techniques of demonstration. Collecting and preserving of materials. Study of the research in elementary science teaching and comparative curricula. Practice teaching will be an integral part of the course. Prerequisites: two First Year science courses, Education 201 (or equivalent). Education 309 must be taken prior to or concurrently. [2-2; 2-2]
- 412. (3) Introduction to Adult Education.—Survey of present programmes for adult education including study of methods, institutions, and conditions under which it has developed in modern society. [3-0; 3-0]
- 413. (1½) Emerging Trends in Secondary Education.—Approaches to Secondary Education as a field of inquiry; levels and agents of educational policymaking; patterns of secondary school organization; organization of the curriculum; the materials of inquiry; technologies; the professionalization of teachers; the dynamics of change.

  [0-0; 2-0]
- 414. (3) Audio-Visual Education.—The role of the teacher in communication, the study of various materials related to learning, and the sources, selection, effective utilization and evaluation of these materials. [2-2; 2-2]
- **416.** (3) Speech Education.—Speaking and thinking. Effect of stress and fatigue on voice production. Practical application and practice. [3-0; 3-0]
- 417. (1½ or 3) Educating the Slow Learner.—An examination of techniques for identifying and educating the slow learning and culturally disadvantaged child in the elementary school, (I.Q. 75-90). Prerequisite: Ed. 403.

  [3-0; 3-0]
- 418. (3) Introduction to Special Education in Secondary Schools.—Psychological, sociological and curriculum problems in teaching the children in the occupational programme. School and community relations. [3-0; 3-0]
- 419. (3) Introduction to Speech Correction.—A survey of the speech defects of children to make the teacher aware of the problems and to acquaint him with some basic skills for dealing with speech problems. [3-0; 3-0]
- 420. (1½) Special Education for the Trainable Retarded—An examination of techniques for identifying and educating moderately retarded (TMR) children. Prerequisite: Ed. 403. [3-0; 3-0]
- 421. (1½) Principles of Teaching the Visually Impaired—An introductory course reviewing the identification and education of blind and partially-sighted children. [3-0; 3-0]
- 422. (1½ or 3) Phonetics and Voice Science.—An introduction to the phonetic alphabet designed to give the classroom teacher a practical knowledge of the alphabet of sound, the mechanisms used in the production and

articulation of speech sounds, and their application to the speech problems of children. No prerequisite required. [3-0; 3-0]

- 423. (1½) Principles of Teaching the Hearing Impaired.—An introductory course reviewing methods of teaching, administration, and organization of the education programme for the hearing impaired. [3-0; 0-0]
- 424. (3) Principles of Speech Correction.—Some basic principles for the understanding and handling of speech disorders such as simple articulation defects, stuttering, and others, within the framework of the classroom and the school. Practical experience and observation in a clinical setting to be arranged. Prerequisite: Education 419. [3-0; 3-0]
- 426. (1½) Personnel Services in the School.—The development of personnel or guidance services in school systems; their theoretical bases; the functions and roles of the specialists, including teachers and counsellors.

[2-0; 0-0]

- **427.** (1½) Guidance: Planning and Decision-making.—The work of the beginning counsellor and guidance worker in assisting students with educational, vocational, and personal planning and decision-making. [0-0; 2-0]
- 428. (1½) Mental Health in the School.—Appraisal of current concepts of mental health. Mental health hazards; prevention and treatment. Roles of the teacher and other school personnel. [2-0; 2-0]
- 429. (1½) Special Education for the Educable Retarded.—An examination of techniques for identifying and educating mildly retarded (E.M.R.) children. Prerequisite: Ed. 403.
- 430. (3) History of Education.—An introductory course in the history of education from the time of ancient Greece to the present. [3-0; 3-0]
- 431. (1½) Primary Learning Disabilities.—The identification and assessment of basic motor, perceptual, and language disabilities in children.

[3-0; 3-0]

#### 432. (3) Adolescent Psychology.

Note: Students who have already obtained credit for Education 332 may not elect Education 432. [2-0; 2-0]

- 433. (3) The Personal and Social Development of the Adult.—Major determinants of personality problems in vocational development and adjustment. [3-0; 3-0]
- 435. (1½) Introduction to the Study of Individuals and Groups.—An exploration of self awareness in relation to the classroom and other groups.

  [2-2; 0-0]
- 436. (1½) Behaviour Disorders in Children.—An introductory course dealing with identification, classification, and aetiology of emotional disturbance and social maladjustment in children. (In conjunction with the Department of Psychiatry.)
- 437.  $(1\frac{1}{2})$  or 3) Teaching Maladjusted Children.—An examination of techniques for educating maladjusted children in public school, residential schools, and day hospital programmes. [1-2; 1-2]
- 438. (1½-3) Observation and Recording.—Observing and recording behaviour of young children with a view to developing professional skills in the interpretation and uses of data in the educational guidance of young children.

  [2-1; 2-1]
- 440. (1½ or 3 units, at option of the Department). Special Study in a Subject-matter Field.—Topics in a subject field relevant to teaching and not covered in previous undergraduate work. Director's approval required. (Open

only to students admitted with an academic deficiency.) Not for credit toward a graduate degree or for undergraduate credit in an academic subject.

- 441. (1½) Audiology I.—Physics of sound; anatomy of the ear; physiology of hearing; pathology and aetiology of hearing impairments. [3-0; 3-0]
- 442. (1½) Audiology II.—Measurement of hearing; hearing aids and audiology training. Prerequisite Audiology I. [3-0; 3-0]
- 443. (1½) Teaching Communication Skills to the Hearing Impaired.—
  Receptive and expressive language; speech reading; manual communication systems. [3-0; 3-0]
- 444. (1½) Teaching Academic Subjects to the Deaf.—Organization and modification of curriculum. [3-0; 3-0]
- 445. (1½) Teaching Speech to the Deaf.—Methods of teaching speech; practicum. [3-0; 3-0]
- 446. (1½) History of Education of the Deaf.—Historical survey of methods and practices in education of the deaf. [3-0; 3-0]
- 447. (1½) Psychology of Deafness.—Theoretical and experimental studies of the effects of deafness upon development; adaptation and use of psychological tests with the deaf.

  [3-0; 3-0]
- 449. (3) Supervised Study.—This course is available only to outstanding students approved by the Director in their final year to undertake a research investigation into a particular problem.
- **450. (3) Technology of Woodworking II.**—Design and layout of contemporary furniture; elementary finishing; production principles and techniques. Prerequisite: Education 350. [2-4; 2-4]
- 451. (3) Technology of Metalworking II.—An intermediate course in bench metalwork and light machine work; operations on lathe, shaper, surface grinder and milling machine; heat treatment, forging, welding and related metallurgy; students design and manufacture individual items. Prerequisite: Ed. 351.
- 452. (3) Technology of Building Construction I.—Design and construction of single unit residential buildings; custom and prefabrication methods; western platform frame and post and beam construction. Prerequisite: Education 350. [2-4; 2-4]
- 453. (3) Automotive Theory and Practice I.—General construction of power plant, auxiliary systems, fuels, carburetion, lubrication, cooling systems, clutch, gear box, rear axles, drive shafts, universal joints, front suspension and steering gears, brakes. Prerequisites: Ed. 360, 351. [2-4; 2-4]
- 454. (3) Pattern-Making and Foundry Practice.—Influence of foundry techniques and metallurgy on design; practical application of various types of patterns; core box making; green sand moulding; coremaking; gating; practice; melting and pouring brass, iron, and aluminum alloys. Prerequisite: Education 351.
- 456. (3) Electronics in Industrial Education III.—Transducers; Processors; Transmission; Deprocessing; Transducers for Readout and Display. Prerequisite: Education 356. [3-3: 3-3]
- 457. (3) Technology of Metalworking III.—Methods of forming, joining, machining heat treatment and finishing of metals. Design analysis and the development of manufacturing techniques. Prerequisite: Education 451.
- 458. (1½) Problems in Graphic Representation.—Specific drafting problems associated with each of the following specialties: (a) Construction: millwork and furniture drawings, small boat design; national and local building

- codes; descriptive geometry. (b) Metals-Mechanics: surface development; gearing; descriptive geometry. (c) Electricity-Electronics: layout and representation of problems in electrical and electronic design. Prerequisite: Education 252. [1-2; 1-2]
- 459. (3) Materials Technology in Industrial Education.—Wood and materials directly derived from wood; metals and alloys; synthetics; adhesives; physical testing of materials. Prerequisites: Education 350, 351. [3-3; 3-3]
- 460. (3) An Introduction to Educational Administration.—Historical, social and conceptual views of administration, administrative theory, purposes, functions and tasks. [3-0; 3-0]
- 461. (3) Educational Diagnosis and Remedial Instruction.—Interpretation of informal and standardized test scores in educational diagnosis: estimate of actual and optimum levels of individual achievement; individual differences as factors affecting performance; methods of encouraging the optimum achievement of individuals; methods and practice materials for remedial teaching. Students intending to take both Education 461 and Education 472/473 or 472/474 should take Education 472/473 or 472/474 either prior to or concurrently with Education 461.
- 463. (3) Technology of Synthetic Materials.—Principles and practices of synthetic materials lay-up; forming and extrusion; design and production of moulds and plugs; die casting. Prerequisites: Ed. 350, Ed. 351. [2-4; 2-4]
- 464. (3) Technology of Building Construction II.—Design and construction of industrial commercial buildings; level and transit; estimating and contracting. Prerequisites: Ed. 350, Ed. 452. [2-4; 2-4]
- 465. (3) Technical Problem.—This course gives the student the opportunity to conduct directed study in an area within his technical field of specialization. Study will culminate in a written paper. Prerequisites: Completion of a technical specialty or equivalent. [1-5; 1-5]
- 466. (3) Problems in Electrical Equipment Production.—Fabrication and assembly of electrical and electronic equipment; techniques applicable to the school situation; evaluation of design and manufacturing technique. Prerequisites: Ed. 230, Ed. 356. [3-3; 3-3]
- 467. (3) Automotive Theory and Practice II.—Advanced automotive design and repair; diagnosis of mechanical and electrical faults; evaluation of modern servicing procedures. Prerequisite: Ed. 453. [2-4; 2-4]
- 470. (3) Educational Sociology.—Factors related to the social structure of modern western civilization which have significant relevance to education and to the educability of children. [3-0; 3-0]
- 472. (1½) Developmental Reading—Theoretical.—Psychological, sociological, and sensory bases and learning processes of reading. Students registering for Ed. 472 must at the same time register for either Ed. 473 or Ed. 474. [3-0; 0-0]
- 473. (1½) Developmental Reading—Practical, Elementary Grades.—Basic skills, reading in the subject fields, materials, tests, classroom organization, remedial reading in the regular classroom. Students registering for Ed. 473 must at the same time register for Ed. 472. [0-0; 2-1]
- 474. (1½) Developmental Reading—Practical, Secondary Grades.—Content as for Ed. 473 except at secondary school and adult levels. Students registering for Ed. 474 must at the same time register for Ed. 472.
- [0-0; 2-1] 475. (1½) Remedial Reading—Theoretical.—Identification of retarded readers; diagnosis and treatment of disabilities in reading. Prerequisite—

- Education 472 and 473 or Education 472 and 474 or equivalent. Students registering for this course must at the same time also register for Education 476. [3-0; 0-0]
- 476. (1½) Remedial Reading—Practical, General Problems.—Organization of the special remedial reading classroom; selection of materials; practice teaching in remedial classes. Prerequisite: Education 475. [0-0; 1-2]
- 477. (1½) Remedial Reading—Practical, Special Problems.—Methods and materials for children with specific learning disabilities: confused orientation, perceptual difficulties, motor and oral language disabilities; practice teaching. Prerequisite: Education 475 and 476 or Education 431. [1-2; 1-2]
- 478. (3) Teaching English as a Second Language.—Linguistic insights that govern the effective teaching of a second language. [3-0; 3-0]
  - 481. (1½) Introduction to Education Research. [1-1; 1-1]
- 482. (1½) Introduction to Statistics in Educational Research.— A first course in statistics for persons proceeding to graduate work involving quantitative methodology. Coverage: probability models; sampling distributions; hypothesis testing; regression and correlation, simple and multiple. Prerequisite: Some university-level mathematics, preferably recent. [2-1; 2-0]
- 483. (1½) Educational Statistics.—An introduction to statistical theory with special reference to problems in education. Not for persons intending to take graduate courses in statistics. [2-1; 2-0]
- 484. (1½) Nonparametric Statistics.—Distribution-free methods of treating data. Introduction to sample survey methods. Prerequisite: Educ. 482 or 483 or consent of instructor. [2-1; 2-0]
  - 488., (1½) Problems in the Teaching of Elementary School Mathematics. [3-0; 0-0]
- 490. (3) Book Selection and Evaluation.—Criteria; aids; sources; reading interests; individual and group reading guidance. [3-0; 3-0]
- 491. (3) The Acquisition and Organization of Library Materials.—The principles and methods of acquiring, classifying, cataloguing and organizing of book and non-book materials.

  [2-2: 2-2]
- 492. (3) The School Library: Sources of Information.—A basic course in the use of books and libraries with special emphasis upon the resources and methods for locating educational information and upon the techniques for teaching the use of school libraries. [3-0; 3-0]
- 497. (0) Programme A (1) Seminar and Student Teaching.—Seminars throughout year to be arranged. A minimum of two weeks post-sessional practicum required.
- 497. (0) Programme A (1) Transfer and A (3) Seminar and Student Teaching.—Seminars as arranged. Periods of teaching practice in fall and spring terms plus a minimum of two weeks post-sessional practicum. Demonstration lessons and field trips as arranged. Individual assistance from faculty adviser.
- 498. (0) Seminar and Student Teaching.—Seminars at convenient intervals during the year. Minimum two-week post-sessional practicum in junior secondary schools in metropolitan area.
- 499. (0) Seminar and Student Teaching.—Seminars as arranged. Periods of teaching practice in fall and spring terms plus a minimum of two weeks postsessional practicum. Demonstration lessons and field trips as arranged. Individual assistance from faculty adviser.

# Fine Arts - Art Education

101. (3) History of the Fine Arts.—History of music, art and architecture, with emphasis upon the cultural development of mankind through the ages. Appreciation and understanding will be encouraged through illustration and discussion of major works.

[3-0; 3-0]

300. (3) Introduction to the Plastic and Graphic Arts.—Experiment and study of various media of art expression as a basis for advanced work for an art major. This course is an introduction to the four major areas, painting, ceramics, design and print-making. Students must obtain a second class standing in F.A. 300 to continue study toward an Art Major. [1-3; 1-3]

301. (3) Drawing and Composition.—A basic course in drawing in various media. A study of the fundamentals of composition and picture analysis. Students will be expected to submit a sketch book of work as part of the final mark.

[1-3: 1-31]

302. (3) Drawing and Painting.—Designed to form the basis for any advanced work towards an art major. The fundamentals of both techniques will be explored using still life, figure and landscape. Students will be expected to submit a sketch book of work done outside of class as part of the final mark.

[1-3; 1-3]

303. (3) Ceramics and Modelling I.—Introduction to ceramics and modelling with emphasis upon the preparation of clays, use of glazes and kilnfiring techniques. Demonstration and introduction to wheel techniques. (This course will require extra laboratory time.) Prerequisites: Fine Arts 300 and 302, or equivalent courses.

305. (3) Design I.—This course will include studio experiment in both two and three dimensional design problems with the purpose of developing a fuller understanding of the fundamental design principles. Prerequisites: Fine Arts 300 and 302 or equivalent courses. [1-3; 1-3]

307. (3) Graphic Arts I.—An introduction to various printmaking methods such as linocuts, woodcuts, silkscreen, etching, drypoint, lithography, with a strong emphasis on the development of personal graphic imagery. Prerequisites: Fine Arts 300 and 301 or equivalent courses. [1-3; 1-3]

401. (3) Painting I.—The skills and techniques of the medium will be developed by experiments and problems. Studio and outdoor subjects will be used. A sketch book must be submitted as part of the final mark. Prerequisites: Fine Arts 300 and 302 or equivalent courses. [1-3; 1-3]

402. (3) Painting II.—The skills and techniques of the medium will be developed by experiments and problems. Studio and outdoor subjects will be used. A sketch book will be submitted as part of the final mark. Prerequisite: Fine Arts 401 or equivalent course. [1-3; 1-3]

403. (3) Ceramics and Modelling II.—Advanced ceramics and modelling with specialization in the use of the potter's wheel, molds and casting, firing techniques; investigation of local and imported clay; glazing research. (This course will require extra laboratory time.) Prerequisite: Fine Arts 303 or equivalent course. [1-3; 1-3]

405. (3) Design II.—This course will apply experiment and technique to specific design problems with emphasis on such aspects of design as interest decoration, industrial design and fabric design. Prerequisite: Fine Arts 305 or equivalent course. [1-3; 1-3]

407. (3) Graphic Arts II.—In this more advanced course, students will become involved in some media not previously studied and will go more deeply into others introduced in F.A. 307. There will be a continued stress on the development of personal imagery. Prerequisite: Fine Arts 307 or equivalent course.

- 413. (3) Ceramics and Modelling III.—A special study in an advanced field of ceramics and modelling. Prerequisites: Fine Arts 303 and 403 or equivalent courses.

  [1-3; 1-3]
- 415. (3) Design III.—A special study in an advanced field of design. Prerequisites: Fine Arts 405 or equivalent courses. [1-3; 1-3]
- 417. (3) Graphic Arts III.—Advanced work in one or more printmaking techniques with a strong emphasis on personal imagery. Prerequisites: Fine Arts 407 or equivalent course. [1-3; 1-3]
- N.B. The Fine Arts studio courses are scheduled for four hours a week. Students who have timetable clashes with these courses may be absent for not more than one hour but must attend the first hour. Students will be required to make up the time lost.

# English

- **303. (3) English Composition.**—The principles and practice of good writing. [3-0; 3-0]
- 311. (3) Children's Literature.—A survey of children's literature from early sources to recent books. The appraisal of books and authors for children.

  [3-0; 3-0]

#### General Science

309. (3) General Science for Elementary School Teachers. — General science as a systematic study of our environment and man's relation to it will cover such topics as living things, matter, energy, earth science, and the universe. Techniques of science, the improvisation and acquisition of necessary equipment, utilization of community resources. The course is intended to provide teachers with a broad background for teaching general science.

[3-2; 3-2]

#### Music Education

- 101. (3) Elementary Theory.—Fundamentals of musicianship.
- 201. (3) Counterpoint and Harmony.—A continuation and expansion of Music 101. Prerequisite: Music 101.
- 302. (3) Instrumental Techniques.—Instruction in the playing and teaching techniques of strings, brasses, woodwinds. Prerequisite: Music 201.
- 303. (3) Choral Music.—Principles and techniques of choral music. Prerequisite: Music 201.
- 401. (3) Orchestration and Arranging.—Techniques of writing and arranging for chorus, band and orchestra. Prerequisite: Music 201.

From the Faculty of Arts:

#### Music

**320.** (3) History of Music II.—The development of music from *circa* 1600 to the present day. [3-0; 3-0]

#### Social Studies

302. (3) The Development of Canadian Society.—Selected studies of Canadian society with emphasis on its geographical basis, historical development, and sociological settings. Not available to history or geography majors or to students taking a senior course on Canada in history or geography. Prerequisite: Ed. 322 or equivalent. [3-0; 3-0]

#### GRADUATE PROGRAMMES IN EDUCATION

The University offers, through the Faculty of Graduate Studies, graduate degrees in Education—the Master of Arts, the Master of Education, and the Doctor of Education. The instruction and guidance is given by the Faculty of Education, but admission, residence requirements and standards are set by the Faculty of Graduate Studies. Requirements may include a language which may be satisfied by the completion of French 210 or 220, German 200, Russian 200, or by means of a reading examination administered by the Faculty of Education. Candidates who are deficient in the language requirement should consult the director of graduate studies in the Faculty.

Admission to all courses leading to a graduate degree requires registration with the Faculty of Graduate Studies and full approval of the Faculty of Education. Those who wish to embark on a course for a Master's degree and have met the requirements, should submit to the office of the Registrar an application form accompanied by complete official transcripts of the applicant's academic and professional training record to date. If his application is accepted the applicant will be referred to the appropriate department chairman, or a person appointed by him, to gain approval for a planned sequence of courses. The student will be under the guidance of a properly appointed adviser to whom he must make regular report on his progress. All changes in programmes must be reported to the office of the Graduate Division.

# Requirements for Admission to M.A. in Education and M.Ed.

The following persons are admissable to Master's degree programmes:

- 1. Those with (i) B.A. (or its equivalent in another Faculty) and University postgraduate teacher training (one year), or (ii) a B.Ed. (Secondary), or (iii) a B.Ed. (Elementary) and at least 15 units of approved course work who have an average standing of not less than 72 per cent in 45 selected units of senior courses most recently credited on the applicant's transcript. These should also comprise not less than 24 units of academic and not more than 21 units of Education courses. (B.Ed. Elementary graduates who had arranged a fifth year prior to 1969 will be considered for admission on the basis of 21 units in Education and 9 units of academic work in addition to whatever other courses were taken for the fifth year.)
- 2. Those with a B.A. degree (or its equivalent in another Faculty) and Normal School training (one year) who meet requirements similar to those of 1. above, applied to 30 units of senior course work.
- Note: (a) Applicants not admissible under either 1. or 2. above may be permitted to take up to a maximum of 15 units of qualifying work in prescribed senior courses in order to meet the above requirements.
  - (b) Alternatively, the applicant may be admitted on completion of a qualifying program of 15 prescribed units at an average of First Class standing.
  - (c) A maximum of 6 units of qualifying course work completed at high Second Class standing or better may subsequently be applied to a master's degree.

In special circumstances, as determined by the department concerned and by the Dean of Education's Committee on Graduate Admissions, teacher training may be waived for those applicants who have—(a) a university degree with standing sufficient for admission to a master's program at this university, and (b) adequate experience related to their proposed field of specialization.

\*These units will ordinarily be those senior courses most recently credited on the applicant's transcript. They will comprise not less than 24 units of academic course work and not more than 21 units of Education course work.

# Requirements for the M.A. Degree

- (a) The completion of a minimum of twelve units of approved graduate courses taken during at least one full academic year in resident graduate study.
- (b) A thesis.

# Requirements for the M.Ed. Degree

The M.Ed. degree makes provision for a more general study, at an advanced level, of several fields. At least 3, but not more than 15 units of further study in an academic subject, are required. Arrangements for all work must be made in consultation with the director of the Graduate Division and the chairman of the department concerned. This work must be in a subject for which the candidate's undergraduate programme has prepared him for advanced study. The degree need not entail a thesis; instead, the amount of course work is increased to a minimum of 21 units. If a thesis is written a minimum of 15 units of course work is required.

Upon successful completion of all the course work every candidate for the M.Ed. degree, excepting those who submit a thesis, will be required to pass a comprehensive examination covering his major field of specialization and other areas related to his Master's programme. These examinations will be available twice a year, prior to graduation in April and at the end of the summer session in August. An application for the comprehensive examination must be submitted in writing to the office of the Director of the Graduate Division by March 1 for the April examination or by July 1 for the August examination.

# Residence Requirements and Transfer of Credit

The Ed.D. and M.A. degree programmes require full time residence during winter sessions. The Master of Education programme may be completed by summer sessions.

Graduate courses taken at another university are not normally acceptable as credit towards these degrees unless permission prior to undertaking the course has been given. Correspondence and off-campus extra-sessional courses may be offered as prerequisites, but they are not acceptable in the Master's programme. Students who hold full-time teaching positions may not undertake more than three units (one course) for credit during a winter session.

## Major Fields of Specialization

For the M.A. degree a student is normally required to take Education 48 and at least 9 units of advanced work in the major field in which the thesis will be written. For an M.Ed. degree a student must elect at least 9 unit from a major field, either professional or academic.

The Faculty of Education is organized into some twenty-five areas of study or "departments." An applicant for a Master's degree must select an appropriate department to supervise his programme. Individual courses in areas other than the student's selected department must be approved by the adviser who will assist the student to prepare an official *Programme of Graduate Studies* 

Note: Graduate credit at the Master's level may be given only for courses numbered 300 or above. Ed. 404, Ed. 410, and Ed. 440 may not be taken for graduate credit. No course credited to a previous degree or diploma may be applied to a Master's programme. Correspondence and off-campus extrasessional courses may not be used for credit on advanced degrees, although they may be used for prerequisite purposes.

The following is a list of the currently established areas of study within the Faculty of Education in which a student may complete a major programme when offered:

- 1. Administration
- 2. Adult Education
- 3. Art Education
- 4. Audio-Visual Education
- 5. Curriculum Theory
- 6. Educational Psychology
- 7. Elementary Education
- 8. English Education
- 9. Foreign Languages
- 10. Foundations
- 11. Guidance & Counseling

- 12. Health & Physical Education
- 13. Higher Education
- 14. Industrial Education
- 15. Library
- 16. Mathematics Education
- 17. Music Education
- 18. Pre-school Education
- 19. Reading Education
- 20. Science Education
- 21. Social Studies Education22. Special Education
- \*23. Primary Education
- \*24. Secondary Education
- 25. Speech & Drama

# Programmes for the Ed.D.

Programmes for the Ed.D. will be arranged to meet the needs of individual applicants, within the resources of the Faculty of Education and other departments of the University.

#### Admission

- 1. To become candidates for a doctoral degree graduate students must apply by letter to the Registrar. Applications should be submitted before March 1 and will not be accepted after August 1.
- 2. Candidates for the Ed.D. degree must satisfy the Executive Committee of the Faculty of Graduate Studies that they are competent to proceed to the course of study proposed and must hold a Master's degree (or equivalent) in Education, with standing of sufficient quality to warrant admission to the programme; or, subject to the approval of the admissions committee, an applicant who has obtained a first class Bachelor's degree and first class in Feacher Training, or a first class B.Ed. (Elem.) degree plus a fifth year with irst class standing, may be admitted directly to the doctoral programme. Such applicants will be required to take at least nine units in the first year and maintain a first class average.

Candidates will normally be required to spend a minimum of two winter essions at the University.

<sup>\*</sup>Graduate Programmes not offered 1969-70.

- 3. Each candidate must satisfy the Executive Committee of the Faculty of Graduate Studies of his competence in the English language. The choice and number of languages other than English, and the standard and competence required in such languages, will be determined by the department in which the candidate intends to write his thesis.
- 4. As the number of candidates that can be accommodated is limited, students, no matter how well qualified, can be accepted only if there is a vacancy in the specific field in which they propose to major.
- 5. Since candidates for the Ed.D. degree are expected to devote full-time to their reading, courses, and research, candidates who undertake remunerative employment must obtain prior permission of the Executive Committee of the Faculty of Graduate Studies through the department or departments concerned. They may be required to spend additional time in residence or supervised study before coming up for the final examination. The amount and nature of this additional time will be determined by the Executive Committee in consultation with the departments concerned.
- 6. Agreement to microfilm the thesis and publish a suitable abstract of the doctoral dissertation is prerequisite to the awarding of the doctoral degree. Forms for this purpose may be obtained from the Special Collections Division in the Library.

## Courses of Study

- 1. The work of each candidate will be supervised by a Candidate's Committee consisting of not less than five members, at least one of whom may be chosen from a department other than that in which the candidate is writing his thesis. This Committee will assist the candidate to plan his work, supervise his research, and direct the preparation of his thesis.
- 2. Upon registration an applicant must outline his proposed programme of study on forms obtainable in the Registrar's office. The programme must be approved both by the Candidate's Committee and by the Executive Committee of the Faculty of Graduate Studies. Work for the Ed.D. degree will consist of seminars, assigned readings, consultations, and such formal courses as may be deemed essential for the fulfilment of the requirements for the degree. A major part of the candidate's work will consist of a thesis embodying the results of original and independent research. The Executive Committee of the Faculty of Graduate Studies shall require the thesis to be submitted to an outside examiner or examiners approved by the Committee. I may also require the publication of the thesis in whole or in part as a condition of granting the Ed.D. degree.
- 3. At the doctoral level the requirements of different subjects and depart ments vary so greatly that the precise amount of course work needed can not be specified in a uniform fashion. It shall be the duty of each candidate' committee to recommend the kind and number of courses to be taken by the candidate. The recommendation of the candidate's committee regarding the course work shall be subject to the approval of the Department con cerned and of the Executive Committee of the Faculty of Graduate Studies
- 4. Unless, in the opinion of the Executive Committee of the Faculty of Graduate Studies, the delay has been justified by circumstances that are altogether exceptional, candidates who have not received their degree at the end of six winter sessions will be required to withdraw.

#### **Examinations and Thesis**

1. The progress of all Ed.D. candidates will be reviewed in the spring ceach year, and the Executive Committee of the Faculty of Graduate Studie

may require any candidate to withdraw if his work has not been satisfactory. If a candidate for the degree of Ed.D. fails to obtain 65 per cent in any course, the Executive Committee of the Faculty will deal with the matter after consultation with the department concerned.

- 2. The examinations required will be determined by the department concerned, with the approval of the Executive Committee of the Faculty of Graduate Studies. These will consist of the following: (a) course examinations, in which candidates are required to secure at least Second Class standing; (b) examinations to test the candidate's ability to read the foreign languages required for his programme of study; (c) a comprehensive written and/or oral examination, which normally will be held when the candidate has completed all course work required, and which is intended to test his grasp upon his chosen field of study as a whole; and (d) a final oral examination for the degree.
- 3. Examinations in the formal course work must be completed before a candidate takes the final oral examination.
- 4. A candidate's thesis must be presented in the form described in the leaflet entitled *Preparation of Graduate Theses*, copies of which may be obtained from the Registrar.

#### Courses for Credit

Only the following courses will be accepted for Ed.D. credit:

- (a) Graduate courses numbered 500 or above offered in the department or departments concerned, provided credit has not already been obtained for such courses.
- (b) Certain courses numbered 400 or above in related subjects as approved in particular cases on the recommendation of the department concerned.

#### GRADUATE COURSES

The following courses are those applicable to the Master's and Doctoral degrees in Education. On occasion, courses at the 500-level may be taken for undergraduate credit when approved by the Director of Elementary or Secondary Education.

- 501. (3) The Psychology of Classroom Learning and Teaching.—A study of educational outcomes and the formulation of the appropriate instructional strategies for their achievement. Prerequisite: One prior course in general or educational psychology.
- 507. (1½) History of Special Education.—A historical review of programmes in Special Education in Europe and North America. Prerequisites: Ed. 407 or consent of instructor.
- 508. (3-6) Review of Research in Methods of Teaching Specific School Subjects.—Three units will be given for each course in an individual subject. No more than 6 units may be credited towards a Master's degree. Each course reviews the philosophy, purpose and function of the subject in school. Studies are made of recent research on curriculum organization, on particular methods of teaching, on the use of material aids, on factual comprehension and attitude testing. Prerequisite: Education 204 or 404.
- 509. (1½) Organization of Special Education.—Detailed review of contemporary Special Educational Services; organization and planning of programmes; teacher education. Prerequisites: Ed. 407 or consent of instructor.
  - 510. (3) The Development of Science Curriculum Materials.—Prerequis-

ites: Science Major. Recommended: Ed. 508 taken before or concurrently. Consent of the instructor.

- 511. (3) Seminar in Science Education.—Prerequisite: Consent of instructor.
- 513. (1½) Advanced Seminar in Mental Retardation.—Review of recent educational, psychological, and medical research in the field of mental retardation. Prerequisites: Ed. 403 or consent of instructor.
- 514. (3) Foundations of Adult Education.—Historical, political and social factors which influence movements and programmes of adult education. Developments in Britain, the United States, and Canada. Philosophical problems related to the extension of adult education. Prerequisite: Education 412.
- 516. (3) Mass Media and Adult Education.—The major information facilities and the context for adult learning they create. Types of learning resulting from each of the major media, by means of various experiments.
- 517. (3) Health Education in Schools.—The philosophy, the administration and the teaching of health in schools. School medical service, the healthful school environment. Methods and materials of teaching in schools from Grade 1 through Secondary School.
- 518. (3) Methods of Adult Education.—Factors involved in adult learning. Learning theory, attitude change, group dynamics and special aspects of aging, and methods by which curriculum is created. Prerequisite: Education 412.
- 519. (3) History of Canadian Education.—The historical growth of public education in Canada from the French regime to the present. The development of provincial public school systems and Canadian educational thought and practice. Prerequisite: At least one of Education 400, 430, 470, or similar courses taken at another university; or History major.
- 521. (3) Advanced Seminar in Philosophy of Education.—Current trends in educational philosophy; social implications of current educational theories. Prerequisite: Education 400 or senior level philosophy course, or consent of instructor.
- 522. (3) The Logic of Teaching.—Analysis and study of the logical operations used in teaching. Prerequisite: Education 400, or Philosophy 200 or 212, or consent of the instructor.
- **523.** (3) Comparative Education.—Comparative analysis of the social, economic, and political determinants of the organization and administration of selected foreign educational systems. Prerequisite: At least one of: Education 400, 432, or 470.
  - 524. (3) Advanced Seminar in Comparative Education.
- 525. (3) Social History of American Education.—The interrelationship of education and social developments in the U.S.A. from the colonial period to the present. Prerequisite: One of a senior history course, Education 400, 430 or 470.
- 527. (3) Seminar in Library Education.—Research in the field of school librarianship. Prerequisite: Consent of instructor.
  - 528. (1½) Basic Principles of Measurement.—Prerequisite: Education 482.
  - **529.**  $(1\frac{1}{2})$  Test Construction.—Prerequisite: Education 528.
- 530. (3) Psychology of Learning.—Intraserial phenomena, maturation effect, frequency, transfer, retention, practice, and material effects in learning. Theories of learning, and results of research in learning. Relationship of theories to methodology and curricular practices. Prerequisite: Education 102 or 301.

- 531. (1½) The Interview and non-standardized measures in Guidance Services—Theoretical assumptions in the use of non-standardized appraisal techniques: interviews, observation techniques, rating scales, cumulative records, autobiographies, and sociometric procedures. Case studies.
- 532. (1½) Tests in Pupil Personnel Services.—The use of standardized measures of mental ability, achievement, aptitude, interest, and personality.
- 533. (1½) Psychology of Handicapped Children.—Physical, mental, social, and emotional characteristics of handicapped children (backward, crippled, hard-of-hearing, etc.). Prerequisite: Education 407 or consent of instructor.
- 536. (3) Individual Tests.—Administration, scoring, interpreting, and values of Revised Stanford Binet, Wechsler-Bellevue, etc.; nature of intelligence; constancy of the IQ, etc.
- 538. (3) Communications Theory.—Relationship of communications theory to other theory systems and communications design. Prerequisite: Ed. 414 or equivalent or instructor's consent.
- 539. (3) Educational Television.—An extensive study of the theory, practice, and evaluation of educational television, based on research. Prerequisite: Education 414 or consent of staff. Limited to 20 students in any one session.
- 540. (3) Research in Audio-Visual Education for Schools.—Recent research on the effects of various types of audio-visual material on learners. Review of experimental work on techniques of using audio-visual media.
- 541. (3) Theory and Principles of Art Education.—History, theories, principles, methods and practices of art education. The place and contribution of art in total education. Prerequisite: a major in Art or equivalent.
- 542. (3) Theory and Principles of Music Education.—Supervision and administration of music education. Individual projects in special interest areas. Prerequisite: a major in Music Education or equivalent.
- 543. (3) Historical Aspects of Speech Communication.—The history of speech persuasion from the classical to the modern writers; implications in the field of human values as related to communication. Prerequisite: Ed. 416 or Ed. 575 or Ed. 430 or consent of instructor.
  - 545. (11/2) Foundations of Mathematics Education.
  - 546. (1½) Measurement and evaluation in Mathematics Education.
- 547. (1½) Mathematics in the Elementary School.—Research and Thought. Prerequisite: Education 482.
- 548. (1½) Mathematics in the Secondary School.—Research and Thought. Prerequisite: Education 482.
  - 549. (1½) Problems in Teaching Secondary School Mathematics.
  - 551. (3) Foundations for Inquiry in Educational Administration.
  - 552. (3) Basic Contributions to Administrative Thought.
  - 553. (3) Seminar and Group Inquiry in Educational Administration.
  - 555. (11/2) Educational Finance. (Formerly Ed. 559).
  - 556. (1½) Administration of the Educational Programme.
  - 557. (1½) Administration of the Elementary School. Prerequisite, Ed. 556.
  - 558. (11/2) Administration of the Secondary School. Prerequisite: Ed. 556.
- 559. (1½) Administration of Post Secondary Institutions.—Selected problems in the administration of various post-secondary educational institutions. The course focuses upon the planning, staffing, controlling, and coordinating functions of administrations in the context of emerging and developed institutions of higher learning.

- 560. (1½) School Law.
- 561. (1½-3) Laboratory Practicum.—Offered in departments offering graduate work in Education. Admission by consent of instructor.
- 562. (1½) Curriculum Organization in the Elementary School.—History and development of elementary curricula; principles of organization, administration, and evaluation; unit, course, and programme design.
- 563. (1½) Curriculum Organization in the Secondary School.—History and development of secondary curricula; principles of organization and adaptation; articulation of secondary with higher education programmes.
- 564. (3) Research Problems in Curriculum Organization.—Theories of curriculum organization and a review of recent research. The work of the curriculum director. Prerequisite: Education 204 or 404.
- 565. (3) Special Course in Subject Matter field.—Courses in various subject matter fields designed to bring teachers up to date in new advances and recent findings in each field. See also Physics 430 (Recent Developments in Physics).
- 566. (3) Principles of Secondary Education.—Recent thought on class-room procedures, provisions for individual differences, discipline. The place of various school subjects in total education, and remedial education in Canada and other countries.
- 567. (3) Problems in Elementary Education.—New developments and current issues in elementary education.
- 568. (1½) Special Education of the Orthopaedically and Neurologically Handicapped.—For specialists in the education of the crippled, hospitalized, spastic, etc. Recent research in methods of instruction. Prerequisite: Education 407 or consent of instructor.
- 569. (3) The Regional, Junior or Community College.—History and philosophy of the junior college. Studies of the theoretical bases for its establishment, organization, finance, personnel and curriculum.
- 570. (3) Advanced Seminar in Educational Sociology.—Development of social theory; contemporary systematic positions and their relation to modern educational theory. Culture. Social motivation. Social problems of administration and control. Prerequisite: Education 470 or consent of instructor.
- 571. (3) Advanced Seminar in Educational Psychology.—Advanced study of research and problems in learning, mental hygiene, measurement. Prerequisite: Education 530 or approved Senior Course.
- 572. (3) Advanced Seminar in Curriculum Organization.—Presentation and discussion of current theories and practices in curriculum organization and administration. Prerequisite: Education 562-63/or Education 564.
- 573. (3) Advanced Seminar on Exceptional Children.—Review of research related to diagnostic and remedial techniques in Special Education, and application of these techniques in field experience. Prerequisite: Education 533.
- **574.** (3) Supervision of Reading.—Curriculum analysis and planning. Implications for the administrator, the consultant and supervisor of reading. Prerequisite: Consent of instructor.
- 575. (1½) Classical Theories of Education.—The educational writings of such educational theorists as Plato, Aristotle, Quintillian, Comenius, Locke, Rousseau, Pistalozzi, Herbart, Froebel. Prerequisites: Ed. 400 or Ed. 430 or consent of instructor.
- 576. (3) Advanced Seminar in the Supervision of Instruction.—For Superintendents, Principals, Directors of Education and other Supervisory Per-

sonnel desiring advanced study in this area. Prerequisite: Consent of Division.

- 577. (1½) Pragmatism and Education.—The philosophic presuppositions in the educationally relevant thought and writings of Charles Pierce, Herbert Mead, William James and John Dewey. Prerequisite: Ed. 400 or senior level philosophy course or consent of the instructor.
- 578. (1½) Counseling Theory and Procedures I.—Theories and procedures for counseling all individuals in their development devices and tasks; ethical and legal implications; the counselor's consultant role.
- 579. (3) Research on Guidance Services.—Present resources and services together with techniques of assessing and using available material. Workshop in character requiring experimental investigations.
- 580. ( $1\frac{1}{2}$ -6) Problems in Education.—Investigation and report of a problem.
- 581. (1½) Methods of Educational Research.—Scientific method in education; discovering problems; types of research; standards in thesis writing; critical study of published research.
- 583. (3) Advanced Seminar in Adult Education.—Discussion of various projects in research or organization carried out by students. Prerequisite: Education 514 or 515 or 518.
- 585. (3) Advanced Seminar on Research in Education for Young Children.—Prerequisites: Any 6 units of Education 333, 334, 336.
- 586. (1½) Philosophy and Educational Policy.—Philosophical examination of educational policy issues and the grounds relevant to their resolution. Prerequisites: Education 300 or 430 or 470 or consent of instructor.
  - 587. (1½) Social Philosophies and Education.
- Prerequisites: Ed. 400 or Ed. 470 or consent of instructor.
  - 588. (1½) Existentialism and Education.
- Prerequisites: Ed. 400 or Ed. 430 or Ed. 470 or consent of instructor.
- 589. (3) Theories and Models of Education As A Discipline.—An examination of available systems and proposed system theories as they bear on the philosophy of Education as a disciplined field of inquiry. Prerequisites: Ed. 400 or equivalent or consent of instructor.
- 590. (3) Current Developments in Higher Education.—The special issues relating to universities, colleges and technical education today with special reference to Canada, Britain and the United States. Prerequisite: consent of instructor.
- 591. (3) Epistemological Foundations of the Curriculum.—An inquiry in to the nature and organization of knowledge. Implications for curriculum construction and classroom teaching. Prerequisites: Ed. 400 or a senior level philosophy course, or consent of instructor.
- 592. (1½) Design and Analysis in Educational Research I.—Design and analysis of experiments; the testing of multivariate hypotheses; introduction to factor analysis. Prerequisite: Ed. 482 or consent of instructor. A knowledge of matrix algebra would be helpful.
- 593. (3) Ethical Foundations of Educational Thought and Practice.—Inquiry into the nature of moral reasoning and its place in education. Implications for moral education, and the formulation of policy statements. Prerequisites: Ed: 400 or a senior level philosophy course, or consent of instructor.
- 594. (3) Mental Constructs in Educational Theory.—Philosophical analysis of the basic mental constructs used in educational theory and the implica-

tions of this analysis for resolving theoretical difficulties. Prerequisites: Ed. 400 or a senior level course, or consent of instructor.

- 595. (1½) Analysis of Educational Concepts.—The theory and practice of conceptual analysis and its application in philosophy of education. Prerequisites: Ed. 400 or a senior undergraduate philosophy course or consent of instructor.
  - 599. (3) Master's Thesis.
  - 601. (3-6) Doctoral Seminar.
- 677. (1½) Theories of Vocational Development.—Sociological and psychological aspects of career planning, theories of vocational development, vocational choice.
- 678. (1½) Counseling Theory and Procedures II.—Theories and procedures for counseling individuals with special problems in development requiring attitudinal and behavioral change; the counselor's function in community liaison.
- 679. (1½) Information Systems in Guidance and Counseling.—The application of automatic data processing to guidance and counseling in student accounting, job placement, information dissemination and in interviewing. Prerequisite: Course in Computer Science.
- 682. (1½) Design and Analysis in Educational Research, II.—Prerequisite: Education 592.
  - 699. Doctoral Dissertation.

#### UNIVERSITY SUMMER SESSION

The announcement of the courses to be offered in the summer session (approximately seven weeks in length) will be issued in March, and will be available on request from the Registrar.

The regulations, etc., governing the summer session are as follows:

- 1. The maximum credit for summer session work in any one calendar year is 6 units.
- 2. Students are required to register on or before May 1, after which date a penalty will be exacted. No student will be permitted to register after June 1.
  - 3. Restriction on registration in the Summer Session:
  - (a) A student who obtained Fail standing during the last Winter Session attended may not enrol in Summer Session.
  - (b) A student in attendance at a secondary school during the previous winter may not enrol in the Summer Session.
  - (c) Any student who applies for admission to the Summer Session after June 3 will not be admitted.
  - (d) The University reserves the right to reject applicants for the Summer Session whose previous academic records are unsatisfactory, even if they technically meet entrance requirements.
  - (e) Unless students have or are eligible for a teacher's certificate they may not take professional Education courses at Summer Session.

#### UNIVERSITY INTER-SESSION

In Industrial Education and in special courses for Commerce students a period of study in May and June is organized. Extra-sessional courses are also provided in the period May-July.

# CORRESPONDENCE COURSES FOR ACADEMIC CREDIT

University credit may be obtained in a number of fields by correspondence courses offered through the Department of University Extension. Although University regulations preclude a student from taking a full degree programme by this means, these courses will be valuable to teachers wishing to improve their qualifications during their teaching year, to persons who have had to interrupt their regular university attendance, or even to graduate students of this or other universities who may wish to take certain prerequisites in other fields of study. A Correspondence Course Syllabus is available from the Department of University Extension or from the Office of the Registrar.

Admission. Correspondence courses are open to applicants with full First Year or Grade 13 standing, or to holders of a teacher's certificate with an acceptable matriculation standing. Students registered in the winter session of the University are not allowed to enrol in correspondence courses concurrently with winter session work or during the summer between successive winter sessions.

Registration. Applications for correspondence courses should be directed to the Office of the Registrar. Only one correspondence course may be taken at a time. Correspondence courses may not be taken concurrently with any other course work of the University. All courses must be completed within the time specified.

Credit. Full degree credit is granted for correspondence courses in undergraduate programmes. However, the maximum number of units of credit which may be taken by correspondence courses towards a degree is 15 units. The University will not grant credit for correspondence courses taken concurrently from another university.

Fees. Fees for a correspondence course are \$100.00 (subject to change without notice).

Examinations. Final examinations in correspondence courses may be written in April, August or December. Students who have successfully completed all course papers and assignments must notify the Office of the Registrar of the date and centre selected for their final examination. The Registrar of the University will endeavour to arrange the supervision of the examination at the centre selected by the student or an alternative centre conveniently located.

Standards in the final examinations will be the same as those for resident students. Students who fail in two final examinations in any one course will not be permitted to register again for that course.

# Course Offerings (3 units per course)

Economics 306, Labour Economics and Industrial Relations; Education 400, Philosophy of Education; Education 412, Introduction to Adult Education; English 200, Literature and Composition; English 303 (formerly 300), English Composition (for students in the Faculty of Education only); English 392, Victorian Poetry; German 200, Second Year German; His-

tory 212, History of the United States of America; History 326, British North America, 1763-1867; History 413, The Reformation; Philosophy 100, Introduction to Philosophy; Political Science 200, Democratic Government and Politics; Psychology 100, Introductory Psychology; Psychology 206, Dynamics of Behavior.

Certain courses are open to a limited number of students who do not wish to take them for credit. Non-credit students should register through the Extrasessional Division of the Department of University Extension. In all these courses the instructor rules on any non-credit student's eligibility to enter and to remain in the course. Students will be expected to maintain the same schedule of readings and written assignments as the regular students but will not be required to write the final examination.

Note: For non-credit diploma courses in the Faculty of Commerce and Business Administration, see the calendar for that faculty.

# **EXTRA-SESSIONAL CLASSES**

- l. Extra-sessional classes in the evenings or late afternoons may be taken for credit, in certain subjects, by students proceeding to the B.Ed. degree who are eligible for registration at least as Second Year students (full undergraduate or conditioned) and who have the prerequisite standing. Certain courses for students qualified to proceed to the M.A. (in Education), or M.Ed. degree may also be available on campus.
- 2. Students attending the extra-sessional classes will normally be tested by the ordinary winter session examinations.
- 3. Correspondence and off-campus extra-sessional courses may be offered as prerequisites, but they are not acceptable for credit on a Master's programme.

# THE SCHOOL OF PHYSICAL EDUCATION AND RECREATION

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA

VANCOUVER 8 • BRITISH COLUMBIA CANADA

# The School of Physical Education and Recreation calendar, 1969-70

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For topics not listed above, see the General Information bulletin.	

#### Financial Assistance

A list of Fellowships, Scholarships, Bursaries and Loans open to students in the University will be found in the publication "Awards and Financial Assistance" which may be obtained from the Registrar's office. For details, consult this publication. In general, application must be made to the Dean of Inter-Faculty and Student Affairs.

#### ACADEMIC STAFF

- ROBERT F. OSBORNE, B.A., B.Ed. (Brit. Col.), Professor and Director of the School.
- STANLEY R. BROWN, Diploma of Phys. Ed. (Otago), M.S., Ph.D. (Illinois), Professor.
- H. Douglas Whittle, B.P.H.E. (Toronto), M.S., Ph.D. (Oregon), Professor.
- ROBERT G. HINDMARCH, B.P.E. (Brit. Col.), M.S., Ed.D. (Oregon), Associate Professor.
- A. B. Laithwaite, C.D., Dip. in Phys. Ed. (Carnegie Phys. Tr. Coll.), M.S. (Oregon), Associate Professor.
- Peter M. Mullins, Dip. in Phys. Ed. (Sydney Teachers' College), M.S., Ed.D. (Washington State), Associate Professor.
- Mrs. Marian Penney, B.A. (Toronto), A.M. (Texas State College for Women), Associate Professor.
- JACK B. POMFRET, B.A. (Health and P.E.), M.S. (Washington), Associate Professor.
- RICHARD L. RAMSAY, B.S. (George Williams, Chicago), M.A., Ed.D. (Columbia), Associate Professor.
- ERIC F. BROOM. Dip. in Phys. Ed. (Loughborough Coll.), M.S. (Washington), Assistant Professor.
- EDWIN H. M. GAUTSCHI, B.P.E., B.Ed., M.P.E. (Brit. Col.), Assistant Professor.
- Mrs. Bonnie Gordon, B.A. (P.E.) (Sask.), M.Sc. (Purdue), Assistant Professor.
- Joseph R. Johnson, M.P.E. (Brit. Col.), Assistant Professor.
- RONALD G. MARTENIUK, B.P.E., M.A. (Alta.), Ed.D. (Calif., Berkeley), Assistant Professor.
- D. LIONEL PUGH, B.A., Dip. in Educ. (Wales), Dip. in Phys. Ed. (Carnegie Phys. Tr. Coll.), Assistant Professor.
- WILLIAM M. REESKE, A.A. (Mt. San Antonio), B.A. (Los Angeles State College), M.A. (California State College), Assistant Professor.
- MISS MARILYN RUSSELL, B.P.E. (Brit. Col.), M.S. (Washington), Assistant Professor.
- MISS BARBARA SCHRODT, B.P.E. (Brit. Col.), M.S. (Oregon), Assistant Professor.
- DONN E. SPENCE, B.P.E. (Brit. Col.), M.S. (Oregon), Assistant Professor.
- Miss Anne D. Tilley, Dip. Dartford College of Physical Education, B.A. (Mc-Master), M.Ed. (Birmingham), Assistant Professor.
- FRANK T. GNUP, B.S. (P.E.) (Manhattan College), Senior Instructor.
- R. J. PHILLIPS, Senior Instructor and Athletic Director.
- INDREW P. BAKOGEORGE, B.A. (Western Ont.), M.Sc. (Alta.), Instructor.
- OHN L. CARTMEL, B.P.E. (Brit. Col.), Instructor.
- JESTOR N. KORCHINSKY, B.P.E., M.A. (Alta.), Instructor.
- IRS. HELEN GOODWIN, Dip. Laban Art of Movement Studio, London, England, Lecturer.

PAUL A. WILLEY, B.A. (Sacramento State), Lecturer. Frank Read, Honorary Lecturer.

Lecturers from other Departments:

LORNE E. BROWN, B.P.E., M.A. (Oregon), Associate Professor.

NORMAN S. WATT, B.P.E. (Brit. Col.), M.S., Ed.D. (Oregon), Associate Professor and Associate Director of Summer Session.

J. R. MITCHELL, B.P.E., B.Ed. (Brit. Col.), M.S., Ed.D. (Ore.), Assistant Professor.

Mrs. INGE WILLIAMS, M.P.E. (Brit. Col.), Assistant Professor.



# THE SCHOOL OF PHYSICAL EDUCATION AND RECREATION

The School of Physical Education and Recreation is responsible for (1) the voluntary physical education activities of all students, (2) the intramural sports programme, (3) the courses leading to the degrees of Bachelor and Master of Physical Education and to a bachelor's degree in Recreation (4) the physical education programme for students majoring in Physical Education in the Faculty of Education.

#### Admission Requirements

Students may gain admission direct from secondary school or on transfer from a recognized university or college.

A student of a British Columbia Secondary School, following Grade 12, will be admitted if he obtains an average of at least 60% on recommended grades from an accredited senior secondary school, or on a combination of school grades and gradings on examinations conducted by the Department of Education and is considered by the Senate Admissions Committee to give promise of success in university studies.

A student who has completed appropriate studies with satisfactory standing beyond Grade 12 may be considered for admission and the granting of advance credit. Credit on transfer is restricted to the first year following Grade 13 or to First and Second Year following junior college. An applicant holding a Grade 12 certificate of another Canadian province will not be granted advance credit for subjects of Grade 12.

The University reserves the right to reject applicants for admission on the basis of their overall academic records even if they technically meet entrance requirements and to limit enrolment if its facilities and resources are inade-

# (a) B.P.E. Degree Programme.

The School of Physical Education and Recreation accepts graduates of the Academic and Technical Secondary School programmes with any of the specialties offered. Students who plan to enrol in Option B of the B.P.E. programme (see page M12 should major in sciences while at secondary school.

# (b) Recreation Programme.

The School of Physical Education and Recreation accepts graduates of the Academic and Technical Secondary School programmes with any of the sperialties offered. Recreation 12 is recommended for entrance.

# General Requirements for the Degree of B.P.E.

Students in all years are normally subject to the same regulations as those n the B.Ed. (secondary field) course. Supplemental examinations will not be ranted in Physical Education Activity Courses. Students who are unable to neet the requirements because of medical or other approved reasons may, at he discretion of the School and with the approval of the Dean, be granted eferred examinations. Such privilege will be considered only if the student ubmits a written application to the Director before the end of the official xamination period. When the privilege of supplemental or deferred examinaons has been granted, students must complete requirements prior to attend-nce at the next regular session. The School may require that additional work e undertaken in summer school.

# **Swimming Requirements**

All students enrolled for the B.P.E. degree or for the B.Ed. degree (with a major in Physical Education) must register for P.E. 230 or present to the Director of the School evidence of proficiency in swimming.

#### Medical Examination

Students enrolling for the B.P.E. degree or for the B.Ed. degree with a major in Physical Education are required to have a medical examination conducted by the University Health Service at the time of first registration for Activity Courses in Physical Education.

This examination is provided by the Health Service. Appointments must be made during the registration period. The examination must be completed within the first two weeks of the Session.

For subsequent years students are advised and encouraged to consult the Health Service concerning any health problems.

N.B. Students who fail to meet these requirements will be refused admission to classes, and will have to assume responsibility for obtaining a medical certificate at their own expense.

# Specific Requirements for the Degree of B.P.E.

The B.P.E. degree (the hood is malachite green) will be awarded on the completion of a minimum of 69 units of approved course work. Two different programmes are available.

- (a) Option A, see page M11.
- (b) Option B, see page M12.

All students must elect a second concentration consisting of a minimum of 9 units of course work normally offered in the Third and Fourth years of the Faculty of Arts or the Faculty of Science. Students intending to enroll in the Faculty of Education for the one-year programme for university graduates, should choose their courses so as to satisfy the requirements for admission to that programme. (See Faculty of Education calendar).

# Requirements for the Degree of M.P.E.

Prerequisites: Bachelor's degree equivalent to the B.P.E. of the University of British Columbia with standing as indicated in the Admission Requirements for the Master's degree (see the Faculty of Graduate Studies calendar) and in Physical Education 470 (Tests and Measurements) or an equivalent course.

M.P.E. Course: a total of 18 units, including a thesis (counting from 3 to 6 units), required advanced courses in Education and Physical Education and courses in other departments. Details of the required advanced course will be available from the Director of Physical Education and Recreation.

# Requirements for the Degree of M.Ed.

Students holding a B.Ed. degree, with a major in Physical Education, who have been accepted for the M.Ed. degree, may with the approval of th Graduate Division of the Faculty of Education, enroll for a programme c advanced studies in Physical Education. (See the Faculty of Graduate Studie calendar).

# **Unsatisfactory Standing**

(a) A student who passes in fewer than nine units in the first year (University following Grade 12 will not be permitted to re-enrol at University

to repeat the studies of that year. Consideration will be given to re-admitting a student in this category following his satisfactory completion of Grade 13 or its equivalent.

- (b) A student in the First Year who obtains credit for only nine units on a full programme will be re-admitted on probation but during the subsequent session may be required at any time to withdraw for unsatisfactory progress.
- (c) A student in the Second Year who passes in fewer than six units will not be permitted to re-enrol to repeat the studies of that year. He may be admitted to the Third Year if he can show, at some later date, that he has completed, as a student at another institution, further studies that give him full standing equivalent to First and Second Year. A student who passes six units while not receiving credit in the year, may re-enrol on probation.
- (d) A student at any level of University study who fails for a second time, whether in repeating a year or in a later year, will be required to withdraw from the University; he may be re-admitted after a period of at least one year if his appeal to Senate is supported by the Committee on Admissions of the Faculty concerned and upheld by Senate.

# Fees—Subject to change without notice

First Term Fees, \$243 (includes A.M.S. fee of \$29), payable in full at the time of registration. However, students may pay full fees of \$457 at time of registration. Fourth Year students will be charged an additional \$7 to cover the graduating fee.

Second Term Fees, \$214, payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Finance Department before this date with a note showing name and registration number.

A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.

# Awards and Scholarships

The Alice Bishopric Memorial Book Prize—A book prize of \$25, in memory of Mrs. Alice Bishopric, is awarded annually to the student in the Third Year of the B.P.E. degree course with First Class standing in the biologial sciences.

The Fruehauf Trailer Company Scholarships—A scholarship or scholarhips to the total of \$400, the gift of Fruehauf Trailer Company of Canada imited, Dixie, Ontario, may be offered in the School of Physical Education nd Recreation. The awards will be made to one or more students, on the asis of good scholarship and demonstration of all-round leadership qualities, ho show special interest in health, particularly in the preventive field, and tho have need for assistance.

Gymnastic Book Prize—A book prize of \$25, donated by the British Columla Gymnastic Association, is awarded annually to a student in the First or econd Year of B.P.E. degree programme with general academic proficiency nd high standing in gymnastics.

The J. J. McRae Memorial Book Prize—A book prize of \$25, in memory of J. McRae, will be awarded annually to a student in the B.P.E. degree proamme with general academic proficiency who has made a contribution to youth work. Special consideration will be given to a student who has worked with the blind or other handicapped groups.

The Leonard Osborne Memorial Book Prize—A book prize of \$25, in memory of J. Leonard Osborne, will be awarded annually to a student in the B.P.E. degree programme with general academic proficiency, and high standing in basketball or soccer courses.

The Lieutenant James Douglas Hamilton Book Prize—A book prize, in memory of Lieutenant James Douglas Hamilton, a graduate in Physical Education and a former member of the C.O.T.C. of this University, who, on April 13, 1952, was killed in action in Korea, is offered by the Physical Education Alumni and Undergraduate Societies. The award is open to Third Year students in Physical Education showing academic and physical proficiency in the course.

National Fitness and Amateur Sport Scholarships and Bursaries.—A number of scholarships in the amount of \$500.00 are available on a competitive basis to British Columbia students entering a degree programme in Physical Education or Recreation in first or second year. Application forms may be obtained from the office of the principal of any Secondary School.

A limited number of bursaries are available to students registered in degree programmes. Application forms may be obtained from the Director of the School of Physical Education and Recreation.

The above awards are made possible by the Fitness and Amateur Sports Directorate, Department of National Health and Welfare, Ottawa, through the cooperation of the Provincial Government.

#### Graduation

Every candidate for a degree must make formal application for graduation not later than March 15. Special forms for this purpose are provided by the Registrar's office.

#### Attendance

Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments may be excluded from the final examinations

Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes.

Students, who because of illness are absent from a December or Apri examination, must submit a certificate, obtained from a doctor, to the Uni versity Health Service as promptly as possible.

#### Withdrawal

Any student who after registration decides to withdraw from the Unversity must report to the Registrar's Office. He will be required to obtai clearance from the University, to the satisfaction of the Registrar, beforebeing granted Honourable Dismissal or recommended, where applicable, for refund of fees.

The Senate of the University may require a student to withdraw from the University at any time for unsatisfactory conduct, for failure to abide be regulations, for unsatisfactory progress in his programme of studies training, or for any other reason which is deemed to show that withdraw is in the interests of the student and/or the University.

#### Examination Results

Results of the sessional examinations in April are mailed to students in the graduating classes about the time of Congregation, and to students in the lower years by approximately June 15. Any student who must meet an application date for another institution prior to June 15 should inform the transcript clerk in the Registrar's Office in order that arrangements may be made to meet the deadline.

# Review of Assigned Standing

Reviews of Assigned Standing are governed by the following regulations:

- 1. Any request for the review of an assigned grade, other than for a supplemental examination (in which a request for a review will not be granted), must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each course concerned, which will be refunded only if the mark is raised.
- 2. Each applicant for a review must state clearly why he believes the course deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a second time before results are announced. For this reason an applicant granted a supplemental should prepare for the examination since a change in the original mark is unlikely and the result of the review may not be available before the end of the supplemental examination period. A review will not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.
- 3. Reviews will not be permitted in more than two courses (6 units) in the work of one academic year, and in one course (3 units) in a partial course of 9 units or less or in the work of one summer session.

# Supplemental Examinations

Supplemental examinations may be written in August at the following centres: Cranbrook, Dawson Creek, Kamloops, Kitimat, Ocean Falls, Penticton, Powell River, Prince George, Prince Rupert, Trail, Victoria; and at Whitehorse, Y.T. Other centres outside of British Columbia are restricted to universities or their affiliated colleges.

In unusual circumstances a student working in a remote area may be permitted to write supplemental examinations at a special centre if satisfactory arrangements can be made. Since permission is contingent on completion of arrangements, only early applications will be considered.

The fee for each supplemental examination written at the University is \$7.50; at a regular outside centre, \$10.00; at a special centre, \$20.00. In the event that a candidate does not appear for an examination a refund will be authorized only if, within 10 days after the scheduled examination, the candidate submits to the Registrar an adequate explanation for the failure to write the examination; if such refund is made, it will be \$5.00.

Applications for supplemental examinations in respect of the winter session examinations, accompanied by the necessary fees, must be in the hands of the Registrar by July 8.

# Transcript of Academic Record

A transcript of a student's academic record will, on request of the student,

be mailed direct to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the inscription "official transcript only if presented with seal unbroken". On graduation or withdrawal a student may obtain for his own use a copy of his record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of midterm examinations.

Student records are confidential. Transcripts are issued only at the request of students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made arrangements satisfactory to the Finance Department to meet any outstanding indebtedness.

Granted Honourable Dismissal indicates that the student is in no disciplinary difficulty at the time the transcript is issued; the term has no reference to scholastic status.

Application for a transcript should be made at least one week before the document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

# THE BACHELOR OF PHYSICAL EDUCATION DEGREE PROGRAMME (69 units)

The School of Physical Education and Recreation offers two options within the Bachelor of Physical Education degree programme. Both options will permit a student to enter a teacher education programme and/or graduate studies. Beyond these common possibilities, each option offers special opportunities as indicated below.

A student may not change his programme from Option A to Option B, or vice versa, unless permission has been granted in writing by the Director of the School.

#### Option A

This programme is intended primarily to meet the needs of those students who plan to enter the Faculty of Education for the One-Year Programme of Teacher Education for graduates following the attainment of the Bachelor of Physical Education degree.

First Year	Units
Biology 101	3
English 100	3
* Electives: two courses from the Faculty of Arts or the Faculty	
of Science	6
Physical Education 160	Ō
Physical Education Activities: see section below	4
* See Note 1.	10
See Note 1.	16
Second Year	Units
Second Year English 200 or 303	Units 3
English 200 or 303 Psychology 100	
English 200 or 303	
English 200 or 303  Psychology 100  * Electives: two courses from the Faculty of Arts or the Faculty of Science	
English 200 or 303	3 3 6 11/2
English 200 or 303  Psychology 100  * Electives: two courses from the Faculty of Arts or the Faculty of Science	3 3 6 11/2
English 200 or 303	3 3 6 11/2

#### Note

1. Electives must be chosen so as to meet any prerequisites for programmes in the Third and Fourth Years. A student must have a concentration of at least nine units of courses numbered 300 or higher in the Third and Fourth Years chosen from one of the following areas:

Biological Science	Geography	Latin*
Commerce (Business)	German*	Mathematics
Commerce (Secretarial)	Guidance (Psychology)	Physics
Chemistry	History	Russian*
English	Home Economics	Spanish*
French		

\* Indicates courses not widely taught in British Columbia Secondary schools."

Third Year	Units
Electives: based on second teaching major	6-9
Electives: Physical Education Theory	3-6
Physical Education 391	3

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Physical Education 455	0 3
	18
Fourth Year	Units
Electives: including completion of second teaching major Electives: Physical Education Theory Physical Education 455 Physical Education 460 Physical Education 462 Physical Education Activities: see section below	6 4½ 0 1½ 1½
Notes	$17\frac{1}{2}$

#### Notes:

1. A student must have a concentration of at least 9 units of courses numbered 300 or higher in the Third and Fourth Years chosen from one of the following areas:

**Biological Science** Mathematics Geography Commerce (Business) German\* Physics Commerce (Secretarial) Guidance (Psych.) Russian\* Chemistry History Spanish\* English Home Economics French Latin\*

- 2. Students intending to enter graduate studies should take Physical Education 470.
  - 3. See General Notes for all Students on page M13.

#### PHYSICAL EDUCATION ACTIVITY

Required courses for all students on Option A and Option B

Physical Education 201 or 202

Phyiscal Education 203

Physical Education 230

Physical Education 240

Physical Education 250

One course from Area V (Team Activities) see page M22.

One course from Area VI (Individual Activities) see page M23.

Elective courses:

Option A - 8 units

Option B - 8 units

Note: It is strongly recommended that Women students complete two units of Dance, one of these being P.E. 241.

#### Option B

This programme is intended primarily to meet the needs of those students who are strongly interested in the science disciplines which relate to the study of physical education.

First Year	Units
English 100	3

<sup>\*</sup>Indicates courses not widely taught in British Columbia Secondary Schools.

#### Notes:

- A student must have a concentration of at least 9 units in the Third and Fourth Years, chosen from one of the following areas: Life Sciences, Physical Sciences, Social Sciences.
- 2. A student may include no more than 4 units of Physical Education Activities in the Fourth Year.
- 3. See General Notes for All Students below.

#### General Notes For All Students

- All students must be able to swim. See note on Page M10 and also following P.E. 230 course description. With the written permission of the Director of the School, students who have achieved the Senior Red Cross Award, Bronze Medallion or the equivalent, may substitute another course for P.E. 230.
- L Students entering the course from Grade 13 or from First Year Arts or Science must complete the Physical Education courses listed in First Year.

- 3. (a) English 100 must be taken prior to English 200 or 303.
  - (b) Other than the exception noted above, academic courses listed for the First and Second Years may be interchanged.
- 4. Physical Education 455 may be taken in Third or Fourth Year.
- 5. Academic Electives Students must elect a second area of concentration normally consisting of a minimum of six units in the First and Second Years, and nine units normally offered in the Third and Fourth Years of the Faculty of Arts or the Faculty of Science. Students who plan to obtain teacher certification should choose their courses so as to satisfy the requirements for admission to the one-year Faculty of Education programme for University graduates. Physics 110 or 120 or 130 must be taken in First or Second Year by all students preparing for the Biological Sciences (see Education calendar) or Zoology (see Education calendar).
- Physical Education Activity Courses A student may not count more than fifteen units of such course work towards the required total of sixtynine units for the Bachelor of Physical Education degree.
- 7. Anatomy 390 is to be taken after completion of all Second Year course work (Third Year Standing).
- 8. Students planning to proceed to graduate studies should discuss their programmes with the Chairman of the Graduate Committee or with the Director of the School.
- Physical Education 361 and 461.—Students who wish to engage in special studies in the area of Athletic Training should take Physical Education 361 in Third Year and Physical Education 461 (Project) in Fourth Year.

# REQUIREMENTS FOR A MAJOR IN PHYSICAL EDUCATION FOR STUDENTS ENROLLED FOR THE BACHELOR OF EDUCATION DEGREE

# Elementary Programme

The Physical Education Major for students on the Elementary Programme consists of twelve & one half (12½) units as prescribed hereunder.

*Physical Education 230: see Note 2	
*Physical Education 201 or 202	
Physical Education 240 or 241	
One course from Area V (see page M22)	
One course from Area IV or VI (see pages M22, M23) 1	
<del></del>	-
5	
Theory Courses Unit	s
Physical Education 260 11/	, )
Physical Education 262	; ;
One other required	5
Electives: Physical Education Theory or Activity	
<u> </u>	_ ===
Physical Education 260	121/

- Notes:
- 1. \*These courses should be taken in First or Second Year.
- 2. Swimming Physical Education 230: Students who can demonstrate

- satisfactory standards in swimming may select an optional course in lieu of P.E. 230, provided written permission has been obtained from the Director of the School of Physical Education and Recreation.
- 3. Students are advised that an extra three (3) units of Physical Education course work can be taken as the "free elective" in Fourth Year. It is recommended strongly that students take advantage of this opportunity.

# Secondary Programme

The Physical Education Major for students on the Secondary Programme consists of 15 units as listed hereunder:

Activity Courses—9 units to consist of:  Physical Education 230: See Note 1 Physical Education 201 or 202 Physical Education 240 or 241 One course from Area V One course from Area VI	Units 1 1 1 1 1
Electives Physical Education Activity	4
Theory Courses—6 units to consist of: Second Year:	9
Physical Education 260	$\frac{11/2}{11/2}$
Third & Fourth Years—two of: Physical Education 360; 361; 362; 363; 380; 460; 462; 470	3
	6
	<del>===</del>

#### Notes:

- 1. Swimming-Physical Education 230: Students who can demonstrate satisfactory standards in swimming may select an optional course in lieu of P.E. 230, provided written permission has been obtained from the Director of the School of Physical Education and Recreation.
- 2. Students are encouraged to register for an additional three (3) units from the courses listed in the Physical Education calendar. Written approval must be obtained from the Director of the Secondary Division in the Faculty of Education.

# THE BACHELOR OF PHYSICAL EDUCATION DEGREE RECREATION PROGRAMME

(69 units)

This programme is intended for students planning a career in Recreation. A graduate of this programme will not be immediately eligible for admission to the postgraduate Teacher Education year of the Faculty of Education.

Students in the Recreation Programme are subject to the same conditions as those in Physical Education. This is with specific reference to regulations pertaining to general admission, unsatisfactory standing, fees, graduation, attendance, withdrawal, examination results, review of assigned standing, supplementary examinations, medical examination and transcript of academic record.

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Exceptions for the Recreation Programme are as follows:

- 1. No pre-requisite Secondary School course is required (e.g. Chemistry or Physics), providing the student has met the basic requirements for entrance to the University.
- 2. Recreation 12 in the Secondary School Programme is recommended for entrance but it is not mandatory.
- 3. Recreation students are not required to complete a second major.

First Year (17 units)  English 100  Psychology 100  Biology 101  Fine Arts 125  Physical Education Activities: Notes 1 and 2  Electives: See Note 5	3 3 2
Second Year (17½ units)  English 200 or 303  Recreation 286  Recreation 296  Sociology 200 or 250 or 260: See Note 3  *Physical Education Activities: See Notes 1 and 2  Psychology 206  Electives: See Note 5  *See Notes 1 and 2.	3 1½ 3 1 3
Third Year (17 units)  Recreation 396  Physical Education 262	$\frac{11/2}{11/2}$
Fourth Year (17½ units)  Recreation 492  Recreation 496  Physical Education 460  Courses in Social Work or Planning or Architecture: See Note 4	[1/ <sub>2</sub>
Third or Fourth Year  Recreation 394  Psychology 308  Education 412  Architecture 424  Architecture 425  Physical Education or Recreation Electives: See Note 5  Electives: See Note 5	3 3 1½ 1½

#### Notes:

- 1. Physical Education 230 must be included in the physical education activity courses, unless written permission to substitute another course has been obtained from the Director.
- 2. Recreation students may elect any Physical Education activity course to satisfy the requirements with the approval of the Faculty Advisor.
- 3. Sociology 250 and 260: to be announced by Sociology Department.
- 4. Registration in these courses is subject to the written approval of the appropriate Director.

# 5. Suggested Electives:

(a) Professional and Academic:

Within the School—P.E. 361 (1½); P.E. 362 (1½); P.E. 366 (1½); Rec. 461  $(1\frac{1}{2})$ ; Rec. 465  $(1\frac{1}{2})$ . Other Faculties-Anthropology 200 (Introduction) (3); Anthropology 300 (Social Organization) (3); Economics 100 (Introduction) (3); Economics 101 (Political Economy) (3); Education 416 (Speech and Communications) (3); English 303 (Composition) (3); Geography 102 (Human Geography) (3); History 101 (European) (3); History (Canadian) (3); Political Science (Government) (3); Psychology 301 (Developmental) (3); Psychology 307 (Motivation and Emotion) (3); Psychology 311 (Individual Differences) (3); Religious Studies 200 (Introduction) (3); Sociology 301 (Deviance) (3); Sociology 306 (Socialization) (3); Sociology 315 (Social Stratification) (3); Sociology 325 (Theory of Organization) (3); Sociology 330 (Population Change and its Socio-Economic Implications) (3); Theatre 120 (Introduction) (3); Social Work 502 (Group Work) (2); Social Work 503 (Community Organization) (3); Planning and Forestry—Courses to be selected in connection with respective Departments. selected in connection with respective Departments.

- (b) Activities:
  - Re. 217 (1); P.E. 330 (1); P.E. 332 (1); P.E. 240 to 243 (1 each); P.E. 218 (1); P.E. 220 (1); P.E. 224 (1); P.E. 225 (1); P.E. 226 (1); P.E. 227 (½); P./E. 222 (1).
- 6. Descriptions of required courses offered outside the School of Physical Education and Recreation:
  - (a) Psychology 100 (3) Introductory Psychology.—A survey of the areas and methods of psychology with emphasis upon the basic processes in animal and human behaviour; Topics covered include learning, sensation, perception, biological bases of behaviour, personality and social psychology.
  - (b) Biology 101 (3) Principles of Biology.—An introductory course emphasizing principles of wide application to all living organisms, including cell structure and function, the mechanism of inheritance, evolution, and adaptation to environment.
  - (c) Fine Arts 125. (3) History of Art.—The history of architecture, sculpture and painting of the Western World from Ancient Egypt and Mesopotamia to the present.
  - (d) Sociology 200. (3) Introduction to Sociology.—A general introduction to the sociological analysis of selected topics: religion, work, politics, stratification, bureaucratic organizations, kinship, socialization, social roles.
  - (e) Psychology 206. (3) Dynamics of Behaviour.—An experimental, dynamic and social approach to behavioural adjustment with special reference to applications. Prerequisite: Psychology 100.
  - (f) Social Work 502. (2) Social Group Work.—The problem-solving approach in social group work practice. Following initial exploration of selected and interacting dimensions of small group functioning, emphasis is placed upon basic modes of intervention in enabling the individual and the group as a whole to realize selected goals.
  - (g) Social Work 503. (2) Community Organization.—Introduction to theory and practice of community organization in social work; concepts relevant to understanding the community and community problem-solving processes; the role of the professional worker in community organization: typical structures and programmes for community problem-solving and health and welfare planning; key trends and issues, such as com-

munity organization and community development; community decisionmaking; impact of new social science concepts; relationship to other aspects of social work practice.

(h) Planning and Architecture. See School of Architecture calendar.

(i) Psychology 308. (3) Social Psychology.—Theory and research of individual social behaviour; social motivation; attitudes; group interaction; socialization; racial prejudice; and related topics.

- (j) Education 412. (3) Introduction to Adult Education.—Survey of present programmes for adult education including study of methods, institutions, and conditions under which it has developed in modern society.
- (k) Architecture 424. (1½) History of Urban Form.—A history of cities in the western world with an analysis of their physical forms as related to the cultural forms of the societies and times in which they developed.
- (I) Architecture 425. (1½) History of Urban Planning.—The emergence of the city planning movement as an aspect of social and political reform traced throughout the 19th and 20th century.

## THEORY COURSES

# **Physical Education**

160. (0) Seminar in Physical Education.

[1-0 or 0-1]

- 260. (1½) Foundations of Physical Education.—A study of physical education as a profession; principles, nature and scope, objectives and their interpretations. (Two hours lecture, one hour seminar.) [3-0 or 3-0]
- 262. (1½) Health I.—An introduction to anatomy and physiology; body systems, growth and development, personal hygiene. For Recreation and B.Ed. students only [2-2 or 2-2]
- 360. (1½) Comparative Physical Education.—A comparative study of the objectives, programmes, methods, personnel, facilities, and evaluations of the physical education, physical recreation and sports systems of selected countries. Prerequisite: P.E. 260 (Two hours lecture, one hour seminar)

[0-0; 3-0]

- 361. (1½) Prevention and Care of Injuries. Prerequisite: Third Year standing. [2-2 or 2-2]
- 362. (1½) Adapted Physical Education.—A study of the problems related to the physically handicapped and mentally retarded, to low fitness, to body mechanics; nutritional disturbances and other handicaps. [0-0; 2-2]
- 363. (1½) Kinesiology.—Anatomical concepts and physical laws applied to joint and muscular action. Analysis of human movement in the performance of motor skills. Prerequisite: P.E. 262 or Anatomy 390 or P.E. 391 [2-2; 0-0]
- 365. (1½) Training and Conditioning for Competition.—Methods of athletic conditioning, planning the programme, psychology of training and coaching, athletic evaluation. Prerequisite: Third Year standing. [0-0; 3-0]
- 366. (1½) Physical Activities for Young Children.—A study of physical activities, games and athletic practices appropriate for young children. Theory and practice.

  [1-1; 1-1]
- 380. (1½) History of Physical Education and Recreation.—The historica and philosophical bases of physical education and recreation, and the relationship to current programmes and issues. Prerequisite: P.E. 260 (Two hour lecture, one hour seminar) [3-0; 0-0]

391. (3) Human Anatomical Systems.—Human anatomical systems and their integration, special emphasis on the major body systems and their functioning in physical activities. Prerequisite: Third Year Standing.

- 394. (1½) Outdoor Recreation.—A study of outdoor areas, such as playgrounds, parks and camps, and the relationship of phenomena of nature; camp craft and programme skills; climbing and hiking and related activities; principles of safety and survival in mountainous and wilderness areas. [3-0; 0-0]
- 460. (1½) Organization and Administration of Physical Education. A study of the problems relating to the organization and administration of physical education programmes. Prerequisite: Fourth Year standing.

[3-0 or 0-3]

- 461. (1½) Physical Education Project.—Students may elect to study in one of the following areas: Mental Retardation, Motor Learning, Care and Prevention of Injuries, or any other approved topic.
- 462. (1½) Health II.—Current problems in health education with selection determined by needs of the students—social hygiene, habit-forming substances, communicable and non-communicable diseases. Prerequisite: Physical Education 262 or Anatomy 390 or P.E. 391. [3-0 or 0-3]
- 463. (1½) Physiology of Exercise.—Study of the acute and chronic effects of exercise on body systems; examination of working capacity, acid-base balance, strength, peripheral circulation using plethysmographic and other methods; monitoring physiological changes with telemetric methods. Prerequisites: Anatomy 390 and Zoology 303. [2-2; 0-0]
- 464. (1½) Health III.—The organization and administration of health in the school and community; methods, materials and techniques of health instruction. Prerequisite: P.E. 462 which may be taken concurrently. [0-0; 3-0]
- 468. (1½) Human Motor Performance.—An introduction to the theoretical and practical problems involved in studying the motor performance and learning of man. Prerequisite: Fourth Year standing. [2-2; 0-0]
- 470. (11/2) Tests and Measurements in Physical Education.—Physical education tests; physical fitness, physiological fitness, posture, strength, motor ability, social efficiency, skill and knowledge tests. [2-2; 0-0]

#### Recreation

- 286. (3) The Creative Arts in Recreation.—A collaborative programme in art, dance, music and recreation.
- 296. (1½) Introduction to Recreation and Field Work Explorations.—An introduction to the background and principles of community recreation; the relationship of school programmes to community programmes; the philosophy and principles of recreation.
- 394. (1½) Outdoor Recreation.—A study of outdoor areas, such as playgrounds, parks and camps, and the relationship of phenomena of nature; camp craft and programme skills; climbing and hiking and related activities; principles of safety and survival in mountains and wilderness areas. [3-0; 0-0]
- 396. (11/2) Recreation Field Work Placement I.—Planned observation and supervised practice work in a variety of appropriate institutions and agencies; seminar on problems in field work practice. Normally this course will extend throughout the whole of the Third Year.
- 461. (1½) Recreation Project.—Students may elect to undertake special studies in Mental Retardation or another approved field.

- 465. (1½) Recreation Therapy.—Philosophy, objectives and content of programmes in therapeutic recreation. [3-0; 0-0]
- 492. (1½) Recreation Administration.—A study of the legal, financial and organizational aspects of public recreation, with special attention to planning, public relations, and the organization of community resources. [0-0; 3-0]
- 496. (1½) Recreation Field Work Placement II.—Field work practice; study of programme methods, problems and practice of supervision.

#### GRADUATE COURSES

- 500. (1-3) Graduate Seminar.
- 530. (1-3) Directed Studies.
- 563. (1½) Physical Fitness Seminar.—Elements of fitness; physical fitness testing; bodily changes prior to, during and following exercise.
- 565. (1½) Analysis of Physical Activity.—A review of techniques used in evaluating physical performance with special reference to the inter-disciplinary nature of such work.
- 568. (1½) Seminar in Human Motor Performance.—An interpretation of the research literature in several topics chosen from such areas as learning theory, individual differences in performance and learning, kinesthesis, stress, motivation, reaction time and movement time, co-ordination, transfer of training, and retention. Prerequisite: Physical Education 468 or consent of instructor.
- 570. (1½) Review of Research in Physical Education.—Historical, philosophical; anthropometric and body mechanics; kinesiological research in the mechanics of sports and physical education activities; related physiological and psychological research.
- 571. (1½) Physical Education for the Atypical Student.—The Theory and practice of adapted physical education. Programmes of general class activities, special adaptive education and physical recreation for the disabled and handicapped and the mentally retarded. The laboratory period affords practical experience in individual and group methods for conducting developmental conditioning and corrective exercises.
- 580. (1½) Current Problems in Physical Education.—Objectives; programmes; leadership; history and trends; professional status; community organizations and auspices.
- 583. (1½) Physical Education Programmes.—The development of curricula in physical education; relationships of programmes in schools, community centres and other institutions.
- 584. (1½) Motor Skills and Physical Efficiency of Young Children.—Survey of the literature in child development with special emphasis on physical growth and skill acquisition. Development of limited research projects by individual students and presentation of a seminar report on one research aspect of child development.
  - 599. (3-6) Master's Thesis.

#### **ACTIVITY COURSES**

#### Uniforms

All students enrolling for Physical Education Activity Courses must obtain the following required standard uniforms or personal items as indicated by course instructors. All items are not required in the First Year.

#### Men

Shorts and "T" Shirts
Track suit
Bathing suit
Regulation Teaching Trousers
White tennis shoes
Gymnastic slippers

#### Women

Shorts and "T" Shirts Track suit Bathing suit Leotard Teaching tunic White tennis shoes Gymnastic slippers

# Area 1: Aquatics:

- 230. (1) Swimming I.—Water safety, strokes, skills, entries, survival techniques, teaching methods and techniques. Prerequisite: Ability to swim 25 yards using a recognized stroke. NOTE: Students who are non-swimmers must report to the director of the voluntary swimming programme at the time of registration.
- 330. (1) Swimming II.—Water rescue, synchronized and competitive swimming, diving, teaching methods and techniques. Prerequisite: Physical Education 230 or the equivalent. (Successful candidates who hold Red Cross Instructors Certificates will be automatically requalified).
- 332. (1) Aquatic Programmes.—Organization and administration of aquatic programmes and meets, operation and care of facilities. Prerequisite: Physical Education 230 or the equivalent.
- 430. (1) Swimming Coaching.—Prerequisite: P.E. 330 and written permission as noted.\*

#### Area II: Dance

- 240. (1) Dance.—A composite course of folk, square and ballroom dance, teaching methods and techniques.
- 241. (1) Contemporary Dance I.—Rhythm and movement skills, dance notation, percussion, accompaniment, teaching methods and techniques.
- 242. (1) Ballroom Dance I.—Figures and techniques of waltz, fox trot, rhumba, samba, tango, teaching methods and techniques.
- 243. (1) Square Dance.—Square and couple dances, teaching methods and techniques.
- 244. (1) National Dance.—Steps, dances and style characteristics of the folk dance of various countries, teaching methods and techniques.
- 341. (1) Contemporary Dance II.—Dance techniques, improvisation, composition. Prerequisite: Physical Education 241.
- 342. (1) Ballroom Dance II.—Variations, composition, teaching methods and techniques. Prerequisite: Physical Education 242.
- 441. (1) Contemporary Dance III.—Composition, group and stage production. Prerequisite: Physical Education 341.

#### Area III: Gymnastics.

- 201. (1) Gymnastic Activities IA (Women). Tumbling and apparatus, rhythmical gymnastics, teaching methods and techniques.
- 202. (1) Gymnastic Activities IB (Men).—Tumbling and apparatus, teaching methods and techniques.
- 203. (1) Conditioning Programmes (Men/Women).—Conditioning exercises, fitness assessment, adaptation of exercise programmes, teaching methods and techniques.
  - 301. (1) Gymnastic Activities II. (Men/Women).—A problem-solving

- approach to gymnastic activities. Applied methods and techniques of individual and group instruction. Prerequisite: P.E. 201 or 202.
- 303. (1) Olympic Gymnastics (Men/Women). Competitive gymnastic skills and routines, teaching and coaching methods and techniques. Prerequisite: Physical Education 201 or 202.
- 304. (1) Gymnastic Demonstration Programmes (Men/Women).—Tumbling, vaulting, pyramids, rhythmical gymnastics, demonstration techniques. Prerequisite: Physical Education 201 or 202.
- 402. (1) Gymnastic Coaching (Men/Women). Prerequisite: Physical Education 303 and written permission as noted (\*).

#### Area IV: Track and Field.

- 250. (1) Track and Field I.—Study of selected events; kinesiological principles; teaching methods and technique appropriate to school programmes.
- 251. (1) Track and Field II.—A specific study of the following competitive events: sprinting, middle distance, hurdling, relays, jumping, pole vaulting, throwing. Prerequisite: Physical Education 250 or consent of Instructor.
- 350. (1) Track and Field II.—Organization, administration and conduct of Track and Field and Cross-Country Meets. Prerequisite: Physical Education 250.
- 450. (1) Track and Field Coaching.—Prerequisite: Physical Education 251 and written permission as noted (\*).
- Area V: Team or Group Activities.—Skills, rules, offensive and defensive tactics teaching methods and techniques of:
  - 206. (1) Lacrosse
  - 208. (1) Baseball.
  - 209. (1) Softball.
  - 210. (1) Basketball.
  - 211. (1) Ice Hockey.—Skating skill required.
  - 212. (1) Football.
  - 213. (1) Field Hockey.
  - 214. (1) Rugby.
  - 215. (1) Soccer, Speedball, Speed-a-way (women).
  - 216. (1) Soccer.
  - 219. (1) Volleyball.
- 217. (1) Social Recreation.—Programme planning, teaching methods and techniques.
- 218. (1) Games, Contests, Relays.—Individual, pair, team and group activities, teaching methods and techniques.
  - \*410. (1) Basketball Coaching.—Prerequisite: Physical Education 210.
  - \*411. (1) Ice Hockey Coaching.—Prerequisite: Physical Education 211.
  - \*412. (1) Football Coaching.—Prerequisite: Physical Education 212.
  - \*413. (1) Field Hockey Coaching.—Prerequisite: Physical Education 213.
  - \*414. (1) Rugby Coaching.—Prerequisite: Physical Education 214.
  - \*416. (1) Soccer Coaching.—Prerequisite: Physical Education 216.
  - \*419. (1) Volleyball Coaching.—Prerequisite. Physical Education 219.

# \*Coaching Courses.

N.B. Permission to register for coaching courses will be considered by the Director upon receipt of a written application from the student following completion of the prerequisite course work. Such application must be submitted prior to August 1. Normally permision will be granted only if the student has a clear standing for the preceding year, has obtained Second Class standing in the prerequisite course, and has had some previous coaching and/or playing experience. Registration will be limited.

Area VI: Individual Activities.—Skills, rules, tactics, teaching methods and techniques of:

- 220. (1) Badminton.
- 221. (1) Archery.
- 223. (1) Wrestling.
- 224. (1) Golf.
- 225. (1/2) Bowling—not offered 1969-70.
- 226. (1) Tennis.
- 227. (1) Curling.
- 222. (1) Outdoor Activities.—An introduction to skiing, orienteering, sailing and canoeing.
- 228. (1) Figure Skating.—Skills, rules, teaching and coaching methods and techniques. Minimal skating skill required.

#### Area VII: Field Work.

455. Approved Field Work or Supervised Teaching.—To be taken in Third or Fourth Year as a requirement for graduation but without unit value.

# Courses Offered by Other Departments

#### Anatomy

390. (3) Basic Human Anatomy.—A lecture course dealing with the basic structure of cells, tissues and organs of the human body in relation to their function. Prerequisites: Chemistry 103, 110 or 120 and Biology 101 or equivalent; exemptions may be arranged for Honours or Graduate students. Permission of the Department is required. [3-0; 3-0]

#### Architecture

- 424. (1½) History of Urban Form.—A history of cities in the western world with an analysis of their physical forms as related to the cultural forms of the societies and times in which they developed. Textbooks: Lewis Mumford, The City in History; Hiorns, Town Building in History. Mr. Rogatnick and Mrs. Wisnicki. [3-0;0-0]
- 425. (1½) History of Urban Planning.—The emergence of the city planning movement as an aspect of social and political reform traced throughout he 19th and 20th centuries, the roots of the planning process are examined in terms of British planning legislation, the American City Beautiful movement, and the French contribution to urban structure and design. Emphasis is placed apon urban planning as a process of Government within the general framework of profound social and economic change as the city becomes the prevailing way of life in Canada. Dr. Oberlander. [0-0; 3-0]

#### 3iology

101. (3) Principles of Biology.—An introductory course emphasizing prin-

ciples of wide application to all living organisms, including cell structure and function, the mechanism of inheritance, evolution, and adaptation to environment. A comparative approach to the unity and diversity of organisms will be stressed. Biology 11 is strongly recommended. An additional one hour tutorial period is required each week for those students who have not previously had Biology 11 or its equivalent in high school. Biology 100 from Grade 13 in British Columbia will not be accepted as equivalent to Biology 101; however, Botany 105 or Zoology 105 will be accepted as equivalent for prerequisite purposes.

[3-3; 3-3]

Note: Students who have satisfactorily completed Biology 11 and Biology 12 may write a placement examination in general biology during the week of

Note: Students who have satisfactorily completed Biology 11 and Biology 12 may write a placement examination in general biology during the week of registration. If this examination is passed, the student will be granted exemption from Biology 101 and may subsequently be admitted to courses requiring Biology 101 as a prerequisite. Students wishing to sit for the placement examination must apply to do so not later than 22 August 1969. Applications should be addressed to: The Chairman, Biology 101, Department of Zoology, The

University of British Columbia.

# Chemistry

- 103. (3) General Chemistry.—A study of the fundamental principles of chemistry including the molecular structures of both inorganic and organic compounds. Prerequisite: Physics 11 (or Physics 110 or 130 concurrently); Mathematics 100 and 121 (Math. 120, 1968-69 or earlier) (or 110) must precede or be taken concurrently. [3-3; 3-3]
- 110. (3) Principles of Chemistry.—A study of the fundamental principles of chemistry with particular reference to the nature of solutions, the solid state and the molecular structure of both inorganic and organic substances. This course is intended for prospective Science and Engineering students who have not taken Chemistry 12. Prerequisites: Chemistry 11, Physics 11. Mathematics 100 and 121 (Math. 120, 1968-69 or earlier) and a first year Physics course 110 or 120 must precede or be taken concurrently. [3-3-1; 3-3-1]
- 120. (3) Principles of Chemistry.—Similar to Chemistry 110 but the subject matter is treated in somewhat more detail. This course is intended for those prospective Science and Engineering students who have taken Chemistry 12. Prerequisites: Chemistry 11 and 12, Physics 11. Mathermatics 100 and 121, (Math. 120, 1968-69 or earlier) and a first year Physics course (110 or 120) must precede or be taken concurrently.

  [2-3-1; 2-3-1]
- 203. (3) Organic Chemistry.—Fundamental principles of the chemistry of aliphatic, aromatic, alicyclic and heterocyclic organic compounds. This course is only for prospective Honours (or major) students in science. Prerequisites: Chemistry 110 or 120 and permission. (Chemistry 210 or 220 must precede or be taken concurrently.) [3-3; 3-3]
- 230. (3) Organic Chemistry.—The fundamental principles of modern organic chemistry including a discussion of the main classes of organic compounds. Prerequisite: Chemistry 103, 110 or 120. Credit will not be giver for both Chemistry 203 and 230. [3-3; 3-3]

#### Education

412. (3) Introduction to Adult Education.—Survey of present programme for adult education including study of methods, institutions, and condition under which it has developed in modern society. [3-0; 3-0]

# English

100. (3) Literature and Composition.—A study of the principles of compo

sition and of some twentieth-century examples of drama, short story, poetry and novel. Essays and exercises are required. [3-0; 3-0]

- 200. (3) Literature and Composition.—A study of literature from Chaucer to the nineteenth century, and of the principles of composition. Themes and exercises are required. Prerequisite: English 100 or Arts I.
- 303. (3) English Composition.—The principles and practice of good writing. For students in the Faculty of Education. [3-0; 3-0]

#### Fine Arts

125. (3) History of Art.—The history of architecture, sculpture and painting of the Western World from Ancient Egypt and Mesopotamia to the present. [3-0; 3-0]

#### Mathematics

100. (2) Calculus I.—Prerequisite: Mathematics 12 (Secondary School Programme, B.C.).

Ideas, techniques and applications of differentiation and integration.

[2-1; 2-1]

120. (1) Introduction to Analysis I.—(Meets 2 hours a week for half a year. Offered in the Fall and again in the Spring term.) Prerequisite: Math 100, which may be taken concurrently when Math 100 and 121 (120, 1968-69 or earlier) is taken in the Spring term.

Discussion of some basic concepts underlying Calculus such as induction greatest lower bound, least upper bound, sequence, limit, continuity, and proofs of some theorems. [2-0; 0-0] and [0-0; 2-0]

121. (1) Introduction to Vectors and Matrices.—(Meets 2 hours a week for half a year. Offered in the Fall and again in the Spring term.) Prerequisite: Mathematics 12 (Secondary School Programme, B.C.).

Systems of linear equations, vectors, matrices, determinants, linear dependence. [2-0; 0-0] and [0-0; 2-0]

# Physics

Physics 130.—Is intended mainly for students not planning to specialize in physical science or engineering. Students from Faculties other than Science, planning to take Physics 130 as their only physics course, are advised to defer t to their second or a higher year at the University. Physics 130 may be accepted for entrance into second year Physics courses in the Faculty of Science or into the Faculty of Applied Science in the case of a student who has schieved First (or high Second) class standing in both Physics 130 and Mathematics 120, and whose overall academic record is deemed satisfactory v a Physics Departmental Advisor.

130. (3) Elements of Physics.—From Newton's mechanics to particle physes, a description of ideas, principles and their applications. [3-3\*-0; 3-3\*-0]

'sychology

- 100. (3) Introductory Psychology.—A survey of the areas and methods of sychology with emphasis upon the basic processes in animal and human ehaviour: Topics covered include learning, sensation, perception, biological ases of behaviour, personality and social psychology. [3-0; 3-0]
- 200. (3) Experimental Psychology.—The principles and methods of experiental psychology; use of elementary statistics in analysis of data; laboratory emonstrations. Prerequisite: Psychology 100. [3-0:3-0]
- 206. (3) Dynamics of Behaviour.—An experimental, dynamic and social

approach to behavioural adjustment with special reference to applications. Prerequisite: Psychology 100. [3-0; 3-0]

Sociology

200. (3) Introduction to Sociology.—A general introduction to the sociological analysis of selected topics: religion, work, politics, stratification, bureaucratic organizations, kinship, socialization, social roles. [3-0; 3-0]

Zoology

303. (3) Vertebrate Physiology.—Organ physiology for students not taking the Major or Honours B.Sc. programme. Prerequisite: First year Chemistry. Biology 101 or the equivalent of one lecture per week and 3 hours laboratory per week for one semester devoted to the functional anatomy of vertebrate animals. Mr. Perks. Students will get credit for one only of Zoology 303 and 307/308. [2-2; 2-2]



# THE FACULTY OF FORESTRY

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA
VANCOUVER 8 • BRITISH COLUMBIA CANADA

# The Faculty of Forestry calendar, 1969-70

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#### Financial Assistance

A list of Fellowships, Scholarships, Bursaries and Loans open to student in the University will be found in the publication "Awards and Financia Assistance" which may be obtained from the Registrar's office. For details consult this publication. In general, application must be made to the Dear of Inter-Faculty and Student Affairs.

#### ACADEMIC STAFF

- JOSEPH A. F. GARDNER, M.A. (Brit. Col.), Ph.D. (McGill), F.C.I.C., Professor and Dean of the Faculty.
- NORMAN C. FRANZ, B.S. (State Univ. of New York), M.W.T., Ph.D. (Michigan), Professor.
- Kenneth Graham, B.A. (Brit. Col.), M.Sc. (McGill), Ph.D. (Toronto), Professor.
- PHILIP G. HADDOCK, B.S., Ph.D. (Calif.), B.C.R.F., Professor.
- J. HARRY G. SMITH, B.S.F. (Brit. Col.), M.F., Ph.D. (Yale), B.C.R.F., Professor.
- ROBERT W. WELLWOOD, B.A.Sc. (Brit. Col.), M.F., Ph.D. (Duke), B.C.R.F., P.Eng., Professor.
- JACK W. WILSON, M.S., Ph.D. (State Univ. of New York), Professor.
- RAYMOND E. FOSTER, B.A., B.S.F. (Brit. Col.), Ph.D. (Toronto), B.C.R.F., Professor (Part-time).
- LASZLO ADAMOVICH, Dipl. For. Eng. (Sopron), M.F. (Brit. Col.), P.Eng., Associate Professor.
- Walter W. Jeffrey, B.Sc. (Hons.) (Edinburgh), M.F. (Oregon State), Ph.D. (Colorado State), B.C.R.F., Associate Professor.
- ANTAL KOZAK, M.F., Ph.D. (Brit. Col.), Associate Professor.
- J. VINCENT THIRGOOD, B.Sc. (For. and Bot.) (Wales), M.F. (Oregon State), M.F. (Brit. Col.), Associate Professor.
- OSCAR SZIKLAI, Dipl. For. Eng. (Sopron), M.F., Ph.D. (Brit. Col.), B.C.R.F., Associate Professor.
- ROBERT W. KENNEDY, B.S. (State Univ. of New York), M.F. (Brit. Col.), Ph.D. (Yale), Associate Professor (Part-time).
- ERIC P. SWAN, B.A., M.Sc. (Brit. Col.), Ph.D. (McGill), Associate Professor (Part-time).
- CONOR W. BOYD, B.Sc. (For.) (Edinburgh), M.Sc. (New Brunswick), Ph.D. (McGill), Assistant Professor.
- Peter J. Dooling, B.A., B.P.E., M.A. (Alta.), Assistant Professor.
- DAVID HALEY, B.Sc. (Aberdeen), M.F., Ph.D. (Brit. Col.), Assistant Professor.
- JAMES P. KIMMINS, B.Sc. (Bangor), M.S. (Calif.), M.Phil. (Yale), Assistant Professor.
- Donald D. Munro, B.S.F. (Brit. Col.), M.S. (Oregon State), Ph.D. (Brit. Col.), B.C.R.F., Assistant Professor.
- LEONID VALG, M.F. (Brit. Col.), Assistant Professor.
- BART J. VAN DER KAMP, B.S.F. (Brit. Col.), Ph.D. (Aberdeen), Assistant Professor.
- OHN G. WORRALL, B.Sc. (Durham), B.S.F. (Brit. Col.), M.F., Ph.D. (Yale), Assistant Professor.
- BIR MULLICK, B.Sc. (Hons.) (Agr.) (Delhi), M.S.A., Ph. D. (Brit. Col.), Assistant Professor (Part-time).
- J. GLENDON YOUNG, B.A.Sc. (Brit. Col.), P.Eng., Instructor.
- ASZLO PASZNER, M.F., Ph.D. (Brit. Col.), Research Associate.
- BERNARD CHING-HUEY SUN, B.S.Ag. (Taiwan), M.Sc. (Brit. Col.), Demonstrator.
- Braham G. Griffith, M.A. (Brit. Col.), M.F. (Harvard), Ph.D. (Washington), B.C.R.F., Professor Emeritus.

- F. MALCOLM KNAPP, B.S.F. (Syracuse), M.S.F. (Washington), B.C.R.F., Professor Emeritus.
- JOHN WALTERS, M.F. (Brit. Col.), B.C.R.F., Director of the University Research Forest.

Members of Faculty representing other Departments:

J. F. Bendell, B.A., Ph.D.; V. C. Brink, M.S.A., Ph.D.,; B. E. Burke, B.Com., M.A., D.B.A., C.G.A.; L. Cox, B.A.Sc.; G.G.S. Dutton, M.A., M.Sc., Ph.D., F.R.I.C.; W. G. Heslop, B.A.Sc., M.E.I.C., Assoc. C.I.M.; V. J. Krajina, D.Sc.; D. Macaree, M.A., Ph.D.; C. A. Rowles, M.Sc., Ph.D.



# **FACULTY OF FORESTRY**

#### Introduction

Forestry is the science, the art, and the practice of managing and using for human benefit the natural resources which occur on and in association with forest lands.

The Faculty is well situated to help serve the needs for education of men and women as foresters, wood scientists, and forest biologists in Western Canada. Productive forests of British Columbia cover about 135 million acres and contain many commercially valuable tree species. The forests of B.C. support a dynamic forest industry that generates annually about one billion dollars of income. It is estimated that with good forest management and full utilization this production could at least be tripled. British Columbia forests also yield important crops of fish and game and forage for domestic livestock. Forests have a beneficial influence on water flow and provide many pleasant opportunities for wildland recreation.

There are excellent opportunities in British Columbia for satisfying professional careers in all aspects of managing, harvesting, protecting and growing of forest crops and for manufacturing and selling forest products. About 60 per cent of the University of British Columbia graduates in forestry are employed in industry and approximately 80 per cent are employed in British Columbia. There are good opportunities also for employment in Alberta, Saskatchewan, Manitoba and other Canadian Provinces. Several firms of consultant foresters serving national and international markets have their head-quarters in Vancouver. Many large companies producing forest products in this area, as well as forestry associations, have their head offices in Vancouver. The district headquarters of the B. C. Forest Service is situated in Vancouver.

Although a very large proportion of graduates in forestry remain in their profession, some have chosen to study for new careers in public-school teaching, law, and medicine. The B.S.F. degree is accepted as a basic requirement for many post-graduate programmes but transfer at the undergraduate level to other Faculties at the University of British Columbia and to other Faculties of Forestry in Canada usually causes a loss in time.

In-service training for forest rangers is offered by the B. C. Forest Service at Green Timbers near New Westminster. The British Columbia Institute of Technology and Selkirk College offer terminal sub-professional, two-year post-high school curricula in forest technology. The former also offers a corest products technology curriculum.

#### General

The degree of Bachelor of Science in Forestry (B.S.F.—the hood is brown vith green cord) is granted on the completion of the required programme, usually four years of study in the Faculty of Forestry.

For admission to the Faculty of Forestry, a student shall have completed he First Year in Arts or Science at the University of British Columbia, or Frade 13 (British Columbia), or the equivalent at another university or at junior college.

The courses required provide a strong, well-rounded professional training nd at the same time give the student, through his choice of options, n opportunity to supplement his knowledge of allied sciences as a backround for further specialized education. This objective is attained by

requiring the student to take during each academic year a basic core of essential subjects and other courses which are elective. The electives have been arranged so that a student wishing to proceed with graduate studies in a particular specialty may do so without the necessity of having to take, before commencing his graduate programme, a large number of prerequisite undergraduate courses. The main phases of forestry or allied fields are: Forest Land Management, Forest Business Management, Forest Harvesting, Forest Wildlife Management, Silvics (including Forest Pathology and Forest Entomology) and Wood Science.

All options provide basic knowledge of arts and sciences and their application to forestry problems, and establish a sound foundation to help foresters meet rapidly changing circumstances. The courses which may be elected in any option are chosen to provide a sound basis for undertaking the work implicit in the title of the option. Forest land managers are concerned with the management and utilization of all the resources of forest land. Within the forest land management option students may emphasize timber, water, recreation, or forage for domestic and game animals by their choice of essay and thesis topics and their elective courses. Forest business managers are concerned with selling of forest crops, primarily timber, and with manufacture and sale of forest products. Forest harvesters are concerned with the harvesting of forest crops and engineering aspects of forest development programmes. Students in the Silvics option are concerned with growing and protecting of forest crops. They are involved largely in the application of the principles of biology to forest ecosystems. Forest wildlife managers maintain and improve wildlife crops and control wildlife populations by managing habitat. Students in Wood Science will gain systematized knowledge of wood based on learned study, observation and experimentation at levels of specialized botany, physics, chemistry, and mathematics with application to the wood source and/or product spectrum. They are concerned with creation and dissemination of knowledge about wood and pulp and with technical control of forest products manufacture.

The student at the beginning of his second year must elect one of the six options offered. If at the end of the second or subsequent years the student wishes to change his option he can generally do so but must complete any prerequisites of the new option and make up any deficiencies before graduation. Transfers into Forest Harvesting and Wood Science options usually present some difficulties. It is impossible to schedule all course combinations of potential interest to students. The programme shown for any option therefore, represents only what is considered to be the optimum combination for a particular area of concentration. Students with averages of at least 70 per cent who wish to prepare themselves for graduate study within a specialized field may take some courses which have not been scheduled o which conflict with the prescribed courses. The Dean may allow such student to substitute up to six units for the in-session courses ordinarily required in each of second, third, and fourth year in the B.S.F. programme. Substitution must be recommended by the appropriate staff advisor. Omissions from th core programme should be made up later if they can be scheduled. Th maximum number of in-session course units is 18 for each year.

Students interested in a career in Forest Biology teaching or researc rather than professional Forestry may elect a combined Honours Programm in Biology and Forest Biology in the Faculty of Science.

Graduates from options other than Wood Science should be eligible for registration in the Association of British Columbia Foresters.

Between the spring and fall sessions the student is expected to obtain practical experience not obtainable in laboratory or field classes. Before a degree will be granted, a candidate is required to satisfy the Faculty that he has gained a suitable amount of experience related to his option.

Students in Forestry options are required to attend a 10-day field course in forest surveying at the University Research Forest near Haney immediately prior to the fall term, preceding the Second Year. The fee for this course is \$35.

Immediately preceding the fall term, all third year students must take a 6-day field trip into the Interior of the Province. They also must complete 21 field days of instruction at the University Research Forest following completion of the spring examination period. The fee for the 6-day field trip is \$40; the fee for the spring camp is \$75. In addition, short field trips are required from time to time throughout the Third and Fourth Years, and the student is responsible for expenses incurred.

Campus and Research Forests are well suited for field instruction and for research in Forestry and related sciences.

#### Graduate Studies

Throughout Canada there are some excellent opportunities in research and teaching for students who have specialized appropriately in their post-graduate studies.

The following graduate degrees are offered through the Faculty of Graduate Studies:

M.F. —in economics and finance, entomology, fire control, forest ecology, genetics, hydrology, harvesting, influences, management, mensuration, pathology, photogrammetry, products, recreation, silvics, silviculture, soils, wildlife management, and wood science and engineering, for students with a B.S.F. degree.

M.Sc. —in scientific aspects of forestry and wood science for graduates in Science, Applied Science, Agriculture, or Forestry.

M.A.Sc. —in Forest Engineering for graduates in Forest Engineering.

Ph.D. —in fields concerned with the basic scientific or economic aspects of forestry and forest products.

Detailed information may be obtained from the calendar of the Faculty of Graduate Studies.

#### Admission

The general requirements for admission to the University are given in the General Information bulletin.

For admission to Forestry, a student shall have completed the First Year n Arts or Science at the University of British Columbia, or Grade 13 (British Columbia), or the equivalent at another university or at a junior college.

Students who plan to enter Forestry should register for the following courses in First Year Arts or Science, or the equivalent in Grade 13:

Biology 101, Principles of Biology or Physics 130, Elements of Physics, or Physics 110, Mechanics, Electricity and Atomic Structure or Physics 120, Matter and Mechanics.

Chemistry 110 or 120, Principles of Chemistry, or 103, General Chemistry. English 100, Literature and Composition.

Mathematics 100, Calculus I, and Mathematics 121, Introduction to Vectors and Matrices.

One additional course

A student who does not have credit for either Biology 101 or Physics 110 or 120 or 130 may be admitted to First Year Forestry but must consult the Dean before registering.

Candidates who expect to complete the requisite entrance standing through University or Grade 13 (British Columbia) supplemental examinations, held in August or September, may apply for admission and their applications will be considered subject to the results of these examinations.

Students intending to enter Forestry are advised to present Chemistry 12, Mathematics 12, and Physics 12 for Secondary School Graduation (Academic or Technical Programme).

A student holding a Grade 12 certificate of another Canadian province may not be admitted direct to the Faculty but should apply for the pre-Forestry Studies in the Faculty of Science if he is a B.C. resident, otherwise he should complete the pre-Forestry requirements at his own provincial university.

#### Transfer

Applications for transfer of students from other universities or other faculties to the Faculty of Forestry will be given careful consideration. Courses offered by transfer students will be reviewed flexibly, in relation to the core programme and special requirements of the option of interest to the student, with the general objective of keeping time lost by transfer to a minimum. Maturity, experience, and motivation will be considered carefully.

#### Fees-Subject to change without notice

First Term Fees, \$282 (includes A.M.S. fee of \$29), payable in full at the time of registration. However, students may pay full fees of \$535 at time of registration. Fourth Year students are assessed \$260 (total fees \$542) which includes the Graduating Class Fee of \$7.

Second Term Fees, \$253, are payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Accounting Office before this date with a note showing name and registration number.

A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.

#### **Examinations and Advancement**

- 1. Examinations are held in December and April. December examinations will be held in all subjects of the First and Second Years and are obligatory for all students taking these subjects. December examinations ir subjects of the Third and Fourth Years, excepting those subjects that are completed before Christmas, are optional with the departments concerned Application for special consideration on account of illness or domestic affliction must be submitted to the Dean not later than 48 hours after the close of the examination period. For further information see below.
- 2. Candidates, in order to pass, must obtain at least 50 per cent in each subject; in courses which comprise both lecture and laboratory work of problem sessions students will be required to pass in both the written examinations and laboratory work or problem sessions before standing in the subject will be granted. The grades are as follows: First Class, an average of 80 per cent or over; Second Class, 65 to 79 per cent; Pass, 50 to 64 per cent in a subject in which a candidate has failed to obtain 50 per cent, the Facult may, at its discretion, award a pass in that subject on the basis of a goo

aggregate standing. Such a pass will be entered on his record as an 'adjudicated pass'.

3. If a student's general standing in the final examinations of any year is sufficiently high, the Faculty may grant him supplemental examinations in the subject or subjects in which he has failed. Notice will be sent to all students to whom such examinations have been granted.

A candidate who has been granted a supplemental examination may write

it only twice.

- 4. Supplemental examinations will be held in August. For further information see below. Special examinations will not be granted except by special permission of the Faculty, and then only during the third week in October or the third week in January. This permission is granted only in exceptional circumstances, such as domestic affliction or certified illness.
- 5. No student with defective standing will be admitted to the Second Year unless special permission is granted by the Dean.
- 6. No student may enter the Third or higher year with supplemental examinations still outstanding in respect of more than 4 units of the preceding year, or with any supplemental examination outstanding in respect of the work of an earlier year unless special permission to do so is granted by the Faculty.
- 7. No student will be allowed to take any subject unless he has previously passed, or secured exemption, in all prerequisite subjects.
- 8. A student who is required to repeat his year will not be allowed to take any Forestry courses in a higher year. A student repeating his year need not repeat the laboratory portion of certain courses provided he has obtained a standing in the laboratory work which is acceptable to the head of the department in which the course is given.
- 9. A student who fails a year of University study for a second time will be required to withdraw from the University.
- 10. Any student whose academic record, as determined by the tests and examinations of the first term, is found to be unsatisfactory, may be required by the Faculty to discontinue attendance at the University for the remainder of the session. Such a student will not be re-admitted to the Faculty as long as any supplemental examinations are outstanding.
- 11. A candidate who does not complete his studies for graduation in May following Fourth Year, will be required to register for all uncompleted subjects, including graduating thesis. in a subsequent session, summer or winter, and will be assessed the prescribed fees for these subjects. Students who do not complete Forestry 499, B.S.F. Thesis, in their fourth year must complete the thesis within a year, in time for graduation the following spring. Students who do not complete their thesis within the specified period of time must formally re-register in the B.S.F. programme in a subsequent session and must spend at least one term in residence, in order to complete the thesis.

#### Graduation

Every candidate for a degree must make formal application for graduation. Application for graduation must be made not later than March 15. Special orms for this purpose are provided by the Registrar's office.

Honours graduate standing will be granted to those who obtain a First llass average in the Final Year and who have passed any one of the three receding years with at least 50 per cent. in each subject and 75 per cent. on ne whole.

#### Attendance

Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments, may, on the recommendation of the Head of the Department, be excluded by the Dean of the Faculty from the final examinations. Students who are unavoidably absent because of illness or disability should report in writing to the Dean and advise their instructors on return to classes.

Students, who because of illness are absent from a December or April examination, must submit a certificate, obtained from a doctor, to the University Health Service as promptly as possible.

#### Withdrawal

Any student who after registration decides to withdraw from the University must report to the Registrar's office. He will be required to obtain clearance from the University to the satisfaction of the Registrar, before being granted Honourable Dismissal, or recommended, where applicable, for refund of fees.

The Senate of the University may require a student to withdraw from the University at any time for unsatisfactory conduct, for failure to abide by regulations, for unsatisfactory progress in his programme of studies or training, or for any other reason which is deemed to show that withdrawal is in the interest of the student and/or the University.

#### Examination Results

Results of the sessional examinations in April are mailed to students in the graduating classes about the time of Congregation, and to students in the lower years by approximately June 15. Any student who must meet an application date for another institution prior to June 15 should inform the transcript clerk in the Registrar's office in order that arrangements may be made to meet the deadline.

# Review of Assigned Standing

Reviews of Assigned Standing are governed by the following regulations:

- 1. Any request for the review of an assigned grade other than for a supplemental examination (in which a request for a review will not be granted), must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each course concerned which will be refunded only if the mark is raised.
- 2. Each applicant for a review must state clearly why he believes the course deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a second time before results are announced. For this reason an applicant granted a supplemental should prepare for the examination since a change in the originamark is unlikely and the result of the review may not be available before the end of the supplemental examination period. A review will not be granted when the standing originally assigned is consistent with the student's term work and record in other subjects.
- 3. Reviews will not be permitted in more than two courses (6 units) in the work of one academic year, and in one course (3 units) in a partial course of 9 units or less or in the work of one summer session.

# Supplemental Examinations

Supplemental examinations may be written in August at the followin centres:

Cranbrook, Dawson Creek, Kamloops, Kitimat, Ocean Falls, Penticton, Powell River, Prince George, Prince Rupert, Trail, Victoria; and at Whitehorse, Y.T. Other centres outside of British Columbia are restricted to universities or their affiliated colleges.

In unusual circumstances a student working in a remote area may be permitted to write supplemental examinations at a special centre if satisfactory arrangements can be made. Since permission is contingent on completion of arrangements, only early applications will be considered.

The fee for each supplemental examination written at the University is \$7.50; at a regular outside centre, \$10.00; at a special centre, \$20.00 In the event that a candidate does not appear for an examination, no refund will be made. However, if the candidate within 10 days of the scheduled time of the examination submits to the Registrar an explanation of the circumstances concerning his failure to write, a refund will be considered. A refund, if made, will be \$5.00 only.

Applications for supplemental examinations in respect of the winter session examinations, accompanied by the necessary fees, must be in the hands of the Registrar by July 8.

## Transcript of Academic Record

A transcript of a student's academic record will, on request of the student, be mailed by the Registrar directly to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the inscription "official transcript only if presented with seal unbroken." On graduation or withdrawal a student may obtain for his own use a copy of his record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of mid-term examinations.

Student records are confidential. Transcripts are issued only at the request of students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made arrangements satisfactory to the Accountant's office to meet any outstanding indebtedness.

Granted Honourable Dismissal indicates that the student is in no disciplinary difficulty at the time the transcript is issued; the term has no reference to scholastic status.

Application for a transcript should be made at least one week before the

document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

# Forestry (B.S.F.) Course First Year

	First	Term	Secon	d Term
Subject	Lect.	Lab.	Lect.	Lab.
English 150 Composition For. 150 Dendrology	2	2*	2	2*
For. 151 Profession of Forestry	i		i	
M.E. 154 Mechanical Drawing		3		3
Pl. Sc. 321 Biometrics	3	2		
Comp. Sc. 201 Automatic Programming	0	0	3	l
Structure or Biol. 101 Principles of Biology	3	3	3	3
plus 6 units from Chem. 230 (3), Math. 155 (3), Soc. 200 (3).**	Com. 4	159 (3)	,	

<sup>\*</sup>Alternate weeks.

#### Second Year

All students entering Second Year Forestry options other than Wood Science are required to attend a 10-day field course in forest surveying at the University Research Forest near Haney immediately preceding the fall term of the second year. All students also are required to submit an essay of not less than 1000 words. This should take the form of a scientific report, preferably on original observations made during the summer. Any suitable subject, however, may be chosen. Emphasis will be placed upon the precise and accurate use of English, but credit will also be given for subject matter, form and illustrations. If the essay is not up to the standard of a pass mark in English it will be failed and require submission of a new essay during the time for supplemental examinations in August. Two copies are required, one of which need not be illustrated. The essay must be handed in to the Dean not later than Ianuary 31.

*Option	Required Courses
All Options	Econ. 350; For. 270, 272, 298.
Forest Land Management	Bot. 330; For. 250, 261, 262; Geog. 214; Soil Sc. 200.
Forest Business Management	Com. 261; For. 250, 261, 262; Geog. 214; one of Bot. 330, For. 278, Math. 200 or 151 and 156 or Math. 300
Forest Harvesting	For. 250, 261, 262; Geog. 214; Geol. 150; Phys. 155.**
Forest Wildlife Management	Bot. 330; For. 250, 261, 262; Geog. 214; Soil Sc. 200.
Silvics	Bot. 330; For. 250, 261, 262; Geog. 214; Soil Sc. 200.
Wood Science	Bot. 330; Chem. 205; For. 278; Phys. 155.**

<sup>\*</sup>Students are required to continue the options they select in their 2nd year unless permission change is granted by the Dean.

\*\*To be offered only in second year after 1969-70.

<sup>†</sup>Students should select the course which was not offered for entrance requirement.

<sup>\*\*</sup>Students planning to take Wood Science must have Chem. 230 and Math. 155 or 202 or equivalents to enter second year B.S.F. Students planning to take Forest Harvesting must have Math. 155 and Com. 459 or equivalents to enter second year B.S.F. Students planning to take Forest Business Management option must have Com, 459 to enter second year B.S.F. Chem. 230 is recommended in preparation for Bot. 330.

#### Third Year

All students entering Third Year Forestry must take a 6-day field trip into the Interior of the Province before lectures commence in the fall term. Detailed arrangements will be announced at the close of the second year. They also must submit an essay of not less than 2000 words. It shall be a technical description of the work on which the student was engaged during the summer, or of any scientific or professional work with which he is familiar. Two copies are required, one of which need not be illustrated. Detailed essay requirements are available from the Faculty. Outlines of essays are due in the Dean's Office not later than October 15 and the completed essays are due January 31. Third Year students other than Wood Science must also complete 21 days of field instruction at the University Research Forest following completion of spring examinations.

Option	Required Courses
All Options	Com. 357; For. 350, 351, 363, 375, 390, 398.
Forest Land Management	For. 352, 355, 362, 372 or 361 plus 1½ units.
Forest Business Management	Com. 331, 364; For. 362.
Forest Harvesting	Ap. Sc. 270*; For. 361, 362, 372.
Forest Wildlife Management	Bot. 302; Zool. 202.
Silvics	Bot. 302; For. 352, 355.
Wood Science	Ap. Sc. 270*; Phy. 156.

<sup>\*</sup>To be offered only in third year after 1969-70.

# Fourth Year

Tourist Tour		
Option	Required Courses	
All Options	For. 391, 453, 481, 499.	
Forest Land Management	For. 480; and 10 units from For. 450, 451, 462, 463, 464, 475, 482, 484, 485, 493, 494.	
Forest Business Management	5-6 units from Com. 321, 322, 458, 465; and 6-7 units from: For. 463, 475, 476, 477, 480.	
Forest Harvesting	Ap. Sc. 270; and 9 units from: Com. 458; For. 463, 471, 472, 475, 478, 482.	
Forest Wildlife Management	Biol. 322; For. 463 and 493 or 482, 494; Zool. 416, 421.	
Silvics	11 units from: Agron. 304; Bot. 303, 425; For. 410, 418, 450, 466, 480, 482, 484, 485; Soil Sc. 313, 416.	
Wood Science	Ap. Sc. 270; For. 475; and 9 units from For. 466, 471, 476, 477, 478, 479.	

Note: All students other than those in Wood Science are required to complete the field work at the University Research Forest before proceeding into he fourth year. The students in Wood Science will replace For. 391 (Field Work) with 3 units of For. 455 (Directed Studies).

#### COURSES OF INSTRUCTION

The number of units assigned to a course is given in round brackets immediately following the course number.

The hours assigned for laboratory, lectures and tutorials in a course are indicated as follows:

2 lectures and 3 hours laboratory per week, both terms. [2-3; 2-3] 1 lecture and 2 hours laboratory per week, first term. [1-2; 0-0]

1 lecture and 2 hours laboratory per week, second term. [0-0; 1-2]

2 lectures, 3 hours laboratory and 2 hours problem session or discussion per week, both terms. [2-3-2; 2-3-2]

Students from other Faculties may take certain of the courses offered in Forestry provided they offer the necessary prerequisites, but in all such cases permission of the instructor must be obtained.

- 150. (1½) Dendrology.—Identification, distribution and factors governing establishment and growth of commercially important forest trees. Mr. Worrall. [1-2\*-0; 1-2\*-0]
- 151. The Profession of Forestry.—Survey of the profession; opportunities available in forestry and the wood sciences. The Staff. [1-0-0; 1-0-0]
- 250. (1½) Forest Ecology.—Forest geography of Canada; components of the forested landscape; the forest ecosystem; atmospheric environmental factors; CO<sub>2</sub> and nutrient cycles; introduction to site classification. Mr. Kimmins.

  [0-0-0; 3-0-0]
- 261. (1½) Field Work in Forest Surveying.—Elementary surveying; field problems involving the use of compass, transit, tape, level, and plane table; topographic mapping; forest road location. For ten days at the University Research Forest immediately prior to the fall term. The Staff.
- 262. (3) Forest Mensuration.—Methods of measuring forests and forest products; forest inventory systems; prediction of growth and yield. Mr. Munro. [2-0-2; 2-0-2]
- 270. (2) Wood Anatomy.—Anatomy of wood; natural wood defects; growth-quality relations, macroscopic identification of the more important woods of North America. Textbook: Panshin, deZeeuw and Brown, Wood Technology, Vol. I. Mr. Wilson. [2-4-0; 0-0-0]
- 272. (2) Principles of Forest Harvesting.—Description of the forest as a resource and environment for logging; examination of harvesting functions; introduction to forest transportation systems. Mr. Boyd. [2-0-1; 2-0-1]
- 278. (2) Wood Physics.—Elementary physical properties of wood in relation to its behaviour and use; microscopic identification of wood and wood pulps; preparation of wood for microscopic and wood-quality studies. Textbook: Brown, Panshin and Forsaith, Wood Technology, Vol. II. Mr. Franz. [0-0-0; 2-4-0]
- 298. (1/2) Essay.—Students entering Second Year are required to submit ar essay of not less than 1000 words. It should take the form of a scientific report, preferably on original observations made during the summer.
- 300. (3) Principles of Forestry and Wood Sciences.—Objectives, intro duction to methods; scientific and economic bases; examples of forest land use, multiple purpose forestry, and forest products manufacture and use (Not available for credit to forestry students; no pre-requisites.) Mr. Thirgoo and the staff.

  [3-0-0; 3-0-0

<sup>\*</sup> Alternate weeks.

- 350. (2) Silviculture.—Theory and practice of controlling forest establishment, composition, and growth; methods of establishing natural regeneration; crop tending practices; development of silviculture in western North America. Textbook: Smith, *Practice of Silviculture*. Mr. Haddock. [2-0-2\*; 2-0-2\*]
- 351. (4) Forest Protection.—Damage to forests and forest products caused by animals, climate, disease, fire, and insects; principles of control and managed use of these agents. Mr. Graham, Mr. Smith, Mr. van der Kamp. [3-2-0; 3-2-0]
- 352. (1½) Forest Genetics.—Principles of genetics and their application to forestry; selection and breeding methods. Mr. Sziklai. [0-0-0; 2-2\*-0]
- 355. (1½) Seeding and Planting.—Artificial regeneration; forest nursery practice. Textbook: Tourney and Korstian, Seeding and Planting in the Practice of Forestry, 3rd edition. Mr. Sziklai. [2-2\*-0; 0-0-0]
- 361. (1½) Forest Surveying.—Methods used in forest survey with emphasis on forest road location and design. Textbook: Brinkler and Taylor, *Elementary Surveying*. Mr. Adamovich. [0-0-0; 2-2\*-2\*]
- 362. (1½) Data Processing and Quality Control.—Methods of collecting, processing, and analysing forestry data; introduction to statistical quality control. Mr. Kozak and Mr. Valg. [2-0-2; 0-0-0]
- 363. (1½) Principles of Forest Land Management.—Objectives and methods of planning for timber production and multiple purpose forestry, Textbook: Davis, Forest Management, 2nd Ed. Mr. Smith. [0-0-0; 2-0-2]
- 372. (3) Analysis of Harvesting Operations.—Engineering and economic analysis of logging operations; relationships among time, cost and production factors in all phases of logging. Prerequisite: Math. 155 or 202. Mr. Boyd. [2-0-2; 2-0-2]
- 375. (2½) Manufacture of Forest Products.—Methods used in and field studies of industries manufacturing forest products. Textbooks: Panshin et al., Forest Products: Brown and Bethel, Lumber. Mr. Valg. [2-3\*-0; 2-3\*-0]
- 390. (1) Field Work in Logging, Silvics, and Utilization.—A 6-day field trip immediately prior to the fall term to demonstrate forest land use, and the elements of silviculture, logging, management, and utilization in the forest types of the Interior. A substantial written report is a required part of the course. Required of all students entering Third Year. The Staff.
- 391. (3) Field Work in Harvesting, Silviculture, and Mensuration.— Twenty-one field days of study at the University Research Forest is required of all forestry students preceding their final year at the University. The Staff.
- 398. (1) Summer Essay.—Students entering Third Year are required to submit an essay of not less than 2000 words. It should be a technical description of the work on which the student was engaged during the summer, or of scientific or professional work with which he is familiar.
- 410. (1½) Principles of Forest Entomology.—Insects in relation to forests and forestry, general objectives of forest entomology; specific problems, concepts and practices leading to forest insect control. Mr. Graham.[0-0-0;2-2-0]
- 418. (1½) Methods in Forest Pathology.—Field and laboratory methods and techniques in handling disease problems in trees, stands, and forest products. Mr. van der Kamp. [0-0-0; 2-2-0]
- 450. (2) Advances in Silviculture.—Fundamental silvicultural problems; the application of research findings to the practice of silviculture. Mr. Haddock. [2-0-0; 2-0-0]

- 451. (1½) Fire Control and Use.—Fire prevention; danger rating; fire behaviour, detection, communication, transportation and suppression; planning for control and use of fire. Mr. Smith.

  [0-0-0; 2-0-2]
- 453. (1) Seminar.—Oral presentation and discussion of current forestry topics; reviews of important papers in forestry periodicals. The Staff.

[0-0-1; 0-0-1]

- 455. (1-3) Directed Studies in Forestry.—In special cases and with the approval of the instructor concerned a student may carry on directed studies of specific problems in forestry. The Staff.
- 462. (1½) Growth and Yield.—Techniques of measuring and estimating growth and yield of trees and stands. Textbook: Spurr, Forest Inventory. Mr. Munro. [0-0-0; 2-0-2]
- 463. (1½) Forest Management.—Preparation and analysis of plans for regulating and increasing timber production. Mr. Smith. [2-0-2; 0-0-0]
- 464. (1½) Photo-Interpretation.—Application of photo-interpretation, photo-mensuration, and photo-mapping to forest management. Textbook: Spurr, Photogrammetry and Photo-interpretation. Mr. Munro. [2-0-2; 0-0-0]
- 466. (1½) Advanced Biometrics.—Analysis of variance, multiple regression and analysis of covariance. Sampling procedures. Design and analysis of experiments. Mr. Kozak.

  [0-0-0; 2-0-2]
- 471. (3) Optimization Techniques in Forestry.—Application of probability, statistics, simulation, flow theory, network techniques and linear programming to problems in forestry. Pre-requisite Math. 155 or 202. Mr. Boyd, and Mr. Young.

  [2-0-2; 2-0-2]
- **472.** (3) Forest Transportation Systems.—Engineering and economic aspects of the design, construction, and maintenance of forest transportation systems and structures. Mr. Adamovich. [2-0-3; 2-0-3]
- 475. (2) Forest Products Utilization.—Utilization problems; product development; distribution and marketing of forest products. Mr. Wellwood.

[2-0-0; 2-0-0]

- 476. (2) Glued Wood Products.—Types and characteristics of wood adhesives; manufacture, properties, and uses of plywood, laminated wood, and composite wood products. Pre-requisite For. 278. Mr. Valg and Mr. Wellwood. [3-3-0; 0-0-0]
- 477. (2) Wood Seasoning and Preservation.—Principles and methods of seasoning forest products; principles of finishing wood; preservative treatments. Pre-requisite For. 278. Mr. Valg and Mr. Wellwood. [0-0-0; 3-3-0]
- 478. (2) Mechanical Properties of Wood.—Factors affecting the strength of wood; timber-testing procedures; design of wood structures; mechanics of columns and beams; timber fasteners. Textbook: Scofield and O'Brien, Modern Timber Engineering. Mr. Adamovich and Mr. Franz. [3-0-3; 0-0-0]
- 479. (2) Physical and Chemical Properties of Wood.—Physical properties of wood in relation to moisture, heat, sound and electricity; chemical nature of the constituents of wood; wood analysis. Mr. Wilson and Mr. Franz.

[0-0-0; 3-3-0]

- 480. (1) Forest History, Policy and Administration.—The development and implementation of forest policies in Canada, the United States and other countries. Textbook: B.C. Forest Act. Mr. Thirgood. [0-0-0; 2-0-0]
- 481. (3) Forestry Economics.—Economics of production, distribution and consumption of goods and services produced by, or dependent on, the fores resource. Mr. Haley. [2-0-2; 2-0-2]

- 482. (3) Hydrology of Forest Land Use.—Influence of forest and other vegetation and of land use upon water yield, regime and quality; management of water sheds for water production. Mr. Jeffrey. [2-0-2; 2-0-2]
- 484. (1½) Forest Ecosystems.—Quantitative study of the forest ecosystem, with particular emphasis on energy and nutrient cycling. Mr. Kimmins. [2-0-2; 0-0-0]
- 485. (1½) Forest Land Classification.—Methods of classifying capability of land for multiple purpose forestry. Mr. Smith. [2-0-2; 0-0-0]
- 493. (1½) Forest Recreation Management.—Principles of management for recreation uses of forest and associated wildlands; habitat maintenance and improvement. Mr. Dooling. [0-0-0; 2-0-2]
- 494. (1½) Forest Wildlife Management.—Principles of maintaining and improving forest and associated wildland habitats for preservation and production of fish and game; methods of reducing animal damage to trees and stands. (May not be offered in 1969-70.) [0-0-0; 2-0-2]
- 495. (1½) Forest Environmental Management.—Forestry impacts upon environment; man's relationship to the forest; interactions of industrial forest practice with other resource uses, their economic implications and relevance; approaches to and problems of maintaining environmental quality. Mr. Haley and staff.

  [0-0-0; 2-0-2]
- 499. (3) B.S.F. Thesis.—Each Fourth Year Student is required to undertake independent study of a subject of special interest to him. The subject may be scientific or technical but must be appropriate to his option.

#### **Courses for Graduate Students**

Formal lecture courses or seminars are indicated by a single unit value assigned to them. In all problem and research courses, as indicated by a variable number of units, individual laboratory or field investigations or reviews of literature are usually planned to serve the special interests of individual students. When several students have a similar interest in advanced study, formal lectures or seminars may be given.

The staff members listed with the graduate courses are responsible for their administration through the Graduate Programme Committee. Staff members other than those listed may direct studies in specialized topics for interested students, on the recommendation of their programme supervisors. Courses for graduate students are not ordinarily available to undergraduate students.

- 510. (3) Advanced Forest Entomology.—Problems and case studies considering current hypotheses, supporting evidence, and design of experiments and surveys to test these. Mr. Graham. [2-0-2; 2-0-2]
- 518. (3) Advanced Forest Pathology.—Studies of hereditary, physiological, anatomical, and microbiological factors of trees and pathogens that influence levels of resistance or susceptibility to disease. (Given in 1969-70 and alternate years.) Mr. van der Kamp.
  - 549. (3-6) Master's Thesis.
- 551. (1-3) Forest Fire Control.—Advanced study in fire control and use in forestry. Mr. Smith.
- 553. (1) General Forestry Seminar.—May be required for the first two years of residence of all graduate students in Forestry. Credit may be granted for each year taken. The Staff.
- 555. (1-3) Silvics and Silviculture.—Directed study in silvical characteristics of forest trees; silvicultural systems. Mr. Haddock, Mr. Sziklai and Mr. Thirgood.
- 556. (1) Forest Tree Seed.—Seed production, collection, provenance, testing, treatment, and the application of these to the practice of forestry. Mr. Haddock and Mr. Sziklai.
- 557. (1-3) Studies in Forest Genetics.—Problems associated with forest tree improvement; analysis of variation in tree quality. Mr. Sziklai.
- 558. (1-3) Studies in Forest Tree Physiology.—Principles of plant physiology as applied to problems in growth and development of tree species. Mr. Worrall.
- 560. (1-3) Advanced Studies in Forest Mensuration.—Development and analysis of forest inventory systems; sequence and patterns of tree growth; analysis of crown development; improvement of stand growth and yield; methods of bio-mass analysis. Mr. Munro and Mr. Smith.
- 561. (1-3) Advanced Studies in Forest Management.—Problems in forest and forest land management; planning and development of forestry or forest industry programmes. Mr. Smith.
- 562. (3) Multiple Regression Methods.—Matrix algebra; algebra and inference of multiple linear and multiple curvilinear regressions for solution of problems in forestry and related fields. Methods of least squares for analysis of variance and covariance. Introduction to multivariate statistical analysis. Mr. Kozak.
- 563. (1-3) Problems in Forest Land Management. Mr. Jeffrey and Mr. Smith.
- 564. (1-3) Advanced Studies in Forest Photogrammetry. Problems ir photo-interpretation, photo-mensuration and forest-land classification. Mr Munro.

- 566. (1-3) Problems in Statistical Methods.—Electronic computing for forestry and forest research; simulation, linear programming, decision theory, and other aspects of operations research. Mr. Kozak, Mr. Smith, Mr. Valg.
- 567. (3) Forest Sampling Methods.—Principles and methods in the design of sample surveys for natural populations. Biases, variances and costs of estimators for simple random sampling, stratification, ratio estimation, cluster sampling, systematic sampling and selection with unequal probabilities. Mr. Munro.

  [2-0-2; 2-0-2]
- 568. (3) Dynamic Programming in Resource Allocation.—Mathematical background, classical optimization methods, principle of optimality in one, two, and three dimensions; dimensionality reduction; feedback mechanisms; examples from Forestry and Natural Sciences. Prerequisites: linear algebra, calculus, probability theory, or consent of instructor. Mr. Boyd. [3-0-0; 3-0-0]
- 570. (1-3) Wood Science.—Research in basic wood and fibre properties; anatomy, chemistry and physics; analysis of variation in wood qualities; chemistry of wood extractives. Mr. Gardner, Mr. Franz, Mr. Wellwood and Mr. Wilson.
- 571. (2) Rheological Behaviours of Wood Base Materials.—Time dependent phenomena of the wood matrix and wood fibre webs; relation of polymer constructions with emphasis on wood molecular architecture; features of viscoelastic memory systems. Prerequisites: For. 270 and Math. 300, or taken concurrently. Textbook: Nielsen, Mechanical Properties of Polymers, Mr. Franz, Mr. Wilson and Mr. Wellwood. [1-2-0; 1-2-0]
- 572. (1-3) Problems in Forest Engineering.—Operational efficiency in logging; forest transportation systems; design and construction of simple structures. Mr. Adamovich.
- 573. (1) Logging Cableways. Location, design and construction of cableways. Mr. Adamovich.
- 574. (1) Wood and Pulp Science Seminar.—Participation in the development of critical attitudes on theory, techniques, classical contributions and current issues in wood and pulp science. Required each year of graduate student residence in the field of Wood and Pulp Science. Credit may be granted for each year taken. Prerequisites: For. 270 and 453, or equivalents. Pre-reading list will be furnished. The Staff.
- 575. (1-3) Problems in Forest Products.—Directed study in problems associated with the forest industries; utilization; integration; development and marketing of forest products. Mr. Wellwood.
- 576. (2) Energy Transfer Mechanisms in Wood and Related Products.—Response of high polymers to energy sources with special reference to chemical and physical effects on wood and related products; cross-linking, copolymerization and degradation reactions; ionizing radiation. Mr. Wilson and Mr. Paszner.

  [3-0-0:0-3-01]
- 578. (1-3) Advanced Studies in Wood Products.—Research in the properties of solid and reconstituted wood products. Mr. Gardner, Mr. Franz, Mr. Wellwood and Mr. Wilson.
- 579. (2) Origin of Wood Pulp Properties.—Exploration of basic interelationships between wood characteristics, chemical and mechanical prosessing and wood pulp behaviors. Prerequisites: For. 270 and 479, or taken oncurrently. Textbook: Rydholm, *Pulping Processes*. Mr. Wilson.[3-0-0; 0-3-0]
  - 580. (1-3) Studies in Forest Policy. Mr. Thirgood.
  - 581. (1-3) Advanced Studies in Forest Economics and Finance.—Opera-

ional efficiency in the forest industry; economics of reforestation, forest management, harvesting and forest products manufacture. Mr. Haley and Mr. Smith.

- 582. (1-3) Research in Forest Hydrology. Mr. Jeffrey.
- 583. (1-3) Problems in Forest Watershed Management. Mr. Jeffrey.
- **585. (2)** Research Methods in Forest Hydrology.—Methodology and technique of studying the terrestrial components of the hydrologic cycle, in relation to forest hydrology. Mr. Jeffrey. [0-0-0; 3-0-2]
  - 590. (1-3) Studies in Forest and Land Use History. Mr. Thirgood.
- **591. (1-3) Studies** in Forest Development Planning.—Silvicultural, managerial, and manufacturing methodology for development with particular regard to the developing nations. Mr. Thirgood and Staff.
  - 593. (1-3) Problems in Forest Recreation Management. Mr. Dooling.
  - 594. (1-3) Research Method in Forest Recreation. Mr. Dooling.
  - 595. (1-3) Problems in Forest Wildlife Management. The Staff.
  - 596. (1-3) Research Methods in Forest Wildlife Studies. The Staff.
  - 599. (3-6) M.A.Sc. Thesis.
  - 649. Ph.D. Thesis.

# COURSES GIVEN IN OTHER FACULTIES

#### Agronomy

304. (1½) Range Management.—Ecology and management of range-land. Textbook: Sampson, Range Management. [2-2; 0-0]

# Applied Science

270. Strength of Materials.—An introductory course dealing with elementary relations existing between external forces and accompanying stresses, strains and deflection produced in simple types of structural and machine elements.

[2-0-1; 2-0-1]

# Biology

- 101. (3) Principles of Biology.—An introductory course emphasizing principles of wide application to all living organisms, including cell structure and function, the mechanism of inheritance, evolution, and adaptation to environment. A comparative approach to the unity and diversity of organisms will be stressed. Biology 11 is strongly recommended. A one-hour tutorial is required each week for those students who have not previously had Biology 11 or its equivalent in high school. Biology 100 from Grade 13 in British Columbia will not be accepted as equivalent to Biology 101; however, Botany 105 or Zoology 105 will be accepted as equivalent for prerequisite purposes. [3-3; 3-3]
- 322. (1½) Principles of Ecology II.—Population and community ecology, with emphasis on animals. This course complements Biol. 321 and normally should be taken in the same session. [0-0; 3-0]

# Botany

- 302. (3) Morphology & Taxonomy of Seed Plants.—The principles and practices of seed-plant taxonomy emphasizing the use of morphological and evolutionary features in classification and identification. [2-4; 2-4]
- 303. (3) Biology of Microorganisms. Morphology, reproduction, and classification of fungi and other heterotrophic plants including bacteria and viruses. [2-3; 2-3]
- 330. (3) Plant Physiology.—Introduction to physiological processes in plants, including photosynthesis, transpiration, absorption, enzyme and hormone action, and growth. Chemistry 230 is recommended but not required. [3-2; 3-2]
- 425. (3) Plant Ecology.—An introduction to relationships between plants and their environment. [2-3; 2-3]

## Chemistry

- 205. (3) Physical-Inorganic and Analytical Chemistry.—Systematic inorganic chemistry, properties of matter from a molecular standpoint, equilibria in solution, physical chemistry useful in biology, medical, agricultural, and related sciences. This course is not intended for Honours in Science or for majors in Chemistry. Prerequisites: Chemistry 110, 120 (or 103 with standing of 65%). Credit will not be given for both Chemistry 205 and 210 or 220.
- 230. (3) Organic Chemistry.—The fundamental principles of modern organic chemistry including a discussion of the main classes of organic compounds. Prerequisite: Chem. 103, 110 or 120. Credit will not be given for both Chemistry 203 and 230. [3-3; 3-3]

#### Commerce

261. (2) Fundamentals of Marketing.—A study of the basic considerations affecting the domestic and international marketing of goods and services.

[2-0; 2-0]

- 321. (3) Organizational Behaviour and Administration.—A study of theory and practice in the effective design of organizational structures and problems of effective administration. The course will examine problems of work environment, motivation and morale and their influence on productivity.

  [3-0; 3-0]
- 322. (1½) Labour Relations.—An examination of the impact of trade unions on the management of industrial and commercial enterprises. This course will develop for the student of business administration an understanding of trade unions in Canada, their aims and objectives. Problems of public policy in the regulation of labour-management relations will be examined in detail. [3-0; 0-0]
- 331. (3) Commercial Law.—Introduction to the law of contracts, with particular reference to contracts for the sale of goods (Sale of Goods Act) and related law of personal property; negotiable instruments (Bills of Exchange Act); elementary principles of agency; partnership (Partnership Act) and company law (B.C. Companies Act); examination of selected legal and commercial documents. [3-0; 3-0]
- 357. (2) Accounting and Finance.—This course will give a foundation in basic accounting principles and elements of business finance. [2-0; 2-0]
- 364. (1½) International Marketing.—An analysis of the bases of trade, international commercial policy, and other environmental factors which affect international marketing; followed by an investigation of the problems peculiar to the development and implementation of marketing strategy to serve international markets.

  [3-0; 0-0]
- 458. (2) Cost Accounting.—Principles of cost accounting and their use in the forest industry. Pre-requisite: Commerce 357 or Commerce 459. [2-0; 2-0]
- 459. (3) Introduction to Accounting.—Introduction to accounting for business organizations; interpretation of financial statements; underlying problems of valuation; forms and uses of business organizations; cash flow; elements of internal control; importance of accounting data in decision-making in the firm. (For non-Commerce students only). [3-0; 3-0]
- 465. (1½) Marketing Research Problems.—The application of research methods to problems in marketing; a study of selected techniques of measurement and analysis; the use of behavioural and quantitative models in marketing investigations. [3-0; 0-0]
- 466. (1½) Industrial and Resource Marketing Problems.—Managerial problems involved in marketing Canadian industrial and agricultural commodities and basic resources; an examination through problem analysis of producer goods and the specialized channels of distribution through which they flow.

  [3-0: 0-0]
- 468. (1½) International Marketing Management.—An analysis of the scope and significance of contemporary international business operations with particular reference to the marketing problems encountered by firms with multinational branches and subsidiaries. [0-0; 3-0]

#### Computer Science

201. (1½) Automatic Programming.—A complete description of an automatic programming language with applications to various data-processing problems in statistics and accounting, as well as elementary scientific calculations. Prerequisite: At least two units of first year mathematics. [0-0; 3-1]

#### **Economics**

350. Principles of Economics.—An analytical approach to economics for students of engineering. Production decision and markets; determinants of investment, income and employment; international trade; public finance and [2-0-0; 2-0-0] government policies.

# English

150. Composition.—The work consists of (1) essays, class exercises, and selected reading; (2) written examinations. Students will be required to make [2-0-0; 2-0-0] a passing mark in each...

Geography

214. (1½) Introduction to Weather and Climate. (For students in the Faculty of Forestry only.) - Atmospheric elements, meteorological instruments and practical weather observations; classifications of climate. Throughout the course attention will be given to the relationship between climatology and forestry.

# Geology

150. Earth Science for Engineers.—Principles and techniques of geology applied to engineering with special emphasis on earth materials and processes. For engineering and forestry students only. Text: Arthur Holmes, *Principles of Phusical Geology*, Revised Edition. Mr. Kucera. [2-2\*-0; 2-2\*-0]

#### **Mathematics**

151. (1½) Linear Algebra.—Vectors and matrices. Scalar and vector product. Linear transformations. Eigenvalues and eigenvectors, complex numbers. [3-0-0; 0-0-0]

- 155. (3) Calculus.—Partial derivatives; multiple integrals; polar, spherical and cylindrical coordinates; improper integrals; indeterminate forms; series. [3-0-0; 3-0-0]
- 156. (1½) Vector Calculus.—Differentiation and integration of vector valued functions. Gradient, divergence and curl. Line and surface integrals. Theorems of Gauss, Green and Stokes, [0-0-0; 3-0-0]
- 200. (3) Algebra and Geometry.—Introduction to matrices, linear equations, linear transformations of the plane, determinants, vectors, complex numbers, elementary theory of equations, mathematical induction. Prerequisite: Mathematics 100 and 121 (120, 1968-69 or earlier). [30; 3-0]
- 202. (3) Calculus.—Integration with applications, vector analysis, intro-[3-0; 3-0] luction to functions of several variables.
- 300. (3) Calculus II.—Infinite series, partial differentiation, multiple intecration, line and surface integrals, vector fields, introduction to differential quations. Prerequisite: Mathematics 202 or 220. [3-0; 3-0]

# Mechanical Engineering

- 154. Mechanical Drawing and Graphics.—Pencil and ink work in orthoraphic drawing, lettering, technical sketching, graphical presentation of data, processes for reproducing data. [0-0-3: 0-0-3]
- 458. Industrial Engineering.—A course designed to cover organisational nd technical matters of factory planning and operation with special refernce to personnel and technology. [2-0-1; 2-0-1]

#### Plant Science

321. (1½) Biometrics.—Elementary principles of the analysis presentation and interpretation of biological data. Textbook: Li, Statistical Inference, Vol. I. Prerequisite: First Year Mathematics. [3-2; 0-0]

# **Physics**

110. (3) Mechanics, Electricity and Atomic Structure.—Particle kinematics and dynamics; rigid body dynamics; work and energy concepts; general wave motion, sound and light; electricity and magnetism; atomic spectra; waves and elementary particles; laboratory work emphasizing physical techniques of obtaining, treating and interpreting data as applied to mechanics, heat, electricity, optics, and radioactivity. Mathematics 100 and 121 (120, 1968-69 or earlier) must precede or be taken concurrently with this course.

[3-3\*-2\*; 3-3\*-2\*]

- 120. (3) Matter and Mechanics.—The structure and properties of matter; photons, waves, spectra; electrons, atoms; Newtonian mechanics of particles and rigid bodies; laboratory investigations emphasizing the use of electrical instruments. (Geiger counter, cathode ray oscilloscope, microwave apparatus, etc.) Prerequisites: Physics 12 (or 92) plus permission of the Physics Department Advisor. Mathematics 100 and 121 (120, 1968-69 or earlier) must precede or be taken concurrently with this course.
- 130. (3) Elements of Physics.—From Newton's mechanics to particle physics, a description of ideas, principles and their applications. [3-3\*-0; 3-3\*-0]
- 155. Mechanics.—The principles of statics and dynamics; work and energy, impulse and momentum for linear and curvilinear motion; virtual work, friction; gravitational systems and elementary orbital motion. Textbook: Halliday and Resnick, *Physics* (Part I). [2-0-4; 2-0-4]
- 156. Heat, Light and Sound.—The thermal properties of matter; the first and second laws of thermodynamics; applications. Radiation laws; simple harmonic motion; waves, sound, geometrical and physical optics. Textbooks: Halliday and Resnick, Physics (Part I); Engineering; Yarewood and Castle, Physical and Mathematical Tables.

  [2-3\*-2\*; 2-3\*-2\*]

# Sociology

**200.** (3) Introduction to Sociology.—A general introduction to the sociological analysis of selected topics: religion, work, politics, stratification, bureaucratic organizations, kinship, socialization, social roles. [3-0; 3-0]

#### Soil Science

- 200. (1½) An Introduction to the Study of Soils.—Physical, chemical and biological properties of soils; soil formation, classification, use and conservation. (Credit will not be given for both Soil Science 200 and 203.) [0-0; 3-2]
- 413. (1½) Soil Physics.—A study of physical properties and processes o soils, with emphasis on basic principles. Laboratory exercises in physica methods used in soil investigations. Prerequisites: Soil Science 200 or equiva lent, Physics 110 or 120 or 130. [2-2; 0-0]
- 416. (1½) Soil Classification, Cartography and Use.—Factors of soi formation, field description, classification and cartography of soils; nature distribution and use of soil groups. (Some field work is required.) Pre requisite: Soil Science 200, (or 203).

# Zoology

- 202. (3) Vertebrate Zoology.—A comparative study of vertebrate morphology, evolution and life; dissection of representative forms. [2-3; 2-3]
- 410. (3) Entomology.—A detailed consideration of selected aspects of entomology, functional morphology, taxonomy, biology and physiology of insects. Prerequisite: Zoology 311. [0-0; 2-3]
- 416. (3) Terrestrial Vertebrate Zoology.—The form, function and evolution of terrestrial vertebrates as related to their distribution and abundance. The laboratory includes classification, life histories, and ecology of terrestrial vertebrates with particular attention to British Columbia. Prerequisite: Zoology 202. [2-3; 2-3]
- 421. (3) Principles of Applied Ecology.—Principles of animal and community ecology applicable to the management of animal resources; application of statistical and computer techniques for measuring, analyzing, modeling, and simulating resource systems; problems of multiple resource use. Mr. Bendell and Ecology Staff. [2-2; 2-2]

#### CANADA

#### DEPARTMENT OF FISHERIES AND FORESTRY

# Forest Products Laboratories

#### Vancouver

R. E. Foster, B.A., B.S.F. (Brit. Col.), Ph.D. (Toronto), Director.

The Vancouver Laboratory is one of two laboratories in the Federal Department of Fisheries and Forestry organized to carry out research on forest products. It has been maintained in close association with the University of British Columbia since its establishment in 1918. Research programmes at both it and the Ottawa Laboratory are co-ordinated on a national basis through a central headquarters in Ottawa. Excellent facilities and equipment are provided for a wide range of activities including—timber mechanics, plywood, wood anatomy, wood preservation, wood pathology, wood chemistry, pulping, physics and physical chemistry, and wood utilization. Currently there are 43 professionals and a total staff of 131.

The Laboratory is located on the Campus and co-operates closely with the Faculty of Forestry by providing research leadership and specialized equipment for graduate research.

# THE FACULTY OF GRADUATE STUDIES

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA
'ANCOUVER 8 • BRITISH COLUMBIA CANADA

# THE FACULTY OF GRADUATE STUDIES CALENDAR 1969-70

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# DEPARTMENTS OFFERING GRADUATE STUDY

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gricultural Extension	010	Hydrology	087
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nthropology	O21	Institute of International	
rchitecture	023	Relations	O90
rctic and Alpine Research		Interdisciplinary Studies	O90
sian and Slavonic Research	O25	Italian (see Hispanic &	. 000
sian Studies	O26	Italian Studies)	. O91
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iochemistry	O27	Law	091
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hemical Engineering	O31	Metallurgy	. 000 099
hemistry	033	Microbiology	-000
ivil Engineering	U35	Minaral Engineering	0101
lassics	O39	Mineral Engineering	0102
ommerce and Business	- 10	Music	O103
Administration	O40	Neurology	O105
ommunity and Regional		Nursing	0106
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#### FACULTY OF GRADUATE STUDIES

IAN McTaggart Cowan, B.A. (Brit. Col.), Ph.D. (California), F.R.S.C Dean of the Faculty.

BENJAMIN N. MOYLS, M.A. (Brit. Col.), Ph.D. (Harvard), Assistant Dean.

# Membership of the Executive Committee of the Faculty:

Ex-officio Members—The Dean (Chairman) and the Assistant Dean of th Faculty, Dean W. H. Gage, Dr. M. Darrach (Curriculum Committee Registrar.

#### Elected Members-

Dr. L. L. Bongie, Dr. D. T. Kenny, Dr. F. A. Kaempffer, terms expi 1969.

Dr. S. D. Cavers, Dr. G. B. Porter, Dr. W. Robbins, terms expire 197 Dr. G. M. Chronister, Dr. M. Lee, Dr. G. Rosenbluth, terms expired?

#### Membership of the Faculty

Ex-officio Members—The President, the Dean and the Assistant Dean of t Faculty of Graduate Studies, the Dean of Inter-Faculty and Stude Affairs, the Librarian.

All full-time Professors, Associate Professors and Assistant Professors teaching graduate courses or supervising graduate theses, and all Instrutors and Lecturers actively engaged in the supervision of graduate studi

#### DEGREES OFFERED

The degrees offered in the Faculty of Graduate Studies are:

Doctor of Philosophy (Ph.D.)
Doctor of Education (Ed.D.)
Master of Arts (M.A.)
Master of Applied Science
(M.A.Sc.)
Master of Architecture (M.Arch.)
Master of Business Administration

(M.B.A.)

Master of Education (M.Ed.)

Master of Forestry (M.F.)
Master of Laws (LL.M.)
Master of Music (M.Mus.)
Master of Science in Nursing
(M.S.N.)

Master of Physical Education (M.P.E.)

Master of Science (M.Sc.)

#### THE DEGREES OF Ph.D. AND Ed.D.

#### Idmission

1. Application for admission to the degree programme is made in writing o:

The Registrar,

The University of British Columbia,

Vancouver 8, B.C.

Applications may be accepted at any time but formal course work in the inter session begins September 8.

2. Applicants for the Ph.D. degree must have completed:

(i) a Master's degree (or equivalent), or

- (ii) a Bachelor's degree with First Class Honours (or equivalent), or
- (iii) a successful first graduate year on a Master's programme, with clear evidence of research ability.

In addition, the Executive Committee of the Faculty of Graduate Studies ust authorize admission to a proposed course of study.

Admission to the Ph.D. programme will be in one of the following tegories:

- (a) Full standing. Granted to applicants who have met one of the puirements (i), (ii) or (iii) above. Students entering directly from the chelor's degree under (ii) must, during the first year of graduate study, mplete nine units with a First Class average and obtain First Class standing at least five units of course work.
- (b) Provisional standing. Granted to applicants with minor deficiencies at must be removed, or in cases where doubt exists.
- 3. Candidates for the Ed.D. degree must satisfy the Executive Comttee of the Faculty of Graduate Studies that they are competent to produce to the course of study proposed and normally must hold a Master's gree (or equivalent) in Education, with standing of sufficient quality to rrant admission to the programme. Subject to the approval of the admissions committee, an applicant who has obtained a first class Bachelor's degree of first class in Teacher Training, or a first class B.Ed. (Elem.) degree plus of the year with first class standing, may be admitted directly to the doctoral orgamme. Such applicants will be required to take at least nine units in first year and maintain a first class average.
- Language Requirements. The Executive Committee of the Faculty of iduate Studies must be satisfied that the student is competent to pursue dies in the English language. The department in which the student intends write his thesis shall determine the number of and standard of competence anguages other than English.
- . The number of candidates that can be accommodated is limited. Qualified lents can be accepted only if there is a vacancy in the specific field in ch they propose to major.

#### irses of Study

(a) Students will normally be required to spend a minimum of three ter sessions at the University. Those possessing a Master's degree (or the ivalent) may have this period of time reduced by the Executive Comtee of the Faculty of Graduate Studies.

- (b) Unless, in the opinion of the Executive Committee of the Faculty of Graduate Studies, the delay has been justified by circumstances that are altogether exceptional, those who have not received their degree at the end of six winter sessions will be required to withdraw.
- (c) Students are required to register for each session during their studies Those who fail to register as required may forfeit their candidacy and may be required to reapply.
- 2. Students proceeding to the Ph.D. or Ed.D. degree are expected to devote full time to their academic programme, and those who undertake remuner ative employment other than Teaching Assistant duties, must obtain prio permission of the Executive Committee of the Faculty of Graduate Studie through the department or departments concerned. They may be required to spend additional time in residence or supervised study before coming up for the final examination. The amount and nature of this additional time will be determined by the Executive Committee in consultation with the departments concerned.
- 3. The work of each candidate will be supervised by a Candidate's Committee consisting of not less than three members, at least one of whom mabe chosen from a department other than that in which the candidate i writing his thesis. This Committee will assist the candidate to plan his worl supervise his research, and direct the preparation of his thesis.

The membership of the Candidate's Committee may, if necessary, kaltered during the study period. The Executive Committee of the Faculty of Graduate Studies will approve all such changes.

- 4. Upon registration the student must outline his proposed programme a study to his Candidate's Committee for its approval, followed by that of the department concerned, and the Executive Committee of the Faculty. The programme of studies will consist of seminars, assigned readings, consultations, and such formal courses as may be deemed essential for the fulfillmes of the requirements for the degree. A major part of the candidate's work we consist of a thesis embodying the results of original research. The Executive Committee of the Faculty of Graduate Studies shall require the thesis to submitted to an outside examiner or examiners approved by the Dean.
- 5. It shall be the duty of each candidate's committee to recommend thind and number of courses to be taken by the student in relationship to be background and to the requirements which are appropriate to the doctor level in the chosen major field. No uniform course requirements can applied to all departments at the doctoral level.
- 6. Changes in the programme of study may be required during the stu period, and these must be approved by the Candidate's Committee, the maj department and the Executive Committee of the Faculty.
- 7. Courses listed under departmental programmes may not all be giv each year. Students should apply to the department concerned for detail information about courses to be offered.

#### **Examinations and Thesis**

- 1. The progress of all students working for the Ph.D. and Ed.D. degr will be reviewed in the spring of each year, and the Executive Committee the Faculty of Graduate Studies, after consultation with the Candida Committee and the department concerned, may require any candidate withdraw if his work has not been satisfactory.
  - 2. The doctoral student will expect to meet the following examinations:

- (a) Course examinations in which a minimum of 65 percent must be obtained.
- (b) A test of the student's ability to read foreign languages where departnental regulations require it.
- (c) A comprehensive written and/or oral examination normally to be held fter the student has completed all required course work, and intended to test is grasp of the chosen field of study as a whole. The Candidate's Committee vill set and judge this examination.
- 3. All other forms of examination must be completed before a student takes ie final oral examination.
- 4. A candidate's thesis must be presented in the form described in the aflet entitled *Instructions for the Preparation of Graduate Theses*, copies of hich may be obtained from the Special Collections Division in the Library. from the Office of the Registrar.
- 5. The candidate must agree to microfilming of the thesis and publication a suitable thesis abstract as a prerequisite to awarding the doctoral degree. It is purpose may be obtained from the Special Collections Division the Library.

#### ourses for Credit

Only the following courses will be accepted for Ph.D. or Ed.D. credit:

- (a) Graduate courses numbered 500 or above offered in the department or partments concerned, provided credit has not already been obtained for ch courses.
- (b) Certain courses numbered 300 or above in related subjects as approved in particular cases on the recommendation of the department conned.

#### COURSES LEADING TO THE MASTER'S DEGREE

#### mission

. Application for admission to the degree programme is made in writing

The Registrar, The University of British Columbia, Vancouver 8, B.C.

pplications may be accepted at any time, but formal course work in the ter session begins September 8.

The Master's degree is offered in various approved fields, and in each I the degree conferred will be that which, in the view of the Faculty, ribes most appropriately the character of the work done.

- (a) If the field of study lies wholly within a single department the Master's course must be chosen in consultation with that department and approved by its head.
- (b) If the field of study involves work in more than one department the candidate's course must be approved by a standing inter-departmental committee appointed by the Executive Committee of the Faculty of Graduate Studies to represent the departments concerned.
- (c) If the field of study is one which does not fit into the present departmental structure of the University the candidate's course must be approved by the special committee which will supervise his work. The course so chosen must also be approved by the Executive Committee of the Faculty of Graduate Studies.
- 3. Applicants for the Master's degree must hold a Bachelor's degree witl
- (a) Honours in the field of the proposed Master's course with First Clas standing in at least two (6 units) of the Third and Fourth Yea courses in that field, or
- (b) First Class standing in at least two (6 units) of the courses and a least Second Class standing in each of the remaining courses of Thir and Fourth Year work prescribed by the department or department or special committee concerned as prerequisite to the Master's course
- 4. Graduate students who do not meet the full requirements of Section may be permitted to make up any deficiencies and to proceed concurrently i the Master's course provided that they keep within an over-all maximum (18 units (or the equivalent in the departments of Applied Science and Forestry) in any one winter session, but may receive credit for such courses on after being accepted for the Master's degree in accordance with Section 3.
- 5. Admission to the Master's programme will be in one of the followir two categories:
  - (a) Full standing. Granted to applicants who hold the Bachelor's degree with the required academic standing appropriate to the field of the proposed Master's programme, and who have not more than 6 units prerequisite courses to be completed.
  - (b) Provisional standing. Granted at the discretion of the Executive Cormittee of the Faculty to students who have more than 6 units of pr requisites remaining to be completed, or to students with deficienci in standing.
- 6. Students completing their courses for a Bachelor's degree may, if th lack not more than 6 units, register in courses open to graduate studen provided that they keep within an over-all maximum of 18 units. They w receive credit for such courses towards a higher degree only after registeri for such degree.
- 7. Students with Bachelor's degrees who have serious deficiencies in p requisites for a chosen field of graduate study may be classified as *qualifyi* students until such time as they complete sufficient requirements to become ligible to apply for admission to the Faculty of Graduate Studies. Admission this category are limited and are not normally granted to holders of backlor's degrees of other universities.
- 8. Each student must satisfy the department, inter-departmental, or spec committee that will direct his studies of his competence in the Engl language. The choice and number of languages other than English, and standard and competence required in such languages, will also be det mined in the same way.

#### Course

1. Students working for the Master's degree are required

(a) to spend at least one winter session in resident graduate study unless, in exceptional circumstances, prior permission for other arrangements has been granted by the Executive Committee;

(b) to complete their programmes within five years of initial registration; approval of the Executive Committee is necessary for any extension

beyond this period;

(c) to register for each session during their candidacy.

- 2. Since graduate students are expected to devote full time to their reading, courses, and research, those who undertake remunerative employment must be prepared to spend additional time before coming up for the final examination. All such students must obtain the prior permission of the department, interdepartmental or special committee concerned and must meet residence requirements. Those whose duties (including preparation and performance) are in excess of 12 hours weekly wll not be allowed to come up or final examination in less than two full winter sessions of supervised tudy after registration as graduate students; those whose duties do not exceed his amount may be permitted to qualify after one winter session (September o May) of the University attendance provided that they complete, before or fter the winter session, an additional three to four months of research work ully satisfactory to the department or departments concerned and have revived prior approval, through these departments, from the Executive Comittee.
  - 3. For the M.A., M.Sc., M.B.A. and M.F. degrees there are two forms of rogramme, one requiring a thesis, and the other without thesis requiring additional course work, one or two major essays and a comprehensive examiation. The choice of either or both of these programmes lies with the idividual departments and faculties.

# rogramme with Thesis

The minimum requirements are:

Thesis Courses numbered 300 or above, including at least 6 units of courses numbered 500 or above Total

12 to 6 units

3 to 9 units

# ogramme with Comprehensive Examination

The minimum requirements are:

Courses numbered 300 or above, including at least 9 units of courses numbered 500 or above One or two major essays

Comprehensive examination

15 units

I. The M.A.Sc., M.Arch., LL.M., M.Mus., M.S.N., and M.P.E. programmes I require a thesis counting from 3 to 6 units, and courses numbered ) or above so that the total number of units, including the thesis, is at st 18 (or the equivalent in the departments of the Faculties of Applied ence and Law). The programme will normally include at least 6 units of trees numbered 500 or above. If the degree is to be taken in a single artment, at least 3 and not more than 6 units must be taken in related

fields outside the department, except by special permission of the department concerned. The Master's thesis in Law is valued at 10 units.

- 5. The M.Ed. degree may be taken either with or without thesis. For a degree with thesis the minimum requirements are those given in section 4 above. For a degree without thesis the requirements are similar except that 21 units of course work must be taken. (see page O61).
- 6. Except as provided in Sections 4 and 6 under Admission, no credit towards the Master's degree will be given for work done prior to registration as a candidate for that degree.
- 7. A student whose work is considered to be unsatisfactory may be required to withdraw from the Faculty.
- 8. Courses listed under the departmental programmes may not all be given each year. Students should apply to the department concerned for detailed information about courses to be offered.

#### Examinations and Thesis

- l. A student taking courses in the Faculty of Graduate Studies to fulfil prerequisites or for credit towards a degree will receive credit for each course in which he obtains at least 65%. Pass standing (P) will be granted for each course in which he obtains at least 60%. However, only 3 units of Pass standing may be credited towards a graduate degree.
- 2. Candidates for the Master's degree must submit in its final form three typewritten copies of the thesis, with a certificate signed by two members of the faculty, department or departments concerned stating that the required standards of a Master's thesis have been met, an abstract approved by the department or departments concerned, and a biographical note. The date of submission of the thesis is not later than one week following the last day of lectures in the second term. (See circular entitled *Instructions for the Prepara tion of Graduate Theses*, obtainable from the Special Collections Division of the Library or from the office of the Registrar.)
- 3. A general examination in the field of the Master's course will be held  $\varepsilon$  the discretion of the faculty, department or departments concerned. Examine tions may be written or oral, or partly written and partly oral.

# Supplementals

- 1. In a course in the programme leading to the Master's degree a supplemental may be granted:
- (a) if, in the winter session, the student has obtained a final mark of n less than 50 per cent and has obtained at least 9 units of credit in that sessio but no such candidate will be granted supplementals in more than two courses and then only in subjects whose total value does not exceed 6 units.
- (b) if, in the summer session, a candidate has obtained a final mark not less than 50 per cent in the course concerned and has obtained at leas units of credit in that session.
- 2. No candidate will be granted more than one supplemental in respect the same course; but, with the permission of the Executive Committee t course may be repeated, or a permissible course may be taken in its pla
- 3. A supplemental must be written at the regular supplemental examination period following the examination in which the candidate failed to obta adequate standing.

Supplemental examinations may be written in August at the followic centres:

Cranbrook, Dawson Creek, Kamloops, Kitimat, Ocean Falls, Penticton, Powell River, Prince George, Prince Rupert, Trail, Victoria; and at Whitehorse, Y.T. Other centres outside of British Columbia are restricted to universities or their affiliated colleges.

In unusual circumstances a student working in a remote area may be permitted to write supplemental examinations at a special centre if satisfactory arrangements can be made. Since permission is contingent on completion of arrangements, only early applications will be considered.

Supplemental examinations for summer session students are held on the second day of the summer session at the University. Arrangements may be made for these examinations to be held at the University of Victoria.

The fee for each supplemental examination written at the University is \$7.50; at a regular outside centre, \$10.00; at a special centre, \$20.00. In the event that a candidate does not appear for an examination a refund will be authorized only if, within 10 days after the scheduled examination, the candidate submits to the Registrar an adequate explanation for the failure to write the examination; if such refund is made, it will be \$5.

Applications for supplemental examinations in respect of the winter session examinations, accompanied by the necessary fees, must be in the hands of the Registrar by July 8.

#### REGISTRATION

- 1. All students admitted to the Faculty of Graduate Studies must normally egister in person on the dates specified for such registration and announced y the Office of the Registrar.
- 2. Graduate students must thereafter maintain continuous registration uring the period of their programmes by registering in person or by mail Off-Campus students only) during the annual registration period.
- 3. Students attending this University for the first time, or returning after an osence of five years or more, and taking 6 units or more, are required to have medical examination completed by their family physician. A medical form obtainable from the Registrar, and it must be submitted to the Health ervice office prior to commencement of lectures.

#### **ON-LEAVE STATUS**

Students who for any reason find it necessary to interrupt their graduate parame must apply for "on-leave" status stating the period for which we is requested. During the period of leave, registration will be maintained regular payment of the "off-campus" fee of \$25.00 per year. Failure to ablish "on-leave" status may lead to cancellation of registration.

#### **FEES**

1. The fee schedule for Ph.D. and Ed.D. students is:

	1st Term	2nd Term	Total
First Year	\$205.00	\$150.00	\$355.00
Second Year	176.00	150.00	326.00
Third Year	176.00	150.00	326.00
each subsequent year on campus	76.00		76.00
each subsequent year off campus	25.00		25.00

with the following provisions:

- (a) A student taking a master's degree at the University of British Columbia and then proceeding to a doctor's degree shall pay the same total fees (including fees paid on the master's course) as a student admitted directly to doctoral studies.
- (b) A student with the master's degree from elsewhere will be exempt the fees as scheduled for the Third Year.
- (c) A student who fails to register as required will forfeit his candidacy; it will be re-established only if his application for reinstatement is approved by the Head of the Department concerned and the Dean of Graduate Studies, and the student pays a fee of \$100.00 plus any applicable incidental fees.
- 2. The normal fee for a Master's degree is \$600.00 plus Graduate Student Centre fee and A.M.S. fee when applicable (see 4 below), payable according to the following schedule:

	lst Term	2nd Term	Total
lst Year	\$205.00	\$150.00	\$355.00
2nd Year	150.00	150.00	326.00

However, students completing the degree requirements before the beginning of the 2nd Term of the 2nd Year will be exempt half of the balance of the two-year fee still outstanding. In case an exemption is granted, the final payment must be made at least one month before the expected date of completion.

Students taking more than two years pay the following fees:

	lst Term	2nd Term	Total
each subsequent year on campus	\$ 76.00		\$ 76.00
each subsequent year off campus			25.00

A student who fails to register as required will forfeit his candidacy; it may be re-established only if his application for reinstatement is approved by the Head of the Department concerned and the Dean of Graduate Studies, and the student pays the total of the prescribed fees for the years in which he failed to re-register. Any student who completed residence requirements prior to September 1965 will be required only to re-register and pay fees for the session in which work for the degree is to be completed.

Students in Master's programmes who attend on a part-time or Summer Session basis may be assessed fees on a course basis; the total of tuition fees paid under this arrangement must be at least \$600. Summer Session Association or AMS fees are payable on registration in each session attended.

3. Fees are normally paid in September and January.

4. The first term fees include a levy of \$26.00 authorized by the Board of Governors for the support and future expansion of the Graduate Student Centre and is payable by all "on campus" students.

The first term fees of the first year of graduate study also include a levy

of \$29.00 authorized by the Board of Governors to support the Alma Mater Society.

Graduate students in Summer Session are assessed a Summer Session Association fee of \$3.00.

- 5. Graduate students on the regular Winter Session programme may take Extra-Sessional or Summer Session courses without fee costs if recommended by their programme advisors.
- 6. Graduate students working toward a graduate degree who are required to take prerequisite or additional courses may do so without additional fee, provided that they keep within an over all maximum of 27 units for the Master's degree; they are subject to sessional fees of \$30.00 per unit for courses beyond 27 units.
- 7. Graduate students not admissible to the Faculty of Graduate Studies who hope to qualify for admission will register as Qualifying students and pay fees on a per unit basis for all courses taken. Fees paid under these circumstances will not subsequently be credited in a graduate degree programme. Admissions in this category are limited and are not normally granted to holders of degrees of other universities.
- 8. Postgraduate students not working toward a graduate degree will be registered as Unclassified students and will be assessed on a per unit basis.
- 9. Students (such as those described in sections 7 and 8 above) who are required to pay fees on a per unit basis will be assessed \$30 for each unit if taking more than 6 units, and will be assessed as for the Summer Session if taking 6 units or less.

#### TRANSCRIPT OF ACADEMIC RECORD

A transcript of a student's academic record will, on request of the student, be mailed *direct* to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the inscription "official transcript only if presented with seal unbroken". On graduation or withdrawal a student may obtain for his own use a copy of his record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of mid-term examinations.

Student records are confidential. Transcripts are issued only at the request f students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made arrangenents satisfactory to the Finance Department to meet any outstanding inebtedness.

Granted Honourable Discharge indicates that the student is in no discipnary difficulty at the time the transcript is issued; the term has no reference scholastic status.

Application for a transcript should be made at least one week before the ocument is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

#### **GRADUATION**

Every candidate for a degree must make formal application for graduation. Application for graduation must be made not later than March 15. Special forms for this purpose are provided by the Registrar's office.

#### FINANCIAL ASSISTANCE

A booklet describing Awards and Financial Assistance is available from the Office of the Registrar on request.

Requests for financial support should be directed to the specific department in which the student wishes to study.

# STUDENT HOUSING

1. All enquiries and applications should be directed to:

Office of the Director of Residences, University of British Columbia, Vancouver 8, B.C.

Application forms are available on February 1 of each year.

2. Residence Accommodation is provided for single students on a room and board basis only.

No student needing special diet or special medical care can be accommodated in University Residences.

Rates — Single Room	Fall Term	Spring Term	Between Term
Permanent residence	\$367	\$417	\$3.59/day
Dormitories	\$302	\$344	\$2.97/day
Graduate dormitories	\$329	\$375	\$3.24/day
Graduate dormitories (room only)*	\$138	\$157	\$1.65/day
Mary Bollert Annex (women only)	\$329	\$375	\$3.24/day
N.Y.			· · · · · · · · · · · · · · · · · · ·

<sup>\*</sup>No meal pass and no meals provided. No cooking allowed in rooms.

# 3. Family Housing

Acadia Park is a new residential area with a high rise tower of 100 sing bedroom suites, and surrounding clusters of two and three bedroom suite. The total of 275 units provides only limited space and students are advise to apply promptly.

Rates:

one bedroom — \$110/mon two bedroom — 125/mon three bedroom — 140/mon

Acadia Camp Married Quarters. Some accommodation is available temporary structures with I, 2, or 3 bedrooms. Rates range from \$45/mon to \$95/month.

4. Children's Day Care. A day care centre with qualified help is organized by graduate student wives. Enquiries can be directed to:

UBC Kindercare, Block 82, Acadia Camp, The University of British Columbia, Vancouver 8, B.C.

5. Off-Campus Housing. A list of off-campus accommodation is kept by the Alma Mater Society, Student Union Building.

#### GRADUATE STUDENT ASSOCIATION

All students registered in the Faculty of Graduate Studies are full active members of the GSA. The organization has as its purpose: the promotion of the welfare of graduate students and of the university, and the organization of social, intellectual, cultural, and recreational activities for graduate students. The GSA is a subsidiary of the Alma Mater Society and the President of the GSA is a member of the AMS Student Council.

#### THEA KOERNER HOUSE

Thea Koerner House is the Graduate Student Centre, and home of the GSA. Opened in 1961, it was donated to the University by Dr. Leon J. Koerner in memory of his wife. The centre provides dining, library, lounge, and recreation facilities which offer many non academic advantages to the community of graduate students at the university.

#### INTERNATIONAL HOUSE

International House is an idea and an opportunity for all students, and t has a physical face. It is a (non-residential) Programme and Service Lentre with a dual purpose. First, it assists foreign students in establishing hemselves here and responds to any special needs which may arise during heir stay. Secondly, it provides an opportunity for students to develop a aried programme through their own initiative. An aim of International Iouse is to provide a maximum learning experience for the maximum umber of people, in an enjoyable atmosphere.

This opportunity exists at least as much for Canadian students as for lose who are already gaining international experience by coming here to anada and U.B.C.

#### THE UNIVERSITY OF BRITISH COLUMBIA AND VANCOUVER

The University of British Columbia (enrolment 20,000; graduate studies 2,500) has a 1000-acre campus situated at the western tip of Burrard Peninsula 300 feet above the sea. A belt of nearly undeveloped land separates the university community from the city of Vancouver. The metropolitan area has a population of 750,000 and offers all the amenities of a large city. There is a resident symphony orchestra, a modern art gallery, and Vancouver is "on the circuit" for most touring opera, ballet, theatre and art exhibitions. The University co-operates in sponsoring worthy cultural enterpises, and as it is a large university, there are continual visits of noted scholars and personalities. In addition to the normal activities in a large city, Vancouver is a seaport, and as the focus for Canada's Pacific trade it possesses cosmopolitan waterfront activity and relatively large communities of Chinese, Japanese and East Indian Canadians. Other ethnic groups of significant size bring diversity to shops and restaurants.

The natural setting of Vancouver and its climate are deemed by many to be the most desirable in Canada. Mountains, rising 5,000 feet from the sea, have some of the city suburbs spreading over their lower slopes. Higher peaks beyond are continuously snow-capped. It is the juxtaposition of both sea and mountains which makes the site unique, and permits easy access to a well-developed range of recreational activity associated with each. The climate is moderate and the summer months are marked by clear skies, cool temperatures—in July the average daily maximum temperature is 72°F and the average daily minimum is 55°F. Winters are not cold by Canadian standards; ir January the mean daily maximum temperature is 42°F, and the average daily minimum is 33°F. The precipitation pattern over the city is uneven, but 50″-60″ fall each year; approximately 85% occurs between the months of Septem ber and April.

# AGRICULTURAL ECONOMICS—M.S. degree.

Professor and Chairman: G. R. Winter.
Professor: C. Verner (Adult Education).

Assistant Professors: P. L. Arcus and M. J. Dorling.

Students wishing to undertake the Ph.D. degree in Agricultural Economics hould register in the Department of Economics (Arts) where they may ndertake a thesis programme under supervision of members of the Department of Agricultural Economics.

Prerequisites for M.Sc.: Honours in Agricultural Economics, Economics, Iathematics or Engineering; or at least 9 units in Agricultural Economics ogether with 6 units of Third and Fourth Year work in Economics, Political Science, Geography or related disciplines.

#### lourses and Seminars:

- 500. (1-3) Graduate Seminar.
- 501. (3) Advanced Marketing.—Price-making forces at retail, wholesale and farm market level. Critical analysis of various marketing schemes. Prequisite: adequate background in economics. Offered in 1969-70.
- 502. (3) Agricultural Problems and Policy.—Influential doctrines in agriltural policy: problems of economic efficiency and welfare. Critical review present and proposed price and income policies. Prerequisite: adequate tekground in economics.
- **504. (3)** Extension Planning and Evaluation.—A study of the relative ectiveness of various methods for the diffusion of agricultural information.
- 530. (1-3) Directed Studies.—On an approved problem.
- 549. (5-6) Master's Thesis.

#### FRICULTURAL ENGINEERING-M.A.Sc. degree.

ofessor and Head: T. Lionel Coulthard.

ociate Professors: Ernest L. Watson, Leonard M. Staley.

norary Lecturer: Mr. V. Raudsepp.

he Master of Applied Science is offered for qualified engineering gradu. Ph.D. programmes can be arranged for suitable candidates in conjunction 1 some other engineering departments.

he Department has well equipped laboratories for studies in Water ulity and Hydrology; Environmental Control; Physical Rheological and rmal Properties of Biological Materials; and Food Process Engineering. c facilities are also available for Power and Mechanization research rammes,

Research equipment and facilities include: Flame Spectrophotometer meteorological and stage recorders, nuclear moisture and density probe "Tecquipment" for model hydraulic studies, "Hele-Shaw" and other apparatus for porous media flow, controlled environmental cabinets, meters for measuring conductive, convective and radiant heat transfer, Instron tester, Haak viscometer, microscopes, strain gauge analysers, polariscope, liquid nitroge freezer, freeze-drier, freezing rooms, differential thermal analyser, driers an heat exchange apparatus, analog computer, CFR engine and dynamometer. Gamma Cell 220 is available to the Department. There are also woodworking electronic and mechanical workshop facilities and a water quality laboratory

Prerequisite—Graduation in Agricultural Engineering. Graduates from othe branches of engineering may be accepted upon approval of their course b the head of the department.

Course—Includes 6 units in the Department of Agricultural Engineerin of which at least 3 units must be courses numbered 500 or above.

Note: All courses listed are not necessarily offered each year.

- 561. (1) Advanced Drainage.—Theory of land drainage by tile and surface methods. Hydrologic characteristics of drainage systems. Drainage requirements of crops. Mr. Coulthard.
- 562. (1) Advanced Irrigation.—Land preparation, irrigation design, wat supplies and water control. Mr. Coulthard.
- 563. (1) Quality of Irrigation Water.—Salinity of water and soils, aquat pollution, fertilizer, pesticide and herbicide effects. Mr. Coulthard.
- 565. (1) Environmental Control for Agriculture Production.—Heat ar Mass transfer applied to the design of environmental control systems Agriculture. Mr. Staley.
- 566. (1) Design of Food Production Systems.—Labour efficiency, mater flow, economic criteria, control of natural hazards. Mr. Staley.
- 580. (1) Engineering Principles Applied to Food Concentration.—Therm dynamics of water sorption and desorption. Permeability and diffusion vapors and gases through tissues and protected interfaces. Moisture migtion, capillary, slip and molecular flow. Mr. Watson.
- 582. (1) Physicomechanical Properties of Agriculture products.—Char teristics of plant and animal material related to the design of production harvesting and processing procedures. Methods of measurement. Mr. Stal
- 583. (1) Viscous Properties of Foods.—Pseudoplastic, dilatent, thixotro and rheopectic properties of foods. Model systems, food texture. Mr. Wats
- 584. (1) Thermal Properties of Plant and Animal Products.—Methods measurement of enthalpy, specific heat, thermal diffusivity. Steady state a transient heating, cooling and freezing. Kinetics of thermal processing. Watson.
- 597. (1-3) Topics in Agricultural Engineering.—Lectures and special top in the field of Agricultural Engineering may be arranged upon approvathe Head of the Department. Staff.
- 598. (1) Seminar.—Presentation and discussion of current topics in A cultural Engineering research. Staff.
  - 599. (3-6) Thesis—For M.A.Sc. degree.

# AGRICULTURAL EXTENSION—M.Sc. degree

Prerequisites: Honours B.Sc. (Agr.) or Major Course B.Sc. (Agr.) of the University of British Columbia or equivalent, fulfilling the requirements of Admissions Section 3 (b), together with satisfactory Agricultural Extension experience.

The course consists of a thesis counting 3 units, 9 units of senior or graduate courses in Agriculture, and 9 units of courses to be chosen from Education 412, 514, 516, 518, 583 and Agricultural Economics 403.

# AGRICULTURAL MECHANICS-M.Sc. degree

For list of faculty members and facilities available, please see Agricultural Engineering.

Prerequisites: Honours; or Second Class standing in at least 12 units in he Department chosen from courses offered in the Third and Fourth Years.

500. (1-3) Graduate Seminar.

501. (3) Advanced Food Mechanics.—Problems in the selection and operation of food-processing machinery. Problems in specific industries may be ttempted by individual students where feasible. Prerequisite: Agricultural Iechanics 401.

530. (3) Directed Studies.—On an approved problem (farm power and archinery, farm structures, irrigation and drainage, processing).

549. (5-6) Master's Thesis.

# NATOMY-Ph.D. and M.Sc. degrees

ofessor and Head: Sydney M. Friedman.

ofessors: F. D. Garrett, J. A. M. Hinke.

sociate Professors: C. L. Friedman, V. Palaty, W. A. Webber.

sistant Professors: C. T. Friz, C. E. Slonecker, A. W. Pira.

The Department offers opportunities for advanced study in the classical lds of Anatomy but its major orientation at the present time is in the areas Ultrastructure and Cellular Biophysics. Special interests include membrane nsport processes, the biophysics of striated and vascular smooth muscle, ctrochemistry of ion and water distribution in cells and tissues, cytonetics in amoeba, cellular immunology and ultrastructure of the kidney 1 of cardiac muscle. Facilities include equipment for histological, histomical and radio-autographic preparative techniques, electromicroscopy

(Phillips EM 200),  $\beta$  and  $\delta$  radioisotopes, ultracentrifugation, amino acid analysis, and electrochemical analysis.

Detailed information on M.Sc. and Ph.D. programmes is available on request from the Department. A Bachelor's degree with Honours in Chemistry, Physics or Zoology or an M.D. or D.D.S. degree or equivalent is required.

#### Courses and Seminars:

- 500. (6) Gross Human Anatomy.—An advanced laboratory course in the structure of the human body.
- 501. (3) Microscopic Human Anatomy.—An advanced laboratory course ir the microscopic structure of the human body.
- 502. (4) Microscopic Anatomy.—The microscopic anatomy of tissues and organs in man. Prerequisite: Anatomy 401 or equivalent.
  - 504. (1) Seminars in Ultrastructure.
- 505. (3) General Cytological Biophysics.—An examination of the architecture and molecular organizations of the cell as a basis for critical evaluation of current biophysical theories. (to be given in 1969-70 and alternatyears)
- 506. (3) Biophysics of Cell Membranes.—A comprehensive study of th structural, electrical, osmotic, transport and regulatory properties of biological membrances. (to be given in 1970-71 and alternate years)
- 510. (2) Neuroanatomy.—The gross and microscopic study of the nervousystem in man.
  - 511. (3) Neuroanatomy.—Selected advanced topics.
  - 548 (1-3) Directed Studies in Anatomy.
  - 549. (6) M.Sc. Thesis.
  - 649. Ph.D. Thesis.

#### ANIMAL SCIENCE—Ph.D. and M.Sc. degrees

Professor and Chairman: W. D. Kitts.

Professor: J. C. Berry.

Assistant Professors: R. M. Beames, C. R. Krishnamurti, R. G. Peterson, R. Tait.

The Department offers excellent facilities for basic and applied research the fields of nutrition, physiology, genetics and breeding and management domestic animals. Newly constructed units for research studies on beef cat dairy cattle, sheep, swine and fur-bearing animals (mink and chinchilla) located on the University campus. Laboratory space and facilities are av able for experimentation with the small laboratory animal (rats, mice, gui pigs and rabbits). The teaching and research laboratories are well equipp In addition to the regular laboratory apparatus, modern equipment nee for gas-liquid chromatography, paper and thin-layer chromatography, elec

phoresis, atomic-absorption spectroscopy, amino acid analyses, radioisotope tracer work, etc. is available.

Broad areas of specialization by the Faculty include ruminant and non-ruminant nutrition, mechanism of specific enzyme systems (cellulases, amylases, etc.), metabolic aspects of ketosis and milk fever, artificial insemination and physiology of reproduction, environmental stresses on animal performance, milk composition, trace mineral nutrition, energy-protein relationship in animal nutrition, dairy cattle and mink breeding studies (criss-cross breeding), etc.

A branch library of the University library having a large collection of textbooks and periodicals on subjects pertaining to Animal Science is located in the main Agricultural Sciences Building.

Prerequisites for M.Sc.: Honours or at least 12 units in Animal Science chosen from courses offered in the third or fourth years or a Bachelor's degree with acceptable courses in fields of study related to Animal Science. Applicants, otherwise acceptable, who do not have 6 units of approved courses in Animal Science may take them concurrently with the Master's programme.

# Courses and Seminars:

500. (1-3) Graduate Seminar.

513. (3) Advanced Animal Breeding.—Special phases and recent research

indings. Lectures, seminars and research.

518. (1½) Advanced Animal Physiology I.—The influence of environnental factors on growth and reproduction; measurement of physiological esponses.

520. (1½) Advanced Animal Physiology II.—Current topics in the study

f metabolism in domestic animals; metabolic disorders.

521.  $(1\frac{1}{2})$  Advanced Animal Nutrition I.—Bioenergetics and growth—nergy utilization and requirements in animal nutrition.

522. (1½) Advanced Animal Nutrition II.—Recent advances on the funcon of individual dietary nutrients in livestock nutrition; interrelationship of utrients.

530. (1-3) Directed Studies.—On an approved problem.

549. (5-6) Master's Thesis.

649. Ph.D. Thesis.

# NTHROPOLOGY-Ph.D. and M.A. degrees

cofessor and Head: (Anthropology and Sociology) Cyril S. Belshaw.

ofessors: David F. Aberle, Charles E. Borden, Kenelm O. L. Burridge, Raymond Firth (Visiting, 1969).

sociate Professors: Michael M. Ames, Wilson Duff, Pierre Maranda, William E. Willmott.

sistant Professors: Braxton Alfred, Brenda Beck, Audrey Hawthorn, Helga Jacobson, J. E. Michael Kew, Mrs. B. MacDougall, Robert D. MacDougall, Robin Ridington.

(See also Sociology listing)

Advanced study in anthropology is offered in a joint Department of Anthropology and Sociology. Area interests are primarily related to the cultures of North America, Asia and Oceania, for which there are good supporting library and museum resources. Work in other areas is possible, provided the student has appropriate local knowledge and connections, and his theoretical interest relates to the competence of the faculty. The main areas of cultural and social anthropology are strongly represented in the department, but no graduate work is possible in physical anthropology, and only up to the M.A. level in archaeology. The department operates a Museum of Anthropology, an archaeology laboratory, and a small groups laboratory. There is a large collection of microfilm theses and the Human Relations Area Files. The mathematical, statistical, and computer resources available to the department are highly developed. Inter-disciplinary contacts are encouraged, and links are maintained with such departments as Asian Studies (which has major library collections), Religious Studies, and Linguistics.

Much of the work in Ph.D. programmes is carried out through directed studies or auditing seminars, rather than through formal course-credit arrangements, provided the student has a thorough preparation in the subject. Theses may be written in French, when a suitable committee can be arranged.

More detailed information is available from the Department admissions officer for Anthropology.

# Courses and Seminars:

- 500. (1-3) Advanced Theory.
- 501. (1-3) Social Structure and Kinship.
- 502. (1-3) Advanced Ethnography of a Special Area.
- 503. (1-3) Social Control.
- 504. (1-3) Tribal and Peasant Economic Systems.
- 505. (1-3) Religion and Society.
- 511. (1-3) Personality and Culture.
- 512. (1-3) Language and Culture.
- 515. (1-3) Cultural Evolution and Cultural Ecology.
- 520. (1-3) Advanced Prehistory of a Special Area.
- 530. (1-3) Social Change.
- 531. (1-3) The Anthropology of Development.
- 532. (1-3) Field Methods.
- 534. (1-3) Special Advanced Courses.
- 540. (3) Advanced Seminar.
- 545. (1-3) Graduate Research Seminar.
- 549. (3-6) Master's Thesis.
- 649. Ph.D. Thesis.

## ARCHITECTURE—M.Arch. degree

Professor and Director: Henry Elder.

Professors: Wolfgang Gerson (in charge of Graduate Studies), Abraham Rogatnick, B. Paul Wisnicki.

Assistant Professors: Robin P. A. Clarke, Andrew Gruft, Charles A. Tiers, Woodruff W. Wood.

Lecturer: John A. Gaitanakis.

#### Programme Objectives

The graduate programme leading to a master's degree in architecture is concerned with furthering knowledge of architecture in the contemporary setting. Oriented to the future the programme emphasizes development of methods of enquiry, experimentation and investigation of architectural ideas. It is designed to give students a chance to work in special areas in which they are interested, as individuals or in teams, together with members of the professional staff. Students are therefore encouraged to investigate areas in which study is carried on by staff members. These investigations are considered to be the central work of the programme. Today this demands an academic environment in which architecture is considered as integrating knowledge of many of the disciplines that contribute to the understanding of man's continuously changing society and his attempt to adjust his physical environment to his own needs and to the enhancement of his life. The social and behavioural sciences, economics, philosophy and technology all form an important background for this work. Co-operation with these disciplines is emphasized.

# Programme Procedure

The graduate programme has a minimum length of one full calendar year. Two regular terms must be spent in session on the campus. The first term generally will develop the theoretical basis of work in a series of lectures, seminars and discussions. During the second term students will work on research projects chosen by them in conjunction with the staff. The summer will complete the research. All research will be under the direction of a professor and, where advisable, a committee will assist in directing the work.

#### Areas of Research

The programme directs interest to the following areas in which enquiry is being conducted, and students are encouraged to choose their research within these broad fields:

#### 1. Residential and Institutional Environments

Mr. W. Gerson, Mr. R. Clarke

Housing—Education—Health Services—and other institutions and their role in the contemporary environment are of particular concern. Students may wish to work on the social, economic, spatial or technological aspects of these institutions or search for relationships between these concerns.

# 2. Architectural History and Theory

Mr. A. Rogatnick

Students interested in architectural history or in theory may undertake study in those fields in which adequate resources are available to them.

## 3. Discipline of Design

Mr. A. Gruft

Formulation of problems, basis, understanding, methodologies, use, learning, etc.

#### 4. Form and Structure

see course description under this name.

## 5. Special Architectural problems of British Columbia

Students may find an interest in special local problems such as the urban design for isolated communities, or building development on mountain slopes or the design of timber structures.

#### Courses

The exchange of ideas and experiences between students and students and between students and staff is the main stimulus to individual work. All students must therefore participate in Arch. 500: Architecture Seminar. A total of eighteen units are required for a master's degree including at least one course of three units taught outside the School of Architecture in a discipline related to the student's chosen field of research. Students may wish to attend other lectures, or on advice by a professor may be asked to attend additional courses informally. At the beginning of the year before final registration a list of suggested courses outside the School will be provided for guidance of students. Each student must work on an acceptable research project.

#### 500 (3) Architectural Seminar

Mr. W. Gerson and other staff

This course serves mainly as a form for the exchange of ideas, and will be based on presentation of student papers.

The second term will concentrate on the dicussion of student research projects.

# 503 (3) History of Architectural Theory and Philosophy

Mr. A. Rogatnick

The exploration and analysis of theories and philosophies of architecture and design, and the ways in which they affect architectural form.

# 504 (3) The Residential Environment

Mr. W. Gerson

Introduction to housing needs and techniques of implementation, survey of social, economic, spatial and technological problems and possibilities. Field surveys, papers and design explorations.

# 505 (3) Form and Structure

Mr. P. Wisnicki

Objectives, restraints and elements of building space and form; forcetime fields, form, material relations as structural determinants; criteria and limits; ideal and practical forms; arch, vault, shell, membrane, plate and their spatial arrangements.

# 549 (9) Research Project for the Master's Degree

The project will be chosen by discussion between the students and professorial staff and must be approved by the professor of graduate studies and research. This project forms the core of the students work and his choice of courses should relate to the subject matter of his research project.

#### ARCTIC AND ALPINE RESEARCH

There are a number of individuals at The University of British Columbia involved in research in arctic and alpine areas. A Committee on Arctic and Alpine research coordinates the activity, funding and mutual interests of this group. At present the university's efforts involve biology, geography, geology and glaciology in both Alpine and Arctic environments. Current areas of special interest to the Committee are the Mackenzie River Basin, N.W.T., and the Keremeos region of B.C. The Committee sponsors lectures, provides a unified group to approach granting bodies, and provides a medium whereby interested faculty and graduate students may exchange arctic and alpine information.

Interested individuals wishing to contact this Committee or present applications for funds to work in arctic and alpine areas, should forward their request to the Dean of the Faculty of Graduate Studies for transmittal to the Committee.

#### INSTITUTE OF ASIAN AND SLAVONIC RESEARCH

The Senate has authorized the establishment of an Institute of Asian and Slavonic Research. It will be concerned mainly with the promotion and direction of post-graduate research in these fields, with emphasis on inter-disciplinary studies in the social sciences, including modern history. In geographical scope its field of interest will include the countries of Asia, from Pakistan eastwards to Japan, the Soviet Union and Slavonic areas of Eastern Europe. The principal activities of the Institute will include the encouragement and financing of research projects, both individual and group, by the University of British Columbia faculty members, post-graduate students and visiting scholars; the organization of special research conferences; the preparation and publication of monographs and bibliographical or research guides; liaison and cooperation with similar research institutions elsewhere; development, in cooperation with the University of British Columbia library, of special collections of research materials on Asian and Slavonic countries.

The Institute's work will be distinct from that of the Departments of Asian Studies and of Slavonic Studies in the Faculty of Arts. Membership in the Institute will be open to the University of British Columbia faculty members having research interests and qualifications in the Asian and Slavonic fields, as well as appointed post-graduate students and visiting scholars, and, by invitation, to scholars from other universities in British Columbia.

Special announcements will be issued later, describing the initiation of projects, the appointment of scholars, and the availability of post-graduate fellowships or research grants. Interim inquiries should be addressed to the Faculty of Graduate Studies, under the supervision of which the Institute will function. Its programme will be guided by a special inter-departmental committee and a part-time director.

It is expected that the Institute will begin operations initially on a modest scale, by September 1969.

## ASIAN STUDIES-M.A. degree

Professor and Head: E. G. Pulleyblank.

Professors: F. C. Chang, S. Kato, W. L. Holland.

Associate Professors: P. Harnetty, J. F. Howes, B. M. Morrison.

Assistant Professors: H. T. Chen, R. Goldman, K. Ogawa, J. I. Richardson, L. Zolbrod.

Lecturers: H. Golay, H. Kato, C. Li.

Lecturers from other Departments: Michael M. Ames, William E. Willmott (Anthropology), Richard Copley, Kernail Sandhu (Geography), B. Harrison (History), B. St. Jacques (Linguistics), S. Iida, A. E. Link (Religious Studies).

There are good facilities for advanced work in various fields of Asian Studies. The purchase in 1958 of the P'u-pan collection gave the University of British Columbia one of the major Chinese libraries in North America. Subsequent purchases have served to consolidate this position. A good foundation for the Japanese collection was laid by the acquisition of books from the libraries of the late E. H. Norman and G. B. Sansom and by the purchase of the Tokugawa map collection. The university library is also a depository for Japanese Government Publications. The library's holdings now exceed 105,000 volumes in Chinese and Japanese in addition to substantial holdings in western languages. The library also has a small but growing collection related to South Asia and the founding in 1968 of the Shastri Indo-Canadian Institute, in which the university is a founder-member and major participant, will greatly assist in this development over the next few years.

The Department offers an M.A. in Chinese or Japanese in the fields of language, literature, and pre-modern history and provides language training for those doing graduate work relating to China and Japan in other departments. Those interested in graduate studies relating to Asia in fields such as modern history, political science, economics, geography, anthropology, fine arts, should apply to the departments concerned.

Admission to the M.A. programme in East Asian Studies normally requires graduation in the Honours programme in Chinese or Japanese or in a majors programme with additional units. This implies four years of language study. The Department is prepared to accept a limited number of students who are otherwise well qualified and show linguistic aptitude but have less than this amount of preparation in language. Such students will be required to spend one or two extra years in their M.A. programme making up this deficiency.

M.A. programmes can also be arranged in certain fields of South Asian studies for suitably qualified persons. For details consult the Department.

#### Courses and Seminars:

- 505. (3) Topics in the History and Structure of the Japanese Language.
- 506. (3) Research Methods and Source Materials in Japanese Studies.
- 508. (3) Problems in the History of the Chinese Language.
- 509. (3) Problems of Modernization in Eastern and Southern Asia.
- 510. (3) Topics in Chinese Literature.

- 511. (3) Topics in Japanese Literature.
- 512. (3) Seminar. Topics in Chinese History and Institutions.
- 513. (3) Seminar on Problems of Japanese Intellectual History.
- 515. (3) Problems of Early Indian Civilization.
- 517. (3) Research Methods and Source Materials in Chinese Studies.
- 525. (3) Seminar. Topics in Pre-Modern Asian History or Literature.
- 549. (3-6) Master's Thesis.

## BIOCHEMISTRY-Ph.D. and M.Sc. degrees

Professor and Head: Marvin Darrach.

Professors: Charles T. Beer, Gordon H. Dixon, Vincent J. O'Donnell, William J. Polglase, Gordon M. Tener, Sidney H. Zbarsky.

Associate Professors: Albert F. Burton, James F. Richards, Michael Smith.

Assistant Professor: Philip D. Bragg. Lecturer (Part time): Blythe Eagles.

# Ph.D. degree

Facilities are available for original investigations in several fields of biochemistry. Candidates must hold an Honours degree in Biochemistry with high standing or a Master's degree in Biochemistry or the equivalent and are required to complete courses in Biochemistry and related fields in accordance with the recommendations of the Department and the Candidates' Committee.

# M.Sc. degree

Prerequisite: An M.D. degree; or a Bachelor's degree with Honours in Biochemistry or related fields in Agriculture, or in Biology, Botany, Chemistry, Microbiology, Physiology or Zoology; or the courses accepted as prerequisites for the Master's degree in one of these subjects.

M.Sc. course includes Biochemistry 400 or 410 and 411 if not already taken; Thesis, counting 6 units, and courses approved by the department in Biochemistry in related fields.

Biochemistry 410 and 411 or the equivalent, are prerequisite to all graduate courses in Biochemistry. Students are advised not to take graduate courses in Biochemistry unless they have obtained at least 65% in Biochemistry 410 and 411 or the equivalent.

500. (1-6) Biochemical Methods.—A study of the principles of modern advanced biochemical techniques and their application to the solution of biochemical problems. The lecture section of the course has a unit value of (1) and registration is not limited. Admission to the laboratory section of the course is by permission of the Head of the Biochemistry Department.

- 502. (1½) The Biochemical Function of Proteins.—Modern concepts of the relationship between macromolecular structure and biochemical function. Given 1970-71 and alternate years.
- 503. (1½) Biochemistry of the Nucleic Acids.—The chemical, physical and biological properties of nucleotides and nucleic acids, the elucidation of nucleic acid structures and modern concepts of their function and replication in the cell. Given 1970-71 and alternate years.
- 504. (1½) Biochemistry of Amino Acids and Proteins.—Metabolism of individual amino acids and modern concepts of the biosynthetic mechanisms leading to the formation of proteins by cellular components. Given 1970-71 and alternate years.
- 505. (1½) Biochemistry of Carbohydrates.—The pathways, reactions, regulatory mechanisms and dynamic control of carbohydrate and energy metabolism. Given in 1969-70 and alternate years.
- 506. (1½) Biochemistry of Lipids.—Modern concepts of the metabolism and biochemical function of fats, phospholipids and cholesterol. Given 1969-70 and alternate years.
- 507. (1½) Biochemistry of Steroids and Hormones.—Modern concepts of the metabolism and biochemical function of the sterols, bile acids, steroid hormones, catecholamines and peptide hormones. Given 1969-70 and alternate years.
- 530. (1) Seminar in Biochemistry.—Attendance is required of all graduate students in Biochemistry. Normally each will present one paper per year on a topic approved by his research advisor or committee or on the results of his research.
- 548. (1-3) Directed Studies.—In special cases, with approval of the Head of the Department, advanced courses may be arranged for graduate students in attendance.
  - 549. (6) M.Sc. Thesis.
  - 649. Ph.D. Thesis.

# BIOLOGY-Ph.D. and M.Sc. degrees

The field of Biology is not treated by a single department, but instruction is offered cooperatively by the Departments of Biochemistry, Botany, Microbiology, Physiology and Zoology. Students wishing to pursue a graduate programme in Biology should consult with the Department or Departments most appropriate to the field of specialization concerning graduate courses.

- 503. (1½) Principles and Techniques in Electron Microscopy I.—A lecture course on the principles of construction and operation of the microscope; the techniques used in the preparation of materials for examination. An introduction to biological applications. Mr. Acton and Mr. Bisalputra.
- 504. (1½) Principles and Techniques in Electron Microscopy II.—A laboratory course in the operation of the electron microscope and the biological techniques in electron microscopy. Enrolment limited. Prerequisite: Biology 503. Mr. Acton and Mr. Bisalputra.
  - 505. (3) Comparative Biology.—A lecture and seminar course on the bio-

- chemical aspects of a wide range of organisms with particular reference to biochemical evolution, nature and control of metabolism and the biochemistry of differentiation. Prerequisites: Biochemistry 410 (or 400). Recommend Biology 330, Zoology 428, or Physiology 301 and 302. Mr. Hochachka.
- 506. (1½) Principles of Radiotracer Methodology in Biological Research.—A comprehensive survey, by assigned reading, tutorials and problem-solving, of the principles of radioactivity and radiotracer methodology as applied to research in the life sciences. First term.
- 507. (1½) Biological Applications of Radiotracers.—A laboratory course including projects and some seminars designed to cover a wide range of problems concerned with techniques, experimental design and interpretation, as well as the handling and disposal of living tissues. Prerequisite: Biology 506. Second Term.
- 508. (3) Current Topics in Genetics.—Recent papers in genetics will be discussed with emphasis on topics concerning chromosomes and gene structure and function. Prerequisite: a genetics course or permission of an instructor. Mr. Clark, Mr. Person, Mr. Susuki and Mr. Warren.
- 509. (3) Advanced Biometrics.—Topics in advanced statistical methods in relation to biological sciences. Experimental design, multivariate analysis, sampling, theory or error, maximum likelihood estimation and special topics in current literature. Mr. Larkin.
  - 548. (1-3) Advanced Topics in Biology.

## BOTANY—Ph.D. and M.Sc. degrees

Professor and Head: G. H. N. Towers.

Professors: R. J. Bandoni, Vladimar J. Krajina, C. O. Person, Glenn E. Rouse, Robert F. Scagel, D. J. Wort.

Associate Professors: Miss Katherine Beamish, T. Bisalputra, Miss Kathleen Cole, G. C. Hughes, W. B. Schofield, Miss Janet R. Stein.

Assistant Professors: B. A. Bohm, Miss Beverley R. Green, J. R. Maze, F. J. R. Taylor, I. E. P. Taylor, E. B. Tregunna.

Students wishing to enrol in any of the following courses should consult the instructor in charge for permission prior to registration.

- 500. (1) Field Botany.—A course designed for students proceeding to a graduate degree in Botany. Attendance may be required at the discretion of the department as a prerequisite to the degree. The course will last approximately one week and will be held immediately after the sessional examinations in April. A fee of \$25, payable to the departmental secretary on registration in September, is levied to help defray expenses. Field studies will focus attention on the ecology, taxonomy and life histories of representative plant groups. Written reports will be required as directed.
- 504. (3) Taxonomy of Vascular Plants.—Before registration in this course students are required to collect at least 150 species of vascular plants.

- Part of the laboratory mark for the course is assigned to this collection. Mr. T. M. C. Taylor.
- 505. (2) Cytogenetics of Natural Populations.—Application of cytogenetic principles to the study of evolution and present-day relationships of vascular plants. Miss Beamish.
- 510. (3) Marine Phycology.—Collection, identification, ecology and life histories of algae; emphasis on marine benthonic forms. (Given in 1969-70 and alternate years.) Mr. Scagel.
- 511. (3) Freshwater Phycology.—Collection, culture techniques, identification, ecology and life histories of the freshwater forms. (Given in 1970-71 and alternate years.) Miss Stein.
- 512. (2) Practical Marine Phytoplankton Study.—A field project involving the collection, identification and distributional assessment of a selected group of marine phytoplankton organisms. Prerequisite: Oceanography 506. Mr. F. J. R. Taylor.
- 513. (2) Cytology of Marine Algae.—A cytomorphological study of marine algae, including a detailed discussion of nuclei and chromosomes. Miss Cole.
- 515. (3) Advanced Mycology.—Taxonomy of fungi; identification, nomenclature, classification. A collection of at least 40 mycological specimens must be made prior to the course. (Given in 1970-71 and alternate years.) Mr. Bandoni.
- 517. (3) Aquatic Mycology.—Structure, classification, culture, and physiology of freshwater, brackish water and marine fungi. Special problems on groups or individual species. (Given in 1969-70 and alternate years.) Mr. Hughes.
- 518. (3) Advanced Forest Pathology.—Lectures, laboratory periods and student seminars to cover hereditary, physiological, anatomical, and microbiological factors of trees that influence levels of resistance or susceptibility to disease. Emphasis on critical analyses of host-pathogen relationships of representative micro-organisms causing different types of tree disease, including the effects from genetic variation within pathogens. (Given in 1970-71 and alternate years.)
- 520. (3) Phytogeography.—Historical and floristic plant geography. The pattern, dynamics and ecology of plant distribution. Terrestrial plants stressed. (Given in 1970-71 and alternate years.) Mr. Schofield.
- 525. (3) Advanced Plant Autecology.—(Given 1970-71 and alternate years.) Mr. Krajina.
- 526. (3) Advanced Plant Synecology.—(Given in 1969-70 and alternate years.) Mr. Krajina.
- 528. (1½) Current Topics in Plant Biochemistry.—Discussions of recent important papers dealing with the biosynthesis and metabolism of secondary metabolites and proteins in plants including fungi. Attention will also be given to micobial degradation of natural products. Given 1969-70 and alternate years. Mr. Bohm, Mr. I. E. P. Taylor, Mr. Towers. Fall Term.
- **529.** (1½) Chemical Plant Taxonomy.—Discussion of the application of chemical and biochemical characters to problems of plant systematics. The usefulness of these characters will be examined with respect to problems a all taxonomic levels. Particular attention will be given to hybridization Given 1969-70 and alternate years. Mr. Bohm. Spring Term.
- 530. (3) Advanced Plant Physiology I.—Studies of the processes and significance of photosynthesis, respiration, and the metabolism of carbo

hydrates, nitrogen and lipid compounds in plants. (Given in 1969-70 and alternate years.) Mr. Tregunna.

- 531. (3) Advanced Plant Physiology II.—Studies of water relations, mineral nutrition, translocation, growth and development in plants. (Given in 1970-71 and alternate years.) Mr. Wort.
- 540. (3) Advanced Palaeobotany and Palynology.—Detailed studies of plant macro- and micro-fossils with emphasis on phylogenetical and palaeocological interpretations. (Given in 1970-71 and alternate years.) Mr. Rouse.
- 541. (3) Structure and Development of Pteridophytes and Gymnosperms.—(Given in 1970-71 and alternate years.)
- 542. (3) Structure and Development of Angiosperms.—(Given in 1969-70 and alternate years.)
- 543. (3) Recent Advances in the Biology of Plant Cells.—This course will emphasize the integration of biochemical and ultrastructural studies at cellular and subcellular levels. Topics will include biological membranes, mitochondria, chloroplasts, nucleocytoplasmic relations, control of cell division, differentiation development and other dynamic aspects of cells. (Given in 1969-70 and alternate years.) Mr. Bisalputra, Miss Green and Mr. Tregunna.
  - 546. (1-3) Advanced Topics in Botany.—Staff.
- **547.** (1) Seminar on Current Topics.—Attendance of all students proceeding to graduate degree in Botany is required during each year of residence. Papers will be presented by students, staff and visitors.
  - 549. (3-6) Master's Thesis.
  - 649. Ph.D. Thesis.

# CHEMICAL ENGINEERING-Ph.D and M.A.Sc. degrees

Professor and Head: J. S. Forsyth.

Professors: S. D. Cavers, N. Epstein.

Associate Professors: R. M. R. Branion, Francis E. Murray, K. L. Pinder, D. W. Thompson, K. B. Mathur (Visiting).

Assistant Professor: J. Lielmezs.

# Ph.D. degree

The Department offers facilities for research studies in the following fields:

- (a) Mass, momentum and heat transfer;
- (b) Chemical engineering unit operations;
- (c) Applied thermodynamics and kinetics.
- (d) Biochemical engineering

The Department also operates a joint research programme at M.A.Sc. and Ph.D. level with the British Columbia Research Council on researches of common interest.

## M.A.Sc. Degree:

Prerequisite—Graduation or equivalent in Chemical Engineering, or graduation in Agricultural Engineering, Mechanical Engineering, Metallurgical Engineering, Mineral Engineering or the Chemical Engineering option of Engineering Physics.

Course—Details of the course to be followed are subject to some flexibility but will include a minimum of 18 units of course work of which the thesis will count between 6 and 3 (traditionally 6 has been a common number).

- 550. (1-2) Industrial Kinetics and Catalysis.—Chemical reaction kinetics and catalytic processes; heat and mass transfer in industrial reactors; design of catalytic converters.
- 551. (1-2) Chemical Engineering Thermodynamics.—Pressure-volume-temperature relations; chemical equilibria by Gibbs' method; vapor-liquid equilibria; thermodynamic calculations by third law and quantum-statistical methods, topics of irreversible thermodynamics and information theory.
- 552. (1-2) Optimization Methods. The mathematical and experimental techniques for optimizing processes will be discussed. Course content will vary from year to year, but will be chosen from the topics: direct search techniques, unconstrained optimization, Jacobian and Lagrangian optimization, mathematical programming, and variational calculus techniques.
- 553. (1-2) Mathematical Operations in Chemical Engineering.—Topics to be discussed will vary from year to year. Amongst these will be dimensional analysis and model theory; treatment and interpretation of chemical engineering data; formulation and solution of differential and finite difference equations; graphical, numerical and statistical methods.
- 554. (1-2) Momentum, Heat and Mass Transfer.—Prediction of velocity, temperature, and concentration profiles for flowing fluids; unifying concepts and analogies in momentum, heat, and mass transport; streamline flow and turbulence, molecular and eddy conduction and diffusion, boundary layers, smooth and rough conduits and other boundaries. References: Bird, Stewart and Lightfoot, Transport Phenomena, and current literature.
- 555. (1-2) Solvent Extraction and Gas Absorption.—Mass transfer in liquid liquid and gas-liquid systems. Design of extraction and of absorption columns for height and for diameter. Gas-liquid and liquid-liquid equilibria. References: Treybal, *Liquid Extraction*; Sherwood and Pigford, *Absorption and Extraction*; and current literature.
- **556.** (1-2) Distillation.—Systems of complete and of limited miscibility; multicomponent systems; graphical and analytical design methods; azeotropic and extractive distillation.
- 557. (1-3) Fluid and Particle Dynamics.—Review of vector and tensor analysis; Navier-Stokes equations; discussions on topics which may include hydrodynamic stability, turbulence, non-Newtonian flow, and gas, liquid and solid particle mechanics.
- 558. (1-2) Process Heat Transfer.—Steady state and transient state studies; calculation and design of industrial heat exchangers.
- 559. (1-3) Topics in Chemical Engineering.—A discussion of some aspects of modern Chemical Engineering. Subject matter varies each year.
- 560. (1-3) Biochemical Engineering.—Kinetics of growth and of biological reactions; principles of agitation; aeration; sterile techniques; product recovery operations; survey of industrial fermentations.
  - 570. (1-3) Advanced Paper Technology.—Engineering aspects of the fol-

lowing topics will be discussed — refining, screening and cleaning, fluid mechanics of the paper machine, pressing, drying of paper, converting operations and paper rheology.

- 571. (1-3) Non-Newtonian Fluid Behaviour.—Selections from the following topics will be discussed kinematics of deformation and flow, dynamics of continuous media, constitutive equations, physical chemical and molecular aspects of viscosity, engineering applications to pipe flow, mixing, heat transfer. Handling of suspensions and polymers.
- 572. (1-3) Pollution Control.—Source of air, water and land pollution; methods of problem assessment, technology of control with special attention to regional problems. Emphasis will vary from year to year with concentration mostly on problems arising from industrial sources.
- 598. (1) Seminar.—Presentation and discussion of current topics in chemical engineering research.
  - 599. (6) Thesis.—For M.A.Sc. degree.
  - 699. Thesis.—For Ph.D. degree.

## CHEMISTRY-Ph.D. and M.Sc. degree

Professor and Head: C. A. McDowell.

- Professors: B. A. Dunell, G. G. S. Dutton, L. G. Harrison, L. D. Hayward, J. G. Hooley, J. P. Kutney, D. G. L. James, W. C. Lin, N. L. Paddock, G. B. Porter, C. Reid, L. W. Reeves, A. Rosenthal, R. Stewart, J. Trotter.
- Associate Professors: N. Basco, A. Bree, J. A. R. Coope, W. R. Cullen, J. B. Farmer, D. C. Frost, K. B. Harvey, D. E. McGreer, T. Money, E. A. Ogryzlo, R. E. Pincock, J. R. Sams, R. F. Snider, D. C. Walker.
- Assistant Professors: F Aubke, C. E. Brion, D. P. Chong, M. C. L. Gerry, L. D. Hall, F. G. Herring, B. R. James, P. Legzdins, A. J. Merer, K. A. R. Mitchell, L. J. Muenster, E. Piers, J. R. Scheffer, R. D. Spratley, A. Storr, R. C. Thompson, L. S. Weiler.

The Department has well-equipped laboratories in which research in any of the following fields can be effectively carried out. Amongst the many modern research instruments available are: analytical and high resolution mass spectrometers, ultraviolet, infrared and Raman spectrometers, microwave spectrometers, ORD and circular dichroism apparatus, electron spin resonance spectrometers, wide-line, spin echo, and high-resolution nuclear magnetic resonance spectrometers, Mossbauer effect apparatus, automatic radioactive counters, automatic X-ray diffraction equipment, analytical and preparative gas chromatographs, magnetic balances, high-energy electron accelerator, a Gammacell 220, a helium liquefier. Facilities for mycochemistry, phytochemistry, and biogenetic studies are available. There are excellent mechanical, electronics, and glassblowing workshops. A micro-analytical service is also provided. Research facilities are now available for the accommodation of over 250 graduate students, post-doctoral fellows and academic staff.

The Department of Chemistry offers a wide variety of research programmes

leading to the degrees of Master of Science and Doctor of Philosophy in the following fields:

Physical Organic Chemistry; Electron Spin Resonance Spectrometry; Mass Spectrometry; Molecular Beams; X-Ray Crystallography; Nuclear Magnetic Resonance Spectrometry; Studies in Chemical Physics; Photoelectron Spectrometry, Chemistry of the Solid State; Heterogeneous Catalysis; Carbohydrate Chemistry, Theoretical Chemistry; Chemistry of Steroids, Alkaloids and Terpenes; Synthetic Organic Chemistry; Structure, Synthesis and Biogenesis of Fungal Metabolites; Chemistry of Biologically Important Substances; Radiochemistry and Radiation Chemistry; Molecular Spectroscopy and Molecular Structure; Microwave Spectroscopy, Chemical Applications of Mossbauer Effect; Chemical Kinetics; Organometallic Chemistry; Combustion and Oxidation Processes; Photochemistry and Radiation Chemistry, Phytochemistry; Isotope Exchange Reactions; Inorganic Fluorine Chemistry; Heterocyclic Chemistry; Polymer Chemistry; Inorganic Ring Systems; Organic Photochemistry; Chemical Cryogenics; Structural Inorganic Chemistry.

## M.Sc. degree

Prerequisite: Honours in Chemistry or Physics, or combined Honours in Chemistry and Physics, Chemistry and Mathematics, or Chemistry and Biology; or a Bachelor's degree in Chemical Engineering with at least Second Class standing; or a single Major in Chemistry with at least Second Class standing; or the equivalent to any of the above.

Course includes Thesis, Chemistry 548 and nine units of graduate or Advanced courses in Chemistry and related subjects.

#### Courses and Seminars

- 500. (2) Advanced Physical Chemistry.
- 501. (2) Topics in Physical Chemistry.
- 503. (1) Seminar in Special Topic.
- 504. (1) Seminar in Chemistry.
- 505. (1) Quantum Chemistry.
- 506. (1) Advanced Theoretical Chemistry.
- 507. (1) Transport Properties of Gases.
- 508. (1) Topics in Chemical Physics.
- 512. (1) Colloid Chemistry.
- 513. (1) Chemical Thermodynamics.
- 514. (1) Radiation Chemistry.
- 515. (1) Advanced Electrochemistry.
- 517. (2) Topics in Inorganic Chemistry.
- 518. (1) Advanced Inorganic Chemistry.
- 519. (1) Radiochemistry.
- 520. (2) Spectroscopy and Molecular Structure.
- 521. (1) Statistical Mechanics.
- 522. (1) Surface Chemistry.
- 523. (1) Chemical Kinetics.

- 524. (1) Chemistry of the Solid State.
- 525. (1) Crystal Structures.
- 526. (1) Physical Chemistry of High Polymers.
- 527. (1) Photochemistry.
- 528. (1) Inorganic Reaction Mechanisms.
- 529. (1) The Chemistry of Organometallic Compounds.
- 530. (2) Topics in Organic Chemistry.
- 531. (1) Organic Stereochemistry.
- 532. (1) Heterocyclic Compounds.
- 533. (1) Carbohydrates.
- 535. (1) Alkaloid Chemistry.
- 536. (1) Isoprenenoid Compounds.
- 537. (1) Cellulose, Lignin and Related Compounds.
- 538. (1) Physical Organic Chemistry.
- 541. (1) Organic Reaction Mechanisms.
- 542. (1) Structure of Newer Natural Products.
- 543. (1) Recent Synthetic Methods in Organic Chemistry.
- 544. (1) Chemistry of Polysaccharides.
- 548 (0) Research Conference.—Attendance is compulsory for all graduate students.
  - 549. (9) M.Sc. Thesis.
  - 649. Ph.D. Thesis.

# CIVIL ENGINEERING-Ph.D. and M.A.Sc. degrees

## M.A.Sc. Degree:

Prerequisite: Graduation in Civil Engineering.

Course—Includes at least 6 units chosen from graduate courses in the Department, and other approved courses.

Note: All courses listed are not necessarily offered each year.

# Ph.D. Degree:

Facilities are provided for study in the general fields of structural engineering, hydraulics, and soil mechanics; studies in cognate fields will be selected in consultation with the candidate's committee.

- 500. (1) Fundamentals of Matrix Structural Analysis.—The linear analysis of plane and space frame structures by the stiffness method. The design and programming of a general stiffness programme for use on digital computers.
- 501. (1) Applications of Matrix Structural Analysis.—The stiffness method and the programming system will be extended to include structure buckling, rielding, vibration-modes, finite element and cables, and applied to such structures as shear walls, arches, suspension bridges and large frames.

- 503. (1) Special Advanced Topics in Structural Theory.—Selected topics in classical structural analysis. Mr. Hooley.
- 505. (1) Numerical Procedures in Structural Analysis.—Numerical and approximate methods for the solution of complex problems with wide application to engineering structures; moments and deflections of beams and beam-columns, moments and deflections of beams on elastic supports, critical buckling loads of bars of variable cross section loaded in various ways, vibrations of elastically supported mass systems. Mr. Cherry.
- 507. (1) Dynamics of Structures I.—Fundamental analysis for the behaviour of structures and structural elements subjected to dynamic loading. A comprehensive treatment of the single degree of freedom system including the following topics: the theory of resonant vibration; energy dissipation in vibrating systems; periodic and transient exciting forces; force and response spectrum theory with special application to the earthquake problem; vibration analysis by integral transform methods, impedance and mobility methods and transfer matrix theory; random vibrations. Mr. Cherry.
- 508. (1) Dynamics of Structures II.—A continuation of C.E. 507: the analysis of multi degree of freedom structures. Lagrange's equations; general normal mode theory; matrix methods in vibration analysis; damping in multi degree of freedom systems; forced oscillations of multi degree of freedom systems with special reference to the earthquake problem; Raleigh and Raleigh-Ritz approximations, transfer matrix techniques; vibrations of continuous systems. (Prereq. C.E. 507). Mr. Cherry.
- 510. (1½) Inelastic Bending & Limit Design I.—Stresses and deformations in beams beyond the elastic limit; limit design; analysis by the mechanism and equilibrium methods; effect of shear and direct force; design of members for ultimate loads.
- 511. (1½) Inelastic Bending & Limit Design II.—Rigid plastic theory; non-rigid plastic theory; repeated loading; alternating plasticity and incremental failure; shakedown; order of hinge formation in frames; deflections.
- 513. (1) Advanced Reinforced Concrete Design I.—Ultimate moment and shear for reinforced concrete members; biaxial bending in columns; torsion in beams; introduction to yield line theory for slabs.
- 514. (1) Advanced Reinforced Concrete Design II.—Short and long-time deformations in members and joints; yieldline theory for orthotropic slabs; limit design for concrete frames; distribution of load concentrations and column reactions in slabs; effect of large openings in slabs and beams.
- 515. (1) Prestressed Concrete.—Design and analysis for flexure and shear, losses in prestress, anchorage zone stresses, deflections, composite beams, statically indeterminate beams. Mr. Lipson.
- 517. (1) Concrete Technology.—A study of cement, aggregates and other concrete materials; mix design methods; control and testing; a review of current literature on concrete with regard to strength, workability, volume change, durability, porosity and permeability. Mr. Heslop.
- 519. (1) Earthquake Resistant Design of Structures.—Case histories of earthquake damage and field studies of earthquakes; current design criteria and design methods for various types of structure; building code requirements; principles underlying current design methods; dynamic analysis; design to minimize earthquake damage; current research in seismic resistant design.
- 521. (1) Optimization of Engineering Design.—A study of the principles and techniques underlying the optimum design of engineering structures and systems.

- 529. (1½) Advanced Strength of Materials.—Stresses in curved beams; shear deflection; column buckling in elastic and plastic range; Buckling of rings; Torsion and warping of the general open and closed section; lateral-torsional buckling of some sections.
- 531. (1½) Theory of Plates.—A study of stress distribution in flat plates by Fourier Analysis, finite differences, models, and the stiffness matrix approximation. Stability of compressed plates. Textbook: Timoshenko and Woinowsky-Kreiger, Theory of Plates and Shells. Mr. Hooley.
- 532. (1½) Theory of Shells.—A study of the stress distribution and stability of various shell forms. Textbook: Flugge, Stresses in Shells. Mr. Hooley.
- 533. (1) Energy Theorems of Structural Mechanics. Configuration space; generalized co-ordinates; holonomic and non-holonomic systems. Virtual work, virtual displacements; Fourier's inequality; stationary potential energy principle; Lagrangian multipliers; equilibrium; stability of equilibrium; matrix formulation of energy theorems. Canonical forms; generalized forms of Castigliano theorems; theorems of complementary energy. Calculus of variations. Variational theorem for mixed boundary value problems. Mr. Finn.
- 535. (1½) Elasticity and Visco-elasticity.—Introduction to linear theories of elasticity and visco-elasticity and their application to engineering problems; stress and displacement fields; creep; stress relaxation; visco-elastic models; transformation of visco-elastic problems to avail of existing elastic solutions; solution inversion. Mr. Anderson.
- 537. (1) Finite Elements.—Minimum principles; displacement, equilibrium and hybrid models; convergence and bounds; plane elasticity and bending problems; other field problems.
- Note: Additional suitable courses in Engineering Mechanics are offered by the Dept. of Mechanical Engineering; M.E. 550, M.E. 561, M.E. 562, M.E. 565, M.E. 567, M.E. 568.
- 540. (1) Advanced Fluid Mechanics I.—Hydrodynamics of viscous and ion-viscous incompressible flow; conformal mapping for free streamline lows; laminar and turbulent boundary layers, and combined applications of hese theories. Mr. Quick.
- 541. (1) Advanced Fluid Mechanics II.—Turbulence, wakes and vorticity; nteraction of fluids and structures; the wave equation applied to tides in stuaries. (Prereq. C.E. 540.) Mr. Quick.
- 542. (1) Unsteady Flow in Closed Conduits I.—Analyses of water hammer 1 penstocks and in pump discharge lines by graphical and characteristic 12thods; influence of friction; optimum gate closure. Mr. Ruus.
- 543. (1) Unsteady Flow in Closed Conduits II.—A study of various single ad multiple surge tanks by analytical, graphical and numerical methods; ability. Mr. Ruus,
- 544. (1) Steady Flow in Open Channels.—Energy and momentum princiles; uniform and gradually varied flow, backwater curves. Flow through ansitions, bends and obstruction, Mr. Ruus.
- 545. (1) Unsteady Flow in Open Channels.—Surge waves in power canals, cks, and navigation canals; method of characteristics, flood routing. Mr.
- 546. (1½) Hydraulic Engineering for Rivers, Harbours and Coasts.—Mole boundary flow in sediment-bearing alluvial channels, and the laws lating to the geometry of their self formation. River morphology and sedient transport. Channel-bed scour at obstructions. River training and devel-

opment for navigation. Water waves and tides. Behaviour of tidal estuaries. Harbour planning and protection. Coastal protection. Use of scale models. Mr. Pretious.

- 548. (1) Governing of Hydraulic Turbines.—Speed regulation of hydraulic turbines. Analyses of speed rise and analyses of turbine governing stability. (Prereq. C.E. 542.) Mr. Ruus.
- 550. (1) Hydrology I.—Weather systems and precipitation processes; evaporation and transpiration, streamflow, groundwater, hydrologic measurements and data networks. Statistical methods, hydrograph analysis, reservoir and channel routing.
- **551.** (1) Hydrology II.—Advanced applications of statistical methods, hydrograph analysis and routing techniques. Flow forecasting procedures. Prerequisite: CE. 550.
- 554. (1) Water Resource Development I.—Availability of water, quantitative and qualitative requirements for water—municipal, agricultural, industrial, etc.; drainage and flood control. Development of water resource systems.
- 555. (1) Water Resource Development II.—Application of statistics, economics, hydrology, hydraulic and sanitary engineering to the development and operation of water resource systems. (Prereq. C.E. 550, C.E. 554).
- 558. (1) Water Resource Development Seminar.—Directed case studies. Application of concepts, processes and techniques of water resource planning to specific problems. (Prereq. C.E. 550, C.E. 554).
- 560. (1) Sanitary Engineering Design.—Design problems in water and sewage treatment, with emphasis on the hydraulic and sanitary engineering considerations.
- 562. (1½) Sanitary Engineering Laboratory.—A laboratory course to familiarize the student with laboratory procedures, instrument analysis, sampling techniques, and data analysis.
- 563. (1½) Unit Operations & Unit Processes in Sanitary Engineering.—Laboratory and field assessments of sanitary engineering operations and processes; effects of various parameters thereon.
- 565. (1) Water Supply Engineering.—An outline of water quantity and quality requirements of water uses, and the development of possible course of action for meeting these requirements. Costs of implementing scheme will be considered.
- 567. (1) Water Pollution Control Engineering I.—Discussion of pollution parameters and the effects of pollutants on the water quality of rivers, lakes and estuaries; basic technology of biological and chemical treatment o wastewater.
- 568. (1) Water Pollution Control Engineering II.—Characteristics o liquid wastes and possible methods of alleviating their effects on receivin waters. Emphasis will be placed upon the procedures required to evaluate th problems.
- 570. (1½) Soil Mechanics I.—Soil composition, stress and strain at point, principle of effective stress, pore pressure parameters; seepage, cor solidation, settlement analysis; shear strength theory. Mr. Byrne.
- 571. (1) Soil Mechanics II.—Settlement analysis; strength theory; direct and triaxial shear machines; stability of slopes; lateral pressure and retainin walls; application of soil mechanics to dams; bearing capacity of soi (Prereq. C.E. 570.) Mr. Finn.
- 572. (1½) Applications of Physical-Chemical Principles to Clay Behavior in Soil Engineering.—Clay colloid theory; electrokinetic phenomena; stru

ture of natural and compacted clays and its effect on swelling, shrinkage, compressibility, resilience, strength, pore pressure, permeability; mechanical and chemical soil stabilization; frost action. Mr. Campanella.

- 574. (1) Experimental Soil Mechanics.—Experimental studies of advanced aspects of soil behaviour; compressibility; shear strength; pore water pressure; dynamic tests; advanced instrumentation and measurement techniques; research reports required. (Prerequisite: C.E. 570). Mr. Campanella.
- 576. (1½) Civil Engineering Uses of Aerial Photographs.—The use of aerial photographs for efficient and economical preliminary and reconnaissance soils surveys and for programming soil explorations. Use of photo interpretation in site layout and developing a boring and sampling programme, in the correlation of test borings, drainage studies, yardage estimates and in preliminary location studies for highways and dams. Mr. Bell.
- 578. (1) Principles of Pavement Design.—The application of soil mechananics to the design of flexible and rigid highway and airport pavements. Limitations of the various design methods now in general use and of the ways of evaluating soil strength and controlling construction. Textbook: Yoder, *Principles of Pavement Design*. Mr. Heslop.
- 580. (1) Advanced Topics in Soil Mechanics.—Stress distributions in soil masses under various boundary conditions; soil dynamics; wave types; wave transmission characteristics; dynamic response; correlation of response with engineering properties; foundation design for dynamic loads; general plastic theory of equilibrium; stability according to various criteria. (Prereq. C.E. 570, C.E. 571, or equivalent.) Mr. Finn.
- 585. (1) Geometric Design of Highways.—Traffic capacity and geometric design of rural highways, arterial highways in urban areas, intersections at grade and grade separation interchanges. Mr. Peebles.
- 590. (1½) Geometric Geodesy I.—Geometry of the spheroid; computation of position on spheroidal surfaces; relation between geoid and spheroid; Laplace correction; Legendre's theorem; geodetic levelling. Textbooks: Clark, Plane and Geodetic Surveying, Vol. II.: Bomford, Geodesy. Mr. Bell.
- 591. (1½) Geometric Geodesy II.—Geodetic triangulation, trilateration, traversing and base measurements; least square adjustment of observations; mathematics of map projections. Textbooks: Clark, *Plane and Geodetic Surveying*, Vol. II.: Bomford, *Geodesy*. (Prereq. C.E. 590.) Mr. Bell.
- 598. (½-3) Topics in Civil Engineering.—Lectures and readings on specialized topics of current interest in the field of civil engineering. To be given on approval of the Head of the Department.
  - 599. Thesis.—For the M.A.Sc. degree. (3 or 6 units.)
  - 699. Thesis.—For the Ph.D. degree.

#### CLASSICS—Ph.D. and M.A. degrees

'rofessor and Head: Malcolm F. McGregor.

ssociate Professors: C. W. J. Eliot, Patrick C. F. Guthrie.

ssistant Professors: A. Barrett, W. J. Dusing, H. G. Edinger, James Russell, Gerald N. Sandy, Robert Todd, John Vartsos.

Instructors: Elizabeth A. E. Bongie, K. Ann McCallum.

Lecturer: Geoffrey B. Riddehough.

The Department will accept candidates for the Ph.D. who wish to specialize in certain fields of Classical Antiquity (e.g., Greek History, Roman History, some phases of Greek and Roman Literature).

The thesis for the M.A. may be written in the field of Greek Language and Literature, or Latin Language and Literature, or Greek History or Roman History, or Greek or Roman Archaeology.

#### Greek

- 521. (3) Aristotle's Politics.
- 522. (3) Homer and the Epic.
- 523. (3) Plato.
- 524. (3) The Tragic Poets.
- 525. (3) Thucydides.
- 535. (3) Problems in Greek History.
- 536. (3) The Monuments and Topography of Athens.
- 545. (3) Greek Epigraphy.
- 549. (3-6) Master's Thesis.
- 649. Ph.D. Thesis.

#### Latin

- 521. (3) Cicero, Letters.
- 522. (3) Roman Elegiac Poetry.—The genesis of the Roman Elegy from its Greek models; a study of the works of Catullus, Tibullus, Propertius and Ovid.
  - 523. (3) Roman Comedy.
  - 530. (3) The Roman Historians.
  - 531. (3) The Roman Epic.
  - 535. (3) Problems in Roman History.
  - 549. (3-6) Master's Thesis.
  - 649. Ph.D. Thesis.

# COMMERCE AND BUSINESS ADMINISTRATION —Ph.D. and M.B.A. degrees

Dean of the Faculty: Philip H. White.

Assistant Dean of the Faculty: Colin C. Gourlay.

Professors: M. E. Beesley (Visiting), N. A. Hall, J. C. T. Mao, R. V. Mattessicl L. G. Mitten (Visiting), R. U. Ratcliff, C. E. Sarndal (Visiting).

Associate Professors: V. F. Mitchell, T. D. Heaver, B. E. Burke, F. A. Webster, R. F. Kelly, S. M. Oberg, J. Swirles, G. Majone.

Assistant Professors: M. A. Goldberg, L. F. Moore, D. Neilson, B. Schwab, W. Winiata, J. Sutherland.

Lecturers: S. Hamilton, H. L. Purdy.

#### Ph.D. degree

At the present time doctoral candidates will be accepted for programmes with specialization in the fields of Finance, Marketing and Organizational Behaviour, as broadly defined. Other fields of Business Administration will be available for doctoral work as soon as arrangements for additional staff strength are concluded and approval received from the Faculty of Graduate Studies.

Appropriate to the academic goals of some candidates are provisions which are in force under the Faculty of Graduate Studies for inter-disciplinary studies which call for crossing department and faculty boundaries. Where such Areas cross into the subject matter of Business Administration, the Doctoral Programme Committee can assist students in working out arrangements with the Faculty of Graduate Studies.

When the candidate has completed the course work in preparation for examination, he will submit to written examinations to test his grasp upon his chosen field of study, including:

- 1. The foundation areas for business study including mathematics, statistics, accounting, economics and the behavioral sciences and research methodology in their applications to the processes of business decision making and research.
- 2. The principal management decision areas including finance, marketing, industrial relations and policy and planning with emphasis upon the inter-relationships among these areas.
- 3. The student's field of specialization covering knowledge and understanding of the literature of the field, the basic concepts—their origins and their evolution, the inter-relationships with cognate fields and the applications of advanced research and decision making methods.

As a final step before admission to full candidacy for the Ph.D. degree, the student must submit to oral examination in defense of his thesis proposal.

## M.B.A. degree

A student with a Bachelor's degree other than Commerce normally will be required to complete a minimum of 15 units to qualify for admission to the Second Year of the programme. In addition, up to three units of additional preparatory work may be required.

Students in the M.B.A. programme are expected to have or to acquire an adequate background preparation in:

Economic Theory
Managerial Accounting
Probability and Statistics
Business Finance
Industrial Relations and Organizational Behaviour
Management Science
Marketing

In addition to the prerequisite requirements, the candidate for the M.B.A. degree must satisfactorily complete, as a minimum, a 15-unit programme. The student must have  $7\frac{1}{2}$  units of course work in addition to the core requirements and courses in the field of specialization.

The student with the approval of his committee may register either in a thesis or a non-thesis programme. The courses taken must include Commerce 591 and 592 and at least an additional 6 units of 500-level courses in Commerce. Up to 6 units of 300- or 400-level courses may be taken. A candidate should expect to include Economics 300 (Intermediate Economic Theory) in his program.

Students in the thesis programme will register in Commerce 549 (3 units). An examination on the field of the thesis normally will be taken after the course work of the Master's year has been completed.

Students in the non-thesis programme will be required to submit two major essays which may be associated with graduate courses in which they are registered. A comprehensive examination will be taken after the course work has been completed.

#### Prerequisite courses for non-Commerce graduates

- 315. (1½) Statistics.—An introduction to statistical methods; probability and probability distributions; statistical inference; simple linear regression analysis.
- 316. (3) Management Science.—Statistical decision theory. Topics from management science: linear programming, critical path analysis, PERT, queuing problems, inventory models, introduction to simulation; applications to business problems.
- 317. (1½) Management Data Processing.—The use of digital computers in business; typical computer applications. Potentials and limitations of computers; costs and benefits. Alternate computer configurations and software systems, economic considerations. Integrated data communication and processing systems; time sharing. Organizational aspects; the problems of automation.
- 323. (1½) Introduction to Administrative Studies.—A study of complex organizations and administration; administration control; communications systems and networks; centralization and decentralization; administrative goals and conflict; decision making; group dynamics.
- 342. (1½) Transportation Policy.—A study of the economic and institutional setting of transportation as a basis for examining policy development within transportation companies and government, and as a background to the role of transportation in business logistics.
- 352. (3) Managerial Accounting.—The use of figure data in making decisions and in appraising actual operating results of business enterprises. The course will include a study of fundamental accounting postulates, as applied in financial accounting, cost accounting, and budgeting.
- 361. (1½) Merchandising and Distribution.—A study of the methods used in the marketing of goods and services. Problems in merchandising, selection of channels of distribution, sales promotion, advertising, and pricing.
- 373.  $(1\frac{1}{2})$  Business Finance.—Types of business organization; problems of financing; provision of short-term and long-term capital; expansion and combination; public policy. Cases and assigned readings.

#### Courses

#### Urban Land Economics:

- 507. (1½) Seminar in Contemporary Land Investment Problems.—Real estate investment analysis for both equity and mortgage investments, investment theory and urban growth, investment behaviour in the real estate market, applications of investment decision theory, role of appraisal procedures, feasibility studies, Ellwood analytical model, computer-aided impact models for investment analysis.
- 508. (1½) Seminar in Government Policy in Relation to Urban Land Ownership.—Community planning and its implementation, police power regulation, housing policies, urban renewal, mortgage money, policies, taxation, expropriation. landlord-tenant legislation.
- 509. (1½) Seminar in Mortgage Financing.—Advanced problems arising in the mortgage money market. Emphasis on contemporary problems of flow of mortgage funds. Comparative study of government and institutional policies.
- 510. (1½) Economics of Location.—Location theory; industrial location; regional growth and locational equilibrium; locational distribution of urban activities.

#### Personnel and Labour Relations:

- 520. (1½) Organizational Behaviour and Administration.—An examination of problems and issues in the administration of human resources in business organizations. The course will concentrate on specific behavioural and attitudinal problems which face the practicing manager. Concepts, theory and research from various social sciences will be presented in analyzing determinants of and possible solutions to the problems.
- 521. (1½) Theory, Research and Methodology in the Study of Organization Behaviour.—An attempt to identify and integrate various theoretical frameworks utilized in the study of behaviour in business organizations. Major empirical research findings will be reviewed in the light of the theoretical viewpoints discussed. Concomitantly, key methodological approaches and problems in behavioural research in business organizations will be illustrated.
- 522. (1½) Selected Problems in Labour Relations.—An examination of contemporary problems of labour relations, with particular emphasis on public policy issues, conciliation, and arbitration procedures, the process of labour-management accommodation to technological change, the status of unions in society and their impact on the management of industrial and commercial enterprises.
- 523. (1½) Seminar in Labour Relations.—An examination of major research findings in selected areas of labour relations with particular reference to the growth and potential or labour unions, their impact on management, disputes settlement, public policy issues in labour-management relations, and internal union structure.
- 625. (1½) Seminar in Organizational Behaviour.—Theoretical and research contributions from the social and administrative sciences relevant to behaviour in business organizations. Emphasis will be placed on evaluation and synthesis of theories and related empirical evidence in the field.
- 626. (1½) Seminar in Manpower Management.—Problems of manpower nanagement at the local, regional and national levels. Emphasis will be

placed on the integration of man-machine systems, development of manpower resources and the application of quantitative and computerized methods and research.

628. (1½) Organizational Behaviour Research Seminar.—A study of the process and methods of research in organizational behaviour. The course will concentrate on the design and execution of ongoing experiments, field studies and survey research, the selection or development of measuring instruments, problems of data collection and the qualitative and quantitative analysis of results.

#### Transportation:

- 544. (1½) Seminar in Transportation.—A study of current transportation conditions and problems. Territorial freight rate adjustments. Regulation of competition. Co-ordination of transportation facilities.
- 545. (1½) Seminar in Transportation Development Economics.—Problems in economic development including benefit-cost analysis; user-cost recovery; entry control, co-operation with neighbouring states, transportation planning.

#### Accounting:

- 551. (1½-3) Advanced Accounting Seminar.—The examination of selected areas in accounting.
- 552. (1½) Seminar in Income Determination.—An examination of the essential characteristics of business income, and the various unsettled issues in its calculation.
- 553. (1½) Seminar in Accounting Standards.—An examination of the accounting standards recommended by professional accounting bodies in Canada, the United States, and the United Kingdom—a comparison of the recommendations and a study of their impact on accounting practice and theory.
- 554. (1½) Seminar in the Controllership Function.—The place of the controller in the business enterprise and his responsibility for financial planning and control.
- 555. (1½) Seminar in Data Processing.—The processing of business data; manual, tabulating, and the electronic data-processing systems.
- 556. (1½) Seminar in Advanced Managerial Accounting. Studies of managerial tools of budgeting, costing for decision-making.
- 557. (1½) Seminar in Taxation.—A study of taxation as it affects business entities.

## Marketing

- 562. (1½) Marketing Strategy.—A course emphasizing the strategic considerations of marketing management decision-making. Attention is given to those variables within the control of management of a given firm; the impact of the actions of a firm's competitors on that firm's decision outcomes; and environmental variables and constraints.
- 563. (1½) Marketing Planning.—This course requires students to appl institutional, and analytic concepts to the marketing problems of the firm the outcome of which is a set of marketing plans consistent with resource and marketing opportunities.
  - 564. (11/2) Seminar in Market Analysis.—The economic and social deter

minants of demand, sales forecasting; market research methodology; the use of sampling, questionnaire design, and statistical inference in marketing investigations; sources of market data, the design of marketing investigations and the analysis of information for marketing management.

- 566. (1½) Seminar in International Marketing.—A study of the management of international marketing activities as performed by the individual firm. The seminar will deal with the foreign marketing of exported products and/or the products of overseas affiliates. Emphasis is placed on the policy and strategy formulation for the firm's international marketing efforts, and on the organization and administration of the firm's resources for accomplishing its international marketing objectives.
- 568. (1½) Seminar in International Business.—A comparative study of the business and marketing systems employed in selected nations of the world. The seminar will deal with the relationships between business and marketing practice and the socio-economic environments of these nations.
- 660. (1½) Research Seminar in Marketing.—A study of the research process and the methodological problems in undertaking research in marketing. Particular attention will be given to sampling problems, the design of measuring instruments, the design of experiments, problems of data collection, and the analysis of experimental results.
- 661. (1½) Seminar in Marketing Systems.—An investigation of the structure of the marketing system and the institutions that contribute to the distribution of goods and services; the constraining effect of the social, legal, competitive and economic environment on marketing variables.
- 662. (1½) Seminar in Buyer Behaviour.—Analysis of the factors influencing buyer behaviour. Methods of influencing demand are evaluated in relation to specific marketing objectives.

#### Finance and Investments

- 571. (1½) Seminar in Optimal Financing Decisions.—This course presents a systematic application of financial theory to the problem of the firm's financing decisions. It assumes an understanding of basic corporate finance, statistics and economics. Topics to be examined include: the problem of capital structure, including the relation of price to leverage, the basis for risk aversion and the concept of utility in financing decisions; mergers.
- 572. (1½) Seminar in Financial Management.—This course is concerned with the development of decision criteria for asset management under uncertainty from the corporate viewpoint. Particular emphasis will be directed to capital expenditure decisions—forecasting funds flow and the economic management of current assets.
- 574. (1½) Seminar in Security Analysis.—Studies of recent research in principles and techniques of security analysis; valuation of securities; analysis of investment risks; use of statistical techniques in security selection. Review of theories on security price movements.
- 575.  $(1\frac{1}{2})$  Seminar in Investment Management.—Policies and practices of a stitutional investors. Quantitative analysis of security and real estate investments. Market behaviour.
- 576. (1 $\frac{1}{2}$ ) Seminar in Financial Institutions.—A study of the functional rocesses of monetary and non-monetary financial institutions participating 1 the market for financial assets. The seminar will deal with the implemental aspects of monetary policy and be concerned with the various attempts 1 ade to develop a theory of financial institutions.

- 577. (1½) Seminar in International Finance.—The organization and functioning of the international financial system; financial decision-making and planning of multinational firms.
- 579. (1½) Seminar in Insurance and Risk Management.—Studies of the theory of risk, risk bearing and insurance within the framework of management decision-making. Specific topics to be dealt with will include: risk analysis; methods of meeting risk with attention given to special problems, e.g. those arising out of consolidations and foreign operations; employee group benefits; the financial aspects of social security; business life insurance; and the relationships between insurance and government.
- 671. (3) Advanced Topics in Finance.—This seminar is concerned with advanced topics in valuation, capital structure, cost of capital, capital budgeting, working capital management, portfolio selection and financial markets, with particular emphasis on the theoretical foundations. Key concepts and issues will be developed through study of the literature, class discussion and written reports.
- 672. (1½) Research Seminar in Finance.—This seminar is designed to bring together on a regular basis, doctoral candidates and faculty members interested in the field of finance. Focus will be on the current research of faculty and doctoral candidates in the several areas of finance. The seminar will provide opportunities for the presentation, discussion and criticism of research work, including thesis proposals.

#### Production

580. (1½) Seminar in Production.—Readings and research in new techniques in manufacturing and production control.

#### Management Science

- 581. (1½) Seminar in Management Science.—A course in the application of mathematical programming to business problems; linear programming; variations on simplex method, post optimal analysis; non linear programming, integer and dynamic programming, standard model formulation. Generally, where applicable, computer package programmes will be used.
- 582. (1½ or 3) Seminar in Simulation Models in Business.—A study of computer simulation used as a management tool; simulation models of the total firm and subsystems of the firm.
- 583. (1½) Advanced Statistics.—Multiple correlation and regression analysis. Analysis of variance. Factorial experiments. Non-parametric statistics.

#### Policy and Administration.

- 591. (1½) Seminar in Business Policy.—A study of policy-making in business, government, and social fields.
- 592. (1½) Seminar in Business Administration. An examination of present-day thinking and research in the field of business administration.

#### Research

- 549. (3) Master's Thesis.—A comprehensive treatment of some theoretica or institutional problem.
- 590. (1½-3) Research in Business Administration.—Directed research into a selected area of business administration. Admission on the recommendation

of the students' advisory committee and on the approval of the Dean of the Faculty of Commerce and Business Administration.

593. (1½) Seminar in Research Methodology (of Business Administration).—An introduction to problems of logic and epistemology peculiar to the management sciences. Empirical inference, theory construction and hypotheses testing especially under the impact of small confidence ranges. The philosophic background of modern decision theory. Economic problems of computerized knowledge creation etc.

#### THE SCHOOL OF COMMUNITY AND REGIONAL PLANNING

Professor and Director: H. Peter Oberlander.

Associate Professors: V. Setty Pendakur, Brahm Wiesman.

Assistant Professors: Robert W. Collier, H. Craig Davis, Nirmala devi Cheru-

kupalle.

Honorary Lecturer: L. C. Marsh.

Part-Time Lecturers: W. T. Lane, Chris McNiven, Mrs. Hilda Symonds.

Canada has clearly emerged as an urban nation faced by the challenge of rapid social, economic and political changes inherent in a city-oriented society in an urbanizing world. These universal forces are strongly evidenced in urban and regional development in British Columbia and represent the context of the University's programme of education for planning for regional development leading to a Master's Degree. This degree will be either that of Master of Arts or of Master of Science, whichever best describes the prerequisites offered by the candidate and the courses chosen. The teaching and research at the School emphasize planning for regional development in the context of rapid urbanization in a resource conversion economy. The curriculum is particularly concerned with the spatial implications of regional development and the opportunities for improving the quality of the resulting environment through planning as an integrative and coordinative process of government.

Admission to the School is based on a Bachelor's Degree with high standing and assumes a deep involvement of mature students through self-education and strong inter-action between students and staff. Planning is concerned with anticipating and guiding social, economic and political changes and involves rationally applied forethought within a wide range of realistic situations and an explicit value system. Planning for regional development is focused on man's spatial environment as a professional practise within a prevailing governmental framework. It relates to the rational decision-making processes affecting human settlement and regional growth through a multi-disciplinary approach to the comprehensive use of selected human and natural resources.

#### Prerequisites and Curriculum

Prerequisites: A Bachelor's degree with major study in: Agriculture, Anthro-

pology, Architecture, Civil Engineering, Commerce, Economics, Fine Arts, Forestry, Geography, Law, Philosophy, Psychology, Political Science, Sociology, or Social Work. The undergraduate degree must be adequate in the range of courses offered and academic standing obtained to admit the candidate to a Master's degree in his previous field of undergraduate study. The candidate must have taken at least three of the following courses or their equivalents, each one of which must be selected from a different area of study: Anthropology 300, 412; Agricultural Economics 403; Agricultural Plant Science 316, 416; Architecture 422, 424, 425, 445; Civil Engineering 465, 470; Commerce 307, 309, 407, 444, 445, 446; Economics 304, 310, 313, 321, 400, 404, 409, 412, 415, 460, 484; Fine Arts 228, 331, 425, 431; Geography 350, 351, 360, 361, 366, 407, 450, 460, 461, 462; Political Science 300, 302, 400, 404; Sociology 306, 315, 330, 406, 425; Soil Science 314, 416.

If a candidate in addition to his prerequisites has taken courses equivalent to those described for the Master's degree he may be given credit not to exceed 12 units for those courses.

If a candidate's qualifications are not adequate he may be allowed to make up deficiencies concurrently with his Master's course provided that he does not register for more than 18 units in any one winter session. For the purpose of making good these deficiencies, courses chosen from the above list may be accepted in lieu of the courses required in the previous fields of undergraduate study. Applications for admission to the programme should be in the hands of the Director before June 1.

#### M.A. and M.Sc. Courses

The candidate in the Master's degree must satisfactorily complete an approved program of study consisting of a minimum of 30 units of core courses and elective courses. The following core courses are common to and required of all students in the School: Planning 425, 500, 501, 503 and 505. The School offers three areas of specialization, each consisting of required courses and electives. The candidates ought to choose one of the following areas for specialization and select courses from the respective areas at the beginning of the second semester of the first year.

- 1. Resources Development and Regional Planning.
  - a. Required courses: Planning 502, 520, 521, 522, 549.
  - b. Elective courses: Commerce 307, 409, 507, 508, 510; Economics 305, 409; Geography 461, 462, 463; Political Science 404, 502; Planning 506, 507, 508, 533; Sociology 425; Zoology 500.
- Transportation and Support Systems.
  - a. Required courses: Planning 470, 532, 533, 534, 549.
  - b. Elective Courses: Civil Engineering 595; Commerce 342, 444, 544, 545; Economics 484; Political Science 404; Planning 502, 506, 507, 508, 521, 522; Sociology 425.
- 3. Urban Structure and Housing.
  - a. Required courses: Planning 502, 504, 510, 522, 549.
  - b. Elective courses: Architecture 504; Commerce 507, 508, 509, 510; Economics 305; Planning 470, 506, 507, 508, 511, 521, 532; Political Science 404; Social Work 503; Sociology 425.

The candidate who satisfactorily completes this programme of study will receive either a Master of Arts degree or a Master of Science degree, depending upon his previous training and the elective courses taken concurrently with his Master's course.

A field trip to a neighbouring urban centre is part of the complete programme of study and usually occurs in the first term. The student is expected to report on his observations. He should reserve about \$100 to cover the expenses of this trip.

Courses:

425. (1½) History of Urban Planning.—The emergence of the city planning movement as an aspect of social and political reform traced throughout the 19th and 20th cenutry; the roots of the planning process are examined in terms of British planning legislation, the American City Beautiful movement, and the French contribution to urban structure and design. Emphasis is placed upon urban planning as a process of Government within the general framework of continuing social and economic change as the city becomes the prevailing way of life in Canada.

This course is identical and corresponds to Arch. 425 see School of Archi-

tecture listing.

This course corresponds to Civil Engineering 470.

- 500. (3) Community Planning Workshop I.—This course and its sequels, Planning 510 and Planning 520, forms the core of the planning training and is organized as a planning workshop and seminar. Students work individually and collaboratively. During the first term emphasis is placed on the nature and evolution of the city as the most important form of human settlement. During the second term, planning projects dealing with the details of survey, analysis and design within the comprehensive planning process introduce the student to the problems of urban communities and their possible solutions.
- 501. (1½) Introduction to Planning Analysis.—The context within which analysis for planning takes place with regard to planning as a profession; relationship to the social sciences; the structure of the urban community; and decision-making in the urban community. The general kinds of analysis in planning and their application to problems of the urban community.

502. (11/2) Advanced Planning Analysis I.—Use of the scientific method in planning decision-making. Sampling and other survey methods. Methods and techniques of analysis, prognosis, and programming in population, econ-

omic base, and land use studies.

503. (1½) Planning Engineering.—An introduction to the civil engineering aspects of community and regional planning; public services and utilities (sewerage, water supply, drainage, traffic and transportation, surveying and maps). This is a special course for students without previous engineering knowledge.

504. (1½) Urban Land Site Planning.—Each student undertakes a specific workshop problem in the detailed design of an urban residential layout. The location and characteristics of the site of the subdivision in the community are analyzed in relation to contemporary subdivision principles and standards. Various street, block, and lot patterns are considered. Alternative subdivision schemes are developed and evaluated; this leads to the preparation of sketch drawings and a report substantiating the final design proposal.

505. (1½) Traffic and Transportation Planning.—This course forms a continuity of Planning 503 and 504 but will be considered an elective for Planning students. Problems of ways and means of urban traffic and transportaion systems will be examined in light of current problems and the growing body of scientific knowledge as it affects the Planning process. Planning 503

or its equivalent is a prerequisite.

506. (11/2) Urban Land Planning and Economic Change.—The economic rinciples governing the structure, growth and development of urban ecoomies. The theory of market and public planning allocations of land resources in urban areas. Provincial and local government planning for urban land development; analytical methods, current experience, and welfare implications with examples from the developed and developing countries.

- 507. (1½) Environmental Quality Planning.—Elements of environmental quality, land, air and water criteria and standards for pollution; control devices and community services; planning at municipal, provincial and federal levels. National and provincial legislation and standards affecting pollution. U.S. and Canadian experiences in environmental quality control are discussed in the context of urbanization and planning.
- 508. (1½) Advanced Planning Analysis II.—Quantification and data analysis in the planning process. Introduction to computer programming and computer graphics, urban mapping, urban data banks, collection, selection and interpretation of data for planning purposes in the context of computers and computerization.
- 510. (1-3) Community Planning Workshop II.—An existing urban area or community is investigated in detail, including comprehensive surveys and analysis of physical, social, economic, and political aspects. This enables the students working both as individuals and teams to develop policy recommendations and plans within the framework of an overall programme for the community, as a solution to its current and anticipated problems. A comprehensive Project Report is prepared by the students.
- 511. (1½) Urban Renewal Seminar.—Federal, Provincial and local objectives, and programmes in the areas of urban development, rehabilitation, conservation, and public housing are reviwed. The experiences of Canada and the U.S.A. are emphasized. Current problems and trends are discussed. Student research reports are utilized as a basis for the seminar.
- **520. (3) Regional Planning Workshop.**—This course forms the continuity to Planning 510 and lasts the second term only. Students will work collaboratively and individually on problems in regional planning and resource development.
- 521. (1-3) Regional Planning Theory, Methods and Techniques.—The principals, problems, methods and techniques of planning for areas larger than a city; metropolitan areas, resource development programmes for the rapidly developing countries of the world, including river basin regions. Theory of regions, principles of regional economic development, techniques of resource analysis and regional planning; financing regional development.
- 522. (3) Local and Regional Planning Administration.—Planning as a function of government; methods and techniques of implementing a comprehensive development plan through land use controls, by-laws and administrative procedures; problems of governmental jurisdiction; regional authorities and commissions.
- 532. (1½) Transportation Planning I.—Urban Environment and Community Consequences.

Impact of Traffic and Transportation routes and modes upon Urban Structure and form. Criteria for Access, Mobility and Economic Impact:

Community Consequences; planning problems and controls, freeways arterials and community facilities; continuous data collection; priority programming, transportation systems; alternative modes and the resulting Urbar Structure.

533. (1½) Transportation Planning II.—Regional and System's Analysis Regional Transportation Needs and Regional Development; Transpor Technology and Transportation Modes; Inter-relationship between Air, Rai and Road, Travel; Transportation Terminal Systems and Inter-Termina

Transportation; Transport Investment and the Regional Economy; Regional Transportation for Resource Development; Recreation and Special Purposes; Transport System's Analysis and Coordination.

## 534. (1-3) Transportation Research Seminar.

A critical analysis of current research methods and techniques in Transportation Planning; these will be reviewed in the light of current literature in Transportation Planning and U.S. and Canadian professional experience. Goals and objectives of moving people and goods will be examined in relation to urban form and structure.

549. (3-6) Master's Thesis.—The fall term is organized as a seminar, and is spent examining selected references on the significance and scope of research into urban and regional planning theory and methods. Concurrently, the individual student selects his thesis topic and formulates his study hypothesis and thesis outline. During the spring term the individual student undertakes relevant research and field work, and completes the thesis. A Thesis Committee approves the student's selection of the thesis topic, reviews progress periodically, and conducts the final oral examination on the project. Credit is given for the course upon acceptance of the Thesis.

550. (1-3) Directed Studies.

In special cases and with the approval of the Director of the School a student may carry on directed studies in Urban and Regional Development.

#### COMPARATIVE LITERATURE

Chairman of the Programme: Professor Z. Folejewski, Department of Slavonic Studies.

Advisor for the Programme: Professor M. Goetz Stankiewicz, Department of German.

At present the Programme offers opportunities for study leading to the M.A. degree in Comparative Literature. Areas of emphasis: modern literatures, themes and motifs (myth), genres and literary relations (slavic—western, oriental—occidental).

#### Requirements for Admission:

Fluency in one foreign language (i.e., at least three language courses and two literature courses taken in this language on the undergraduate level or the equivalent), and an acceptable knowledge of a second foreign language (students whose qualifications are doubtful will be required to take a reading examination in it).

## Requirements for the degree:

A student's programme must be arranged in consultation with and be approved by the Comparative Literature Committee. The normal M.A. programme will consist of 18 units. After finishing his course work a student must pass a general examination in his field of concentration.

Graduate students not reading for an M.A. in Comparative Literature may be admitted to these courses with the permission of the instructor.

- 500. (3) Introduction to Comparative Literature.—A critical evaluation of various approaches to Comparative Literature. Literary works and intellectual cross-currents studied both in their natural setting and against the international background.
- 501. (3) Studies in Genre.—The development of a genre in its national and historical settings, with regard to the relevant philosophical and social background, to problems of structure, and to the critical concept of "genre" itself.
- 502. (3) Studies in Literary Movements and Periods.—Periods and literary movements in an international context, in the light of the national characteristics (whether temperamental, philosophical, or historically determined) which may alter a movement's manifestations from country to country.
- 503. (3) Studies in Myth, Theme and Tradition.—Major unifying patterns in Western literature defined by subject and content rather than by form: e.g. archetypes and recurrent themes; the use of mythology in literature; Christian and Classical traditions and the relationships between them.
- 504. (3) Topics in Comparative Literature.—Problems of structure and technique, critical theory, literary relations, major literary figures, and other traditionally comparative topics.
- 505. (3) New Problems in Comparative Literature.—Discussions of literature as a basic force in man's definition of values. Explorations of the relationship between literature and other forms of creativity: e.g., literature and art, literature and philosophy, literature and history, literature and the social sciences.
- 506. (3) Comparative Studies in Oriental and Occidental Literatures.—A study of the analogies and contrasts in the development of the national literatures of selected European and Asian countries.
  - 547. (3-6) Reading Course.
  - 549. (3-6) Master's thesis.

Slavonic Studies 542, Theatre 510, English 507, Russian 540 and Creative Writing 515 may be accepted as equivalent to seminars in Comparative Literature.

# COMPUTER SCIENCE—M.Sc. degree

Professor and Head: John E. L. Peck.

Professors: James M. Kennedy, Charlotte F. Fischer (on leave, 1968/69).

Assistant Professors: J. R. H. Dempster, R. S. Rosenberg.

Lecturers from other Departments: Z. A. Melzak (Mathematics), A. G. Fowler (Computing Centre), G. F. Schrack (Electrical Engineering).

The Department, founded in 1968, offers opportunities for advanced study leading to the M.Sc. degree. Fields of study include Programming Languages, Adaptive Systems, Numerical Analysis, Theory of Automata, and Combinatorics. The facilities of the University Computing Centre are available for teaching and research in the Department; these include a large IBM 360/67

system run in the multiprogramming mode.

Detailed information on courses and financial assistance is available from the Department on request. Not all of the courses listed below are offered in any given year.

#### Courses:

- 501. (3) Theory of Automata.
- 502. (3) Adaptice Systems.
- 503. (3) Formal Languages.
- 531. (1-3) Topics in the Theory of Automata.
- 532. (1-3) Topics in Adaptive Systems.
- 534. (1-3) Topics in Computer Systems.
- 535. (1-3) Topics in Simulation.
- 537. (1-3) Topics in Coding & Information Theory.
- 538. (1-3) Topics in Information Processing.
- 549. (3) Thesis for Master's Degree.

Courses in Numerical Analysis are listed under Mathematics; courses in other computer-related fields are listed under Electrical Engineering.

# CREATIVE WRITING-M.A. degree

Associate Professor and Head: Robert Harlow.

Professor: Douglas Bankson.

Associate Professor: Jacob Zilber.

Assistant Professor: J. Michael Yates.

The Department offers a two-year course of resident study designed to help the talented student become a productive writer. The programme is based on the premise that capable student authors can benefit from judicious criticism and the chance to develop their abilities in an academic setting. Without sacrifice of standards, the staff members, all producing writers, are eclectic in attitude toward various modes of writing. Workshops, conferences and tutorials are designed to focus attention on the student's own work in advanced studies in the writing of poetry, fiction, drama and in translation. M.A. degrees are offered in Creative Writing, in Translation and in Creative Writing/Theatre for playwrights. The latter is designed for advanced playwrights who must be accepted by both departments. All candidates are selected on the basis of work submitted. Reading assignments will be given in various books and journals, including *Prism international* and *Contemporary Literature in Translation*.

A detailed brochure is available on application to the Department.

507. (3) Advanced Writing of Drama.—Workshop in the writing of stage, screen, television, and radio plays. Studio work may be required, and some stage plays may be given workshop production.

- 509. (3) Advanced Writing of Fiction.—Workshop in the writing of the short story, novella and novel.
  - 510. (3) Advanced Writing of Poetry.—Workshop in the writing of poetry.
  - 515. (3) Advanced Workshop in Translation.
- 547. (4) Directed Reading.—A course designed according to the needs of the individual student, including literary genres on which he is not concentrating, as well as works from related fields such as Philosophy, Fine Arts. etc.
- 549. (3) Thesis.—Ordinarily, the thesis will consist of 50 pages of poetry or 100 pages of completed fiction. Playwrights on the Creative Writing-Theatre M.A. are asked to write and help stage a full-length play. Students proficient in a second language may fulfill the thesis requirement with a work of translation, and M.A. candidates in Comparative Literature specializing in translation may include such a work in partial satisfaction of the thesis requirement.

M.A. students in the Department of English may be allowed to submit a body of creative work instead of an academic thesis. A student who wants to do so must submit sample work to the Department of Creative Writing for appraisal. If the department finds that the work meets its standards, the student should seek the approval of the Graduate Committee of the Department of English, with whom final sanction rests.

## ECONOMICS-Ph.D. and M.A. degrees

Professor and Head: Anthony Scott.

Professors: Robert M. Clark, Stuart M. Jamieson, J. Tait Montague, A. Milton Moore, Gideon Rosenbluth, John H. Young.

Associate Professors: John G. Cragg, John F. Helliwell, Gerald F. McGuigan, Gordon R. Munro, Peter H. Pearse, Ronald A. Shearer, John Vanderkamp, Robert M. Will.

Assistant Professors: David E. Bond, John D. Boyd, Paul G. Bradley, Carolyn Clark, David J. Donaldson, Geoffrey B. Hainsworth, E. Bruce Hurt, Michael Kelly, Hartley V. Lewis, Roger P. Mendels, Keizo Nagatani, Philip A. Neher, James D. Rae, Robert Swidinsky, Russell S. Uhler.

Instructors: Elizabeth Bond.

Lecturers from other Departments: H. E. Ronimois (Slavonic Studies), George R. Winter (Agricultural Economics), Craig H. Davis (Community and Regional Planning).

The programme leading to the degree of Master of Arts is designed to prepare the student for employment in business or government or to serve as a first stage in a programme leading to the Ph.D. degree. The studies leading to the degree of Doctor of Philosophy are designed to equip the student to carry out research, with a view toward a career in university teaching, business or government. With a faculty of more than thirty mem-

bers, the Department of Economics is able to offer courses and seminars and to supervise research in a wide variety of subjects. Among others these include economics of natural resources, economic growth and development, macroeconomic theory and policy, econometrics, industrial organization, public finance, and industrial relations. The University Library's holdings in economics are particularly extensive in serial publications and the postwar literature. Graduate students also use the special collection of the Social Sciences Graduate Reading Room, which contains the principal professional journals and frequently used books. Special research facilities include the Institute of Industrial Řelations, the University Computing Centre, and the Statistical Centre for the Social Sciences. The Computing Centre has an IBM 7040 computer, and is presently installing an IBM 360 model 67 system. The Statistical Centre for the Social Sciences offers guidance and assistance to faculty members and graduate students conducting quantitatively-oriented research in the social sciences. Its library of frequently-used machine programmes is constantly being expanded. The services of programmers and keypunch operators are available through the Statistical Centre.

Courses are listed below but some courses will not be offered every year. A listing and description of the courses actually offered this year are contained in a detailed brochure available on application to the Department.

- 500. (1½) Micro-Economics I.
- 501.  $(1\frac{1}{2})$  Micro-Economics II.
- 503. (3) History of Economics Analysis.
- 504. (3) Applied Statistics and Econometrics.
- 506. (3) The Economics of Income-Security.
- 507. (3) Economics of Labour.
- 508. (3) Money and Banking.
- 509. (3) Economic Analysis and Natural Resources.
- 510. (3) Governmental Finance.
- 512. (3) Economic Development.
- 515. (1½) Mathematical Economics I.
- 516. (1½) Mathematical Economics II.
- 520. (3) Economic History.
- 535. (1-3) Special Advanced Course.
- 536. (1-3) Directed Reading.
- 540. (3) Research Seminar.
- 549. (3-6) Master's Thesis.
- 550.  $(1\frac{1}{2})$  Macro-Economics.
- 551. (1½) Economic Fluctuations and Growth.
- 552.  $(1\frac{1}{2})$  International Economics I.
- 562. (1 $\frac{1}{2}$ ) International Economics II.
- 581. (1½) Market Structure and Business Behaviour.
- 591. (1½) Business Performance and Public Policy.
- 600. (1½) Special Topics in Economic Theory.
- 604. (3) Advanced Econometrics.
- 608. (3) Banking Processes and Policies.
- 612. (1½) Problems and Policies in Economic Development.
- 649. Ph.D. Thesis.
- 652. ( $1\frac{1}{2}$ ) Topics in International Economics.
- 657.  $(1\frac{1}{2})$  Topics in the Economics of Labour.
- 667.  $(1\frac{1}{2})$  Topics in Industrial Relations.

## EDUCATION-Ed.D., M.Ed. and M.A. degrees

Professor and Dean of Faculty: Neville V. Scarfe.

Professor and Associate Dean: C. E. Smith.

Professor and Director of Graduate Studies: G. M. Chronister.

Professors: K. F. Argue, Sam Black, C. J. Brauner, A. E. Clingman, Harold M. Covell, F. Henry Johnson (Director of Elementary Education), Joseph Katz, David Kendall, L. C. Marsh, J. Ranton McIntosh (Director of Secondary Education), Lloyd H. Slind, Robin N. Smith, Harry L. Stein, Coolie Verner.

Associate Professors: S. S. Blank, G. H. Cannon, J. B. Coombs, F. Gamble, R. F. Gray, W. J. Hartrick, T. A. Howitz, Ruth McConnell, T. D. M. McKie, E. MacPherson, B. C. Munro, Myrne Nevison, O. A. Oldridge, R. L. R. Overing, W. Schwahn, D. C. Smith, George Tomkins, C. G. Trowsdale, L. Walters.

Assistant Professors: L. B. Daniels, J. D. Dennison, H. J. Dyck, E. G. Fiedler, J. D. Friesen, J. A. Niemi, M. Niemi, H. A. Wallin.

#### Graduate Programmes in Education

The University offers, through the Faculty of Graduate Studies, graduate degrees in Education—the Master of Arts, the Master of Education, and the Doctor of Education. The instruction and guidance is given by the Graduate Division in Education, but admission, residence requirements and standards are set by the Faculty of Graduate Studies. Requirements may include a language which may be satisfied by the completion of French 210 or 220, German 200, Russian 200, or by means of a reading examination administered by the Faculty of Education. Candidates who are deficient in the language requirement should consult the director of graduate studies in the Faculty.

Admission to all courses leading to a graduate degree requires registration with the Faculty of Graduate Studies and full approval of the Graduate Division in Education. Those who wish to embark on a course for a master's degree, and have met the requirements, should submit to the office of the Registrar an application form accompanied by complete official transcripts of the applicant's academic and professional training record to date. If his application is accepted the applicant will be referred to the appropriate department chairman, or a person appointed by him, to gain approval for a planned sequence of courses. The student will be under the guidance of a properly appointed adviser to whom he must make regular report on his progress. All changes in programmes must be reported to the office of the Graduate Division.

Requirements for Admission to M.A. in Education and M.Ed.

The following persons are admissible to master's degree programmes:

1. Those with (i) a B.A. (or its equivalent in another Faculty) and university postgraduate teacher training (one year), or (ii) a B.Ed. (Secondary), or (iii) a B.Ed. (Elementary) and at least 15 units of approved course work

who have an average standing of not less than 72% in 45 selected units of senior courses most recently credited on the applicant's transcript. These should also comprise not less than 24 units of academic and not more than 21 units of Education courses. (B.Ed. Elementary graduates who had arranged a fifth year prior to 1969 will be considered for admission on the basis of 21 units in Education and 9 units of academic work in addition to whatever other courses were taken for the fifth year.)

- 2. Those with a B.A. (or its equivalent in another Faculty) and Normal School training (one year) who meet requirements similar to those of 1. above, applied to 30 units of senior course work.
- \*These units will ordinarily be those senior courses most recently credited on the applicant's transcript. They will comprise not less than 24 units of academic course work and not more than 21 units of Education course work.
- Note: (a) Applicants not admissible under either 1. or 2. above may be permitted to take up to a maximum of 15 units of qualifying work in prescribed senior courses in order to meet the above requirements.
  - (b) Alternatively, the applicant may be admitted on completion of a qualifying programme of 15 prescribed units at an average of First Class standing.
  - (c) A maximum of 6 units of qualifying work completed at high Second Class standing or better may subsequently be applied to a master's degree.
- 3. In special circumstances, as determined by the department concerned and by the Dean of Education's Committee on Graduate Admissions, teacher training may be waived for those applicants who have—(a) a university degree with standing sufficient for admission to a master's programme at this university, and (b) adequate experience related to their proposed field of specialization.

# Requirements for the M.A. degree

- (a) The completion of a minimum twelve units of approved graduate courses taken during at least one full academic year in resident graduate study.
- (b) A thesis.

## Requirements for the M.Ed. degree

The M.Ed. degree makes provision for a more general study, at an advanced level, of several fields. At least 3, but not more than 15 units of further study in an academic subject, are required. Arrangements for all work must be made in consultation with the Director of the Graduate Division and the Chairman of the department concerned. This work must be in a subject for which the candidate's undergraduate programme has prepared him for advanced study. The degree need not entail a thesis; instead the amount of course work is increased to 21 units. If a thesis is written a minimum of 15 units of course work is required.

Upon successful completion of all the course work every candidate for the M.Ed. degree excepting those who submit a thesis, will be required to pass a comprehensive examination covering his major field of specialization and other areas related to his Master's programme. These examinations will be available twice a year, prior to graduation in April and at the end of the summer session in August. Applications for the comprehensive examination

must be submitted in writing to the office of the Director of Graduate Studies by March I for the April examination or by July I for the August examination.

## Residence Requirements and Transfer of Credit

The Ed.D. and M.A. degree programmes require full time residence during winter sessions. The Master of Education programme may be completed by summer sessions.

Graduate courses taken at another university are not normally acceptable as credit towards these degrees unless permission prior to undertaking the courses has been given. Correspondence and off-campus extra-sessional courses may be offered as prerequisites, but they are not acceptable in the Master's programme. Students who hold full-time positions may not undertake more than three units (one course) for credit during a winter session.

# Major Fields of Specialization

For the M.A. degree a student is normally required to take Education 481 and at least 9 units of advanced work in the major field in which the thesis will be written. For an M.Ed. degree a student must elect at least 9 units from a major field, either professional or academic. The remaining units should include courses from other major fields of specialization.

The Faculty of Education is organized into some twenty-five areas of study or "departments". An applicant for a master's degree must select an appropriate department to supervise his programme. Individual courses in areas other than the student's selected department must be approved by the adviser who will assist the student to prepare an official Programme of Graduate Studies.

Note: Graduate credit at the master's level may be given only for courses numbered 300 or above. Ed. 404, Ed. 410, and Ed. 440 may not be taken for graduate credit. No course credited to a previous degree or diploma may be applied to a master's programme. Correspondence and off-campus extrasessional courses may not be used for credit on advanced degrees, although they may be used for prerequisite purposes.

The following is a list of the currently established areas of study within the Faculty of Education in which a student may complete a major programme when offered:

- 1. Administration
- 2. Adult Education
- 3. Art Education
- 4. Audio-Visual Education
- 5. Curriculum Theory
- 6. Educational Psychology
- 7. Elementary Education
- 8. English Education
- 9. Foreign Languages
- 10. Foundations
- 11. Guidance & Counseling
- 12. Health & Physical Education
- 13. Higher Education

- 14. Industrial Education
- 15. Library
- 16. Mathematics Education
- 17. Music Education
- 18. Pre-school Education
- 19. Reading Education
- 20. Science Education
- 21. Social Studies Education
- 22. Special Education
- \*23. Primary Education
- \*24. Secondary Education
- 25. Speech & Drama
- \* No graduate programmes offered in 1969-70.

The following courses are those applicable to the Master's and Doctoral

degrees in Education. On occasion, courses at the 500-level may be taken for undergraduate credit when approved by the Director of Elementary or Secondary Education.

- 501. (3) The Psychology of Classroom Learning and Teaching.—A study of educational outcomes and the formulation of the appropriate instructional strategies for their achievement. Prerequisite: One prior course in general or educational psychology.
- 507. (1½) History of Special Education.—A historical review of programmes in Special Education in Europe and North America. Prerequisites: Ed. 407 or consent of instructor.
- 508. (3 or 6) Review of Research in Methods of Teaching Specific School Subjects.—Three units will be given for each course in an individual subject. No more than 6 units may be credited towards a Master's degree. Each course reviews the philosophy, purpose and function of the subject in school. Studies are made of recent research on curriculum organization, or particular methods of teaching, on the use of material aids, on factual comprehension and attitude testing. Prerequisite: Education 204 or 404.
- 509. (1½) Organization of Special Education.—Detailed review of contemporary Special Educational Services; organization and planning of programmes; teacher education. Prerequisites: Ed. 407 or consent of instructor.
- 510. (3) The Development of Science Curriculum Materials.—Prerequisites: Science Major; Recommended: Ed. 508 taken before or concurrently; consent of the instructor.
- 511. (3) Seminar in Science Education.—Prerequisite: Consent of instructor.
- 513. (1½) Advanced Seminar in Mental Retardation.—Review of recent educational, psychological, and medical research in the field of mental retardation. Prerequisites: Ed. 403 or consent of instructor.
- 514. (3) Foundations of Adult Education.—Historical, political and social factors which influence movements and programmes of adult education. Developments in Britain, the United States, and Canada. Philosophical problems related to the extension of adult education. Prerequisite: Education 412.
- 516. (3) Mass Media and Adult Education.—The major information facilities and the context for adult learning they create. Types of learning resulting from each of the major media, by means of various experiments.
- 517. (3) Health Education in Schools.—The philosophy, the administration and the teaching of health in schools. School medical service, the healthful school environment. Methods and materials of teaching in schools from Grade 1 through Secondary School.
- 518. (3) Methods of Adult Education.—Factors involved in adult learning. Learning theory, attitude change, group dynamics and special aspects of aging, and methods by which curriculum is created. Prerequisite: Education 412
- 519. (3) History of Canadian Education.—The historical growth of public education in Canada from the French regime to the present. The development of provincial public school systems and Canadian educational thought and practice. Prerequisite: At least one of Ed. 400, 430, 470 or similar courses taken at another university, or History major.
- 521. (1½) Advanced Seminar in Philosophy of Education.—Current trends in educational philosophy; social implications of current educational theories. Prerequisite: Education 400 or senior level philosophy course or consent of instructor.

- **522.** (3) The Logic of Teaching.—Analysis and study of the logical operations used in teaching. Prerequisite: Education 400, or Philosophy 202 or 212, or consent of the instructor.
- **523. (3) Comparative Education.**—Comparative analysis of the social, economic, and political determinants of the organization and administration of selected foreign educational systems. Prerequisite: At least one of: Ed. 400, 430, or 470.
  - 524. (3) Advanced Seminar in Comparative Education.
- 525. (3) Social History of American Education.—The interrelationship of education and social developments in the U.S.A. from the colonial period to the present. Prerequisite: One of a senior history course, Education 400, 430 or 470.
- **527.** (3) Seminar in Library Education.—Research in the field of school librarianship. Prerequisite: Consent of instructor.
  - 528. (1½) Basic Principles of Measurement.—Prerequisite: Education 482.
  - 529. (1½) Test Construction.—Prerequisite: Education 528.
- 530. (3) Psychology of Learning.—Intraserial phenomena, maturation, effect, frequency, transfer, retention, practice, and material effects in learning. Theories of learning, and results of research in learning. Relationship of theories to methodology and curricular practices. Prerequisite: Education 102 or 301.
- 531. (1½) The Interview and Non-Standardized Measures in Guidance Services.—Theoretical assumptions in the use of non-standardized appraisal techniques: interviews, observation techniques, rating scales, cumulative records, autobiographies, and sociometric procedures. Case studies.
- 532. (1½) Tests in Pupil Personnel Services.—The use of standardized measures of mental ability, achievement, aptitude, interest, and personality.
- 533. (1½) Psychology of Handicapped Children.—Physical, mental, social, and emotional characteristics of handicapped children (backward, crippled, hard-of-hearing, etc.). Prerequisite: Education 407 or consent of instructor.
- 536. (3) Individual Tests.—Administration, scoring, interpreting, and values of Revised Stanford Binet, Wechsler-Bellevue, etc.; nature of intelligence; constancy of the IQ, etc.
- **538.** (3) Communications Theory.—Relationship of communications theory to other theory systems and communications design. Prerequisite: Ed. 414 or equivalent or instructor's consent.
- 539. (3) Educational Television.—An extensive study of the theory, practice, and evaluation of educational television, based on research. Prerequisite: Education 414 or consent of staff. Limited to 20 students in any one session.
- 540. (3) Research in Audio-Visual Education for Schools.—Recent research on the effects of various types of audio-visual material on learners. Review of experimental work on techniques of using audio-visual media.
- 541. (3) Theory and Principles of Art Education.—History, theories, principles, methods and practices of art education. The place and contribution of art in total education. Prerequisite: a major in Art or equivalent.
- 542. (3) Theory and Principles of Music Education.—Supervision and administration of music education. Individual projects in special interest areas. Prerequisite: a major in Music Education or equivalent.
- 543. (3) Historical Aspects of Speech Communication.—The history of speech persuasion from the classical to the modern writers; implications in the field of human values as related to communication. Prerequisite: Education 416, or 575 or 430, or consent of instructor.

- 545. (1½) Foundations of Mathematics Education.
- 546. (1½) Measurement and Evaluation in Mathematics Education.
- 547. (1½) Mathematics in the Elementary School.—Research and Thought. Prerequisite: Education 482.
- 548. (1½) Mathematics in the Secondary School.—Research and Thought. Prerequisite: Education 482.
  - 549. (1½) Problems in Teaching Secondary School Mathematics.
  - 551. (3) Foundations for Inquiry in Educational Administration.
  - 552. (3) Basic Contributions to Administrative Thought.
  - 553. (3) Seminar and Group Inquiry in Educational Administration.
  - 555. (1½) Educational Finance. (formerly 559).
  - 556. (1½) Administration of the Educational Programme.
  - 557. (1½) Administration of the Elementary School.
  - 558. (1½) Administration of the Secondary School.
- 559. (1½) Administration of Post Secondary Institutions.—Selected problems in the administration of various post-secondary institutions. Prerequisite: Ed. 556.
  - 560. (1½) School Law.
- 561. (1½-3) Laboratory Practicum.—Offered in departments offering graduate work in Education. Admission by consent of instructor.
- 562. (1½) Curriculum Organization in the Elementary School.—History and development of elementary curricula; principles of organization, administration, and evaluation; unit, course, and programme design.
- 563. (1½) Curriculum Organization in the Secondary School.—History and development of secondary curricula; principles of organization and adaptation; articulation of secondary with higher education programmes.
- 564. (3) Research Problems in Curriculum Organization.—Theories of curriculum organization and a review of recent research. The work of the curriculum director. Prerequisite: Education 204 or 404.
- 565. (3) Special Course in Subject Matter field.—Courses in various subject matter fields designed to bring teachers up to date in new advances and recent findings in each field. See also Physics 430 (Recent Developments in Physics).
- 566. (3) Principles of Secondary Education.—Recent thought on class-room procedures, provisions for individual differences, discipline. The place of various school subjects in total education, and remedial education in Canada and other countries.
- 567. (3) Problems in Elementary Education.—New development and current issues in elementary education.
- 568. (1½) Special Education of the Orthopaedically and Neurologically Handicapped.—For specialists in the education of the crippled, hospitalized, spastic, etc. Recent research in methods of instruction. Prerequisite: Education 407 or consent of instructor.
- 569. (3) The Regional, Junior or Community College.—History and philosophy of the junior college. Studies of the theoretical bases for its establishment, organization, finance, personnel and curriculum.
- 570. (3) Advanced Seminar in Educational Sociology.—Development of social theory; contemporary systematic positions and their relation to modern educational theory. Culture. Social motivation. Social problems of administration and control. Prerequisite: Education 470 or consent of instructor.

- 571. (3) Advanced Seminar in Educational Psychology.—Advanced study of research and problems in learning, mental hygiene, measurement. Prerequisite: Education 530 or approved Senior Course.
- 572. (3) Advanced Seminar in Curriculum Organization.—Presentation and discussion of current theories and practices in curriculum organization and administration. Prerequisite: Education 562-63/or Education 564.
- 573. (3) Advanced Seminar on Exceptional Children.—Review of research related to diagnostic and remedial techniques in Special Education, and application of these techniques in field experience. Prerequisite: Education 533.
- 574. (3) Supervision of Reading.—Curriculum analysis and planning. Implications for the administrator, the consultant and supervisor of reading. Prerequisite: Consent of Instructor.
- 575. (1½) Classical Theories of Education.—The educational writings of such educational theorists as Plato, Aristotle, Quintillian, Comenius, Locke, Rousseau, Pstalozzi, Herbart, Froebel. Prerequisites: Ed. 400 or Ed. 430 or consent of instructor.
- 576. (3) Advanced Seminar in the Supervision of Instruction.—For Superintendents, Principals, Directors of Education and other Supervisory Personnel desiring advanced study in this area. Prerequisite: Consent of Division.
- 577. (1½) Pragmatism and Education.—The philosophic pre-suppositions in the educationally relevant thought and writings of Charles Pierce, Herbert Mead, William James and John Dewey. Prerequisite: Ed. 400 or senior level philosophy course or consent of the instructor.
- 578. (1½) Counseling Theory and Procedures I.—Theories and procedures for counseling all individuals in their development devices and tasks; ethical and legal implications; the counselor's consultant role.
- 579. (3) Research on Guidance Services.—Present resources and services together with techniques of assessing and using available material. Workshop in character, requiring experimental investigations.
  - 580. ( $1\frac{1}{2}$ -6) Problems in Education.—Investigation and report of a problem.
- 581. (1½) Methods of Educational Research.—Scientific method in education; types of research; standards in thesis writing; critical study of published research.
- 583. (3) Advanced Seminar in Adult Education.—Discussion of various projects in research or organization carried out by students. Prerequisite: Education 514 or 515 or 518.
- 585. (3) Advanced Seminar in Research on Young Children.—Educational procedures and materials found through research to meet best the physiological, social and psychological needs of young children. Prerequisites: Education 331 and 333.
- 586. (1½) Philosophy and Educational Policy.—Philosophical examination of educational policy issues and the grounds relevant to their resolution. Prerequisites: Education 300 or 430 or 470 or consent of instructor.
- 587. (1½) Social Philosophies and Education.

Prerequisites: Ed. 400 or Ed. 470 or consent of instructor.

- 588.  $(1\frac{1}{2})$  Existentialism and Education.
- Prerequisites: Ed. 400 or Ed. 490 or Ed. 470 or consent of instructor.
- 589. (3) Theories and Models of Education as a Discipline.—An examination of available systems and proposed system theories as they bear on the

philosophy of Education as a disciplined field of inquiry. Prerequisites: Ed. 400 or equivalent or consent of instructor.

- 590. (3) Current Developments in Higher Education.—The special issues relating to universities, colleges and technical education today with special reference to Canada, Britain and the United States. Prerequisite: consent of instructor.
- 591. (3) Epistemological Foundations of the Curriculum.—An inquiry in to the nature and organization of knowledge. Implications for curriculum construction and classroom teaching. Prerequisites: Ed. 400 or a senior level philosophy course, or consent of instructor.
- 592. (1½) Design and Analysis in Education Research I.—Design and analysis of experiments; the testing of multivariate hypotheses; introduction to factor analysis. Prerequisite: Ed. 482 or consent of instructor. A knowledge of matrix algebra would be helpful.
- 593. (3) Ethical Foundations of Educational Thought and Practice.—Inquiry into the nature of moral reasoning and its place in education. Implications for moral education, and the formulation of policy statements. Prerequisites: Ed. 400 or a senior level philosophy course, or consent of instructor.
- 594. (3) Mental Constructs in Educational Theory.—Philosophical analysis of the basic mental constructs used in educational theory and the implications of this analysis for resolving theoretical difficulties. Prerequisites: Ed. 400 or a senior level course, or consent of instructor.
- 595. (1½) Analysis of Educational Concepts.—The theory and practice of conceptual analysis and its application in philosophy of education. Prerequisites: Ed. 400 or a senior undergraduate philosophy course or consent of instructor.
  - 599. (3-6) Master's Thesis.
  - 601. (3-6) Doctoral Seminar.
- 677. (1½) Theories of Vocational Development.—Sociological and psychological aspects of career planning, theories of vocational development, vocational choice.
- 678. (1½) Counseling Theory and Procedures II.—Theories and procedures for counseling individuals with special problems in development requiring attitudinal and behavioural change; the counselor's function in community liaison.
- 679. (1½) Information Systems in Guidance and Counselling.—The application of automatic data processing to guidance and counselling in student accounting, job placement, information dissemination and in interviewing. Prerequisite: course in computer science.
- 682. (1½) Design and Analysis in Education Research II.—Prerequisite: Education 592.
  - 699. Doctoral Dissertation.

#### ELECTRICAL ENGINEERING—Ph.D. and M.A.Sc. degrees

Prerequisites—Graduation in Electrical Engineering, Engineering Physics, Honours Physics and Honours Math-Physics. Students, particularly those in

the Honours courses, may be required to supplement their graduate studies by taking certain undergraduate courses in Electrical Engineering.

Facilities are provided for research in: automata, computers, and switching theory; bio-electronics; communication theory and signal processing; control systems; lasers and quantum electronics; microwaves and plasmas; network theory; nonlinear systems; power systems and electrical machines; radio astronomy instrumentation; solid-state electronics and thin films.

### Ph.D. Degree:

Course—Includes a thesis and 18 units of approved courses. For those holding a Master's degree or transferring from a Master's programme appropriate credit will be given for courses completed.

M.A.Sc. Degree for Graduates in Electrical Engineering and Engineering Physics:

Course—Includes a thesis and 12 units of approved courses, 6 units of which must be at the graduate level within the Department and 3 units in other Departments.

M.A.Sc. Degree for Graduates in Honours Physics or Honours Math-Physics:

Course—Includes a thesis and at least 12 units of approved courses, 6 units of which must be taken at the graduate level within the Department; additional course requirements will depend on the student's academic qualifications.

Students should consult the Department for information regarding courses to be offered in 1969-70.

- 551. (2) Applied Electromagnetic Theory.—Basic relations, concepts and theorems; Green's functions; transverse electromagnetic waves; transmission lines, cylindrical and surface waveguides; problems involving plane-wave, cylindrical-wave and spherical-wave functions; perturbational and variational techniques and applications; radiation.
- 553. (2) Electric Power Systems.—Matrix and network theory, power flow, stability, computer studies of power systems, power system parameters.
- 555 (1) Computational Techniques in Systems Optimization and Identification.—Gradient methods, gradient acceleration methods, dynamic optimization methods and their application to system engineering problems. Identification of system parameters by numerical techniques and special purpose on-line computers. Identification of the state of a system by adaptive parameter tracking models and by Kalman filtering methods.
- 557. (2) Non-linear Systems.—Analytical and graphical techniques applied to non-linear and time-varying systems. Stability via Liapunov's Direct Method. Applications to engineering problems.
- 559. (1) Electronic Instrumentation.—Theory and design of pulse circuits for generating, amplifying and measuring non-sinusoidal wave forms; applications in communication, instrumentation and control. Textbook: Millman and Taub, Pulse and Digital Circuits.
- 561. (2) Network Theory.—Analysis and synthesis of linear electrical networks.
- 563. (2) Theory of Automatic Control.—Linear feedback systems. Synthesis of optimum time-invariant linear systems. Theory of optimal control

of linear and non-linear systems based on the principle of optimality and the calculus of variations.

- 565. (2) Communication Theory.—Axiomatic formulation of probability theory, random variables and functions of random variables, random processes; correlation functions and power density spectra, sampling theory, central limit theorem, Karhunen-Loéve expansion, transmission of signals through linear and non-linear systems, optimum systems; introduction to coding theory and to the statistical theory of signal detection. An introduction to the statistical theory of communication; correlation methods for the detection of signals in noise; optimization of linear systems.
- 567. (1) Analogue Computers. The electronic and electromechanical components used in analogue computation. Specialized circuitry and methods for function generation, multiplication and the solution of trigonometric problems. Various types of analogue computers and their applications in communications and control systems. Network analogues.
- 569. (2) Logic Design.—Representation of logical functions, simplification methods, and realizations using logic modules, multivalued logics, number systems, synchronous sequential machines, state minimization, machine decomposition, elementary automata studies.
  - 571. (1-2) Electrical Engineering Seminar and Special Problems.
- 573. (1) Synchronous Machine Dynamics.—State variable equations of synchronous machine and controllers, stability of linearized system, eigensystem sensitivity analysis and application of optimal control, nonlinear power system stability, synchronization and other synchronous machine problems.
- 575. (1) Signal Processing.—Representation of signals and noise; the detection of signals in noise, matched filter design, correlation methods; general linear, nonlinear and logical signal processing techniques; sampled-data systems and digital filtering; optical signal processing; signal-processing arrays; optimum signal design for radar and sonar; applications in communications, instrumentation and detection systems.
- 577. (2) Matrix Analysis of Electrical Machines.—Tensor concepts applied to electrical engineering problems; the theory of generalized machines; coordinate transformations for various reference frames; the analysis of power and control machines; the synchronous machine and power system problems.
- 579. (1) Solid-State Electronics.—Theory and measurement of simplifying properties and noise performance of parametric amplifiers, tunnel diodes, masers, lasers and other solid-state devices of current interest.
- 581. (2) Electrodynamics.—Field tensors; Maxwell's equations and relativity theory; electron ballistics using Lagrangian and Hamiltonian mechanics; spacecharge waves in electron beams; Cherenkov radiation.
- 583. (2) Microwave Measurements and Techniques.—Theory and techniques for the measurement of wavelength and frequency, impedance, attenuation, Q-factor, power, receiver and transmitter characteristics, antenna characteristics and properties of materials.
- 585. (2) Antennas and Radio Propagation.—Elementary dipole and loop antennas. Parabolic and other reflectors. Antenna arrays. Interferometer techniques. Noise temperature of antennas. Propagation of radio waves. Applications to broadcasting, microwave links, satellite communications, and radio astronomy.
- 587. (2) Thin Film and Solid-State Electronic Devices.—Theory of electronic states and conductivity in semiconductors. Defects in crystals and

ionic transport processes. Technique of thin films. Fabrication and theory of operation of various solid state devices. Integrated and thin film circuitry.

- 589. (2) Man-machine Communication.—Information channel and the source-receiver encoder; fidelity measures of a communication system; characteristics of the human operator, mechanical properties of the ear, basic correlates of the auditory stimulus and the visual stimulus; models of visual and auditory perception; data processing using optical methods; holography and the human operator.
- 591. (2) Engineering Applications of Analogue and Hybrid Computers.—Programming of system equations, time and amplitude scaling, optimization techniques, partial differential equations, application to the study of control systems.
- 593. (1) Instrumentation for Radio-Astronomy.—Dish antennas and antenna arrays. Interferometers. Aperture synthesis and supersynthesis. Lownoise preamplifiers. Multi-channel receivers. Smoothing and data reduction. This course complements Physics 570, which deals with observations and theories resulting from radio-astronomical work.
- 595. (2) Digital Systems Engineering.—The design of systems to perform data acquisition, display, and control. The role of a programmable component in modern digital systems. The interplay between hardware and software in digital system design. Implementation of digital systems using discrete and integrated components. Detailed analysis of representative pulse circuit—speed considerations, worst case design, device limitations, noise factors, etc. Elementary real-time programming.
  - 599. Thesis.—For the M.A.Sc. degree.
  - 699. Thesis.—For the Ph.D. degree.

# ENGINEERING PHYSICS—M.A.Sc. degree

See Physics

#### ENGLISH—Ph.D. and M.A. degrees

Professor and Head: G. H. Durrant (until June 30, 1969).

Professors: G. P. V. Akrigg, W. E. Fredeman, Elliott B. Gose, Edmund Morrison, William Robbins, M. W. Steinberg, W. M. Thompson.

Associate Professors: Keith Alldritt, D. M. Beach, Geoffrey Creigh, Jan de Bruyn, W. F. Hall, James A. Hart, V. G. Hopwood, John F. Hulcoop, R. W. Ingram, J. A. Lavin, Patricia Merivale, Craig W. Miller, A. E. Piloto, Philip Pinkus, P. A. Quartermain, Ian S. Ross, J. G. Spaulding, P. G. Stanwood, Donald Stephens, S. W. Stevenson, Bickford Sylvester, Warren Tallman, J. D. Wigod. Assistant Professors: Thomas E. Blom, Frederick Bowers, Andrew Busza, Ernest J. Carter, John Doheny, David L. Evans, George Garnett, Michael Goldberg, Bruce L. Grenberg, D. D. Gustafson, Ronald C. Johnson, A. R. Kilgallin, E. Ross Labrie, David Macaree, Brian H. Mayne, W. E. Messenger, Ruby D. Nemser, William H. New, F. S. Newby, David L. Powell, Grosvenor E. Powell, H. J. Rosengarten, Roger G. Seamon, J. F. Stewart, F. E. Stockholder, Peter A. Taylor, L. M. Whitehead, F. H. Whitman, W. E. Yeomans.

Instructors: A. R. Shucard.

University Professor of English: Roy Daniells.

The Department offers opportunities for advanced study in English, American, Canadian, and Commonwealth Literature, and in English language. The graduate teaching staff numbers approximately 50, and the Library has good working collections in most areas and particularly strong collections of periodicals, Burns materials, Canadiana, and—in the Colbeck Collection—nineteenth— and early twentieth-century English literature. Seminars are offered annually in the major periods, figures, and genres. For requirements, students are referred to the Departmental Graduate Handbook.

- 501. (1-3) Bibliography and Methods.—Required of all graduate students lacking the equivalent. (1969-70: Mr. Fredeman et al.)
- 503. (3) Studies in Prose.—(1969-70: Hume and eighteenth-century literary criticism: Mr. Ross)
- 504. (3) Studies in Drama. (1969-70: Artifice in the theatre and the play: Mr. Ingram)
  - **505. (3)** Studies in Fiction.—(Not offered in 1969-70.)
- 506. (3) Studies in Poetry.—(1969-70: Donne and T. S. Eliot: Mr. Stanwood)
- 507. (3) Studies in Criticism.—(1969-70: American poetic theory: Mr. G. Powell)
- 508. (3) Studies in the History and Structure of the English Language.— (1969-70: Colloquial English, mainly 1500-1750: Mr. Bowers)
  - 510. (3) Old English Studies.—(Not offered 1969-70.)
- 512. (3) Middle English Studies.—(1969-70: Selected Middle English themes: Mr. Thompson)
  - 515. (3) Shakespeare.—(1969-70: Drama and society: Mr. Akrigg)
  - 519. (3) Studies in the Sixteenth Century.—(Not offered 1969-70.)
- 520. (3) Studies in the Seventeenth Century.—(1969-70: Milton: Mr. Daniells)
- 525. (3) Studies in the Eighteenth Century.—(1969-70: The eighteenth-century novel: Mr. Blom)
- 530. (3) Studies in the Romantic Period.—(1969-70: Section 1: Wordsworth: Mr. Durrant. Section 2: Blake: Mr. Stevenson and Mr. Taylor)
- 535. (3) Studies in the Victorian Period.—(1969-70: The Pre-Raphaelites: Mr. Fredeman)
- 539. (3) Studies in the Twentieth Century.—(1969-70: Innovation and tradition in modern British poetry: Mr. Alldritt)
- 540. (3) Studies in American Literature to 1890.—(1969-70: Melville: Mr. Grenberg)

- 545. (3) Studies in American Literature since 1890.—(1969-70: Faulkner, Ransom, and Tennessee Williams: Mr. Hart)
  - 547. (1-3) Directed reading in fields in which no courses are offered.
- 548. (3) Studies in Canadian Literature.—(1969-70: The Canadian novel, mainly since 1930: Mr. Stephens)
- 549. (3-9) Master's Thesis.—(A student with high standing may be permitted to submit a body of creative work for the Master's degree instead of an academic thesis. Such a student must obtain at least 12 units of graduate credit in English courses and seminars, and satisfy all other requirements of the Master's programme in English.)
  - 649. Ph.D. Thesis.

# FINE ARTS-M.A. degree

Professors: R. C. Cragg, Shuichi Kato.

Associate Professors: Mary Morehart, Ian McNairn.

Assistant Professor: George Rosenberg.

Instructors: Harold Kalman, Ian Wallace.

The Department offers an M.A. in Fine Arts, with opportunities for advanced study in the major periods of Western Art from the medieval to the contemporary period; in the area of Fine Arts Criticism and Methodology; and in the field of Oriental Art. In conjunction with the Department of Anthropology and Sociology, advanced work can also be done in the field of Northwest Coast Indian Art.

Within all of these fields, the Library holdings are substantial enough to support advanced work in major topics and areas. As regards first hand access to actual works of art in connection with M.A. studies, the immediate area of Vancouver only offers this opportunity in the fields of modern and contemporary Canadian painting and sculpture, Canadian architecture, and Northwest Coast Indian Art. Where possible, however, students working in other fields are encouraged to travel at least once during their M.A. work, to study at first hand some of the works of art from the periods and topics in which they are specializing, particularly with respect to the M.A. thesis, where such travel may be essential.

A detailed brochure, covering the Department's B.A. and M.A. programmes, is available on enquiry from the Department. It describes the requirements for the M.A. programme (including the language requirements), the nature of the M.A. thesis, and related matters.

#### Courses

Students should check with the Department as to which courses will be offered in any one year.

- 525. (3) Studies in Mediaeval Art.
- 526. (3) Studies in Oriental Art.

- 527. (3) Studies in Canadian Art.
- 530. (3) Studies in Ancient Art.
- 531. (3) Studies in Renaissance Art.
- 532. (3) Studies in Seventeenth-and Eighteenth-Century Art.
- 533. (3) Studies in Nineteenth-and Twentieth-Century Art.
- 536. (3) Problems in Fine Arts Criticism and Methodology.
- 537. (3) Theory and Criticism of Oriental Art.
- 540. (3) Directed Study in the Visual Arts.
- 541. (3) Special Advanced Courses.
- 549. (3-6) Master's Thesis.

# INSTITUTE OF FISHERIES-including Resources Science Centre

Professor and Director: P. A. Larkin (Zoology).

Professors: I. McT. Cowan (Zoology, and Dean of the Faculty of Graduate Studies), W. S. Hoar (Zoology), C. S. Holling (Zoology), J. Kane (Mathematics and Zoology), N. J. Wilimovsky.

Associate Professors: I. E. Efford (Zoology), J. D. McPhail.

Assistant Professors: T. G. Northcote (Part-time), C. F. Wehrhahn (Zoology).

Computer Analyst: S. W. Borden.

Head Librarian: H. Verwey.

Lecturers from other Faculties: G. F. Curtis (Professor and Dean of the Faculty of Law), H. B. Hawthorn, Professor, Anthropology and Sociology), E. S. Pretious (Professor, Civil Engineering), A. D. Scott (Professor and Head of the Department of Economics), H. L. A. Tarr (Director, Pacific Fisheries Experimental Station, Research Board of Canada).

A student desiring to undertake graduate work in Fisheries should discuss his programme with the Director of the Institute of Fisheries.

The Institute of Fisheries is a part of the Faculty of Graduate Studies primarily concerned with research and teaching in all aspects of fisheries biology. The University of British Columbia is fortunately located for both freshwater and marine fisheries investigation. Federal, provincial and international government agencies conduct active research and management programmes in the immediate area and contribute to the training programme at the Institute. The fishing industry of the province actively supports the Institute's activities.

The Institute's activities are closely tied to those of the Department of Zoology. The Institute staff, together with ecologists in the Division of Community and Population Biology of the Department of Zoology, form an ecology group of wide-ranging interests. In the total complex, field and laboratory facilities of a wide variety are available for ecological studies as

well as for physiological and behavioural research. In addition to the university central computing facility, there is a small digital and analogue computing unit available for use of those in biological sciences.

Various University departments and faculties share interests in questions of resource use and provide courses that complement the training programme in the Institute. A resource science workshop encourages interdisciplinary studies involving Institute staff, and members of the Faculties of Agriculture and Forestry, the Department of Economics and Geography, and the School of Community and Regional Planning. Additionally, special courses in fisheries are offered in economics, law, engineering and anthropology.

All students are advised to enrol in Zoology 502, a general seminar in advanced ecology which has several informal special interest groups. The following courses are among those available and others may be arranged to meet needs of individual students:

## (I) Principles of Resource Ecology.

Zoology 421. (3) Principles of Applied Ecology.—Principles emerging from ecosystem concepts (community structure, stability, succession and energetics), population dynamics and population process analysis (predation, competition, dispersal, reproduction and energetics); their relevance to the management of biological resources; application of statistical and computer techniques for measuring, analyzing, describing and simulating resource systems; optimum yield of wildlife and fisheries resources; pest control.

Zoology 500. Special Advanced Courses.—Special advanced courses correlated with the work for the thesis may be arranged for a graduate student upon the approval of the Head of the Department. The credit will not be more than 3 units in any one such course.

Zoology 502. (3) Advanced Ecology.—Current problems in population and community ecology. Seminars and directed readings. Prerequisite: permission of instructors. Mr. Bendell, Mr. Chitty, Mr. Efford, Mr. Harger, Mr. Holling, Mr. Larkin.

Zoology 509. (1½) Population Genetics.—An introduction to the genetics of animal populations. (1970-71 and alternate years). Mr. Wehrhahn.

Zoology 527. (3) Theoretical Population Dynamics.—Discussion of dynamics of exploited populations and related theoretical population biology. Emphasis will be placed on Mathematical models and their application to population problems. (Offered as required.) Mr. Wilimovsky and Mr. Larkin.

# (II) Specific Areas of Study.

Zoology 520. (3) Limnology.—Physical, chemical and biological factors of lakes and streams in relation to productivity. Prerequisites: Zoology 301, 415. (1970-71 and alternate years.) Mr. Northcote.

Zoology 521. (3) Fisheries Biology and Management.—Consideration of the world fisheries resources; their population dynamics, harvest, technological, legal-social problems and a review of techniques pertinent to the management of commercial and game fishes of marine and inland waters. Prerequisite: Zoology 415 or permission of the instructor. Mr. Wilimovsky.

Zoology 522. (2) Limnology Seminar.—A seminar and reading course on recent advances in limnology. Prerequisite: Zoology 520 or by special arrangement. (1969-70 and alternate years.) Mr. Northcote.

Zoology 528. (3) Ichthyology A.—A comprehensive survey of the morphol-

ogy, phylogeny, paleontology, life histories and literature of primitive fishes, including Cyclostomes, Elasmobranchs, and the soft-rayed Teleosts. Lectures, seminars and laboratory dissection. Prerequisite: permission of instructor. (Offered as required.) Mr. Wilimovsky.

Zoology 529. (3) Ichthyology B.—A survey similar in treatment to Zoology 528 but covering primarily the Perciform fishes. Prerequisites: permission of instructor. (Offered as required.) Mr. Wilimovsky.

Note: Zoology 528 and 529 may be taken in the reverse order.

### (III) Related Disciplines.

Fisheries 500. (1) Fisheries Law.—A seminar course on the law governing fisheries and fisheries problems, with special reference to international aspects. (1970-71 and alternate years.) Mr. Curtis.

Fisheries 501. (1) Hydraulics.—A seminar course designed to acquaint the student with some hydraulic problems related to fisheries conservation. (1969-70 and alternate years.) Mr. Pretious.

Fisheries 502. (1) Anthropology.—A seminar course on the introduction of new techniques and knowledge in fisheries and related fields to non-industrialized societies, including a study of the cultural backgrounds in relation to the technical programmes of international organizations. Prerequisite: Anthropology 200. (1969-70 and alternate years.) Mr. Hawthorn.

Fisheries 503. (1) Economics.—A seminar course on the economics of natural resources with special reference to fisheries. Prerequisite: A special section of Economics 309. (1970-71 and alternate years.) Mr. Scott.

### FOOD SCIENCE—M.Sc. degree

Professor and Chairman: William D. Powrie. Associate Professor: Philip M. Townsley.

Assistant Professor: Shuryo Nakai.

The Department offers opportunities for advanced study in the fields of food chemistry, food physics and structural and environmental bromatology. Fundamental studies may be undertaken on any of the major food commodities. The Department is particularly well equipped for research in the areas of single cell culture, fermentation, chemical composition, rheological properties and sensory evaluation of foods. Equipment available to graduate students includes, an amino acid analyzer, preparative ultracentrifuge capable of sedimentation analysis, electrophoretic and chromatographic analysis equipment, differential thermal analyzer, recording spectrophotometer, Gammacell 220 irradiator, Haake viscometer, Allo-Kramer shear press, fermenter and incubators, a freeze-dryer and standard pilot plant equipment. The Library holdings in Food Science are extensive and include all major serials and reference works. In addition the Library has a particularly strong collection in the supporting sciences. There are 16 students currently pursuing advanced degrees in food science.

Further information may be obtained by writing to the Chairman of the Department.

#### Courses

- 500. (1-3) Graduate Seminar.
- 503. (1½) Advanced Dairy Chemistry.—Chemical and physical properties and mechanisms of stability change of milk proteins.
- 504. (1½) Sensory Properties of Food.—Chemical and physical processes underlying the sensory properties of food and their detection.
- 513. (1½) Advanced Cell Culture.—Intensive study of the products of selected cell cultures.
  - 530. (1-3) Directed Studies.
  - 549. (5-6) Master's Thesis.

## FORESTRY-Ph.D., M.Sc., M.F. and M.A.Sc. degrees

Professor and Dean: Joseph A. F. Gardner.

- Professors: Norman C. Franz, Bertram C. Goodell, Kenneth Graham, Philip G. Haddock, J. Harry G. Smith, Robert W. Wellwood, Jack W. Wilson, Raymond E. Foster.
- Associate Professors: Laszlo Adamovich, Antal Kozak, Walter W. Jeffrey, Robert W. Kennedy, Eric P. Swan, Oscar Sziklai, J. Vincent Thirgood.
- Assistant Professors: Conor W. Boyd, Peter J. Dooling, David Haley, Leonid Valg, Donald D. Munro, Bart J. van der Kamp, J. P. Kimmins, John G. Worrall.

### Ph.D. degree

Opportunities are offered for advanced study in certain fields concerned with the basic scientific or economic aspects of forestry. The Faculty of Forestry also co-operates with other departments in offering advanced work in such fields as forest ecology, forest genetics, forest hydrology, forest pathology, forest entomology, tree physiology, wood anatomy, chemistry and physics, and wildlife biology.

#### M.F. degree

In major branches of Forestry, including economics, entomology, fire control, forest hydrology, harvesting, management, mensuration, pathology, photogrammetry, products, recreation, silvics, silviculture, wildlife management, and wood science and engineering.

Prerequisite: Bachelor's degree equivalent to the B.S.F., or B.A.Sc. in Forest Engineering, of the University of British Columbia.

M.F. Course: Thesis, counting at least 3 units, at least 3 units chosen from graduate courses in the Faculty, including Forestry 553, and other courses to complete the requirements.

M.Sc. degree in fields as noted above for the Ph.D. degree.

Prerequisite: Graduation in Science, Applied Science, Agriculture or Forestry.

Course: Thesis, counting at least 3 units, at least 3 units chosen from graduate courses in Forestry, and other approved courses appropriate to the field of study.

## M.A.Sc. degree

Prerequisite: Graduation in Forest Engineering.

M.A.Sc. course includes at least 3 units chosen from graduate courses in Forestry, at least 3 units chosen from the 300, 400, or 500 series in a department of Applied Science, and other approved courses.

Formal lecture courses or seminars are indicated by a single unit value assigned to them. In all problem and research courses, as indicated by a variable number of units, individual laboratory or field investigations or reviews of literature are usually planned to serve the special interests of individual students. When several students have a similar interest in advanced study, formal lectures or seminars may be given.

The staff members listed with the graduate courses are responsible for their administration through the Graduate Program Committee. Staff members other than those listed may direct studies in specialized topics for interested students, on the recommendation of their program supervisors. Courses for graduate students are not ordinarily available to undergraduate students.

- 510. (3) Advanced Forest Entomology.—Problems and case studies considering current hypotheses, supporting evidence and design of experiments and surveys to test these. Mr. Graham. [2-0-2; 2-0-2]
- 518. (3) Advanced Forest Pathology.—Studies of hereditary, physiological anatomical, and microbiological factors of trees and pathogens that influence levels of resistance or susceptibility to disease. (Given in 1969-70 and alternate years.) Mr. van der Kamp.
  - 549. (3-6) Master's Thesis.
- 551. (1-3) Forest Fire Control.—Advanced study in fire control and use in forestry. Mr. Smith.
- 553. (1) General Forestry Seminar.—May be required for the first two years of residence of all graduate students in Forestry. Credit may be granted for each year taken. The Staff.
- 555. (1-3) Silvics and Silviculture.—Directed study in silvical characteristics of forest trees; silvicultural systems. Mr. Haddock, Mr. Sziklai and Mr. Thirgood.
- 556. (1) Forest Tree Seed.—Seed production, collection, provenance, testing, treatment, and the application of these to the practice of forestry. Mr. Haddock and Mr. Sziklai.
- 557. (1-3) Studies in Forest Genetics.—Problems associated with forest tree improvement; analysis of variation in tree quality. Mr. Sziklai.
- 558. (1-3) Studies in Forest Tree Physiology.—Principles of plant physiology as applied to problems in growth and development of tree species. Mr. Worrall.
- 560. (1-3) Advanced studies in Forest Mensuration.—Development and analysis of forest inventory systems; sequence and patterns of tree growth;

analysis of crown development; improvement of stand growth and yield; methods of bio-mass analysis. Mr. Munro, Mr. Smith.

- 561. (1-3) Advanced Studies in Forest Management.—Problems in forest and forest land management; planning and development of forestry or forest industry programs. Mr. Smith.
- 562. (3) Multiple Regression Methods.—Matrix algebra; algebra and inference of multiple linear and multiple curvilinear regressions for solutions of problems in forestry and related fields. Methods of least squares for analysis of variance and covariance. Introduction to multivariate statistical analysis. Mr. Kozak.
- 563. (1-3) Problems in Forest Land Management.—Mr. Jeffrey, Mr. Smith and Mr. Haley.
- 564. (1-3) Advanced Studies in Forest Photogrammetry.—Problems in photo-interpretation, photo-mensuration and forest-land classification. Mr. Munro.
- 566. (1-3) Problems in Statistical Methods.—Electronic computing for forestry and forest research; simulation, linear programming, decision theory, and other aspects of operations research. Mr. Boyd, Mr. Kozak, Mr. Smith, Mr. Valg.
- 567. (3) Forest Sampling Methods.—Principles and methods in the design of sample surveys for natural populations. Biases, variances and costs of estimators for simple random sampling, stratification, ratio estimation, cluster sampling, systematic sampling and selection with unequal probabilities. Mr. Munro.

  [2-0-2; 2-0-2]
- 568. (3) Dynamic Programming in Resource Allocation.—Mathematical background, classical optimization methods, principle of optimality in one, two, and three dimensions; dimensionality reduction; feedback mechanisms; examples from Forestry and Natural Sciences. Pre-requisites: linear algebra, calculus, probability theory, or consent of instructor. Mr. Boyd. [3-0-0; 3-0-0]
- 570. (1-3) Wood Science.—Research in basic wood and fibre properties; anatomy, chemistry and physics; analysis of variation in wood qualities; chemistry of wood extractives. Mr. Gardner, Mr. Franz, Mr. Wellwood, Mr. Wilson.
- 571. (2) Rheological Behaviours of Wood Base Materials.—Time dependent phenomena of the wood matrix and wood fibre webs; relation of polymer constructions with emphasis on wood molecular architecture; features of viscoelastic memory systems. Prerequisites: For. 270 and Math. 300, or taken concurrently. Textbook: Nielsen, Mechanical Properties of Polymers. Mr. Franz, Mr. Wilson and Mr. Wellwood.
- 572. (1-3) Problems in Forest Engineering.—Operational efficiency in logging; forest transportation systems; design and construction of simple structures. Mr. Adamovich and Mr. Boyd.
- 573. (1) Logging Cableways.—Location, design and construction of cableways. Mr. Adamovich.
- 574. (1) Wood and Pulp Science Seminar.—Participation in the development of critical attitudes on theory, techniques, classical contributions and current issues in wood and pulp science. Required each year of graduate student residence in the field of Wood and Pulp Science. Credit may be granted for each year taken. Prerequisites: For. 270 and 453, or equivalents. Pre-reading list will be furnished. The Staff.

- 575. (1-3) Problems in Forest Products.—Directed study in problems associated with the forest industries; utilization; integration; development and marketing of forest products. Mr. Wellwood.
- 576. (2) Energy Transfer Mechanisms in Wood and Related Products.—Response of high polymers to energy sources with special reference to chemical and physical effects on wood and related products; cross-linking, copolymerization and degradation reactions; ionizing radiation. Mr. Wilson and Mr. Paszner.

  [3-0-0; 0-3-0]
- 578. (1-3) Advanced Studies in Wood Products.—Research in the properties of solid and reconstituted wood products. Mr. Gardner, Mr. Fanz, Mr. Wellwood and Mr. Wilson.
- 579. (2) Origin of Wood Pulp Properties.—Exploration of basic interrelationships between wood characteristics, chemical and mechanical processing and wood pulp behaviours. Prerequisites: For. 270 and 479, or taken concurrently. Textbook: Rydholm, *Pulping Processes*. Mr. Wilson.

[3-0-0; 0-3-0]

- 580. (1-3) Studies in Forest Policy.—Mr. Thirgood.
- 581. (1-3) Advanced Studies in Forest Economics and Finance.—Operational efficiency in the forest industry; economics of reforestation, forest management, harvesting and forest products manufacture. Mr. Smith and Mr. Haley.
  - 582. (1-3) Research in Forest Hydrology.—Mr. Jeffrey.
  - 583. (1-3) Problems in Forest Watershed Management.—Mr. Jeffrey.
- **585. (2)** Research methods in Forest Hydrology.—Methodology and technique of studying the terrestrial components of the hydrological cycle, in relation to forest hydrology. Mr. Jeffrey. [0-0-0; 3-0-2]
  - 590. (1-3) Studies in Forest and Land Use History.—Mr. Thirgood.
- 591. (1-3) Studies in Forest Development Planning.—Silvicultural, managerial and manufacturing methodology for development with particular regard to the developing nations. Mr. Thirgood and Staff.
  - 593. (I-3) Problems in Forest Recreation Management. Mr. Dooling.
  - 594. (1-3) Research Methods in Forest Recreation. Mr. Dooling.
  - 595. (1-3) Problems in Forest Wildlife Management. The Staff.
  - 596. (1-3) Research Methods in Forest Wildlife Studies. The Staff.
  - 599. (3-6) M.A.Sc. Thesis.
  - 649. Ph.D. Thesis.

The Forest Products Laboratory of the Canada Department of Forestry and Rural Development is located on the campus and co-operates in respect to facilities, special equipment and research direction.

# FRENCH—Ph.D. and M.A. degrees

Professor and Head: Laurence L. Bongie.

Professors: Frédéric J. Grover, Gérard R. Tougas.

Associate Professors: Dominique Baudouin, Edward A. Bird, Katherine Brearley, Frank R. Hamlin, Harold C. Knutson, David J. Niederauer, Marguerite A. Primeau.

Assistant Professors: Heather Franklyn, Richard G. C. Holdaway, Alistair R. MacKay, Nicole A. D. Marzac, Edward J. Matte, Geoffrey P. Murray, Helen M. C. Purkis, Floyd B. St. Clair, Ruth L. White, Helen Wilkes.

Instructor: Olga B. Cragg.

The Department of French offers opportunities for advanced study in French Literature and French-Canadian Literature. For a detailed outline of specific Ph.D. and M.A. programmes and information about library resources, please write to the Graduate Advisor of the Department.

#### Courses and Seminars

- 500.  $(1\frac{1}{2})$  Bibliography and Methods.
- 501.  $(1\frac{1}{2}-3)$  Studies in the Literature of Mediaeval France.
- 502. (11/2-3) Studies in Sixteenth-Century Literature.
- 503. (11/2-3) French Society in the Seventeenth Century.
- 504. (11/2-3) Studies in the Seventeenth-Century Novel.
- 505. (11/2-3) Studies in Seventeenth-Century Drama.
- 506. (1½-3) Studies in the Eighteenth-Century Novel.
- 507. (11/2-3) The French Enlightenment.
- 508. (1½-3) Studies in French Romantic Literature.
- 509. (1½-3) Studies in Post-Romantic Nineteenth-Century Literature.
- 510.  $(1\frac{1}{2}-3)$  Modern French Poetry.
- 511. (1½-3) Contemporary French Literature.
- 512. (11/2-3) Studies in Literary Criticism.
- 513. (1½-3) Problems in French-Canadian Literature.
- 514.  $(1\frac{1}{2}$ -3) Problems relating to the French Novel.
- 515.  $(1\frac{1}{2}-3)$  Romance Philology.
- 516.  $(1\frac{1}{2}-3)$  Studies in the History of the French Language.
- 520. (3-6) French Language and Literature.
- 549. (3-6) Master's Thesis.
- 649. Ph.D. Thesis.

PLEASE NOTE: Not all of the above courses will be offered at any one time, although the Department endeavors to activate a representative and adequate number of them every year. As early as possible the Department makes available a list of courses to be offered, usually in February of the preceding academic year.

## GENETICS—Ph.D. and M.Sc. degrees

Professors: J. R. Miller (Medical Genetics), C. O. Person (Botany).

Associate Professors: C. W. Roberts (Poultry Science), D. Suzuki (Zoology).

Assistant Professor: R. A. J. Warren (Microbiology).

Although there is no Department of Genetics at U.B.C. advanced studies

leading to the M.Sc. or Ph.D. degree in genetics are available. Graduate courses in genetics are offered in the departments or divisions of Animal Science, Botany, Forestry, Medical Genetics, Microbiology, Plant Science, Poultry Science and Zoology.

Additional information on graduate programmes in genetics can be obtained from the departments and divisions listed above or from members of the Dean's Advisory Committee.

549. M.Sc. Thesis. 649. Ph.D. Thesis.

### GEOGRAPHY-Ph.D. and M.A. degrees

Professor and Head: J. D. Chapman.

Professors: J. Ross Mackay, J. V. R. Prescott (Visiting), J. Lewis Robinson.

Associate Professors: A. L. Farley, Gary R. Gates, W. G. Hardwick, J. V. Minghi, K. S. Sandhu, A. H. Siemens, J. K. Stager.

Assistant Professors: Richard Copley, John Hay, Roger Leigh, R. N. North, M. North, O. Slaymaker.

Lecturers from other Departments: W. H. Mathews, H. V. Warren (from Geology).

The Department offers M.A. and Ph.D. degrees emphasizing (1) physical geography—geomorphology (quantitative, fluvial, arctic and glacial), physical climatology and hydrology; (2) urban—functional and developmental aspects of cities, city regions and city systems; (3) economic—theoretical and technical aspects of the analysis of regional economies, regional economic development, spatial interaction, natural resources; (4) cultural and historical—cultural change and ecological adaptation in the Chinese culture realm, the colonial impact in S. and S.E. Asia, agrarian reform and resettlement in Latin America; and (5) political—political structure, process and behaviour in relation to boundaries, sovereignty over sea space, political integration and disintegration. The Department participates actively in several interdisciplinary programs: Arctic and Alpine, Hydrology, Resource Science, Urban and Transportation, Asian and Slavonic Studies. Field studies include ongoing projects in the W. Arctic and Cordilleran regions of Canada and special projects in Latin America and Asia. Regional interests within the department include: Western Canada (including the Western Arctic), the U.S.S.R., Latin America, Monsoon Asia, and Western Europe.

A detailed brochure is available on application to the Department describing its programs for the Ph.D. and M.A. degrees.

#### Courses and Seminars:

#### First Year:

500. ( $1\frac{1}{2}$ ) Physical Geography.

501. (1½) Economic Geography.

- 502. (1½) Cultural and Historical Geography.
- 503. (11/2) Political Geography.
- 504.  $(1\frac{1}{2})$  Quantitative and Dynamic Geomorphology.
- 505. (1½) Climatology and Hydrology.
- 506. (1½) Economic Geography.
- 507. (11/2) Urban Geography.
- 508. (11/2) Political Geography.
- 509. (1½) Cultural and Historical Geography.
- 510. (1½) Cartographic and Quantitative Analysis.
- 511. (1½) Modeling Techniques in Geography.
- 512. (1½) Techniques of Spatial Analysis.
- 513. (11/2) Research Sources for Regional Study.
- 514. (11/2) Contemporary Geographic Methodology.
- 515. (1½) History of Geographic Methodology.
- 521. (11/2) Permafrost.

#### Second Year and above:

- 560.  $(1\frac{1}{2}-3)$  Geomorphology.
- 570.  $(1\frac{1}{2}-3)$  Economic Geography.
- 571. (11/2-3) Urban and Transportation Geography.
- 580. (11/2-3) Canada.
- 581.  $(1\frac{1}{2}-3)$  Western Arctic.
- 582.  $(1\frac{1}{2}-3)$  Monsoon Asia.
- 583.  $(1\frac{1}{2}-3)$  U.S.S.R.
- 584.  $(1\frac{1}{2}-3)$  Latin America.
- 600. Doctoral Research Seminar.

# Readings and Theses:

- 550. (11/2-3) Directed Reading.
- 599. (3-6) M.A. Thesis.
- 699. Ph.D. Thesis.

# GEOLOGICAL ENGINEERING—M.A.Sc. degree

For list of Faculty members and courses see Geology.

Prerequisite: Graduation in Mining or Geological Engineering.

M.A.Sc. courses includes Thesis, counting at least 3 units, Geology 504, Geology 545, the required courses in the chosen option and other approved courses. (For doctoral studies see Geology.)

# GEOLOGY-Ph.D. and M.Sc. degrees

Professor and Head: Wm. H. Mathews.

Professors: W. R. Danner, K. C. McTaggart, Vladimir J. Okulitch, J. V. Ross, Glenn Rouse, H. V. Warren, Wm. Harrison White, J. R. Mackay (Geography), M. Y. Williams (Emeritus).

Associate Professors: Raymond V. Best, Robert E. Delavault, J. A. Gower, Hugh J. Greenwood, R. E. Kucera, Alastair J. Sinclair.

Assistant Professors: W. C. Barnes, R. L. St. L. Chase, E. P. Meagher, J. W. Murray.

Instructor: Alfred J. Akehurst.

## Ph.D. degree

Courses in Geology and related fields will be selected in consultation with the candidate's committee.

Generally, the candidate will select one of two broad programmes:

- (a) Economic geology, mineralogy, petrology and structural geology.
- (b) Palaeontology, stratigraphy, and sedimentation.

All candidates, however, must attain reasonable competence in all of these fields.

The thesis will generally require as a basis field work that may take several months to complete.

# M.Sc. degree

Prerequisite: Honours or major in Geology. Course includes Thesis, Geology 504, and Geology 545.

- 504. (1) Advanced Structural Geology.—A course dealing with major problems of earth structure. Mr. Chase.
- 511. (3) Geology of North America.—Evolution of the continent of North America and stratigraphy, structure, and geomorphology of Alaska, Canada, United States, Greenland, Mexico, Caribbean Area, Hawaiian Islands and the eastern Pacific Ocean. Emphasis on the study of geologic features of special interest in these areas including fossil localities. Mr. Danner. (Given in 1968-69 and alternate years.)
- 514. (3) Problems of Stratigraphy.—Seminar and laboratory. Problems of clastic, nonclastic and volcanic-sedimentary deposition. Stratigraphic paleontology. Emphasis on the stratigraphic associations of the eugeosynclinal or volcanic belts. Given in alternate years starting 1969-70. Mr. Danner, Mr. Murray, Mr. Ross.
- 519. (1½) Seminar in Sedimentology.—Principles of sedimentation as applied to modern and ancient deposits. Mr. Murray.
- 520.  $(1\frac{1}{2})$  Problems in Sedimentology.—Directed studies of sediments and sedimentary rocks. Prerequisite: Geology 401 or equivalent. Mr. Barnes.
  - 521. (3) Problems in Paleontology.—Seminar; principles of paleontology,

taxonomy and evolution applied to selected pre-Cenozoic metazoan invertebrate groups; alternates with 531. Prerequisite: Geology 306. Mr. Best.

- 524. (3) Advanced Geochemistry (Mineral Research).—Study of approved problems, using advanced techniques. Prerequisite: Geology 324 or equivalent. Mr. Delavault.
- 526. (3) Mineral Deposits.—Seminar; character, origin, and structure of mineral deposits, with emphasis on ore deposits. Mr. White.
- 531. (3) Advanced Invertebrate Paleontology. Alternates with Geology 521. Selected groups of fossils, special problems of paleontology, paleontological techniques. Prerequisite: Geology 306. Mr. Okulitch.
- 533. (1½) X-ray Mineralogy.—Fundamentals of X-ray diffraction with emphasis on applications in mineralogy. Powder and single crystal methods are discussed and utilized in laboratory assignments. Mr. Meagher.
- 534. (1½) Mechanics of Natural Deformation.—Lectures and laboratory problems. Mr. Ross.
- 541. (3) Paleobotany.—Origin and history of plants through the geologic time. The floras of Paleozic, Mesozoic and Cenozoic era. Techniques of collecting, preparation and identification of fossil plants and pollen. The use of fossil plants as indicators of geological age and ecology. Prerequisite: Geology 306. (Given in 1970-71 and alternate years.) Mr. Rouse.
- 543. (1½) Advanced Mineralogy.—Seminars and lectures. Advanced study of the crystal chemistry of minerals. Mr. Meagher.
- 544. (1½) Rheology and Analysis of Natural Deformation.—Lectures and laboratory and/or problems. Mr. Ross.
- 545. (1) Reading Course.—Assigned reading dealing with problems of geology. Required of all graduate students.
- 546. (1-3) Directed Studies in Geology.—Advanced studies under the direction of a staff member may be arranged in special cases with the approval of the Head of the Department.
  - 549. Master's Thesis.
- 554. (1½) Structure and Properties of Crystals and Crystal Aggregates.—Seminar and laboratory. Mr. Ross.
- 555. (1) Advanced Igneous Petrology.—Seminar and laboratory. Mr. Mc-Taggart.
- 558. (2-3) Theory of ore search.—Lectures, seminars and problem sessions in the selection and evaluation of areas of search for economic mineral deposits; appraisal of geological, geophysical, and geochemical methods and data; economic considerations. Case histories. Prerequisite, Geology 408. Mineral Engineering 351 to be taken previously or concurrently. Mr. Gower.
- 565. (1) Advanced Metamorphic Petrology.—Seminar and laboratory. Mr. McTaggart.
- 575. (1) Geological Phase Equilibrium.—Seminar and problems. Mr. Greenwood.
- 585. (1) Equilibria in Mineral Systems.—Seminar and problems. Mr. Greenwood.
  - 649. Ph.D. Thesis.

# GEOPHYSICS—Ph.D., M.Sc. and M.A.Sc. degrees

Professor and Head: R. Doncaster Russell.

Professor: Michael W. Ovenden (Astronomy).

Associate Professors: Robert M. Ellis, William F. Slawson, Tadeusz J. Ulrych, Gordon A. H. Walker (Astronomy), Tomiya Watanabe.

Assistant Professors: Jason R. Auman (Astronomy), Garry K. C. Clarke, Douglas E. Smylie.

Lecturer: Jean K. Petrie.

The Department offers facilities for research in a number of fields of Geophysics and Astronomy, including the following:

## (a) Astronomy and astrophysics

Studies of stellar spectra are undertaken to examine the chemical and physical properties of stellar atmospheres, and the velocities of stars in space. Fields of special study include binary and multiple star systems, and galactic dynamics. Facilities include a Zeiss Abbé Comparator, and a fully-digitized Joyce-Loebl microdensitometer. The Department has a ten-inch telescope, and faculty and graduate students use the 48-inch and 72-inch telescopes of the Dominion Astrophysical Observatory (at the discretion of the Director).

Theoretical work on the structure of stellar atmospheres is undertaken, with special reference to the atmosphere of late-type stars, and of the components of close binary systems.

# (b) Earth Mechanics

Theoretical studies on the rotation of the Earth, the dislocation representation of earthquake faulting and the main magnetic field are in progress. A laboratory model of thermal convection under rotation and a central force is being developed to aid in the study of planetary magnetic fields and atmospheres.

Theoretical investigations of mechanisms for glacier surging, and the mechanics of flow of non-linear fluids are being undertaken. Field measurements are made on the Fox Glacier in the Yukon Territory.

# (c) Geomagnetism and Upper Atmospheric Physics

The main emphasis has been on a study of micropulsations of the Earth's electromagnetic field. This has been extended to fundamental problems of the magnetosphere and other solar-terrestrial relationships. The emphasis is on the theoretical interpretation of observational results.

The secular variation and origin of the main magnetic field are also under

investigation.

#### (d) Instrumentation

Theoretical and experimental studies are made of electronic, electro-mechanical and electro-optical devices for geophysical and astrophysical measurement. Noise studies and feedback and servo-systems are of special

interest. Mass-spectrometer instrumentation has been a principal field of investigation. Experimental work on the optimum recording of optical images, and the extraction of information from spectrograms, is being undertaken, with specific application to astronomy and astrophysics.

## (e) Isotopic Studies and Mass Spectrometry

The facilities include three mass-spectrometers, each of which can give direct digital output on IBM-compatible magnetic tape. Most work to date has been on common lead isotopes, but now includes rubidium-strontium geochronology and common strontium isotope studies. The Department also operates, with the Department of Geology, a mass-spectrometer for argon studies. The application of mass-spectrometer techniques to various geophysical studies is being actively pursued.

# (f) Seismology

Theoretical and experimental studies of body and surface waves are in progress with emphasis on the effect of the crust on P waves and analysis techniques. The facilities include three portable FM tape recording seismograph systems suitable for both earthquake and explosion studies and two analog-to-digital conversion systems (magnetic tape to magnetic tape and chart to magnetic tape).

## Ph.D., M.Sc., and M.A.Sc. Degrees

Candidates are expected to have the equivalent of an Honours Degree in Science or Engineering, with a firm background of mathematics and physics up to fourth-year level. While some undergraduate instruction in geophysics, geology or astronomy (as appropriate) is an advantage, it is in no way a prerequisite for entry into graduate programmes of the Department. Students enrolled for a degree in Geophysics with no formal training in geology may be required to take Geophysics 502. Students enrolled for a degree in Astronomy with no formal training in astronomy will be required to take Astronomy 421.

The 6-unit M.Sc. thesis is normal in the Department. Only in exceptional circumstances will a 9-unit thesis be approved. Geophysics 501 and Physics 502 are required courses.

A leaflet giving further details of the degree programmes and the availability of financial support for students may be obtained on application to the Department.

#### General Courses:

- 501. (2) Topics in Geophysics and Astronomy.—This course is required of all graduate students enrolled in the Department of Geophysics. They will choose, in consultation with their supervisors, six of the available topics, which at the present time include: Astronomy, Cosmogony and cosmochemistry, Aeronomy, Geomagnetism, Seismology, Isotope Geophysics, Physics of the Earth's Interior, and Tectonophysics. Each of the sections will occupy about three weeks of lectures.
  - 520. (1-3) Directed Studies in Geophysics and Astronomy.
  - 521. (1) Modern Aspects of Geophysics.—A seminar course.
  - 549. (6) M.Sc. Thesis. 599. (6) M.A.Sc. Thesis.

  - 649. Ph.D. Thesis.

### **Astronomy Courses**

- 421. (3) Principles of Modern Astronomy.—An introduction to the interpretation of astronomical observations through physical principles. Topics include the internal structure of the Earth and Planets; the solar atmosphere and solar wind; the origin of stellar spectra; stellar energy generation; intersteller matter; cosmology. (For honours students, and graduate students with no formal astronomical instruction.)
- 515. (1-2) Stellar Structure.—Stellar models, cosmochemistry, and related problems.
- 561. (1-2) The Basic Data of Astronomy.—A critical survey of the accuracy of such basic data as stellar masses, luminosities, temperatures, distances, etc., with emphasis on the most important fields for future work.
- 562. (1-2) Stellar Spectroscopy and Stellar Atmospheres.—Quantitative measurement of stellar spectra, and the physical basis for the interpretation of such measurements.

## Geophysics Courses

- 502. (2) Principles of Earth Science.—A detailed discussion of geologic evidence bearing on graduate research in the Geophysics Department. Prerequisite: consent of the instructor.
- 511. (1-2) Seismology.—Theory of seismic waves and seismographs; focal mechanism, magnitude and statistics of earthquakes; interpretation of surface wave dispersion curves.
- 512. (1-2) Geomagnetism and Aeronomy.—Transient variations, magnetic storms and ionospheric disturbances.
- 513. (1-2) Radioactive and Isotopic Processes in Geophysics. Modern methods of geochronology and the application of mass spectrometry to geological studies.
- 514. (1-2) Geophysical Analysis.—A discussion of the analysis and interpretation of geophysical phenomena; analytical treatment, numerical procedures, and application of statistical methods.

# GERMAN-Ph.D. and M.A. degrees

Professor and Head: Michael S. Batts.

Associate Professors: Helmut Koopmann (Visiting), James A. McNeely, Marketa C. Goetz Stankiewicz.

Assistant Professors: Ronald Beaumont, Maria Fürstenwald, Leslie L. Miller, J. Edward W. Mornin, Bernd Peschken, Peter A. Stenberg.

Instructors: Eherhard Frey, Horst Martin.

The Department of German offers courses leading to the degree of M.A. (with or without thesis) and Ph.D. The courses and seminars listed below are normally given either every year or every second year. For details concerning these courses and for information on specific requirements for graduate

degrees, application should be made to the Graduate Advisor or the Department of German.

The resources of the university library are adequate for research in all fields of German literature and are particularly strong in the mediaeval and the nineteenth-twentieth century areas. Funds are available for the acquisition of materials in areas in which graduate students develop specific interest. To complement library resources, the Department maintains a reading-room for graduate students, in which reference works, editions of standard authors, and some periodicals are kept.

In addition to inviting a Visiting Professor, the Department annually invites scholars of note from North America and Europe to give individual lectures and seminars.

### Ph.D. Degree

The Department should be consulted about fields in which it is prepared to direct specialized research for the Ph.D.

### M.A. Degree

Candidates must take an examination in the history of German literature.

- 501.  $(1\frac{1}{2}-3)$  Studies in the German Novel.
- 501. (1½-3) Studies in the German Novel.

  502. (1½-3) History of the German Language.

  503. (1½-3) Seminar in Modern Authors.

  504. (1½-3) Studies in Mediaeval Literature.

  505. (1½-3) Studies in Expressionism.

  506. (1½-3) Old Icelandic.

  508. (1½-3) Gothic and Comparative Germanic Linguistics.

  509. (1½-3) The Enlightenment.

  510. (1½-3) Studies in the Early Classical Period

- 510. (1½-3) Studies in the Early Classical Period.
  511. (1½-3) Studies in the Later Classical Period.
  512. (1½-3) Studies in Romanticism.

- 513. (1½-3) Studies in Romandersin.
  513. (1½-3) Seminar in Austrian Authors.
  514. (1½-3) Nineteenth-Century Realism.
  515. (1½-3) Contemporary Authors.
  516. (1½-3) Guided Research.
  517. (1½-3) Renaissance Studies.
  518. (1½-3) Studies in the Baroque.

- 519. (1½-3) "Sturm und Drang." 520. (1½-3) Nineteenth-Century Naturalism. 548. (1½-3) Bibliography and Methods.
- 549. (3) Master's Thesis.
- 649. Ph.D. Thesis.

## GREEK—M.A. degree (see Classics)

Normally, the thesis will be written on a Greek subject and the degree will be taken in Classics.

### HISPANIC AND ITALIAN STUDIES

Professor and Head: H. V. Livermore (Spanish and Portuguese).

Associate Professors: R. Giese (Italian), K. I. Kobbervig (Spanish), P. Macera (Spanish), J. A. McDonald (Spanish).

Assistant Professors: S. Ciccone (Italian), G. A. Comin (Italian), Mrs. M. G. R. Coope (Spanish), A. Pacheco (Spanish), S. Vosters (Spanish).

Instructor: Miss M. Tomsich.

# Spanish-M.A. degree

- 501. (3) Problems in Spanish Linguistics.
- 502. (3) Mediaeval Studies.
- 503. (3) The Golden Age.
- 504. (3) The Eighteenth Century and Romanticism.
- 505. (3) Contemporary Spanish Literature.
- 506. (3) Latin-American Studies.
- 520. (3) Spanish Language and Literature.
- 549. (3-6) Master's Thesis.

# Italian-M.A. degree

- 500. (3) Bibliographic survey of Italian Literature.
- 501. (3) Dante: The Minor Works.
- 502. (3) Dante: The Divine Comedy.
- 505. (3) Studies in the Literature of the Renaissance.
- 510. (3) Studies in Modern Italian Literature.
- 515. (3) History of the Italian Language.
- 520. (3) Italian Language and Literature.
- 549. (3-6) Master's Thesis.

# HISTORY—Ph.D. and M.A. degrees

Professor and Head: Margaret A. Ormsby.

Professors: Ivan Avakumovic, John S. Conway, Brian Harrison, Harvey Mitchell, Grady McWhiney, John M. Norris.

Associate Professors: James M. Bak, A. Jean Elder, T. J. Hanrahan, L. E. Hill, Charles W. Humphries, Robert V. Kubicek, Stanley Z. Pech, Margaret E. Prang, Allen A. Sinel, Murray M. Tolmie, Leslie F. S. Upton, Robert C. Walton, James H. Winter.

Assistant Professors: E. J. Hundert, Daniel M. Klang, J. E. Lawrence, Fritz Lehmann, A. N. McDonald, Frank O. Marzari, H. V. Nelles, Christopher W. Stocker.

Instructors: June I. Gow, S. M. Greenwood, H. K. Ralston, A. C. L. Smith, Richard Tyler.

Lecturers from other Departments: Peter Harnetty, William L. Holland, John F. Howes (Asian Studies); Bogdan Czaykowski (Slavonic Studies).

The Department offers opportunities for advanced study in the fields of American, Asian, Canadian, British, European, and British Imperial and Commonwealth History. The Library's holdings, which are adequate to support work in all of these fields, are particularly strong in serials, including newspapers. There are notable collections in the history of the American West, Canadian history (the Howay-Reid collection of Canadian history and literature contains 12,000 volumes; British Columbia History is a strong area, and the French-Canadian history section is well developed), French history (particularly the 18th century and the Revolutionary and Napoleonic periods), and the history of the Slavic peoples and nations of Eastern Europe. In certain fields (classical and pre-modern Asian history) advanced degrees can be arranged in cooperation with other departments. The Library's holdings are strong in Greek history and very strong in East Asian history, in which holdings exceed 100,000 volumes. The Library is a depository for publications of the United Nations, the Canadian government, and Research Libraries, Chicago, and the Association for Research Libraries. The Department of History is a member of the Institute of Historical Research of the University of London, and its students are entitled to use the facilities of the Institute, including attendance at seminars, when carrying out research in England.

A detailed brochure is available on application to the Department describing its programs for the Ph.D. and M.A. degrees.

### Courses and Seminars

- 500-04. (3) Readings in Canadian History.
- 505-09. (6) Seminar in Canadian History.
- 510-14. (3) Readings in American History.
- 515-19. (6) Seminar in American History.
- 520-24. (3) Readings in British History.
- 525-29. (6) Seminar in British History.
- 530-32. (3) Readings in Imperial-Commonwealth History.
- 533-34. (6) Seminar in Imperial-Commonwealth History.
- 535-37. (3) Readings in Medieval History.
- 538-39. (6) Seminar in Medieval History.
- 540-42. (3) Readings in Renaissance-Reformation History.
- 543-44. (6) Seminar in Renaissance-Reformation History.
- 547. (3) Readings: Special Topics in History.
- 548. (6) Historiography.
- 549. (6) Master's Thesis.
- 550-52. (3) Readings in French History.
- 553-54. (6) Seminar in French History.

- 555-57. (3) Readings in German History.
- 558-59. (6) Seminar in German History.
- 560-64. (3) Readings in Russian and East European History.
- 565-69. (6) Seminar in Russian and East European History.
- 570-74. (3) Readings in Asian History.
- 575-79. (6) Seminar in Asian History.
- 580-81. (3) Readings in Intellectual History.
- 584-85. (3) Readings in Economic and Social History.
- 587-88. (3) Readings in Diplomatic History.
- 589. (6) Seminar in Diplomatic History.
- 590-91. (3) Readings in Ecclesiastical History.
- 593-94. (3) Readings in Military History.
- 649. Ph.D. Thesis.

#### HOME ECONOMICS-M.Sc.

Professor and Director: Melvin Lee.

Assistant Professors: J. A. Birkbeck, I. D. Desai, G. S. Myers.

Instructors: C. Daem, J. Nettleton, R. Reyburn.

The School of Home Economics offers opportunities for advanced study in Human Nutrition, with emphasis on Growth and Development, Vitamin Metabolism, Mineral Metabolism, Diet and Cell Metabolism, Lipid Metabolism, and evaluation and nutritional status. Laboratory and small animal facilities are available.

#### Courses:

- 511. (1) Current Topics in Protein and Amino Acid Nutrition
- 513. (1) Current Topics in Lipid Nutrition
- 515. (1) Current Topics in Vitamin Nutrition
- 517. (1) Current Topics in Mineral Nutrition
- 531. (1) Nutrition Seminar
- 547. (1-3) Directed Studies
- 549. (3-6) M.Sc. Thesis

#### HYDROLOGY

Opportunities are available for graduate work in hydrology on a variety of programmes. Individual courses pertaining to hydrology are available in the Departments of Agricultural Mechanics, Civil Engineering, Economics, Geology, Geography, Soil Science and the Institutes of Fisheries and Oceanography. Supervision of advanced work in various aspects of hydrology can be undertaken by most of these departments as well as by the Faculty of Forestry.

In some cases it may be possible for a student to complete a graduate programme entirely within the administrative framework of a single department.

The field of hydrology is, however, so broad that a student may be advised to follow an interdisciplinary programme, in which case his programme may be approved and supervised by an interdepartmental committee responsible directly to the Dean of Graduate Studies.

Students seeking admission to graduate work in hydrology should apply

directly to the Dean of Graduate Studies.

#### INSTITUTE OF INDUSTRIAL RELATIONS

Faculty Involved in Research in the Labour Field

Professor and Director: J. Tait Montague (Economics).

Professor: Stuart M. Jamieson (Economics).

Associate Professors: Noel A. Hall (Commerce and Business Administration), M. A. Hickling (Law), Martin Meissner (Sociology), John Vanderkamp (Economics), George A. Gray (Sociology), Vance F. Mitchell (Commerce and Business Administration).

Assistant Professors: Robert E. Knox (Psychology), Larry F. Moore (Commerce and Business Administration).

The Institute of Industrial Relations was set up in 1960 to encourage research in the broad field of industrial relations. Included within the scope of Institute studies are manpower analysis, collective bargaining studies, and the study of human relations issues as well as economic and social analyses of these areas. The Institute supports studies of industrial relations at graduate and faculty levels. Community activities have also been undertaken.

The programme is interdisciplinary in character. In cooperation with various departments of the University, the Institute endeavours to support many and varied areas of specialized reseach into industrial relations. Fellowships are provided for graduate students carrying on studies in the Social Science Departments of the Arts Faculty as well as in the Faculties of Law and Commerce. Faculty members carrying on research work are drawn from the faculty of the University.

Information with respect to course work or fellowships may be secured through the Director of the Institute.

Credit courses dealing with industrial relations issues are offered in Economics, Commerce, Law, Sociology and Psychology. Industrial relations is recognized as a field for specialization in appropriate courses of graduate studies. Degree requirements of the Faculties are listed elsewhere in this calendar.

The following courses are offered at the graduate level by the Departments indicated:

# Economics Department\*

Economics 507. (3) Labour Economics. — Wage theory; determinants of wage rates in organized and unorganized labour markets; collective bargaining and industrial conflict; impact of union policies on general economic stability and economic growth.

Economics 657. (1½) Topics in the Economics of Labour.—Labour market analysis and manpower policy; problems of labour mobility and structural unemployment; economics of human resources; distribution theory and analysis.

Economics 667. (1½) Topics in Industrial Relations.—Comparisons and contrasts in industrial relations systems in major industrial countries; comparative analysis of collective bargaining and industrial conflict.

## Anthropology and Sociology\*

Graduate training in the field of Industrial Sociology and Complex Organizations is provided through Sociology seminar 521.

#### Commerce and Business Administration\*

Commerce 520. (1½) Organizational Behaviour and Administration.—An examination of problems and issues in the administration of human resources in business organizations. The course will concentrate on specific behavioural and attitudinal problems which face the practicing manager. Concepts, theory and research from various social sciences will be presented in analyzing determinants of and possible solutions to the problems.

Commerce 521. (1½) Theory, Research and Methodology in the Study of Organizational Behaviour.—An attempt to identify and integrate various theoretical frameworks utilized in the study of behaviour in business organizations. Major empirical research findings will be reviewed in the light of the theoretical viewpoints discussed. Concomitantly, key methodological approaches and problems in behavioural research in business organizations will be illustrated.

Commerce 522. (1½) Selected Problems in Labour Relations.—An examination of contemporary problems of labour relations, with particular emphasis on public policy issues, conciliation, and arbitration procedures, the process of labour-management accommodation to technological change, the status of unions in society and their impact on the management of industrial and commercial enterprises.

Commerce 523. (1½) Seminar in Labour Relations—An examination of major research findings in selected areas of labour relations with particular reference to the growth and potential of labour unions, their impact on management, disputes settlement, public policy issues in labour-management relations and internal union structure.

#### Law

Law 315. Labour Law.—Two hours per week, spring term.

Union-management relations; the collective bargaining process; the collective agreement, arbitration and conciliation procedure. The relationship between the union and its members.

Seminars (Law 331).

Special Problems in Labour Law. An examination of concrete examples of problems of contract formation; specific problems in collective agreement observance. Participants in the seminar will be provided with evidence and argument relating to the range of problems which arbitration boards are called upon to consider and will produce and defend solutions to them.

# Psychology\*

Psychology 50t. (3) Social Psychology.

Psychology 508. (3) Human Factors and Systems-Research.

Psychology 515. (3) Psychology of Work.

\*All Departments listed above entertain submissions for thesis work in the broad field of labour, usually under a course headed 549 for M.A. thesis, and 649 for Ph.D. thesis. In addition, most departments have a directed study course under which further work in the labour field can be undertaken.

### INSTITUTE OF INTERNATIONAL RELATIONS

The Senate has authorized the establishment of an Institute of International Relations to encourage interdisciplinary research and study in the relations between states, their organizations and laws, and the social, political, and cultural conditions affecting those relations, organizations, and laws. Included within the scope of the Institute will be research in international politics and organization, diplomatic history, strategic studies, international legal problems, trade and development, and social science theory in so far as it helps describe or explain international relationships. The Institute will endeavour to support individual or group research projects at the graduate, post-doctoral, and faculty levels through grants, graduate and postdoctoral fellowships, professional conferences, publication subsidies, and other services. It will also seek to stimulate the development of courses with an international content throughout the departments of the University. The Institute itself will not offer courses or degree programmes. Membership or association with the Institute will be open to graduate students and faculty from all departments and faculties. It is hoped that the Institute's programme will commence in the near future.

Information regarding the programmes of the Institute may be obtained from K. J. Holsti, Department of Political Science.

#### INTERDISCIPLINARY STUDIES

The Faculty of Graduate Studies encourages the realignment of traditional disciplines into new patterns, crossing department and faculty boundaries where this will foster the development of new areas of learning.

Where such interdisciplinary arrangements, by virtue of major special facilities, regional orientation or patterns of approach, take on the character of departments they may be established as Schools or Institutes within the Faculty.

Less formal arrangements may be termed Areas and the graduate study and research in these will be under the coordination of special committees of the Faculty.

Where the programme of an individual graduate student does not fit into established departmental boundaries the Dean of the Faculty may set up an

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ad hoc committee to plan and guide the entire programme, including the administration of the comprehensive examination and overall direction of the thesis.

ITALIAN—M.A. degree (see Hispanic and Italian Studies)

LATIN—M.A. degree (see Classics)

LAW-LL.M. degree

Professor and Dean: G. F. Curtis.

Professors: C. B. Bourne, D. S. M. Huberman, K. M. Lysyk, A. J. McClean, D. I. MacDougall, J. M. MacIntyre, E. C. E. Todd.

Associate Professors: C. R. B. Dunlop, L. Getz, R. G. Herbert, M. A. Hickling, L. G. Jahnke, K. C. MacKenzie, J. C. Smith.

Assistant Professors: J. J. Atrens, P. G. Barton, S. H. Berner, P. T. Burns, J. T. English, W. H. Knight, D. L. Larson, A. W. Lucas, L. A. Powe.

### Purpose

The programme provides graduates with the opportunity for advanced legal education in preparation for law teaching, legal research, public service and the practice of law.

#### Standard of Admission

A candidate for admission to the graduate programme must demonstrate that he is qualified to engage in creditable research in Law by possessing an adequate academic foundation and a capacity for superior performance. He must have a Bachelor of Laws degree or its equivalent from an approved law school, and must have obtained First Class standing (deemed to be 75% in legal studies in the Faculty of Law) or its equivalent in at least two of the courses and at least Second Class standing or its equivalent in the remaining courses of the final year of work that is accepted by the Faculty of Law as prerequisite to the Master's programme.

A candidate's admission is not complete until his application has been accepted and his course of study has been approved by the Faculty of Law.

### Requirements of the Programme

The graduate programme in law is administered by the Faculty of Law. The requirements for the LL.M. are:

- (a) Full-time residence at the University for a minimum of one academic year (September to May).
- (b) Lectures and seminars amounting to eight class hours per week, chosen in consultation with the Faculty of Law. These may be courses presently offered by the Faculty of Law or may be arranged specially for candidates for the LL.M. A candidate must obtain an overall average of 65% on the work of the year. He may have no more than one mark falling below 65% and no mark below 60%.
- (c) A thesis of satisfactory quality prepared under the direction of a member of the Faculty of Law on a subject related to the general programme of study of the candidate. Its preparation should occupy half of the candidate's time in the programme. It should normally be completed within the period of residence, but in exceptional circumstances permission may be granted for its completion after the period of residence.
- (d) An oral examination covering the course work, the written work, or both. This requirement may be waived by the Faculty of Law.

## Areas of Study

The courses offered from year to year are listed and described in the annual Calendar of the Faculty of Law, which may be obtained from the Office of the Registrar.

The programme for each candidate will be designed to meet his special needs, interests, and previous experience. Special courses may be arranged to cover various areas of the law in which the Faculty of Law has special library or other facilities. Various members of the Faculty are prepared to supervise students writing their thesis in the specific fields of law outlined in the courses of study for the three undergraduate years, problems arising out of these courses, and such additional fields of study as may be arranged with the Faculty.

A candidate may be allowed to select courses in other faculties of the University in substitution for those mentioned in (b) above, but it is expected that the major part of his programme will be undertaken in the Faculty of Law. Some possible courses for the graduate law student are listed below, grouped under headings which indicate the relevant field of legal study.

#### Administrative Law:

Political Science 302 (Public Administration) Political Science 502 (Public Administration) Sociology 352 (Organizations)

# Government Regulation of Business:

Agricultural Economics 501 (Advanced Marketing)

#### Constitutional Law:

History 420 (Evolution of the Canadian Constitution)

Political Science 401 (half-course) (Legislative and Executive Processes ir Canada)

Political Science 402 (half-course) (Canadian Parties and Political Processes)

Political Science 403 (half-course) (Federalism in Canada)

Political Science 404 (half-course) (Local Government)

Political Science 407 (American Politics and Government)

Political Science 501 (Seminar in Canadian Government & Politics)

Political Science 506 (Political Development)

# Criminal Law:

Social Work 629 (Contemporary Issues in Corrections)

### International Law:

Political Science 308 (International Organization since 1919)

Political Science 409 (Comparative Foreign Policies)

Political Science 410 (International Violence and its Control)

Political Science 509 (International Organization)

## Jurisprudence:

Philosophy 212 (Logic and Scientific Reasoning)

Philosophy 301 (Ethics)

Philosophy 313 (Mediaeval Philosophy)

Philosophy 402 (Symbolic Logic)

Philosophy 424 (Philosophy of Social Science)

Philosophy 521 (Political Philosophy)

Political Science 500 (Political Theory)

#### Labour Law:

Commerce 322 (Labour Relations)

Economics 407 (Economics of Labour)

Economics 507 (Economics of Labour)

# Municipal Law:

Political Science 404 (half-course) (Local Government)

#### Land Use Control:

Commerce 307 (Urban Land Economics)

Commerce 309 (Real Estate Finance)

Commerce 407 (Real Estate Valuation)

Commerce 507 (Seminar in Contemporary Land Investment Problems)

Commerce 508 (Seminar in Government Policy in Urban Land Ownership)

#### Natural Resources:

Economics 409 (Economics of Natural Resources)

Economics 509 (Economics Analysis and Natural Resources)

Forestry 363 (Principles of Forest Land Management)

Forestry 463 (Forest Management)

Geography 337 (half-course) (Introduction to Political Geography) Geography 437 (half-course) (Political-Geographic Analysis)

### Taxation:

Economics 310 (Government Finance) Economics 510 (Government Finance) Commerce 552 (Seminar in Income Determination)

# Application

Candidates seeking admission to the graduate programme should obtain application forms and other information from the Registrar of the University. Completed forms must be received by the Registrar by February 1 preceding the academic year for which admission is sought.

### MATHEMATICS—Ph.D., M.Sc. and M.A. degrees

Professor and Head: R. D. James.

Professors: C. W. Clark, D. Derry, N. J. Divinsky, A. W. Goldie (Visiting), E. Leimanis, Z. A. Melzak, B. N. Moyls, D. C. Murdoch, S. W. Nash, R. Ree, R. A. Restrepo, M. Sion, C. A. Swanson.

Associate Professors: L. P. Belluce, A. T. Bui, P. S. Bullen, D. J. Bures, R. R. Christian, C. Fischer, E. E. Granirer, E. Luft, H. A. Thurston, R. Westwick, J. V. Whittaker.

Assistant Professors: S. Aalto, R. Adams, C. T. Anderson, M. Anvari, G. W. Bluman, D. W. Bressler, G. A. Brosamler, A. H. Cayford, B. Chang, T. Cramer, G. Crawford (Visiting), R. R. Douglas, J. J. Fournier, A. Frei, J. Gamst, E. Gerlach, P. E. Greenwood, J. G. Heywood (Visiting), K. Hoechsmann, G. Huige, F. Lemire, J. L. MacDonald, W. E. Meyers, L. A. Mysak, S. S. Page, R. C. Riddell, L. G. Roberts, C. L. Scheffer (Visiting), J. G. Schnute, R. S. Silverman, D. Sjerve, E. L. Sobel, U. Suter, H. Vogele, G. K. White, J. V. Zidek.

Lecturer: G. D. Johnson.

### Ph.D. degree

Programmes of study are offered in most branches of Pure and Applied Mathematics, including Numerical Analysis. A leaflet describing opportunities for reseach and programme requirements is available on request from the Department.

M.Sc. or M.A. degree

Prerequisite: Honours in Mathematics, or the equivalent; or the consent of the Department.

Students interested in graduate courses should consult the Department

- 501. (3) Measure Theory and Integration.
- 502. (3) Point Set Topology.
- 503. (3) Differential Geometry.
- 504. (3) Algebraic Geometry.
- 505. (3) Ordinary Differential Equations.
- 506. (3) Partial Differential Equations.
- 507. (3) Number Theory.
- 508. (3) Theory of Rings.
- 509. (3) Algebra II.
- 510. (3) Homological Algebra.
- 511. (3) Algebraic Topology.
- 512. (3) Theory of Groups.513. (3) Topological Groups.
- 514. (3) Nonlinear Differential Equations II.
- 515. (3) Integral Equations.
- 516. (3) Harmonic Analysis.
- 517. (3) Complex Analysis.
- 518. (3) Probability.
- 519. (3) Statistics.
- 520. (3) Numerical Analysis II.
- 521. (3) Functional Analysis.
- 522. (3) Geometric Topology.
- 523. (3) Theory of Games and Programming 524. (3) Operational Calculus.
- 525. (3) Fluid Mechanics.
- 526. (3) Dynamical Systems II. 527. (3) Theory of Elasticity.
- 530. (1-3) Topics in Algebra.

- 531. (1-3) Topics in Analysis.
  532. (1-3) Topics in Topology.
  533. (1-3) Topics in Geometry.
  534. (1-3) Topics in Applied Mathematics.
- 535. (1-3) Topics in Differential Equations.
- 536. (1-3) Topics in Numerical Analysis. 537. (1-3) Topics in Probability and Statistics.
- 538. (1-3) Topics in the Foundations of Mathematics.
- 539. (1-3) Topics in Functional Analysis. 549. (3-6) Thesis for Master's Degree. 649. Ph.D. Thesis.

## MECHANICAL ENGINEERING—Ph.D. and M.A.Sc. degrees

Professor and Head: James P. Duncan.

Professors: Christopher A. Brockley, Geoffrey V. Parkinson, Zeev Rotem, Vinod J. Modi, William O. Richmond.

Associate Professors: Edward G. Hauptmann, Muhammad Iqbal.

Assistant Professors: Ronald C. Hazell, Hilton Ramsey, Henry Vaughan, Karl V. Bury, Ian S. Gartshore, Thomas E. Siddon.

A prerequisite for enrolment as a graduate student in the Department is graduation at a high standard in mechanical or some other appropriate branch of engineering or in metallurgy at a recognized university.

The M.A.Sc. programme includes a minimum of 9 units for study courses elected to suit the candidate's intended field of research together with a thesis describing that research for which a minimum of 6 units may be given.

It is the normal departmental practice to register students initially for the M.A.Sc. degree. Registration as a candidate for the Ph.D. degree usually follows the award of the master's degree. However, if a student's performance prior to completion of the master's programme is of sufficiently high quality, his immediate elevation to the Ph.D. degree programme may be recommended by supervising faculty.

The Ph.D. programme requires completion of at least 18 units of course work beyond the bachelor's degree level. A candidate holding a master's degree from another institution will have the course requirements for the Ph.D. degree assessed on an individual basis. The Ph.D. thesis constitutes an important and major part of the work for the degree.

A brochure produced annually entitled "Research Projects, Department of Mechanical Engineering, University of British Columbia", describing research in progress is available upon request. The principal fields of research are aerospace sciences, applied mechanics, tribology, optical engineering, fluid mechanics, heat transfer and bioengineering.

Applicants for graduate enrolment may be considered for various scholarships and research assistantships and for appointment as university student demonstrators.

Newly enrolled graduate students are required to consult their supervisors about their course selection. Student's study programmes are designed to suit their intended research programme and not all courses are offered every year.

Students should consult the department for courses to be offered in the 1969-70 session since not all courses will be available.

#### Courses and Seminars

Students should consult the department for courses to be offered in the 1969-70 session since not all courses will be available.

- **550. Special Advanced Courses.**—Special advanced courses may be arranged for a graduate student upon the approval of the Head of the Department. The credit will not be more than 3 units in any one such course.
- 558. (2) Engineering Applications of Statistical Distribution Theory.—The classical theory of the exponential, Gamma, Weibull, and type I extreme value distributions. Estimation techniques and applications to engineering problems.
- 560. (3) Experimental Stress Analysis.—Review of stress-strain formulations and techniques for solving equations of elasticity, computer and numerical methods, physical methods, brittle lacquer techniques, grid and moiré methods, two dimensional photoelasticity, photoelastic coatings, three dimensional methods, point-wise strain and displacement measurement techniques, rosette calculations, recording instruments. Laboratory.
- 561. (3) Applied Elasticity.—Analysis of stress and strain in three dimensions; plane stress and plane strain; photoclasticity; torsion; energy methods

of stress analysis; bending and buckling of rods; bending of plates; stresses in thin shells. Textbook: Wang, Applied Elasticity.

- 562. (1) Introduction to Continuum Mechanics.—Cartesian tensors, transformation and invariants of stress and strain, equations of motion and equilibrium, boundary conditions, constitutive equations for elastic, viscous and viscoelastic substances, plastic yield conditions and associated flow rules.
- 563. (2) Tribology.—Physical properties of lubricants; basic hydro-dynamic theory applicable to lubrication problems; plane sliding bearings; journal bearings subjected to steady and dynamic loads; theory of rolling bearings; boundary lubrication; mechanism of metallic friction; the nature of metallic wear.
- 564. (3) Space Dynamics I.—Dynamics of systems with variable mass; introduction to relativistic mechanics; rectilinear motion of a rocket; ascent to the moon; orbital mechanics; transfer of orbit; estimation of life time; gyrodynamics; theory of stabilized platforms; inertial guidance; performance and stability of space vehicles.
- 565. (2) Linear Mechanical Vibrations.—Single degree of freedom systems with periodic and non-periodic excitation; spectrum analysis and integral transform methods. Multiple degree of freedom systems; energy methods; Lagrange's equations; normal mode theory; matrix iteration methods. Vibration of elastic systems; introduction to vibration of plates and shells with Rayleigh and Rayleigh-Ritz approximations. Self-induced oscillations; electrical analogies; mechanical impedance and mobility; random vibrations; vibrations; vibration measuring instruments and systems.
- 566. (2) Dynamics of Automatic Control.—Linear servo-systems; transient and steady state behaviours; frequency response; the root locus method; lag correction and stabilization; multiple loop systems; synthesis; non-linear control.
- 567. (1) Nonlinear Elasticity.—Fundamentals of tensor calculus, covariant differentiaton of tensors of general order, applications to continuum mechanics. Stress and strain tensors, equations of motion for elastic materials and viscous fluids in general curvilinear coordinate systems. Solution of some special problems in finite elasticity. Prerequisite: M.E. 562.
- 568. (1) Theory of Plasticity.—Selected problems in the theory of plasticity, thick walled cylinders and spheres, torsion, slip-line fields, indentation, drawing and extrusion. Prerequisite: M.E. 562.
- 569. (2) Non-Linear Vibration.—Phase plane representation, singular points, exact solutions, equivalent linearization, perturbation method, averaging method, variation of parameters, forced vibration, self-excited vibration.
- 570. (3) Space Dynamics II.—Dynamics of single and multistage rocket, optimization of rocket performance, geometry of spatial orbit, orbit determination using Gauss, Laplace, and Gibbs method, orbit perturbations and Hansen's method, optimum orbital transfer and rendezvous, active and passive stabilization of space vehicle, introduction to three body problem.
- 571. (3) Advanced Thermodynamics.—A brief review of classical thremodynamics, with an introduction to chemical thermodynamics and equilibrium. Elements of non-equilibrium thermodynamics, entropy generation and the Onsager relations. Elementary gas kinetics and the Boltzmann equation. Introduction to classical statistical mechanics, equipartition and ensembles. Effects of quantization and quantum statistical methods. Discussion of simple examples and engineering applications.
  - 572. (3) Convection Heat Transfer.—Governing equations for laminar and

turbulent flow. Forced convection in internal and external flow. Free and combined free and forced convection. Heat transfer at high velocities, in rarefied gases and in two-phase flow. Heat exchangers. Mass transfer.

- 573. (1½) Radiation Heat Transfer.—Monochromatic and goniometric surface properties. Energy exchange of grey, non-grey, diffuse, directional or specular surfaces. Absorption coefficient and radiation intensity in gas radiation. Radiation between a gas and its enclosure. Radiation of luminous flames.
- 574. (1½) Conduction Heat Transfer.—Two and three dimensional steady and unsteady heat transfer. Analytical methods. Relaxation, graphical and analogue methods. Conduction with heat sources and sinks. Heat transfer with variable thermal conductivity. Contact resistance. Moving boundaries. Extended surfaces, their applications and optimization. Experimental methods for determination of thermal conductivity of solids, liquids and gases.
- 575. (3) Advanced Topics in Momentum, Heat and Mass Transfer.—Special topics in laminar boundary layer theory; arbitrary wall flux. The method of Lighthill; free convection; non-zero wall velocity. Asymptotic expansions, inner and outer solutions. Jets and wakes. Condensation with non-zero interfacial shear. Boiling, Non-Newtonian boundary layer theory: examples.
- 581. (3) Theory of Ideal Fluids.—Topics selected from the kinematics and dynamics of inviscid incompressible fluids in steady and non-steady motion; two-dimensional and axisymmetric potential flows; applications of conformal mapping; Stokes stream function; free streamline flows; vortex motions; non-steady airfoil theory.
- 582. (3) Theory of Real Fluids.—Derivation of the momentum equation for general fluids; application to simple Newtonian fluids. Exact solutions. Creeping flow: Stokes', Oseen's and Hadamard's problems. Theory of differential equations containing a large parameter. Asymytotic and singular perturbation expansions. Higher order flows around sphere and cyliner. Laminar boundary layer theory: stretched coordinates, similarity solution, wedge flows. Goertler's and Von Mises' transformations. Asymptotic integrations, stationary points, method of steepest descent, divergent series. Approximate methods. Optimal coordinates. Elementary stability problems. Turbulent flows; Reynolds' equations. Theory of locally isotropic turbulence.
- 583. (3) High Speed Gas Dynamics.—Topics selected from the dynamics of a gas considered mainly as a non-heat-conducting inviscid continuum; acoustic small-disturbance equations; initial and boundary value problems of wave propagation; applications to airfoils and wings at high speed; conical flow; slender body theory; characteristics theory; hodograph methods; shock and blast waves; similarity methods; hypersonic flow theory.
- **584. (2) Mechanics of Rarefied Gases.**—The flow of a rarefied gas in terms of kinetic theory. A review of classical statistical mechanics. Free molecule flow. The Boltzmann equation applied to non-equilibrium flows.
- 585. (3) Aeroelasticity.—Idealization of elastic systems; elastic axis; influence coefficients; coupled and uncoupled modes of vibration; unsteady aerodynamics; static aeroelastic phenomena; two dimensional and three dimensional flutter theory; solution of flutter stability determinant; buffeting and stall flutter; aspect ratio and compressibility effects; flutter model and testing technique.
- 586. (2) Turbulent Shear Flow.—The basic equations of fluid motion introduction to hydrodynamic stability; Reynolds' equations; energy equations for turbulent motion; entrainment; intermittency; similarity near a solic

boundary and in free turbulence; approximate methods for predicting the growth of turbulent boundary layers and free symmetrical shear flows.

- 587. (1½) Engineering Acoustics.—Acoustic terminology. Transmission, reflection, refraction, diffraction and absorption of sound. Waveforms and spectra, statistical theory and random process. Noise of airodynamic origin. Industrial and domestic noise problems.
- **598.** (1) Seminar.—Presentation and discussion of current topics in mechanical engineering research.
  - 599. Thesis.—For M.A.Sc. degree.
  - 699. Thesis.—For Ph.D. degree.

# METALLURGICAL ENGINEERING—M.A.Sc. degree

Prerequisite: Graduation in Metallurgical, Chemical, Mechanical Engineering, or Engineering Physics.

M.A.Sc. course includes at least 6 units chosen from courses numbered 500 in Metallurgy, and other approved courses.

## METALLURGY-Ph.D., M.Sc. and M.A.Sc. degree

Professor and Head: E. Teghtsoonian.

Professors: W. M. Armstrong, J. A. Lund, E. Peters, C. S. Samis, and F. Weinberg.

Associate Professors: T. H. Alden, L. C. Brown, A. C. D. Chaklader, A. Mitchell, and I. H. Warren.

Assistant Professors: R. G. Butters, N. R. Risebrough, and D. Tromans.

Professor Emeritus: F. A. Forward.

Lecturer from Another Department: J. Leja (Mineral Engineering).

The Department provides facilities for research in Physical and Chemical Metallurgy, and in Ceramics and Non-Metallic Materials. The currently active areas are in hydrometallurgy (leaching of ores and minerals), electrochemistry (of mineral decomposition and corrosion), pyrometallurgy (slag—and fused salt—metal equilibria), electroslag processes (operating parameters and steady-state phenomena) solidification (segregation and dendrite development), deformation (structural parameters), dislocation mechanics, diffusion (in alloys and compounds), electron microscopy, creep, fatigue, superplasticity, refractory metal properties, dispersion hardening, composite structures, fine particle strengthening, sintering and creep (of ceramic materials), solid state transitions (in metals and ceramics), and reinforced plastics. The facilities in the Department include a variety of furnaces, testing machines, analytical tools, microscopes, metallographs, and specially designed research apparatus.

Graduate programmes are available for the degrees of Ph.D., M.Sc., and M.A.Sc. A brochure may be obtained on application to the Head of the

Department, describing the facilities and the graduate programmes in more detail, including entrance requirements, curricula, and financial assistance available.

#### Courses:

- 550. (2) Metallurgical Thermodynamics—Application of advanced thermodynamic principles in metallurgical processes. Mr. Samis.
- 552. (1) Metallurgical Kinetics.—Application of chemical reaction rate theory to metallurgical processes. Mr. Peters.
- **554.** (1) Hydrometallurgy.—Modern theories of comminution, leaching, purification and precipitation processes. Mr. Peters.
- 556. (1) Metallurgical Applications of Fused Salts.—Structure and properties of fused salts; oxide and sulphide slags; slag-metal reaction rates; electrolysis from fused salts; synthesis using fused salts; other related topics. Mr. Mitchell.
- 560. (1) Metallurgy of the Rarer Metals.—Principles, practices, and research trends in the extractive metallurgy of rarer metals. Mr. Warren.
- 561. (1) Nuclear Metallurgy.—Survey of principles of reactor operation; metallurgical aspects of fuels, constructional materials, radiation damage, corrosion. Mr. Armstrong.
- 570. (2) Structure of Metals III.—Nature and properties of lattice imperfections; dislocation theory and its use to describe work hardening, creep, structure of grain boundaries and other phenomena. Mr. Teghtsoonian.
- **571.** (1) Solidification I.—Crystal growth, solute segregation and constitutional supercooling, zone refining, dendritic growth structure, structure of castings. Mr. Weinberg.
- 573. (1) Solidification II.—Advanced topics in solidification. Theories of solidification; eutectic and polyphase solidification; solid-liquid interface morphology; macrosegregation and inverse segregation in castings; microsegregation; homogenization of castings. Mr. Weinberg.
- 574. (1) Topics in Physical Metallurgy.—Topics of metallurgical interest in the field of physical metallurgy to be selected for discussion. Staff.
- 575. (1) Phase Transformations.—Nucleation theory; spinodal decomposition; eutectoid decomposition; age hardening; martensitic transformations. Mr. Brown.
- 576. (1) Diffusion.—Mathematical analysis; Kirkendall effect; mechanisms; theories of self-diffusion and chemical diffusion; grain-boundary and surface effects; theory of sintering. Mr. Brown.
- 580. (1) Metal Fabrication II.—Current research and analysis of metal fabricating processes such as casting, metal forming, and powder metallurgy. Mr. Lund.
- 581. (1) Sintering Theory.—Driving force for sintering; theory of sintering in the solid state, and in the presence of a liquid phase; current theory of hot pressing and reactive hot pressing. Mr. Chaklader.
- 582. (1) Advanced Ceramics.—Complex silicate structures; ion exchange in silicates; kinetics of solid state reactors; kinetics of high temperature processes. Mr. Chaklader.
- 584. (1) Advanced X-Ray Diffraction.—Reciprocal lattice; dislocations and stacking faults; Fourier analysis; microbeam analysis; small angle scattering; applications in physical problems. Mr. Teghtsoonian.

- 586. (1) Electron Microscopy.—A basic course on the theory and practice of electron microscopy with emphasis on transmission microscopy. Mr. Tromans.
- 588. (2) Physical Metallurgy.—Topics covered will include dislocation theory, diffusion, solidification, nucleation theory and structure of liquids. Staff
- 592. (1-3) Special Topics in Metallurgy.—A special advanced course may be arranged with approval of the Head of the Department.
- 558. Research Conference.—A required course for all graduate students in Metallurgy or Metallurgical Engineering, in which current research projects will be discussed. The course carries no academic credit.
- 599. (6) Thesis.—For M.A.Sc. and M.Sc. Degrees—Research studies in chemical metallurgy, physical metallurgy, or ceramics.
  - 699. Thesis.—For Ph.D. Degree.

## MICROBIOLOGY-Ph.D. and M.Sc. degrees

Professor and Head: J. J. R. Campbell.

- Professors: C. E. Dolman (Research Professor), D. M. McLean, C. C. Walden (Honorary).
- Associate Professors: J. E. Bismanis, T. H. Blackburn, Mrs. Julia Gerwing, Mrs. Audrey F. Gronlund, J. J. Stock, R. A. J. Warren.
- Assistant Professors: D. J. Clark, J. B. Hudson, Mrs. Janice M. Joneja (nee Vickerstaff), D. G. Kilburn, Miss Barbara L. Robinson, Miss Delfa Syeklocha.

Lecturer: J. Tremaine (Honorary).

## Ph.D. degree

The Department offers opportunities for work in bacterial genetics, metabolism, pathogenic bacteriology, pathogenic mycology, immunology, virology, oral microbiology, and industrial microbiology.

# M.Sc. degree

Course includes Thesis, counting at least 6 units, and approved science courses.

- 502. (1½) Advanced Immunochemistry.—Lectures and laboratories on biophysical aspects of protein chemistry and on advanced immunochemical methods. Prerequisite: Chemistry 305.
- 503. (1½) Bacterial Cytology and Genetics.—Morphology and functional significance of bacterial cell components. The role of nuclear material in determining inheritable characteristics of bacteria, viruses and fungi. Spontaneous and induced mutations. Transfer of genetic information by processes of transformation, transduction and recombination.
- 505. (1½) Molecular Microbiology.—The cellular processes involved in microbial growth. Transport processes, energy yielding mechanisms, bacterial

protein synthesizing systems, control mechanisms. Offered in 1970-71 and alternate years.

- 506. (3) Microbiological Research Procedures I.—The application of current techniques to the isolation of proteins, criteria of purity and amino acid analysis. Advanced immunochemical methods. This course, or Microbiology 507, must be taken by all first year graduate students in Microbiology if in the opinion of the Department, they have not had an adequate introduction to the techniques used in research in the Department of Microbiology. Given in 1970-71 and alternate years. To be taken only with the consent of the head of the Department.
- 507. (3) Microbiological Research Procedures II.—The isolation and identification of intermediates and end-products of various metabolic reactions; the use of radioactive isotopes, bacterial mutants, respirometry. This course, or Microbiology 506, must be taken by all first year graduate students in Microbiology who, in the opinion of the Department, have not had an adequate introduction to the techniques used in Research in the Department of Microbiology. Given in 1969-70 and alternate years. To be taken only with permission of the head of the Department.
- 509. (3) Viral Ecology.—Range of viruses infectious for man and domestic animals, natural vectors and reservoirs, methods of spread, laboratory diagnostic procedures, histological virology, insect viruses, plant viruses. Prerequisite: Permission of the head of the Department.
  - 530. (3) Seminar in Microbiology.
  - 548. (3) Directed Studies on an approved problem.
  - 549. (6) Master's Thesis.
  - 649. Ph.D. Thesis.

### MINERAL ENGINEERING—Ph.D. and M.A.Sc. degrees

Professor and Acting Head: L. G. R. Crouch.

Professors: C. L. Emery, J. Leja.

Associate Professors: H. Majima, G. W. Poling.

#### Ph.D. Degree:

The Department provides facilities for research studies in the following fields: (a) rock mechanics, (b) mining systems and operations research, (c) mineral dressing.

#### M.A.Sc. Degree:

Prerequisite—Graduation in Mineral or Geological Engineering. Graduates from other branches of engineering may be accepted on approval of their course by the head of the department.

Course—Includes at least 3 units chosen from graduate courses in the Department of Mineral Engineering and other approved courses.

- 550. (1) Mining Methods.—A more advanced study of some aspects of mining methods. Mr. Crouch.
- 551. (2) Rock Mechanics.—Rheology and its mathematical development, testing rocks in the laboratory, testing rocks in situ, mine and excavation geometry, design of rock structures, special supports. Mr. Emery.
- 552. (2) Applied Physical Measurements.—Theory of elasticity, measurement theory and data analysis, measurement techniques and their application in experimental situations. Photoelastic, strain gauge, hydraulic, sonic devices; gravimetric, magnetic, temperature and other measurements.
- 553. (2) Operations Research.—Production engineering, linear programming, queuing theory and applications, simulation, reliability theory, game theory, dynamic programming. Mr. Emery.
- 570. (1) Theory of Fine Particles.—Measurement of particle size and surface area; physical and chemical behaviour of fine particles; methods of separation; settling; filtration. Mr. Majima.
- 571. (2) Properties of Interfaces.—Physical and chemical adsorption at various interfaces; thermodynamic models of adsorption isotherms; surfactants, insoluble monolayers, interactions at interfaces and synergistic effects; electrical effects at interfaces. Applications: flotation, corrosion, emulsification, detergency, lubrication. Mr. Leja.
- 572. (1) Nature of Adsorbed Molecules.—Modern methods of characterizing surface complexes—infrared, visible and ultraviolet spectroscopy, low and high energy electron diffraction, electron, field emission and field ion microscopy, electroanalyses, interferometry, ellipsometry. Contributions to knowledge of: flotation, corrosion inhibition, catalysis, lubrication, adhesion. Mr. Poling.
- 590. (1-3) Special Advanced Topics.—A special advanced course may be arranged upon the approval of the Head of the Department
- 598. (1) Seminar.—Presentation and discussion of current topics in mineral engineering research. Attendance of all students proceeding to graduate degrees in the Department is required during each year of residence.
- 599. Thesis.—For M.A.Sc. Degree. Research studies in mining or mineral dressing.
  - 699. Thesis.—For Ph.D. Degree.

#### MUSIC-M.Mus. degree

Professor and Head: G. Welon Marquis.

Professors: Hans-Karl Piltz, Elliot Weisgarber.

Associate Professors: Cortland Hultberg, Robert Morris, Dale Reubart, French Tickner.

Assistant Professors: Kathryn Bailey, Terence Bailey, Robert Bricker, Paul Douglas, John Loban, James Shell, John Swan, Douglas Talney, Eugene Wilson.

nstructors: John Chappell, Robert Rogers, John Sawyer.

The Master of Music degree is offered in the following areas: (1) Musicology; (2) Composition/Theory; (3) Performance; and (4) General Music.

## Musicology

- 520. (4) Seminar in Musicology.
- 521. (3) Seminar in Performance-Practices OR (522 below).
- 522. (3) Seminar in Notation in Polyphonic Music.
- 549. (3) Thesis.

## Composition/Theory

- 500. (4) Seminar in Analytical Techniques.
- 549. (3) Thesis or Recital.

#### Performance

- 528. (3) Seminar in Music Literature.
- 546. (3) Applied Music.
- 549. (3) Thesis Recital.

#### General Music

- 506. (4) Seminar in Conducting, Materials and Procedures.
- 549. (3) Thesis (including demonstration or recital).

## Theory and Composition

- 500. (4) Seminar in Analytical Techniques.—Prerequisite: Music 400 or permission.
  - 504. (3) Twentieth-Century Practices.—Prerequisite: Music 300.
- **506. (4)** Seminar in Conducting, Materials and Procedures.—Prerequisite: Music 306.
  - 509. (3) Advanced Orchestration and Arranging.—Prerequisite: Music 309.
  - 549. (3) Master's Thesis.

# History and Literature of Music

- **520. (4) Seminar in Musicology.**—Prerequisite: Music 320 and a course in musical history numbered 300 or above.
- **521.** (3) Seminar in Performance-Practices.—Prerequisite: Music 320 and a course in musical history numbered 300 or above.
- **522.** (3) Seminar in Notation of Polyphonic Music.—Prerequisite: Music 320 and a course in musical history numbered 300 or above. (Students who have completed Music 425 should not enrol in this course.)
  - 523. (3) Seminar in Mediaeval Music.—Prerequisite: Music 425.
  - 524. (3) Seminar in Music of the Renaissance.—Prerequisite: Music 425.
  - 525. (3) Seminar in Baroque Music.—Prerequisite: Music 323.
- 526. (3) Seminar in Eighteenth-Century Music.—Detailed study and in vestigations of the development of eighteenth-century music in such centre as Mannheim and Vienna. Prerequisite: Music 323.

- 527. (3) Seminar in Nineteenth-Century Music.—Designated projects relating to nineteenth-century musical developments. Prerequisite: Music 324.
- 528. (3) Seminar in the Literature of Music.—Students in graduate programmes involving performance will be given special projects related to the history, bibliography, repertoire, and teaching problems in each area. A paper will be required. Prerequisites: Music 300 and 320.
  - 549. (3) Master's Thesis.

## Applied Music

- **544.** (1) Private Applied.—Private lessons in voice, piano and orchestral instruments; or in harpsichord, viol, recorder and other historical instruments. Two one-half hour lessons each week with suitable practice.
  - 545. (2) Private Applied.—Same as Music 544 with additional practice.
  - 546. (3) Private Applied.—Same as Music 545 with additional practice.
  - 549. (3) Master's Thesis.—Recital.

#### Ensembles

- 550. (0) University Symphonic Orchestra.
- 551. (0) University Chamber Orchestra.
- 552. (0) University Wind Ensembles.
- 553. (0) University Singers.
- 554. (0) University Choral Union.
- 555. (0) University Chamber Singers.
- 556. (0) Collegium Musicum Ensemble.
- 560. (0) String Chamber Ensembles.
- 561. (0) Piano Chamber Ensembles.

#### NEUROLOGY—M.Sc. degree

Associate Professor and Head: Patrick L. McGeer.

Associate Professor and Acting Head: Louis I. Woolf.

Distinguished Visiting Professor: Sir John Eccles.

Professors: William C. Gibson (Research Professor), Juda H. Quastel (Neurochemistry).

Associate Professors: S. C. Sung, Juhn Wada.

Research Associates: Edith G. McGeer, David A. V. Peters, Robert Wright (Honorary).

Prerequisites: An M.D. degree, or a Bachelor's degree with Honours in one of the related fields in Agriculture, Biology, Botany, Biochemistry, Chemstry, Microbiology, Physics, Psychology, or Zoology; or the courses accepted as prerequisites for the Master's degree in one of these fields.

M.Sc. course includes Thesis, counting 6 units, and approved courses in

elated fields.

It is recommended that students intending to take this degree complete basic work in Chemistry, Physics, Psychology, and Physiology in their undergraduate work.

(See Psychiatry)

## NURSING-M.S.N. degree

Professor and Acting Director: Elizabeth K. McCann.

Associate Professors: Alice J. Baumgart, Helen Gemeroy, Floris E. King, Margaret M. Street.

Assistant Professors: Margaret A. Campbell (on leave 1968-69), Pauline M. A. Capelle, H. Elizabeth Cawston, Margaret R. Francis, Jessie Hibbert, Margaret S. Neylan.

The degree offered is the Master of Science in Nursing.

## Inquiries Relating to Admission

Inquiries relating to admission to the Master's Degree Programme should be addressed to The Director, School of Nursing, University of British Columbia, Vancouver 8.

The programme for full-time students, extends over two academic years and is designed to prepare selected persons for leadership roles in nursing. Emphasis is placed on study of clinical nursing practice and exploration of theoretical foundations of a specialist role such as administrator, supervisor, teacher.

## Requirements:

a) a baccalaureate degree in nursing which represents completion of a generic (i.e. nonspecialized) programme or a satisfactory equivalent;

b) sufficient experience as a professional nurse practitioner to enable the applicant to have demonstrated an acceptable level of competence.

# The Programme

### First Year

520 Core Concepts of Nursing 521 Methods and Techniques of Research		
One of		
530 Nursing in Long-Term Illness	. 4	units
531 Psychiatric Nursing	4	units
*Supportive courses, numbered 300 or above, selected from the offerings of other		
faculties	6	units
	17	units

#### Second Year

One of:		
560 Nursing Education	4	units
570 Administration and Supervision		
in Nursing Service	4	units
*Supportive courses, numbered 300 or above,		
selected from the offerings of other		
faculties	6	units
599 Thesis	3	units
•	13	units

\*The choice of supportive courses will require approval by the departments concerned.

#### Graduate Courses

**520. (3) Core Concepts of Nursing.**—Seminar in historical and philosophical foundations of nursing services; theories of nursing action; components of clinical practice; methods of achieving nursing goals.

**521. (4) Methods and Techniques of Research.**—Logic and thought processes basic to research; formulation of research problems in nursing; research design; data collection; measurement techniques; analysis and interpretation

of findings.

- 530. (4) Nursing in Long-Term Illness.—Seminar and guided practice in nursing of patients with long-term illnesses in institutional and community settings. Consideration of common features of long-term illnesses; effects on various physiological functions; the adaptation phenomenon; social and psychological consequences of long-term illness for the individual, family and community; nursing approaches designed to help the patient and his family cope with a long-term illness.
- 531. (4) Psychiatric Nursing.—Seminars and guided practice in which emphasis is placed on critical appraisal of nursing intervention in mental health problems using various theoretical models of human behaviour.
- 560. (4) Nursing Education.—Historical and philosophical foundations of nursing education; the role of the nurse educator; sources and definitions of educational objectives; selection and organization of content and learning experiences; evaluation of educational outcomes.
- 570. (4) Administration and Supervision in Nursing Services.—The nature and elements of administration; principles of administration and their application in nursing services; concepts and principles of supervision and the role of the nursing supervisor.

599. (3) Thesis.

#### INSTITUTE OF OCEANOGRAPHY

Director: G. L. Pickard.

Professors: W. H. Mathews, R. W. Stewart, R. F. Scagel, B. McK. Bary, R. W. Burling.

Associate Professor: A. G. Lewis.

Assistant Professors: G. C. Hughes, P. H. LeBlond, E. V. Grill, J. W. Murray, F. J. R. Taylor, M. Miyake, L. A. Mysak, R. L. Chase.

The Institute of Oceanography was established at the University of British Columbia in the fall of 1949, and is a part of the Faculty of Graduate Studies. It is supported in part by the National Research Council, by the Defence Research Board, and by the Canadian Committee on Oceanography which represents the interests of the federal departments concerned with the sea.

The increasing interest in the problems of the sea has created a demand in Canada for trained scientists to undertake oceanographic investigations. The Institute represents the cooperative effort of the Departments of Botany, Chemistry, Geology, Geography, Mathematics, Physics and Zoology to train graduate students in one or more of these branches in the principles and techniques of oceanographic research.

The Institute is further charged with the responsibility for fundamental research in oceanography. Its location is particularly suited to this purpose. The fjords of British Columbia present special features which facilitate the study of water properties under restricted conditions. The large volume of fresh water discharged into the Strait of Georgia from the Fraser River represents an estuarine condition which is amenable to detailed study. The strong tidal currents typical of many channels along the coast provide opportunities for the investigation of turbulent mixing. Easy access to the open ocean is obtained through Juan de Fuca Strait.

The wide ranges of salinity and concentration of plant nutrients present special problems in the chemistry of seawater and establish a variety of environmental conditions reflected in the diversified fauna and flora of the region.

The relationships between species and populations of planktonic organisms and their environment offer problems basic to understanding principles in ecology and distribution of these organisms in the sea. The variety of environments available and of the planktonic species ensures rewarding investigations into problems of broad application.

The importance of the sea in the economy of the Pacific Coast forecasts an increasing industrial application of oceanography.

The Institute carries out its extensive research programme at sea in vessels of the Canadian west coast oceanographic research fleet (two vessels for deep-sea work and one for near-shore and coastal studies).

The phycological herbarium, which is housed in the Biological Sciences Building, comprises over 35,000 specimens of marine algae. It is rich in species from British Columbia, Washington, Oregon and Alaska as a result of the collections made by staff and students of the Institute of Oceanography in research projects supported by the National Research Council and the Defence Research Board.

A student wishing to do graduate work in oceanography should first discuss his proposed programme with the Director. Students in oceanography are required to take Oceanography 400, 401, 402 and 403 unless they have previously taken equivalent courses. Students in the biological sciences will substitute Oceanography 506 and/or 507 for Oceanography 403. Additional courses to complete the student's programme will be chosen in consultation with his supervisor or supervising committee.

Courses are offered in the following fields:

## General Oceanography

Oceanography 400. (1) Introduction to Synoptic Oceanography.—Survey of oceanic circulation, distribution of temperature and salinity, energy budget. Textbook: Pickard, Descriptive Physical Oceanography. Mr. Pickard.

Oceanography 501. (1) Advanced Synoptic Oceanography.—Detailed study of the ocean water masses with emphasis on specific and recent studies. Prerequisites: Oceanography 400 and 401. Mr. Pickard.

Oceanography 503. (1) Oceanographic Methods.—Oceanographic instrumentation, design of experiments, processing and analysis of data. Staff.

Oceanography 505. (1-3) Special Advanced Courses.—A special advanced course may be arranged for a student upon approval of the Director of the Institute.

## Biological Oceanography

Oceanography 403. (1) Introduction to Biological Oceanography.—Occurrences and distribution of marine plants and animals in relation to oceanographic factors. For students other than those in the biological sciences. Prerequisite: Oceanography 400. Mr. Bary and Mr. Taylor.

Oceanography 506. (1) Marine Phytoplankton.—A broad review covering the general biology of the organisms concerned and their ecological significance as primary producers. Prerequisite: Oceanography 400 (may be taken concurrently). Mr. Taylor.

Oceanography 507. (1) Zooplankton Ecology.—A study of marine zooplankton, the interrelationships of the species, their biology and relations to the environment. Prerequisite: Oceanography 400. Mr. Bary.

Botany 510. (3) Marine Phycology.—Collection, identification, ecology and life histories of algae; emphasis on marine benthonic forms. Prerequisite: 30tany 305. (Offered in 1969-70 and alternate years.) Mr. Scagel.

Botany 512. (2) Practical Marine Phytoplankton Study.—A field project nvolving the collection, identification and distributional assessment of a elected group of marine phytoplankton organisms. Prerequisite: Oceanoraphy 506. Mr. Taylor.

Botany 517. (3) Marine Mycology.—Structure, classification, culture, and hysiology of marine and brackish water fungi. Special problems on groups r individual species. (Offered in 1969-70 and alternate years.) Mr. Hughes.

Zoology 511. (2) Advanced Marine Zooplankton.—Special advanced studies systematics and ecology of zooplankton, intended for graduate students roceeding in biological oceanography. Prerequisites: Zoology 301, Ocean-graphy 400. (Offered in 1969-70 and alternate years.) Mr. Bary.

## hemical Oceanography

Oceanography 402. (1) Introduction to Chemical Oceanography.—The mposition of sea water, biochemical and chemical factors affecting its riation, determination of selected constituents. Mr. Grill.

Oceanography 502. (1) Advanced Chemical Oceanography. — Selected pics in the marine geochemistry of organic and inorganic constituents of a water. Mr. Grill.

### Geological Oceanography

Oceanography 404. (1) Introduction to Geological Oceanography.—Equipment and techniques used in geological oceanography. Geophysical and geological contrasts between the continents and the ocean basins. Hypotheses on the evolution of the ocean basins. Topography and bottom sediments of inland seas, continental shelves and slopes, and the deep sea. Mr. Murray.

Geology 519. (1 $\frac{1}{2}$ ) Seminar in Sedimentology.—Principles of sedimentation as applied to modern and ancient deposits. Mr. Murray.

Geology 520. (1½) Problems in Sedimentology.—Directed studies of sediments and sedimentary rocks. Prerequisite: Geology 401 or equivalent. Mr. Barnes.

#### Physical Oceanography and Meteorology

Oceanography 401. (1) Introduction to Dynamic Oceanography.—A survey of the physical properties of sea water, hydrostatics, continuity, geostrophic and wind-driven currents, waves and tides, eddy diffusion. Mr. Burling and Mr. Pickard.

Oceanography 508. (1) Air-Sea Transfer Processes.—The physical processes occurring at the atmosphere-ocean boundary. Transfer of energy, momentum and water vapour and their effects on small-scale and large-scale phenomena including fog formation, convection and modification of air masses. Mr. Miyake.

Physics 441. (1) Introductory Meteorology.—Instruments, observations and their presentation. Synoptic patterns. Basic dynamics and thermodynamics of the atmosphere. Water vapour and cloud formation. Radiation. Prerequisites: One of Physics 156, 200, 204 or equivalent. Mathematics 202 or equivalent. Mr. Miyake.

Physics 537. (1) Advanced Dynamic Oceanography.—A more intensive study of the dynamics of ocean currents. References: Stommel, *The Gul Stream*. Prerequisite: Oceanography 401. Mr. Burling and Mr. Stewart.

Physics 538. (1) Fluid Mechanics.—The flow of real and ideal fluids emphasizing the influence of turbulence and the application to ocean currents.

Physics 539. (2) Waves and Tides.—Surface and internal waves, tides c the oceans, tidal currents. Mr. Burling, Mr. LeBlond and Mr. Stewart.

Physics 540. (2) Turbulence.—A discussion of turbulent fluid motion presenting both the empirical aspects and the development of statistics theories, including the spectrum of turbulence and similarity and equil brium hypotheses. Text: Hinze, *Turbulence*. (Offered in 1970-71 and alternate years.) Mr. Stewart.

Physics 541. (1) Dynamic Meteorology.—Development of basic equation of motion and their application to the atmosphere. Prerequisite: Vectoral calculus. Mr. Miyake.

#### PATHOLOGY

Professor and Head: Harold E. Taylor.

Professors: Paris Constantinides, P. S. Vassar.

Associate Professors: W. H. Chase, William L. Dunn, R. H. Pearce, Ralph Spitzer (Part-time).

Assistant Professors: David Hardwick, Philip E. Reid, Donald B. Rix.

Senior Instructor: C. F. A. Culling.

Registration in any graduate course in pathology requires the consent of the Department. Candidates with B.Sc. degree intending to proceed to the M.Sc. or Ph.D. would require as prerequisites Biochemistry 400 or 410, Physiology 400 or 301/302 and a course in General Microscopic Anatomy (eg. Anatomy 501) or their equivalents.

500. (2) General Principles of Pathology.—This course is intended for candidates without the M.D. or D.M.D. degree. The general principles underlying the etiology, pathogenesis, disordered physiology and pathologic anatomy of common disease processes will be discussed in lectures and practical tutorials. A basic knowledge of Histology is recommended.

502. (3) Histopathology.—A lecture and laboratory course that encompasses the theory and the practice of currently available histochemical techniques as applied to pathological material. A basic knowledge of Histology is preferable but not essential.

506. (1) Ultrastructural Pathology.—A review of fine structure as seen in various pathological conditions. Prerequisite: a knowledge of Microscopic Anatomy and Pathology 425 or 500

Anatomy and Pathology 425 or 500.

510. (2) Analytical Methods in Chemical Pathology.—A survey of the application of the principles of analytical chemistry to the investigation of disease. A knowledge of basic analytical chemistry is a prerequisite.

- 512. (2) Chemical Pathology.—A critical survey of current knowledge relating to the physiological and metabolic disturbances underlying disease.
- 515. (4) Experimental Pathology.—A lecture and laboratory course designed to develop in the student the laboratory skills necessary to do critical research in experimental pathology. Prerequisites: Pathology 500 and 502.
- **520. (2)** Recent Advances in Bio-Pathology.—Morphological Aspects. A series of Lectures with related reading designed to cover advancing knowledge concerning new concepts in Biopathology with emphasis on Morphological and structural alterations in disease. Prerequisites: M.D. or D.M.D. degree or Pathology 500 or equivalent. Offered 1969-70 and alternate years.
- **521. (2)** Recent advances in Bio-Pathology.—Chemical Aspects. A series of lectures with directed reading designed to cover advancing knowledge concerning new concepts in Pathology with emphasis on chemical aspects of disease states. Prerequisites: M.D. or D.M.D. degree or Pathology 500 or equivalent. Offered 1970-71 and alternate years.
- **525.** (1) Immunopathology.—A lecture course which deals with those immunologic events which can cause tissue injury. Prerequisite: Pathology 500 or 425.
- 535. (1) Seminar.—Attendance is required of all graduate students in Pathology.

548. (1-3) Directed studies—in various fields of Pathology.

549. (6) M.Sc. Thesis.

649. Ph.D. Thesis.

# PHARMACEUTICAL SCIENCES—Ph.D. and M.Sc. degrees

Professor and Dean: Bernard E. Riedel.

Professors: John E. Halliday, Finlay A. Morrison, Modest Pernarowski.

Associate Professors: Terence H. Brown, Alan G. Mitchell.

Assistant Professors: Frank S. Abbott, Gail D. Bellward, Allan M. Goodeve, J. Glen Moir, Janis O. Runikis, John G. Sinclair.

Senior Instructor: Leona R. Goodeve.

The Faculty of Pharmaceutical Sciences offers opportunities for advanced study leading to the degrees of Master of Science and Doctor of Philosophy in the fields of Biopharmaceutics, Pharmaceutics, Pharmaceutical Chemistry (including Medicinal Chemistry and Natural Products), Pharmacology, Toxicology, and Bionucleonics.

Research facilities include laboratories in each of the major areas of concentration and the equipment necessary to satisfactorily complete assigned projects. Recording spectrophotometers, titrimeters, stability chambers, environmental chambers, gas chromatographic equipment, and apparatus for the measurement of radioactive compounds are examples of the type of equipment in the laboratories.

Subject to evidence of capacity for graduate work, the programme is open to those holding undergraduate degrees from recognized universities, whether in pharmacy or other related disciplines. Those holding undergraduate degrees will normally be required to complete the Master of Science degree. However, students with exceptional academic records may be permitted to proceed directly to the Ph.D. degree. Details with respect to eligibility and course requirements are given in the first few pages of this calendar.

A detailed brochure is available on application to the Faculty describing its graduate degree programmes.

#### Courses and Seminars:

- 501. (3) Physical and Chemical Aspects of Pharmaceutical Systems.
- 520. (2) Advanced Medicinal Chemistry.
- 530. (2) Advanced Pharmacognosy.
- 540. (2) Topics in Pharmacology.
- 548. (1) Seminar.
- 549. (6) Master's Thesis.
- 550. (1-3) Directed Studies.
- 649. Ph.D. Thesis.

## PHARMACOLOGY-Ph.D. and M.Sc. degrees

Professor and Head: James G. Foulks.

Professors: George I. Drummond, Thomas L. Perry.

Associate Professors: Gordon E. Dower, David M. J. Quastel, Morley C. Sutter, Rudolf Vrba.

Assistant Professors: Florence A. Perry, Harvey D. Sanders.

## Ph.D. degree

Facilities are available for original investigation in certain fields of pharmacodynamics, including cellular pharmacology, biochemical pharmacology, autonomic pharmacology, cardiovascular pharmacology, and neuropharmacology.

## M.Sc. degree

Prerequisite: An M.D. degree; or a Bachelor's degree with Honours (or equivalent scholastic standing) in Biochemistry, Biology, Chemistry, Microbiology, Pharmacy, Physiology, Psychology, or Zoology. Credit must have been obtained for Organic Chemistry (Chemistry 203 or 230) and Elementary Physics (Physics 130, 110 or 120). Physical Chemistry (Chemistry 304 or 305) and Bio-physics (Physics 219 or 420) also are recommended.

Course: If not already taken, Physiology 400, or 301 and 302; Biochemistry 400 or 410; Pharmacology 425; Thesis, counting 6 units, and courses in related fields selected in consultation with the Department.

- **500. (2)** Advanced Pharmacology.—Lectures, conferences, and supervised reading in the pharmacological literature. Prerequisite: Pharmacology 425 or its equivalent.
  - 511. (2) Pharmacology Seminar.
- 512. (4) Advanced Pharmacological Techniques.—Lectures, conferences, assigned readings and laboratory exercises in methods and instrumentation available for studying various types of drugs. Prerequisite: Pharmacology 425 or its equivalent.
- 513. (2) Pharmacology of Anaesthesia.—Advances in the pharmacological aspects of anaesthesiology. Conferences, assigned reading and laboratory exercises demonstrating the actions of drugs as currently applied in the practices of anaesthesiology. Prerequisite: Pharmacology 425 or its equivalent.
- 514. (5) Neuropharmacology. Chemical mediation of central synapses and the action of drugs on the central nervous system will be emphasized. Conferences, assigned reading, and laboratory exercises. Prerequisite: Pharmacology 425 or its equivalent.
  - 549. (6) M.Sc. Thesis.
  - 649. Ph.D. Thesis.

#### PHILOSOPHY—Ph.D. and M.A. degrees

Professor and Head: Barnett Savery.

Professors: Donald G. Brown, Peter Remnant.

Associate Professors: Samuel C. Coval, Warren J. Mullins, Richard E. Robinson, Robert J. Rowan.

Assistant Professors: James C. Dybikowski, Howard Jackson, Edwin Levy, Gary E. Overvold, Elbridge N. Rand, Richard I. Sikora, John P. Stewart, Gary A. Wedeking.

Lecturers from other Departments: Fo-Ch'uan Chang.

The Department undertakes doctoral work in epistemology, metaphysics, ethics, aesthetics, political philosophy, logic, philosophy of science and philosophy of mathematics.

- 500. (3) Metaphysics and Epistemology.
- 501. (3) Moral Philosophy.
- 502. (3) Logic.
- 503. (3) Ancient Philosophy.
- 505. (3) Philosophy of Mathematics.
- 506. (3) Philosophy of Mind.
- 511. (3) Aesthetics.
- 513. (3) Mediaeval Philosophy.
- 514. (3) Philosophy of Science.
- 521. (3) Political Philosophy.
- 524. (3) Philosophy of Social Science.
- 530-539. (1½) Problems.
- 549. (6) Master's Thesis.
- 573. (3) Plato.
- 583. (3) Aristotle.
- 593. (3) Kant.
- 649. Ph.D. Thesis.

## PHYSICAL EDUCATION—M.P.E. degree

Professor and Head: Robert F. Osborne.

Professors: Stanley R. Brown, H. Douglas Whittle.

Associate Professors: Robert G. Hindmarch, Peter M. Mullins.

Assistant Professor: Ronald G. Marteniuk.

Instructor: Andrew P. Bakogeorge.

Prerequisite: Bachelor's degree equivalent to the B.P.E. of the University. Physical Education 470 (Tests and Measurements) or an equivalent course.

- M.P.E. Course: a total of 18 units, including a thesis (counting from 3 to 6 units), required advanced courses in Education and Physical Education, and courses in other departments.
  - 500. (1-3) Graduate Seminar.
  - 530. (1-3) Directed Studies
- 563. (1½) Measurement of Human Motor Proficiency.—Survey of research identification and measurement of human motor proficiency in work, exercise and sport. Description and measurement of dimensions of physique, cardiovascular condition and motor fitness which underlie motor performance.
- 565. (1½) Analysis of Physical Activity.—Methods, procedures and techniques of using scientific equipment in the analysis of human physical performance with special reference to the interdisciplinary nature of such work.
- 568. (1½) Seminar in Human Motor Performance and Learning.—An interpretation of the research literature in several topics chosen from such areas as learning theory, individual differences in performance and learning, kinesthesis, stress, motivation, reaction time and movement time, co-ordination, transfer of training, and retention. Prerequisite: Physical Education 468 or consent of Instructor.
- 570. ( $1\frac{1}{2}$ ) Research in Physical Education.—Detailed analysis of representative contemporary research papers in physical education with the aim of preparing the student to read the literature critically.
- 571. (1½) Physical Education for the Atypical Student.—The theory and practice of adapted physical education. Programmes of general class activities, special adaptive education; and physical recreation for the disabled and handicapped, and the mentally retarded. The laboratory period affords practical experience in individual and group methods for conducting developmental conditioning and corrective exercises.
- 580. (1½) Current Problems in Physical Education.—Objectives; programmes; leadership; history and trends; professional status; special problems.
- 583. (1½) Physical Education Programmes.—The development of curricula in physical education; relationships of programmes in schools, community centres and other institutions.
- 584. (1½) Motor Skills and Physical Efficiency of Young Children.—Survey of the literature in child development with special emphasis on physical growth and skill acquisition. Development of limited research projects by individual students and presentation of a seminar report on one research aspect of child development.
  - 599. (3-6) Master's Thesis.

# PHYSICS-Ph.D., M.Sc. and M.A.Sc. degrees

Professor and Head: George M. Volkoff.

Professors: A. J. Barnard, Robert Barrie, M. Bloom, Ronald E. Burgess, R. W. Burling, A. M. Crooker, F. L. Curzon, F. W. Dalby, K. L. Erdman, A. V.

Gold, G. M. Griffiths, Herbert P. Gush, Friedrich A. Kaempffer, D. L. Livesey, Kenneth C. Mann, Roy Nodwell, W. Opechowski, George L. Pickard, M. H. L. Pryce, Robert W. Stewart, E. W. Vogt, J. B. Warren.

Associate Professors: B. Ahlborn, J. W. Bichard, M. K. Craddock, Garth Jones, J. M. McMillan, P. W. Matthews, P. Rastall, C. F. Schwerdtfeger, W. L. H. Shuter, L. de. Sobrino, B. L. White, D. Ll. Williams.

Assistant Professors: E. G. Auld, D. A. Axen, D. A. Balzarini, D. S. Beder, M. J. Crooks, J. E. Eldridge, J. F. R. Gower, Mrs. R. Guccione-Gush, Roger Howard, R. R. Johnson, P. H. LeBlond, J. Marko, P. W. Martin, J. Meyer, M. Miyake, P. Stephas, B. G. Turrell.

### Ph.D. degree

The Department offers opportunities for study in the following major fields:

## (a) Theoretical Physics:

Elementary particles.

Statistical mechanics of gases and solids.

Properties of semiconducting and magnetic solids (especially group theory methods).

Nuclear many-body problem.

Gravitation.

Quantum field theory.

# (b) Radio Astronomy:

21 cm. line and spectral studies in collaboration with the Dominion Radio Astrophysical Observatory, Penticton, B.C., and radio source studies using the National Research Council facilities at Algonquin Park, Ontario.

# (c) Magnetic Resonance:

Spin relaxation in gases, liquids and solids; paramagnetic-antiferromagnetic phase transitions; nuclear magnetic resonance in metallic crystals and ferromagnetic alloys; hyperfine interactions using nuclear orientation; Stern-Gerlach experiment for charged particles.

# (d) Plasma Physics:

Pinch discharges, shock waves, D.C. discharges and plasma jets using optical and spectroscopic methods, laser scattering and electric and magnetic probes.

# (e) Nuclear Physics:

Facilities include a 3 MeV van de Graff generator and considerable ancillary equipment including a PDP computer, beta-ray spectrometers, and magnetic and solid state particle spectrometers with data handling equipment for low energy nuclear reactions including those of astrophysical interest.

# (f) Semiconductor Physics:

A study of impurities in semiconductors using the techniques of infrared and paramagnetic resonance absorption.

# (g) Low-Temperature Physics:

Properties of liquid helium, superconductivity, phonon transport in solids, thermometry and specific heats at low temperatures.

# (h) Oceanography and Fluid Turbulence:

Facilities are available for research in collaboration with the Institute of Oceanography.

(i) Electron Physics:

Fluctuations in equilibrium and non-equilibrium in semiconductors, metals, and super-conductors, and random processes in physical systems.

(i) Molecular Spectroscopy and Atomic Physics:

Facilities for spectroscopic research include (1) various sources; (2) a variety of prism and grating spectrographs covering the region from 100A° to 50 microns; (3) interferometers including a high resolution Michelson interferometer for infrared spectroscopy; (4) an automatic Grant comparator, a Zeiss-Abbe comparator, and specialized recording microphotometers. Studies include energy levels and transition probabilities in simple molecules, Stark and Zeeman effects, and effects of collisions of electron beams with simple atoms and molecules.

(k) Electronic Properties of Metals:

The Fermi surface, wave functions, momentum distributions, magnetic exchange interactions and other related physical properties of conduction electrons in single crystals of pure metals and alloys are being studied by a variety of experimental techniques including the de Haas-van Alphen effect and related quantum phenomena, positron annihilation, nuclear magnetic resonance, and the propagation of magnetoplasma waves.

(1) Tri-University Meson Facility (TRIUMF):

In conjunction with scientists from Simon Fraser University, University of Victoria and the University of Alberta, plans have been completed to build on the UBC campus a sector-focussed cyclotron providing a 100 microampere beam of protons of energy variable from 150 MeV up to a maximum of 500 MeV. The project has been funded and this facility will be ready for intermediate energy nuclear structure physics and particle physics by 1973.

(m) Critical Phenomena:

Experimental investigations by optical means of the critical regions of fluids. Analysis of scattered laser light yields parameters characterizing fluids near the critical point. A new optical interference technique permits measurements of critical temperature to within a few millidegrees. The programme is being expanded to study several gases and determine the validity of the law of corresponding states. The effect of impurities is also being investigated.

A brochure describing the research facilities in more detail is available on request from the Department of Physics.

Related Subjects: Astronomy, Chemistry, Electrical Engineering, Mathematics and Metallurgy.

M.Sc. Degree

Prerequisite: Honours in Physics, Physics and Mathematics, Mathematics; or Bachelor's degree with at least Second Class standing in Engineering or Applied Science; or Bachelor's degree with a Physics Major, with at least Second Class standing.

Prerequisite: Graduation in Engineering Physics or Electrical Engineering. The M.A.Sc. program requires a thesis counting at least 3 units, at least 6 units of graduate courses in Physics, and other approved courses.

## Ph.D. Degree.

Prerequisite: Master of Science (or Master of Arts) in Physics, or Master of Applied Science (or Engineering) in Engineering Physics or Electrical Engineering. After a year's residence at U.B.C., particularly well-qualified M.Sc. or M.A.Sc. candidates may be transferred directly to a Ph.D. program.

#### Courses:

(For descriptions of undergraduate level physics courses (numbered less than 500) consult the Faculty of Science Calendar and the Faculty of Applied Science Calendar.)

- 501. (2) Elementary Quantum Mechanics. Non-relativistic quantum mechanics with application to atomic problems. Prerequisite: a senior undergraduate course in atomic and nuclear physics.
- 502. (2) Waves.—Wave propagation in one, two, and three dimensions with consideration of reflection, refraction, diffraction, dispersion, surface coupling, waveguide phenomena, and propagation of waves in inhomogeneous and dissipative media. Principal emphasis will be on electromagnetic and acoustic waves.
- 503. (1) Electromagnetic Theory.—A deductive presentation of the classical theory of electrons and its relation to the macroscopic electromagnetic theory. Prerequisite: a senior undergraduate course in Electromagnetic Theory through Maxwell's Equations and their applications.
- 505. (2) Nuclei and Particles.—General properties of the nucleus, two-body problem at low energies, nuclear forces, nuclear models, nuclear reactions, interaction of nuclei with electromagnetic radiation, beta-decay. Properties of elementary particles, classification of interactions, intermediate and high energy reactions.
- 506. (2) Quantum Theory of Solids.—An elementary treatment of the theory of the structure and properties of solids; energy band method, lattice vibrations, phonon and electron transport, dielectric and magnetic properties, imperfections.
- 507. (2) Plasma Physics.—Equilibrium theory of ionized gases, kinetic theory, transport coefficients. Motion of individual charges, cyclotron radiation. Waves, Landau damping. Derivation of magnetohydrodynamic equations.
- 509. (1) Theory of Measurements.—Probability, statistical distributions, significance tests, least squares, experimental design, numerical techniques.
- 510. (1) Stochastic Processes in Physics.—Statistical and thermodynamic fluctuations in electromagnetic, mechanical and thermal systems. Fundamental limits of observation and measurement in classical and quantum systems.
- 511. (1) Advanced Magnetism.—Spin hamiltonian, theory of ferro- and antiferromagnetism, nuclear magnetic resonance, relaxation in spin systems. Prerequisites: Physics 501 and 506.
- 512. (1) Spectroscopy.—Energy states of atoms and diatomic molecules. Textbooks: Herzberg, Atomic Spectra and Atomic Structure; Herzberg, Molecular Spectra and Molecular Structure. Prerequisite: Physics 501.

- 513. (1) Crystal Structure and X-rays.—Fundamentals of crystallography, production and properties of X-rays, structure analysis by X-rays and electron diffraction.
- 514. (1) Special Relativity Theory. Relativistic kinematics, dynamics, connection with electromagnetic theory. Prerequisite: a senior undergraduate course in Electromagnetic Theory through Maxwell's Equations and their applications.

515. (1) Physical Electronics.—Electronic processes in vacuo and in solids with particular reference to electron beams and semiconductors and the

physical aspects of the devices derived therefrom.

516. (2) Statistical Mechanics.—Ensemble theory (classical and quantum mechanical). Fluctuations. Response to external perturbations. Non-equilibrium statistical mechanics. Prerequisite: a senior undergraduate course in Thermodynamics and Statistical Mechanics.

- 517. (1) Introduction to Low Temperature Physics.—Description of cryogenic techniques insofar as these differ from normal techniques. Phenomenological aspects of low temperature physics.
- 518. (1) Low Temperature Physics.—Theoretical aspects of selected topics of interest in low temperature physics. Students enrolling in this course are expected to have a working knowledge of quantum mechanics.
- 519. (1) Molecular Spectroscopy.—Theory of Raman effect and infra-red absorption. Vibrational spectra of polyatomic molecules. Chemical applications.
- 520. (2) Advanced Spectroscopy.—Selected topics; determination of nuclear properties, microwave spectra. Textbooks: Condon and Shortley, The Theory of Atomic Spectra; Herzberg, Infra Red and Raman Spectra.
- **521.** (2) Group Theory Methods in Quantum Mechanics.—Selected topics from atomic, molecular, solid state, nuclear and elementary particle physics treated by group theory methods. Prerequisite: Physics 501.
- **522.** (2) Nuclear Physics.—Selected topics in low and intermediate energy nuclear physics. Prerequisites: Physics 501 and 505. Offered in alternate years beginning in 1968.
- 523. (1) Advanced Electronics.—Advanced treatment of problems in noise, non-linear circuit theory and information theory.
- **524.** (1) Waves and Antennas.—Energy and power flow, wave impedance **concept**, reflection and refraction; properties of media, dispersion, propagation **along** the ground and via the ionosphere; antenna radiation, electromagnetic **screening**; plasma waves.
- 525. (1) Advanced Topics In Solid State Physics.—Theory of the structure and properties of solids, with emphasis on electronic phenomena.
- **526.** (1) Quantum Theory of Radiation.—Calculation of cross-sections for **ebsorption**, emission and scattering of photons, creation and annihilation of **positrons**. Theory of radiation damping. Prerequisites: Physics 501, 503 and 514.
- 527. (1) Theoretical Nuclear Physics. Selected topics from current nuclear theory. Prerequisites: Physics 501 and 505.
- 528. (2) Elementary Particle Physics.—Selected topics in high energy physics. Prerequisites: Physics 501 and 505. Offered in alternate years beginning in 1969.
- **529.** (2) Advanced Quantum Mechanics.—Selected topics in relativistic quantum mechanics, quantum field theory, and theories of elementary particles. Prerequisites: Physics 501 and 514.

- 530. (1) General Relativity Theory.—Primarily for students interested in theoretical physics. Prerequisites: Physics 503 and 514.
- 531. (1) Advanced Plasma Physics.—Selected topics from current research in plasma physics—seminar course.
- 532. (2) Plasma Dynamics. The magnetohydrodynamic formulation of plasma dynamics including the effects of diffusion, viscosity, thermal conduction and ionization phenomena on plasma motion.
- 534. (1) Radiological Physics 1.—A systematic study of the principles involved in radio-therapy and of the techniques required for the application of these principles.
- 535. (1) Radiological Physics II.—A continuation of Physics 534, including an extension of the topics discussed in that course.
- 537. (1) Advanced Dynamic Oceanography.—A more intensive study of the dynamics of ocean currents. Reference: Stommel, *The Gulf Stream*. Prerequisite: Oceanography 401.
- 538. (1) Fluid Mechanics.—The flow of real and ideal fluids, emphasizing the influence of turbulence and the application to ocean currents.
- 539. (2) Waves and Tides.—Surface and internal waves, tides of the oceans, tidal currents.
- **540. (2)** Turbulence.—A discussion of turbulent fluid motion, presenting both the empirical aspects and the development of statistical theories, including the spectrum of turbulence and similarity and equilibrium hypotheses. Textbook: Hinze, *Turbulence*. (Offered in 1968-69 and alternate years.)
- 541. (1) Dynamic Meteorology. Development of basic equations of motion and their application to the atmosphere. A knowledge of vector calculus is assumed.
- 544. (1) Magnetic Resonance Seminar.—Selected topics in the recent developments of the theory and applications of magnetic resonance.
- 545. (1) Theoretical Physics Seminar.—Selected topics from current literature.
  - 549. (6) Master's Thesis.
- 555. (1-3) Directed Studies in Physics.—With approval of the Head of the Department, advanced studies under the direction of a staff member may be arranged in special cases.
- 570. (1) Radio Astronomy.—Emission, propagation and detection of radio noise from the solar system, galaxy and extragalactic radio sources. This course complements E.E. 593 which deals with instrumentation for radio astronomy.
- 571. (1) Cosmic Physics.—Reviews of radio, infra-red, optical, ultra-violet, X-ray, gamma ray and particle astronomy. Studies of interstellar matter. Developments in theories of gravitation and cosmology.
  - 649. Ph.D. Thesis.

PHYSIOLOGY
PLANT SCIENCE

# PHYSIOLOGY-Ph.D. and M.Sc. degrees

Professor and Head: D. Harold Copp.

Professor: Hugh McLennan.

Associate Professors: Carl F. Cramer, Ralph Keeler, J. R. Ledsome.

Assistant Professors: John C. Brown, Franco Lioy, C. Owen Parkes, A. J. Pearson.

## Ph.D. degree

The Department offers opportunities for advanced study in the field of mammalian physiology.

Studies in cognate fields will be selected in consultation with the Candidates' Committee.

# M.Sc. degree

Prerequisite: An M.D. degree; or a Bachelor's degree with Honours in Physiology or related fields in Agriculture, or in Biology, Botany, Biochemistry, Chemistry, Microbiology or Zoology; or the courses accepted as prerequisites for the Master's degree in one of these subjects.

Courses: Physiology 301, 302 and Biochemistry 400 or 410 and 411 if not already taken; Thesis, counting 6 units, and approved courses in related fields. Physiology 301, 302, Biochemistry 410, 411 or the equivalent, or consent of the Department, are prerequisite to all graduate courses.

511. (1-3) Seminar in Mammalian Physiology.—Seminar in selected topics in mammalian physiology.

549. (6) M.Sc. Thesis.

649. Ph.D. Thesis.

# PLANT SCIENCE—M.Sc. and Ph.D. degrees

Professor and Chairman: Vernon C. Brink.

Professors: D. P. Ormrod, A. J. Renney, M. Shaw.

Associate Professors: G. W. Eaton, C. A. Hornby, J. W. Neill.

Lecturer: B. Sivak.

Department of Recreation and Conservation; H. R. MacCarthy, Research Branch, Canada Department of Agriculture.

The Department offers advanced study in the fields of environmental plant plant plant plant plant plant plant properties of weeds, vegetable crops culture and breeding, pom-

ology, landscape horticulture, plant genetics, plant pathology and the ecology of forage and range. Laboratories and greenhouses support a wide range of researches on the morphology, cytology, genetics and nutrition of crop plants, especially as they may relate to cool temperature responses, flowering and fruiting in horticultural crops and mode of action of herbicides and measurement of herbicidal residues. Special equipment items available for research, are controlled environment growth chambers and gas analyzers; facilities for the artificial induction of mutations are available; special equipment is available for the study of plant host-parasite relations.

In certain fields advanced study may be arranged with other Departments, notably with Soil Science in plant-soil relationships, with Animal Science in forage physiology, and with Zoology in wildlife biology. Close associations are maintained with the research departments of the Canada Department of Agriculture located on the campus and elsewhere in Western Canada.

#### Courses and Seminars:

Prerequisites: Honours in Plant Science or a Bachelor's degree with acceptable courses in fields of study related to Plant Science. Applicants, otherwise acceptable, who do not have 6 units of approved courses in Plant Science, may take them concurrently with the Master's programme.

The M.Sc. course includes a thesis counting 6 units.

500. (1-3) Graduate Seminar.

**501.** (3) Advanced Pomology.—Discussion of current research problems, systematic pomology, developmental and reproductive physiology, determination of nutrient requirements of fruit crops, morphogenesis. Open to graduate students with a background in pomology and physiology. (Offered in 1969-70 and alternate years).

507. (3) Advanced Plant Genetics and Breeding.—The genetics of crop

plants. Prerequisite: Introductory genetics.

508. (3) The Ecology and Physiology of Weed Control.—Effects of environmental factors and phytotoxic agents on unwanted plants. Permission of instructor.

509. (3-5) Advanced Plant Pathology.—Laboratory and field techniques and procedures. Experimental methods, culture methods, virus studies, miscellaneous experimental methods, interpretation of experimental results.

- 510. (3) The Physiology and Biochemistry of Plant Pathogens.—An advanced course on the interactions between plant pathogens and their hosts. Prerequisite: An advanced course in plant biochemistry and permission of the instructor.
- 512. (1-3) Response of Plants to Controlled Environments.—Experimental modification of the plant environment and its effects on growth, development, and post-harvest characteristics. Lectures and laboratories. Prerequisite: Botany 300 or Plant Science 324.
- 516. (1-3) Advanced Landscape Horticulture.—Lectures and assigned problems in organization and development of man's environment with emphasis on the use of plant materials in the landscape. Field Trips. History of Landscape design.
- 517. (3) Advanced Vegetable Crops.—The improvement and production o vegetable crops with emphasis on research methods and current problems (Offered in 1970-71 and alternate years).
  - 530. (3) Directed Studies.
  - 549. (5-6) Master's Thesis. 649. Ph.D. Thesis.

## POLITICAL SCIENCE-Ph.D. and M.A. degrees

Professor and Head: R. S. Milne (until June 30, 1969).

Professors: Frank C. Langdon, Jean A. Laponce, Donald V. Smiley, W. J. Stankiewicz.

Associate Professors: Alan C. Cairns, K. J. Holsti, Ole R. Holsti, Walter D. Young.

Assistant Professors: Heath B. Chamberlain, David J. Elkins, Martin B. Levin, Paul Tennant, Michael D. Wallace, John R. Wood, Mark W. Zacher.

The Department offers opportunities for advanced study in the major fields of Political Science. It is particularly strong in Canadian Politics, British Columbia Politics, International Relations, Political Development and non-Western Politics with special reference to Asia. The library is a depository for United Nations, Canadian Government, British Columbia Government, and most U.S. Government documents. The library is especially strong in Soviet and Communist Studies, Asian Studies, and Canadian Government. The Department is a member of the Inter-University Consortium for Political Research (Ann Arbor), and belongs to the International Survey Library Association (Williamstown). Computer facilities are available.

A detailed brochure is available on application to the Department describing its programmes for the Ph.D. and M.A. degrees.

#### **Courses and Seminars**

- 500. (3) Political Theory.
- 501. (3) Seminar in Canadian Government and Politics.
- 502. (3) Public Administration.
- 503. (3) Techniques of Political Analysis and Research.
- 504. (3) The Theory of International Relations.
- 505. (3) Political Parties and Political Movements.
- 506. (3) Political Development.
- 507. (3) Comparative Western Government.
- 508. (3) Comparative Non-Western Governments.
- 509. (3) International Organization.
- 510. (3) Directed Studies.
- 511. (3) International Law Problems.
- 540. (3) Master's Seminar.
- 549. (3-9) Master's Thesis.
- 550. (3) Political Thought.
- 649. Ph.D. Thesis.

Not all these courses are offered in any given year.

### POULTRY SCIENCE—Ph.D. and M.Sc. degrees

Professor and Acting Head: W. D. Kitts.

Associate Professors: C. W. Roberts, B. E. March.

Assistant Professor: J. F. Richards.

Research Professor: J. Biely.

The Genetical Research Laboratory: Graduate students may select areas of study and research ranging from population to biochemical genetics. Chickens, Japanese quail and Tribolium are available for investigation with any area of study selected. The laboratory has a capacity for 7,000 laying hens of which 3,000 are in individual cages. A population of 400 Japanese quail, with nearly 100 individual mating cages also are available. A large incubation capacity along with controlled brooding and rearing facilities enable the investigator to study the growing as well as the production phase of the chicken and the quail. A diversity of mutant lines in both species is maintained for quantitative as well as qualitative studies. Genetic studies with many mutant lines of T, confusum and/or castaneum are constantly in progress. Students who are interested in expanding their scope of research ability may avail themselves of the opportunity to design and conduct independent investigations with Tribolium. Some of the current studies include (1) Heritability and genetic correlations between the blood serum proteins and growth rate as well as egg production in the chicken, (2) genetic variability in antibody formation in the baby chick, (3) studies in the causes of heterosis of riboflavin storage in Tribolium, (4) identification of biochemical mutants in Tribolium and the chicken.

The Nutritional-Physiological Research Laboratory: There is no limitation as to the direction of study in physiology and/or nutrition for the graduate student. Research in these areas may be conducted on birds of any age under controlled environmental conditions. Radioisotopic tracer studies as well as early biochemical indicators of muscular dystrophy in the chicken typifies the scope of research that has been undertaken. In addition nutritional studies with amino acids as they influence egg size and other production traits are presently underway. The nutritional farm can house up to 5,000 laying birds of which 1,000 are in individual laying cages. These facilities are further complemented by cage brooding units (capacity 3,000 baby chicks) which allow the investigator to conduct his experiments with a suitable population size.

The Products Research Laboratory: Research and advanced study are available for all aspects of poultry products. Special areas of quality control and sensory testing are emphasized. Present research involves chemical and physical changes in poultry meat and eggs as they relate to the functional value of these products as food or food ingredients. The scope of research within the laboratory is indicated by some experiments which are presently underway by graduate students: variation of egg albumen viscosity among genetically different strains in order to establish a sampling program for internal quality control, egg shell strength as related to trace mineral and organic content of shell and the effect of gamma radiation on meat color and pigments as well as its influence on protein hydration, water holding capacity and odor and flavor.

Prerequisite for M.Sc.: a Bachelor's degree with acceptable courses in fields of study related to Poultry Science. Applicants, otherwise acceptable, who do not have 6 units of approved courses in Poultry Science, may take them concurrently with the Master's programme.

#### Courses and Seminars

- 500. (1-3) Graduate Seminar.
- 506. (1½) Meat and Egg Science.—Recent advances relating to the physical, chemical and functional properties of meat and egg products.
- 513. (3) Poultry Genetics III.—Advanced population genetics and biometrical genetics. Textbook: Falconer, *Quantitative Genetics*, and selected research literature. Prerequisite: Poultry Science 413.
- 521. (1½) Advanced Poultry Nutrition I.—The functions of fat-soluble vitamins.
- 522. (1½) Advanced Poultry Nutrition II.—Protein nutrition; concepts of amino acid balance; methods of evaluating protein quality.
- 523. (1½) Biometrical Techniques.—Advanced biometrical techniques in agricultural experimentation. Prerequisite: Plant Science 321 or equivalent.
- 530. (3) Directed Studies.—On an approved problem. (Breeding, nutrition, physiology and poultry products.)
  - 549. (5-6) Master's Thesis.
  - 649. Ph.D. Thesis.

## PSYCHIATRY—M.Sc. degree

Professor and Head: James S. Tyhurst.

Professor: Edward L. Margetts.

- Associate Professors: Harry Klonoff (Head, Division of Psychology), Hamish Nichol (Head, Division of Child Psychiatry), H. Clyde Slade (Honorary).
- Assistant Professors: William T. Brown, Peter Bunton, Anthony M. Marcus, G. Alan Marlatt, Andrew N. McTaggart, James E. Miles, Hugh L. Parfitt, Paul E. Termansen.
- Instructors: Roy Makepeace (Acting Head, Social Psychiatry), P. Susan Stevenson.
- Lecturers: Priscilla Bernard (Part-time), Linda C. Eaves, Valerie MacBean, Lorette K. Toews (Part-time).

Llinical Professor: George A. Davidson.

- llinical Associate Professors: Joseph C. Thomas, Libuse Tyhurst, Henry Zeldowicz.
- linical Assistant Professors: Harvey Breen, C. Hegler Gundry, Carl L. Kline, Roy Slakov, Gordon H. Stephenson.

- Clinical Instructors: Robert Halliday, F. William Hanley, Norman B. Hirt, Eric E. Leyland, Philip G. Ney, Raymond Parkinson, Roderick L. Whitman, Bryce G. Young.
- Lecturers from other Departments: John U. Crichton (Paediatrics), A. G. DeVries (Psychology), John H. V. Gilbert (Paediatrics), David C. Kendall (Paediatrics), Morton D. Low (Medicine), Robert B. Lowry (Paediatrics), James R. Miller (Paediatrics), Robert S. Ratner (Anthropology and Sociology), J. E. B. Ryan (Psychology), Dorothy E. Smith (Anthropology and Sociology).

For prerequisites and course consult the Department.

Required courses for the degree include Psychiatry 500, 501, 510, 520, 530, 540, and other courses designated by the Department.

- 500. (1) The History of Psychiatry.—A series of lectures and seminars given on alternate years in the second half of the year and concerned with an historical review of psychiatry from earliest times to the present.
- 501. (1) Psychopathology.—A series of lectures and seminars concerned with a presentation for graduate students of signs, symptoms and syndromes in psychiatry. Texts and readings are assigned.
- 502. (1) The Interview and the Examination of the Patient.—Lectures and demonstrations concerned with the concepts, processes and clinical skills required in interviewing both for diagnosis and for treatment. Texts and readings are assigned.
- 503. (2) Psychotherapy I.—Lectures, demonstrations and tutorials with an introduction to processes and techniques of individual psychotherapy. Texts and readings are assigned. Psychiatry 501 and 502 are prerequisites.
- 504. (1) Drugs and Somatic Treatments in Psychiatry.—Lectures and demonstrations concerned with a presentation of the rationale and use of drugs and somatic treatments. Texts and readings are assigned. Psychiatry 501 and 502 are prerequisites.
- 505. (1) Methods in Evaluation and Research.—A course of seminars and demonstrations dealing with methods and techniques for the evaluation of programmes and treatment in Psychiatry, with research design and research procedures, including such problems as the use of controls in psychiatric research, the use and interpretation of statistics, etc. Texts and readings to be assigned. The course is given in alternate years.
- 506. (1) The Province and Functions of Psychiatry.—A course of lectures and seminars dealing with roles, responsibilities and functions assumed by and assigned to Psychiatry in medicine and in the community. The course deals with the patterns by which care has been made available in the past, with contemporary patterns now emerging, with the assumptions underlying these developments, and with the problems and issues that appear to be of relevance to Psychiatry in the future. Given in alterate years.
- 507. (2) Psychotherapy II.—An advanced course concerned with the processes, techniques and theories of individual psychotherapy. Prerequisite: Psychotherapy I. Texts and readings are assigned. The course includes three hours of individual tutorial per week.
- 508. (1) Group Therapy and Milieu Therapy.—This course of lectures and demonstrations given in the third year deals with the theoretical and practical issues met with in the use of various social groupings—the therapeutic small group, the family, the ward and the community—in psychiatric treatment. Psychiatry 503 and 507 are prerequisites.

- 509. (1) Theories and Etiology.—This course deals with the dynamics of human behaviour and the etiology of mental illness in a comprehensive manner at three levels of organization—molecular and cellular, psychological and social.
- 510. (2) The Neurological Basis of Human Behaviour.—This course is concerned with the structure, development and function of the human nervous system and the relationship of these to normal and abnormal human behaviour, thinking and emotions. Given through the second year. Psychiatry 501 and 504 are prerequisites. Texts and readings are assigned.
- 511. (1) The Neurological Basis of Human Behaviour (Laboratory).—Dissections and demonstrations of the structure and functions of the human nervous system. Prerequisite: Psychiatry 510.
- 512. (1) Problems of Cerebral Function.—A dissertation in a field related to the content of Psychiatry 510. Prerequisite: Psychiatry 510.
- 513. (1) Behaviour Physiology. An advanced course of lectures and seminars provided on an elective basis in the second half of the year and concerned with a survey of experimental work on the process of the nervous system underlying normal and abnormal behaviour in humans and primates; with special emphasis on the physiological correlates of higher nervous activity. Prerequisite: Psychiatry 501. Texts and readings to be assigned.
- 514. (1) Neurochemistry.—An advanced course provided on an elective basis elaborating chemical principles underlying mental functions. Current findings and theories on chemical aspects of mental illness and certain neurological disorders are presented and discussed. Prerequisite: Psychiatry 501.
- 515. (1) Psychopharmacology. An advanced elective course presenting current facts and theories relating the use of various drugs, experimental and therapeutic, to basic chemical and enzymatic processes in brain and nervous tissue, with special reference to mental illness and research in psychiatry. Prerequisite: Psychiatry 501. Texts and readings to be assigned.
- 520. (2) Social Psychiatry.—A course of lectures and seminars dealing with the relationships between mental illness and a range of social and ecological variables, and with current epidemiological knowledge about the frequency and distribution of mental illness. Texts and readings are assigned.
- 530. (2) Development and Learning.—This course deals with individual development as related to personality growth, mental health, and mental illness. This is a required course for the second year. Texts and readings are assigned.
- 531. (1) Child Psychiatry.—This course deals with diagnosis, prevention and treatment of mental illness and mental retardation in children. Psychiatry 530 is a prerequisite.
- 540. (1) Psychological Measurement.—This course deals with the rationale and administration of various psychological tests and measurements in the clinical setting, and with personality and other theories underlying their use. The course has been developed for both psychiatrists and clinical psychologists in training. Given in the first year. Readings and texts are assigned.
- 550. (3) Directed Studies.—This course provides for a programme of directed reading and study in such special area or areas as may be relevant to the student engaged in some particular area of study and research in Psychiatry.
  - 560. (6) Master's Thesis.

# PSYCHOLOGY-Ph.D. and M.A. degrees

Professor and Head: Douglas T. Kenny.

Professor: E. I. Signori.

Associate Professors: E. S. W. Belyea, D. D. Greenwood, R. D. Hare, D. C. G. MacKay, Demetrios Papageorgis, D. L. G. Sampson, T. F. Storm.

Assistant Professors: D. J. Albert, D. Susan Butt, R. S. Corteen, K. D. Craig, A. G. Devries, Gordon E. Finley, M. S. Humphreys, G. J. Johnson, R. E. Knox, G. A. Marlatt, R. O'Day, W. M. Petrusic, G. Plum, Reva Patashin, George Raymond, Arthur Reber, R. Tees, F. P. Valle, R. Wong, John C. Yuille.

The Department offers opportunities for advanced study in the following areas of specialization:

- (a) Clinical Psychology
- (b) Developmental Psychology
- (c) Experimental Psychology
  - (i) Learning, Cognition, Motivation
  - (ii) Sensory, Perceptual and Physiological Processes
  - (iii) Mathematical
- (d) Occupational Psychology
- (e) Personality
- (f) Social Psychology

Ph.D. students are encouraged to complete their degrees within four years. Since the Department believes that well-rounded preparation in psychology is furthered by some teaching experience, Ph.D. students also are encouraged to undertake some limited teaching responsibilities.

The first year of graduate training is designed to give the student a broad understanding of contemporary, scientific psychology through a core programme of courses emphasizing concepts and major research issues.

During the first year the student is encouraged to conduct some independent research and/or to participate in the research of a faculty member. During his second year, a graduate student will engage primarily in individual research for his Master's Thesis, and if he is a prospective Ph.D. student, he will select a limited number of seminars and courses from within and outside the Department. The third and fourth years are normally devoted to research for the Ph.D. thesis, and in the case of clinical psychology students, to a year's internship at an approved setting. A separate leaflet describing the clinical program may be obtained by writing to the department secretary.

A brochure, describing the Ph.D. and M.A. programme in more detail, is available on application to the Department.

#### Courses and Seminar:

- 500. (3) History of Psychology.
- 501. (3) Social Psychology.
- 503. (3) The Theory of Personality. Prerequisite: Psychology 305.
- 504. (3) Physiological Psychology.

- 505. (3) Psychometrics.
- 506. (3) Perceptual Processes.
- 507. (3) Cognitive Processes.
- 508. (3) Human Factors and Systems-Research.
- 510. (3) Verbal Learning.
- 511. (3) Developmental Psychology.
- 512. (3) Advanced Methods in Research.
- 515. (3) Psychology of Work.
- 516. (3) Advanced Experimental Psychology I.—Advanced treatment of problems in sensory, perceptual and physiological factors in behaviour.
- 517. (3) Advanced Experimental Psychology II.—Advanced treatment of problems in learning, motivation, emotion and cognition.
  - 518. (3) Topics in the Dynamics of Behaviour.
  - 519. (3) Mathematical Psychology.
  - 520. (3) Operant Conditioning.
  - 521. (3) Psycholinguistics.
  - 530. (3) Principles and Techniques in the Evaluation of Personality.
  - 540. (3) Principles and Techniques of Intellectual Assessment.
  - 541. (3) Objective Tests in Diagnosis and Adjustment of Personality.
  - 542. (3) Seminar in Clinical Psychology.
  - 543. (3) Principles of Psychotherapy.
  - 544. (3) Patterns of Child-Rearing.
  - 545. (3) Advanced Statistics I.
  - 546. (1-3) Seminar in Psychological Problems.
  - 547. (1-3) Reading and Conference.
  - 548. (1) Departmental Seminar.
  - 549. (3-6) Master's Thesis.
  - 649. Ph.D. Thesis.

# RELIGIOUS STUDIES—M.A. degree

Professor and Head: William Nicholls.

Professor: Arthur E. Link.

Associate Professor: Hanna E. Kassis.

Assistant Professors: Charles P. Anderson, Shotaro Iida, Joseph I. Richardson.

The Department of Religious Studies offers advanced studies leading to the legree of Master of Arts. Candidates may choose any one of four areas of concentration: Buddhism (in conjunction with the Department of Asian Studies); Old Testament and Cognate Studies; Comparative Religion; Christian thought and Institutions. Before a candidate may proceed to the writing of this thesis he must pass the five written comprehensive examinations designated

for the programme of his choice. He is expected to acquire a competent reading knowledge of the appropriate languages prior to sitting these examinations. In addition to the collection of basic works in the departmental reading room, students have access to the faciliies of the University Library, and, by courtesy, to those of the three theological colleges on campus. A detailed brochure on the graduate programme is available on application to the Department.

#### Courses and Seminars:

- 500. (3) Reading and Research.—A research tutorial on a subject to be chosen in consultation with the student's advisor. Candidates may register in more than one such tutorial.
- 531. (3) Graduate Seminar.—Selected topics: methodology, myth, religious experience, typologies and theories of religion, and others.
  - 549. (3-6) Master's Thesis.

### ROMANCE STUDIES—Ph.D. and M.A. degrees

The Department of French and the Department of Hispanic and Italia Studies offer opportunities for graduate programmes in the field of Romance Studies.

519. (3) The Language and Literature of Old Provençal.—A study of the principal literary works and the development of the language.

520. (3) Studies in Romance Languages and Literature.

## SLAVONIC STUDIES—Ph.D. and M.A. degrees

Professor and Head: Michael H. Futrell.

Professors: Cyril Bryner, Zbigniew Folejewski, H. E. Ronimois, James O. Clair-Sobell.

Associate Professors: Bogdan Czaykowski, Valerian Reyutsky, Alexander Wainman.

Assistant Professors: Frank Beardow, Daniel Dorotich, Alex P. Harsher Irina M. Reid, Jan J. Solecki.

Instructors: Catherine S. Leach, Aram H. Ohanjanian, Irina Rebrin.

M.A. and Ph.D. degrees are offered in the fields of Russian and Po literature. Steadily growing facilities are provided for training in langu literature and area studies. Library holdings have been described in off reports as being among the best in Canada. Comparative studies can undertaken in conjunction with the Comparative Literature Program.

#### Courses and Seminars

## Language and Literature Studies

#### Russian

- 501. (3) History of the Russian Language.
- 510. (3) Russian Thought and Culture.
- 530. (3) Russian Drama and Theatre from the Age of Classicism to the Present.
- 532. (3) Studies in the Russian Novel.
- 533. (3) Russian Literature to the End of the Eighteenth Century.
- 534. (3) Modern Russian Poetry.
- 540-44. (1½-3) Topics in Russian Literature.
- 549. (3-6) Master's Thesis.
- 649. Ph.D. Thesis.

#### Polish

- 545. (3) Studies in Polish Literature.
- 549. (3-6) Master's Thesis.
- 649. Ph.D. Thesis.

#### Slavonic

- 500. (1½) Bibliography and Methods.
- 502. (3) Comparative Slavonic Philology.
- 520. (3) Old Church Slavonic.
- 542. (3) Comparative Slavonic Literature.

#### Area Studies

- 504. (3) Seminar in Russian History.
- 505. (3) Seminar in Soviet History.
- 514. (3) History of Russian Education.
- 541. (3) Selected Problems of Soviet Economic Development.
- N.B. Not all courses are given every year; the department should be consulted.

# SOCIOLOGY—Ph.D. and M.A. degrees

Professor and Head (Anthropology and Sociology): Cyril S. Belshaw.

Professor: Reginald Robson.

Associate Professors: Werner Cohn, Adrian Marriage, Martin Meissner, Dorothy Smith.

Assistant Professors: Yunshik Chang, Jean-Louis de Lannoy, Martha Foschi, George Gray, Terrance Nosanchuk, Robert Pokrant, Robert Ratner, Theodore Ravetz, David Schweitzer, Ronald Silvers, Matthew Speier, Roy Turner.

(see also Anthropology listing)

The Department offers studies leading to the M.A. and the Ph.D. in several fields, and may arrange tutorials and reading assignments to complement formal class work.

Advanced study in sociology is offered in a joint Department of Anthropology and Sociology. Co-ordinated programmes of work have been organized around the approaches of (a) formal and quantitative sociology, (b) socio-cultural and socio-ethnographic studies, and (c) comparative social institutions. While most students will be involved in one or other of these programmes, it is possible to set up programmes which cut across these interests or which relate to anthropology or other inter-disciplinary concerns. The substantive areas of competence in sociology include small groups, ethnomethodology, sociology of work and organizations, urban sociology and demography, development and modernization, ecology, socialization and deviance.

Resources available to the Department include a small groups laboratory and excellent statistical and computing facilities, including a Statistical Centre for the Social Sciences and an IBM 360-67 computer.

Much of the work in Ph.D. programmes is carried out through directed studies or auditing seminars, rather than through formal course-credit arrangements, provided the student has a thorough preparation in the subject. Theses may be written in French, when a suitable committee can be arranged.

More detailed information is available from the Department admissions officer for Sociology, Dr. George Gray.

#### Courses and Seminars

# A. Theory and Research

- 501. (1-3) Seminar.
- 502. (1-3) Seminar.
- 503. (1-3) Seminar.
- 504. (1-3) Seminar.

# B. Relationships Between Individuals and Groups.

- 511. (1-3) Seminar.
- 512. (1-3) Seminar.
- 513. (1-3) Seminar,
- 514. (1-3) Seminar.

## C. Elements of Social Organization.

- 521. (1-3) Seminar.
- 522. (1-3) Seminar.
- 523. (1-3) Seminar.
- 524. (1-3) Seminar.

#### D. Institutional Areas.

531. (1-3) Seminar.

532. (1-3) Seminar.

.534. (1-3) Seminar.

535. (1-3) Seminar.

533. (1-3) Directed Studies.

540. (1-3) Graduate Seminar.

545. (1-3) Graduate Research Seminar.

549. (3-6) Master's Thesis.

649. Ph.D. Thesis.

## SOIL SCIENCE—Ph.D. and M.Sc. degrees

Professors and Chairman: Charles A. Rowles.

Assistant Professors: Jan de Vries, Leslie M. Lavkulich, Lawrence E. Lowe.

Lecturers from other Departments: Lawrence Farstad (from Pedology Section, Canada Department of Agriculture), P. Norman Sprout (from Soil Survey Section, British Columbia Department of Agriculture), T. H. Blackburn (from Department of Microbiology).

The Department offers opportunities for advanced study in the fields of Soil Chemistry and Mineralogy, Soil Organic Matter, Soil Physics, Soil Pollution, Soil Genesis and Classification, Land Use, Soil Fertility and Forested Soils. The Department's laboratories are well equipped for research in these fields and access is available to major equipment installations in other Departments. Excellent library facilities are available in Soil Science and related fields. The Province of British Columbia is an unexcelled outdoor laboratory for the study of soils and the Department's close association with the Soil Survey, Canada Land Inventory and related programs facilitates taking advantage of this for advanced study. The University Research Forest at Haney operated by the Faculty of Forestry is also available for Soil Research.

Prerequisite for M.Sc.: A Bachelor's degree, with acceptable courses in fields of study related to Soil Science. Applicants, otherwise acceptable, who do not have 6 units of approved courses in Soil Science, may take them concurrently with the Master's programme.

## Courses:

500. (2) Graduate Seminar.

504. (1½-3) Advanced Soil Chemistry.—A study of research findings in specific phases of Soil Chemistry. (Offered in 1969-70 and alternate years.)

512. (1½-3) Advanced Soil Microbiology.—Lectures and laboratories reting to modern methods, concepts and research in soil microbiology. Prequisites: Chemistry 230 and Soil Science 312 or by permission of instructor. Not offered 1969-70.)

- 513. (1½-3) Selected Topics in Soil Physics.—Retention and flow properties of soils with respect to water, gas and heat. Thermodynamics of soil water. Prerequisite: Consent of instructor.
- 516. (3) Soil Genesis and Classification.—Principles of soil classification; reactions and processes of soil genesis; development of major soil groups of the world. Saturday field trips required. Prerequisites: Soil Science 416 or equivalent and consent of instructor. (Offered in 1970-71 and alternate years.)
  - 530. (3) Directed Studies.
  - 549. (5-6) Master's Thesis.
  - 649. Ph.D. Thesis.

SPANISH-Ph.D. and M.A. degree. (See Hispanic and Italian Studies.)

## THEATRE—M.A. degree

Associate Professor and Head: John Brockington.

Professor: Donald E. Soule.

Assistant Professors: William Louis, Klaus G. Strassmann, Richard Kent Wilcox.

Instructor: Stanley A. Weese.

The Department offers opportunities for advanced studies in Dramatic Literature, Theatrical History and Criticism; Direction of Plays and Production; Design of Scenery and Costume. The Master's programme in Playwriting is offered in cooperation with the Department of Creative Writing.

#### Courses:

- 505. (3) Scenic Design.
- 506. (3) History and Design of Theatrical Costume.
- 510. (3) Seminar in Comparative Dramatic Literature.
- 515. (3) Seminar: Studies in Theatrical Style.
- 520. (3) Direction and Production.
- 525. (3) Seminar in the Study of a Major Dramatist.
- 547. (3) Directed Studies in Theatre and Drama.
- 549. (3-6) Master's Thesis.

## ZOOLOGY-Ph.D. and M.Sc. degrees

Professor and Head: W. S. Hoar.

- Professors: Ian McTaggart Cowan, Peter A. Larkin, James R. Adams, Brian McK. Bary, Dennis H. Chitty, Paul A. Dehnel, Cyril V. Finnegan, H. D. Fisher, C. S. Holling, Julius Kane, G. G. E. Scudder, H. F. Stich, N. J. Wilimovsky.
- Associate Professors: A. B. Acton, Nelly Auersperg, James F. Bendell, Ian Efford, Peter Ford, A. G. Lewis, J. D. McPhail, T. G. Northcote, A. M. Perks, J. E. Phillips, D. J. Randall, D. Suzuki, J. Mary Taylor.
- Assistant Professors: R. H. Drent, D. W. Francis, J. R. Harger, P. W. Hochachka, Mary Jackson, N. R. Liley, H. Nordan, S. T. Smith, C. F. Wehrhahn.

Opportunities for advanced study and research fall into four broad categories with a healthy overlap of interest and interaction among them. In addition, there are several programmes of a special or interdisciplinary nature in which other departments and faculties participate actively. Following is a brief summary of the varied investigations and facilities for research. A more detailed descriptive leaflet is available on request.

Cell-Developmental Biology—Several groups of workers in this area, which includes GENETICS, are independently investigating problems in a number of different fields of cell biology. The major topics currently under active study are: Factors which control cellular differentiation in the slime moulds; histochemistry of development; cytogenetics; cytochemistry and electron microscopy of primary gene products; tissue culture of cancer cells and an analysis of tumor histogenesis; the genetics of recombination and development in *Drosophila*; viral induced mutagenesis; immuno-genetic studies on somatic cells and cell hybrids of mammals. Equipment includes: Fluorescent microscope; UV-microspectrophotometer; ultracentrifuge; electron microscopes; ultramicrotomes; cryostat; tissue culture and electrophoresis apparatus.

Community and Population Biology—This group is investigating the principles of theoretical and applied ecology and population genetics as they relate to specific ecological systems. The total programme involves field and laboratory experimentation, mathematical modelling, simulation and analysis. Several natural areas are available for field work and the laboratories offer a wide range of facilities for experimentation and observation. New techniques of systems analysis are facilitated through a computing centre containing an analog and a digital computer, optical and graphical displays, and automated field and laboratory data acquisition systems. A systems mathematician, computer analyst, and programmer assist with the planning of research and analysis of data.

Comparative Physiology and Biochemistry—Equipment required for most sinds of physiological and biochemical work is available in several laboratories. Animal holding facilities include controlled environment rooms, several aquarium rooms and a vivarium. Problems currently under active intestigation include: Environmental physiology of marine invertebrates; membrane structure and cell permeability; enzyme systems in poikilotherms; eurohypophysial hormones of fishes and mammalian embryos; reproductive indocrinology and behaviour of fishes; physiology of marine mammals; bionergetics and growth of mammals—particularly the game species.

Evolutionary Biology—A broad spectrum of research, loosely grouped under this heading, is being pursued by faculty and graduate students in various areas of both vertebrate and invertebrate zoology. Facilities include several excellent museums, field equipment including vehicles and rooms for animal culture, experimentation and observation. Problems currently under investigation include: population differences, functional morphology and relationships of insects; distribution of marine plankton in relation to physical and chemical oceanography; systematics; natural variation in morphology and behaviour of fishes; the origin and maintenance of isolation between genotypes; reproductive biology of mammals; factors affecting reproductive output in wild populations; evolution of mammals with special emphasis on speciation in both continental and island populations.

Special Programmes—The Department is actively involved in several interdisciplinary programmes of instruction and research. Further details may be obtained by writing to the Director of the programme or institute as indicated below:

Cancer Research Centre—Dr. R. L. Noble, Faculty of Medicine.

Fisheries-Dr. P. A. Larkin, Director of the Institute of Fisheries.

Oceanography—Dr. G. L. Pickard, Director of the Institute of Oceanography.

Resource Science Programme—Dr. C. S. Holling, Director, Department of Zoology.

Wildlife Biology-Dr. J. F. Bendell, Department of Zoology.

#### Courses:

The graduate courses listed below are described more fully in the Calendar of the Faculty of Science. In addition, a number of the advanced undergraduate Biology and Zoology courses may be selected for credit in the graduate programme. Of the graduate courses listed below, only a selected group is offered annually. In general, Zoology 500, 502, and 505 are offered every year; 503, 510, 512, 516, 519, 522, 530, 531, are offered in 1969-70 and alternate years; 507, 508, 509, 511, 515, 517, 520, 525, 526, 532, will be offered in 1970-71 and alternate years; others as required.

- 500. Special Advanced Course.
- 502. (3) Advanced Ecology.
- 503. (3) Comparative Physiology.
- 504.  $(1\frac{1}{2})$  Ethology Seminar.
- 505. (3) Cell Biology.
- 507. (2) Zoogeography.
- 508. (2) Endocrinology.
- 509. (1½) Population Genetics.
- 510. (1½) Developmental Genetics.
- 511. (2) Advanced Marine Zooplankton.
- 512. (2) Marine Invertebrate Zoology.
- 515. (3) Comparative Invertebrate Embryology.
- 516. (3) Advanced Entomology.
- 517. (3) Principles and Problems of Applied Entomology.
- 519. (3) Parsitology.
- 520. (3) Limnology.

- 521. (3) Fisheries Biology and Management.
- 522. (2) Limnology Seminar.
- 525.  $(1\frac{1}{2})$  Problems in Systematics and Evolution.
- 526. (1) Marine Zoogeography.
- 527. (3) Theoretical Population Dynamics.
- 528. (3) Ichthyology A.
- 529. (3) Ichthyology B.
- 530. (2) Vertebrate Reproduction.
- 531. (2) Ornithology.
- 532. (2) Mammalogy.
- 533. (2) Problems in Wildlife Management.
- 549. (6) M.Sc. Thesis.
- 649. Ph.D. Thesis.

# REGISTRATION IN THE FACULTY OF GRADUATE STUDIES,

# December 1968

Department	Degree	Total
Agricultural Economics	M.Sc.	10
Agriculture Engineering	M.A.Sc.	3
Agricultural Mechanics	M.Sc.	4
Anatomy		2
•	Ph.D	2
Animal Science	Ph.D	4
	M.Sc	8
Anthropology	M.A	28
	Ph.D	20
Architecture	M.Arch.	11
Asian Studies	M.A	17
	1.50	10
Biochemistry		12
Botany	Ph.D	22
	Ph.D	38
Chemical Engineering	MASc	12
		14
Chemistry	M Sc	43
Citemsuy		106
Civil Engineering		28
Givin Bilgineering	Ph.D.	11
Classics		9
		9
Commerce	M.B.A.	124
		1
Community and Regional Planning		39
		7
	Ph.D.	3
Comparative Literature	M.A.	7
Computer Science	M.Sc	8
Creative Writing	. M.A	19
		0.0
Economics	. M.A	36
·	Ph.D	12
Education	M.A	45
	M.Ed.	167
	Ed.D.	40
Electrical Engineering	. M.A.Sc	49
	Pn.D	26

Department	Degree	Total
Engineering Physics	M.A.Sc.	3
	Ph.D	2
English	M.A	123
	Ph.D	45
774 A 4	3.7.4	1.4
Fine Arts	M.A	
Food Science	M.Sc.	
Causet Engineening	Ph.D	
Forest Engineering	M.A.Sc	
Forestry	M.F	_
	M.Sc Ph.D	
French	M.A	
rrench	Ph.D.	
	FII.D	
Geography	M.A	37
	Ph.D	
Geological Engineering	M.A.Sc.	4
Geology	M.Sc	16
	Ph.D	19
Geophysics	M.Sc.	17
	Ph.D	14
Genetics	M.Sc.	4
	Ph.D	5
German	M.A	15
	Ph.D	15
History	M.A.	38
· · · · · · · · · · · · · · · · · · ·	Ph.D.	
Italian	M.A	
	Ph.D	1
Law	LL.M.	2
Linguistics	M.A.	
Mathematics	M.A	
	M.Sc	
	Ph.D	
Mechanical Engineering	M.A.Sc	
M. D.	Ph.D	
Metallurgical Engineering	M.A.Sc.	
Š.	Ph.D	
Metallurgy	M.Sc	
	Ph.D	5

# O140 GRADUATE STUDIES

Department	Degree	Total
Microbiology	M.Sc	10
		12
Mineral Engineering	M.A.Sc	10
	Ph.D	5
Music	M.Mus.	18
Nursing	M.S.N	6
Pathology	M.Sc	4
	Ph.D	2
Pharmaceutical Sciences	M.Sc	12
	Ph.D	1
Pharmacology	M.Sc.	4
	Ph.D	3
Philosophy	M.A	13
	Ph.D	16
Physical Education	M.P.E.	
Physics	M.Sc.	47
	Ph.D	87
Physiology	M.Sc.	10
	Ph.D.	2
Plant Science	M.Sc.	24
	Ph.D	10
Political Science	M.A	23
	Ph.D	11
Poultry Science	. M.Sc	8
		4
Psychology		40
	Ph.D.	20
Religious Studies	. M.A	2
Romance Studies		6
	Ph.D.	4
Slavonic Studies	M.A	22
Sociology	. M.A	29
<b></b>	Ph.D.	14
Soil Science	. M.Sc	8
	Ph.D	3
Spanish	M.A	12
-		2
Theatre	M.A.	14
Zoology	M Sc	79
200063		
	FII.D	10

# THE FACULTY OF LAW

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA

'ANCOUVER 8 • BRITISH COLUMBIA CANADA

# The Faculty of Law calendar, 1969-70

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#### ACADEMIC STAFF

- G. F. Curtis, Q.C., LL.B. (Sask.), B.A., B.C.L. (Oxon.), LL.D. (Dalhousie, Sask.), D.C.L. (New Brunswick), Professor and Dean of the Faculty.
- C. B. BOURNE, B.A. (Toronto), LL.B. (Cantab.), Professor.
- D. S. M. HUBERMAN, B.A., LL.B. (Brit. Col.), LL.M. (Harvard), Professor.
- K. M. Lysyk, B.A. (McGill), LL.B. (Sask.), B.C.L. (Oxon.), Professor.
- A. J. McClean, LL.B. (Queen's, Belfast), Ph.D. (Cantab.), Professor.
- D. J. MacDougall, LL.B. (Melbourne), J.D. (Chicago), Professor.
- J. M. MacIntyre, B.Com., LL.B. (Brit. Col.), LL.M. (Harvard), Professor.
- E. C. E. Todd, LL.B., LL.M. (Manchester), Professor.
- C. R. B. Dunlop, B.A., LL.B. (Alta.), LL.M. (London), Associate Professor.
- L. Getz, B.A., LL.B. (Cape Town), LL.M. (London and Harvard), Associate Professor.
- R. G. HERBERT, D.F.C., C.D., B.A., LL.B. (Brit. Col.), Associate Professor.
- M. A. HICKLING, LL.B., Ph.D. (London), Associate Professor.
- L. G. JAHNKE, LL.B. (Sask.), LL.M. (London), Associate Professor.
- K. C. Mackenzie, B.Com., LL.B. (Brit. Col.), LL.M. (Michigan), Associate Professor. (Leave of absence 1969-70).
- J. C. Smith, B.A., LL.B. (Brit. Col.), LL.M. (Yale), Associate Professor.
- J. J. Atrens, B.A. (Sask., Oxon.), M.A., B.C.L. (Oxon.), Assistant Professor.
- P. G. Barton, B.S.F. (Toronto), LL.B. (Queen's), LL.M. (Harvard), Assistant Professor.
- S. H. Berner, B.A., LL.B. (Brit. Col.), LL.M. (London), Assistant Professor.
- P. T. Burns, LL.B., LL.M. (Otago, N.Z.), Assistant Professor.
- J. T. English, B.Com., LL.B. (Brit. Col.), LL.M. (Harvard), Assistant Professor.
- W. H. KNIGHT, LL.B. (Sydney), LL.M. (British. Col.), Assistant Professor.
- D. L. LARSON, B.A., LL.B. (Alta.), LL.M. (London), Assistant Professor.
- A. W. Lucas, B.C., LL.B. (Alta.), LL.M. (Brit. Col.), Assistant Professor.
- L. A. Powe, B.A. (Yale), J.D. (Wash.), Assistant Professor.
- 3. V. Slutsky, B.A., LL.B. (Brit. Col.), Assistant Professor.
- THE HON. MR. JUSTICE V. L. DRYER, B.A. (Brit. Col.), Lecturer on Evidence.
- W. V. DICKERSON, C.A., B.Com., LL.B. (Brit. Col.), Ph.D. (London), Lecturer on Accounting.
- I. A. HOLLINRAKE, LL.B. (Brit. Col.), Lecturer on Insurance.
- J. O'KEEFE, B.Com., LL.B. (Brit. Col.), LL.M. (California), Lecturer on Taxation.
- i. R. Schmitt, B.A., LL.B. (Sask.), LL.M. (Harvard), Lecturer on Insurance.
- V. D. C. Tuck, LL.B. (British Col.), Lecturer on Maritime Law.
- 1. H. VICKERS, B.A., LL.B. (Brit. Col.), Lecturer on Evidence).
- . V. McCallum, B.A., LL.B. (Brit. Col.), Honorary Liaison Secretary.
- . A. M. MacKenzie, President Emeritus, Honorary Professor of Public International Law.
- READ, LL.B. (Man.), Professor Emeritus of Law (1950).
- J. SHORTHOUSE, B.A., B.L.S. (Brit. Col.) Librarian.
- RS. DONNA R. MACKENZIE, B.A. (Transylvania), B.L.S. (McGill), Librarian.

# FACULTY OF LAW

#### General

The Faculty of Law was established in 1945. The present building, opened in 1951, contains a library of approximately 54,000 volumes, one of the finest law libraries in Canada. The library consists of substantially all the Canadian and English materials, the major United States reports, wide holdings of Commonwealth and foreign texts and periodicals, and a substantial collection of International Law materials. The University is also a repository for United Nations publications.

## Degrees

The Faculty of Law offers two degrees, Bachelor of Laws (LL.B.) and Master of Laws (LL.M.). Information concerning the LL.M. degree may be found in the Graduate Studies Calendar. The Bachelor of Laws degree is granted on the successful completion of a three-year course, and prepares students for admission to the practice of law (subject to further requirements which are set out below) and for business and public service.

# Admission: (i) Application

All applicants applying for entry to the Faculty for the first time, whether for the first year of studies or otherwise, must make formal application to the Registrar of the University as early as possible in the year and in any event not later than July 2nd. An applicant should procure an application form from the Office of the Registrar so that he can have it completed on or before that date whether or not his transcripts are then available. Late applications will not be considered.

A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.

Applicants must submit to the Registrar two recent passport-type photographs of themselves, endorsed with their names, at the time of their first application for admission to the Faculty (in addition to those required on first admission to the University). Photographs should be approximately 11/4 inches by 13/4 inches, black and white and not the "instant" type.

(ii) Academic Requirements

Applicants, in order to be eligible for consideration for admission to the Faculty, must present evidence of having:

- (a) graduated in an approved course of studies from the University of British Columbia and obtained a degree standing of not less than 60%; or obtained the equivalent at an approved university; or
- (b) successfully completed the first three years of an approved course of studies leading to a degree at the University of British Columbia and obtained in the Third Year thereof a standing of not less than 65%; or its equivalent at an approved university; or
- (c) successfully completed the requirements of the Faculty of Commerce and Business Administration in the combined B.Com., LL.B. course in the University of British Columbia and obtained at the regular sessional examinations in the Third Year thereof an average of not less than 65%.

Persons who have demonstrated exceptional ability in their academic and other experience may, in the discretion of the Faculty, be admitted although they lack the foregoing requirements.

## (iii) Advanced Standing

Undergraduates in other faculties or schools of law may, upon application, be granted such standing as the Faculty may determine.

The provisions of (ii) and (iii), above, are subject to these qualifications:

- (a) The Faculty has power to deal with special cases.
- (b) A candidate who, notwithstanding his academic record, is in the opinion of the Admissions Committee deficient in English, will be refused admission.
- (c) A candidate who has failed or has deficient standing in any year of a law course at another institution must, unless the Admissions Committee determines otherwise because of very exceptional circumstances, obtain full standing in that year before he will be considered for admission, for repetition or otherwise, to the Faculty of Law.
- (d) Enrolment in the Faculty is limited to a total of 700 students. In any given academic year numbers may be limited if the Faculty's resources and facilities are not capable of accommodating 700 students. (See General University Regulations, below.) Applicants should therefore regard the satisfying of the above entrance requirements as meaning only that they are eligible for selection, and that such selection shall be solely within the discretion of the Faculty of Law.
- (e) The Faculty may, from the academic year 1970-71, require all applicants for admission to first year to take the Law School's Admission Tests. Information about the test may be obtained from Law School Admission Test, Educational Testing Service, Box 944, Princeton, New Jersey 08540, U.S.A.

# Fees (Subject to change without notice)

First Term Fees, \$282 (includes A.M.S. fees), are payable in full at the time of registration. Third Year students are assessed an additional \$7 (\$289) to cover the graduation fee.

Second Term Fees, \$253, are payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Accounting Office before this date with a note showing name and registration number.

Students may if they wish pay the total fees of \$535 at the time of registra-

When notified that his application has been accepted each applicant shall, within two weeks of notification, send a deposit of fifty dollars (\$50.00) (by cheque payable to The University of British Columbia), which deposit will later be applied to the tuition fees of the law course. If the applicant is unable to register and notifies the Registrar of this fact not later than August 31st, his deposit will be refunded to him. If the applicant does not register or if he neglects to notify the Registrar of his change of intention until after August 31st his deposit will be forfeited.

Note: The deposit of fifty dollars is payable only by those applicants who receive official notification of their admission to the Faculty of Law and should not be sent in with the initial application for admission.

# Graduate Studies

For the graduate programme in Law leading to the degree of LL.M. see the Faculty of Graduate Studies calendar.

# General University Regulations

The University reserves the right to limit attendance, and to limit the

registration in, or to cancel or revise, any of the courses listed. The curricula may also be changed as deemed advisable by Senate.

## Registration

Registration may be completed by mail, or in person in the Law Building on or before the first day of lectures. For details of registration, please refer to the Secretary of the Law School. No student will be allowed to register after the first day of instruction in the term, nor will he be admitted to any class after its first meeting, except by permission of the Dean after written application.

#### Attendance

Regular attendance is expected of students in all their classes (including lectures, tutorials, seminars, etc.). Students who neglect their academic work and assignments may be excluded from the final examinations. Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes.

Students, who because of illness are absent from a December or April examination, must submit a certificate, obtained from a doctor, to the University Health Service as promptly as possible.

## Examinations (i) General

Examinations will be held in April at the close of each session except in respect of those subjects which are given in the First Term only, when examinations will be held immediately prior to the Christmas vacation.

A student, in order to pass his year, must obtain an average of not less than 55 per cent. on the work of that year. No supplemental examinations will be granted or held. Successful candidates will be graded as follows:

First Class, an average of 80 per cent. or over; Second Class, 65 to 80 per cent.; Pass, 55 to 65 per cent.

Term essays and examination papers may be refused a passing mark if they are illegible or deficient in English.

A student who fails his year or withdraws or does not write one or more final examinations must, before July 2, make special application for readmission to the Faculty in order to repeat his year. All such applications will be dealt with on their own merits by the Admissions Committee.

## (ii) Examination results

Results of the sessional examinations in April are mailed to students in the graduating classes about the time of Congregation, and to students in the lower years by approximately June 15. Any student who must meet an application date for another institution prior to June 15 should inform the transcript clerk in the Registrar's office in order that arrangements may be made to meet the deadline.

# (iii) Review of Assigned Standing

Reviews of Assigned Standing are governed by the following regulations:

- 1. Any request for the review of an assigned grade must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each course concerned which will be refunded only if the mark is raised.
- 2. Each applicant for a review must state clearly why he believes the course deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a

second time before results are announced. A review will not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.

3. Reviews will not be permitted in more than two courses in the work of one academic year.

#### Graduation

Every candidate for a degree must make formal application for graduation. Application for graduation must be made not later than March 15. Special forms for this purpose are provided by the Registrar's office.

## Transcript of Academic Record

A transcript of a student's academic record will, on request of the student, be mailed direct to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the inscription "official transcript only if presented with seal unbroken". On graduation or withdrawal a student may obtain for his own use a copy of his record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of examinations held in the first year.

Student records are confidential. Transcripts are issued only at the request of students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made arrangements satisfactory to the Accountant's office to meet any outstanding indebtedness.

Granted Honourable Dismissal indicates that the student is in no disciplinary difficulty at the time the transcript is issued; the term has no reference to scholastic status.

Application for a transcript should be made at least one week before the document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

#### Withdrawal

Any student who after registration decides to withdraw from the Faculty must report to the Registrar's office and to the office of the Dean. He will be required to obtain clearance from the University, to the satisfaction of the Registrar, before being granted *Honourable Dismissal* or recommended, where applicable, for refund of fees.

The Senate of the University may require a student to withdraw from the University at any time for unsatisfactory conduct, for failure to abide by regulations, for unsatisfactory progress in his programme of studies or training, or for any other reason which is deemed to show that withdrawal is in

the interests of the student and/or the University.

## Admission as Barristers and Solicitors

The possession of an LL.B. degree does not in itself confer the right to ractise law in British Columbia. Admission to the Bar of the Province of

British Columbia is governed by the Legal Professions Act and the regulations of the Law Society of British Columbia. Applicants for admission to the Law Society must comply with the requirements of the Society as to academic

standing and ethical standards.

The examinations held in the Faculty of Law are co-examined by examiners appointed by the Law Society, and applicants for admission to the Bar who hold the degree of LL.B. from the University are granted exemption by the Law Society from the professional examinations prescribed by the regulations of the Society, which form part of the qualifications for admission to the Bar.

Applicants who intend to practise law in other jurisdictions should apply for information concerning the requirements for Call and Admission to the Secretary of the governing body of the legal profession in those jurisdictions. In British Columbia information should be obtained from the Secretary of the Law Society, The Court House, Vancouver, B.C.

#### The Law Review

In 1949 the students of the Faculty of Law commenced publication of "Legal Notes", which was an annual volume containing articles and comments written both by students and by outside contributors. By 1959 the publication had increased both in size and in the number of subscribers to the point where the editors felt that the name should be changed to the University of British Columbia Law Review. The students are responsible for the soliciting and editing of material, and for the advertising and sales which make the Review self-sufficient. Members of the Faculty give advice and assistance to the Editorial Board of the Review, but the chief responsibility is that of the Board.

## COURSES OF INSTRUCTION

#### FIRST YEAR

#### All students must take the following courses:

## 101. Constitutional Law. Two hours per week, both terms.

General principles of English constitutional law; proceedings against the Crown in right of Canada and of British Columbia; distribution of legislative power in Canada.

Required: Laskin, Canadian Constitutional Law (3rd edition); the B.N.A. Act, 1867 (as amended).

Recommended: Wade and Phillips, Constitutional Law (7th edition); O'Connor, Report on the B.N.A. Act.

Mr. Bourne, Mr. Lysyk, Mr. Knight, Mr. Barton.

## 103. Contracts. Three hours per week, both terms.

Historical development; formation and enforceability of contracts; parties; contractual terms; changes of circumstances; remedies for breach.

Required: Milner, Cases on the Law of Contracts.

Recommended: Cheshire and Fifoot, Law of Contract; Anson, Law of Contract; Williston, Contracts (Student edition); Corbin, Contracts (student edition).

Dean Curtis, Mr. Dunlop, Mr. Herbert, Mr. Powe.

# 105. Legal Institutions I. Two hours per week, both terms.

An introduction to the history, structure and underlying concepts of the common law system of civil litigation; a critical evaluation of modern trial procedure as a means of conducting legal controversy. Required: B.C. Supreme Court Rules.

Mr. Hickling, Mr. Dunlop, Mr. Barton, Mr. Berner.

# 109. Real Property. Three hours per week, both terms.

Historical and conceptual analysis of interests in land, future interests, the Torrens system of land registration.

Required: U.B.C. Cases and Materials on Real Property (1968); Land Registry Act, R.S.B.C. 1960.

Recommended: Cheshire, Modern Real Property; Lawson, Introduction to the Law of Property; Megarry and Wade, Law of Real Property; Thom, Canadian Torrens System (1962); Moynihan, Introduction to the Law of Real Property (1962).

Mr. Todd, Mr. McClean, Mr. Larson, Mr. Lucas.

# 11. Torts. Three hours per week, both terms.

A study of the bases of civil liability for intentionally and accidentally caused harms.

Required: Wright, Cases on the Law of Torts, 4th edition.

Recommended: Fleming, Law of Torts; Pollock, The Law of Torts; Winfield, Textbook on the Law of Tort; Street, The Law of Tort; Salmond on Torts, 13th edition; Linden, Studies in Canadian Tort Law. Mr. Smith, Mr. Atrens, Mr. Burns.

Legal Writing: Each student in the First Year is required to complete a number of legal writing assignments and argue a Moot under the supervision of Faculty. Performance will be indicated by a letter grade, which will not affect the year's average. However, a satisfactory level of performance of this requirement is necessary in order to receive credit for the year.

#### SECOND YEAR

All students are required to take the following courses:

## 203. Administrative Law. Two hours per week, both terms.

Consideration of the system of legal control exercised through administrative agencies and tribunals other than the courts.

Required: Huberman, Cases and Materials on Administrative Law.

Recommended: Allan, Law and Orders; Griffith and Street, Principles of Administrative Law; Robson, Justice and Administrative Law; S. A. de Smith, Judicial Review of Administrative Action; Davis, Administrative Law; Report of the Committee on Administrative Tribunals and Enquiries (1957).

Mr. Huberman, Mr. Lucas, Mr. Powe.

## 205. Business Organizations. Two hours per week, both terms.

The structure and characteristics of the sole proprietorship, the partnership and the corporation; the promotion and organization of business corporations; authority and fiduciary obligations of management; shareholders' rights and remedies.

Required: Companies Act, R.S.B.C. 1960; Partnership Act, R.S.B.C. 1960

Recommended: Ziegel, Essays in Company Law; Gower, Company Law (2nd Ed.).

Mr. Huberman, Mr. Berner, Mr. Larson.

## 207. Criminal Law and Procedure. Two hours per week, both terms.

Bases of criminal responsibility; principles and objectives of the criminal law and procedure; particular offences.

Required: Criminal Code and Selected Statutes; Schmeiser, Cases or Criminal Law.

Recommended: Smith and Hogan, The Criminal Law; Slahaney, Can adian Criminal Procedure.

Mr. Atrens, Mr. Burns, Mr. Berner.

# 209. Equity and Trusts. Two hours per week, both terms.

The history and development of equity; certain equitable doctrinand remedies. The history and nature of trusts; express, resultir implied secret and charitable trusts, administration of the trust breach of trust.

Required: U.B.C. Cases on Trusts (1966); Trustee Act R.S.B.C. 1960.

Recommended: Keeton, Introduction to Equity; Nathan, Equity Throu the Cases; Keeton, Trusts; Maitland, Equity; Snell, Principles of Equi Pettit, Equity and the Law of Trusts.

Mr. MacIntyre, Mr. McClean, Mr. Barton.

## 211. International Law. Two hours per week, both terms.

History, sources and evidence of international law and its relation to municipal law, international personality, state jurisdiction, treaties and international organizations.

Required: Bourne and Jahnke, Cases and Materials on Public International Law.

Recommended: Oppenheim, International Law; Brierly, The Law of Nations.

Mr. Bourne, Mr. Jahnke, Mr. Burns.

Note: Students who have received credit for Political Science 411 (Public International Law) may not take Law 211 but will be required to take some other course from the second or third year group as directed.

## 219. Taxation. Two hours per week, both terms.

The law and practice of income tax as developed in the courts; succession duties and estate taxes.

Required: Macdonald, Cases on Income Tax, 2nd Ed., The Income Tax Act.

Mr. English, Mr. MacIntyre, Mr. O'Keefe.

Students must choose one of the following two courses:

## 201. Legal Accounting. Two hours per week, one term.

An introduction to basic accounting theory; statement analysis, valuation, and specific applications of accounting to legal problems.

Required: Materials to be announced.

Mr. Dickerson.

or

# 217. Social Legislation. Two hours per week, one term.

A critical analysis of certain social legislation with reference to its history, its policy objectives, the legal concepts uses, the types and suitability of the procedures for its administration, its treatment by the courts, tribunals and agencies, and its effectiveness in achieving the policy objectives sought. The particular area of study will be announced each year.

Required and recommended materials to be announced.

Mr. Hickling.

Note: Students who have already received credit for an accounting course at the University level may not choose Law 201 (Accounting), but may choose between Law 217 (Social Legislation) and Law 313 (Insurance).

Students must choose one of the following two courses:

#### 113. Jurisprudence. Two hours per week, both terms.

A study of the nature of law in its philosophical context. The principal schools of jurisprudential thought will be examined and the ethical basis of each one investigated. Particular attention will be given to the idea of the obligation to obey the law, the meaning of language as used by lawyers and the nature of legal reasoning.

Required: Smith, Readings in Jurisprudence; Lloyd, The Idea of Law. Mr. Smith, Mr. Knight.

# 215. Legal Institutions II. Two hours per week, both terms.

A critical examination of the legislative and judicial processes. The discussion of the legislative process will include a discussion of the process by which various interests become translated into legal rules and a consideration of the relationship between the legislature, administrative tribunals and the courts. The discussion of the judicial process will include comparison between the ordinary courts of law and other judicial processes and an evaluation of the existing judicial process. The course will deal with important jurisprudential concepts—but in concrete situations rather than abstract terms.

Materials to be announced.

Mr. MacDougall.

#### MOOT COURT

Each student in the second year will be required to argue a moot case, including preparation of pleadings and oral arguments. Staff members of the Law Review may, with the prior approval of the Faculty, submit a case comment or other piece of legal research, in substitution for the moot requirement. The moot or legal writing must meet the standard required by the Faculty in order for the student to receive credit for the year, and the performance will be entered on the student's record. Students exercising the option to write in the second year must moot in the third year.

#### THIRD YEAR

#### A. Full Year Courses

Each student must take Law 309 (Evidence) and at least three of the remaining four courses and may elect to take all of the Full Year Courses.

### 305. Conflict of Laws. Two hours per week, both terms.

A study of the legal problems arising in cases in which the relevant facts cut across provincial or national boundaries. Consideration is given to the rules concerning jurisdiction of the courts, choice of appropriate domestic law and recognition of foreign judgments in such fields as marriage, divorce, nullity, legitimacy, contracts, torts, property administration of estates and succession.

Required: Castel, Conflict of Laws: Cases, Notes and Materials (2nd ed.) Recommended: Cheshire, Private International Law (7th ed.), Dice and Norris, The Conflict of Laws (8th ed.).

Mr. Lysyk.

## 309. Evidence. Two hours per week, both terms.

Problems of proof, materiality, admissibility; the hearsay rule, corfessions, opinion evidence, relevancy, corroboration, character evidenc witness, and similar problems will be studied.

Required: Materials to be announced.

Mr. MacKenzie, Mr. Vickers (with the Hon. Mr. Justice Dryer).

#### 311. Family Law. Two hours per week, both terms.

The law of marriage, separation and divorce. Custody, support a

adoption of children; family courts, property rights.

Recommended: Power, The Law of Divorce in Canada (2nd ed.).

Mr. MacDougall, Mr. Herbert.

#### 317. Mercantile Law. Two hours per week, both terms.

The Sale of Goods Act, problems of financing with conditional sales agreements and chattel mortgages. Export sales contracts. The law of negotiable instruments.

Required: Atiyah, The Sale of Goods; Conditions of Sales Act; Consumer Protection Act (Rev. 1968): Bills of Sales Act; Bills of Exchange Act.

Mr. Hickling, Mr. Jahnke.

## 323. Real Estate Transactions. Two hours per week, both terms.

A study of the law of mortgages, vendor and purchaser, and landlord and tenant; equal time being allotted to each of the above subjects.

Materials to be announced.

Mr. English, Mr. Knight.

#### B. Half Year Courses

A student who has chosen four of the above Full Year Courses (including Law 309—Evidence) must take two of the following Fall Term Courses and two of the following Spring Term Courses. A student who has chosen all five of the above Full Year Courses must take one of the following Fall Term Courses and one of the following Spring Term Courses.

#### Fall Term Courses

## 307. Creditor's Remedies. Two hours per week, fall term.

The remedies of the unsecured creditor, such as execution, garnishment, and equitable execution; fraudulent conveyances and preferences; creditors' agreements; mechanics' liens; bankruptcy.

Required: Materials to be announced.

Mr. Dunlop.

# 313. Insurance. Two hours per week, fall term.

The general legal principles of life, automobile, fire, and other types of insurance.

Required: Insurance Act of B.C. (1968); Marine Insurance Act (R.S.B.C. Chap. 231).

Mr. Schmitt.

# 319. Municipal Law. Two hours per week, fall term.

The municipality as a legal entity; its creation, operation and powers. By-laws and their validity; municipal taxation, tortious and contractual liability, planning and zoning.

Required: The Municipal Act, R.S.B.C. 1960 as amended, The Assessment

Equalization Act, R.S.B.C., 1960 as amended.

Recommended: Rogers, The Law of Canadian Municipal Corporations; Manning, Assessment and Rating (4th ed. 1962); Crawford, Canadian Municipal Government (1954); Law Society of Upper Canada, Special Lectures in Municipal Law (1956).

Mr. Todd.

## 325. Succession. Two hours per week, fall term.

The law of wills, intestate succession, statutory interference with wills, principles of probate and administration of estates.

Required: U.B.C. Cases on Wills Including Problems of Intestacy (1966).

Mr. MacKenzie.

# Spring Term Courses

## 301. Maritime Law. Two hours per week, spring term.

The law relating to admiralty and marine jurisdiction, carriage of cargo and passengers, rights and duties of seamen and other maritime workers, general average, collision, limitation of liability, salvage, towage, maritime liens, charter parties, etc.

Recommended: Mayers, Admiralty Law and Practice; Roscoe, Admiralty Law and Practice; Canada Shipping Act; Water Carriage of Goods Act, Admiralty Act; Marsden, The Law of Collisions at Sea; Scrutton, Charterparties and Bills of Lading (16th ed. 1955); Carver, Carriage of Goods by Sea.

Mr. Tuck.

# 303. Business Organization II. Two hours per week, spring term.

Advanced study of corporation planning; corporate reorganization and the problems of financing and taxation with special emphasis on securities regulation. Material to be announced,

Mr. English.

# 315. Labour Law. Two hours per week, spring term.

Union-management relations; the collective bargaining process; the collective agreement, arbitration and conciliation procedure. The relationship between the union and its members.

Required: U.B.C. Cases on Labour Law; selected statutes.

Mr. Hickling.

# 321. Natural Resources. Two hours per week, spring term.

An attempt to define the role of law and lawyers in the total process of resource exploitation. This course focuses mainly on the mining and forest industries of British Columbia as typical models for study. Materials to be announced.

Mr. Lucas.

# 327. Taxation II. Two hours per week, spring term.

Estate and succession duty; estate planning; special corporate tax planning.

Mr. MacIntyre.

#### Seminars (Law 331) C.

Each student is required to take one seminar. The number and content of these seminars will vary from year to year, but the following are representative of those offered in previous years. A substantial paper is required in each seminar, and students are expected to devote at least as much time to a seminar as to any other course.

# Comparative Law.

An introduction to French and Quebec law. A comparison, in the fields

of contract, tort and property, of some aspects of the common (English, Canadian and United States) and the civil (Quebec and French) law. Mr. McClean.

## The Closed Corporation

The corporation, taxation, accounting, insurance and estate planning aspects of the closed corporation, the formation of corporations, the compensation of executives, the sale or purchase of businesses with reference to the closely held corporation.

Mr. Huberman.

#### Current Problems in Constitutional Law

Consideration of the institutions, concepts and legal doctrines developed under Canadian federalism, with emphasis on issues of current importance.

Mr. Lysyk.

#### International Law Problems

A research seminar in which selected problems of international law and organizations are investigated.

Mr. Bourne.

#### Problems in Law of Valuation

An examination of the principles and techniques applicable to the valuation of property for purposes of determining damages at common law, compensation in the law of expropriation, losses in insurance law, and assessments for taxation purposes.

Mr. Todd.

#### Civil Liberties

An examination of the ever present tension between the demands of people for the freedom to do what they please and the interest of society in conformity to community norms through the law. Issues discussed will range from theoretical questions such as the philosophical basis of fundamental rights to specific legal problems involving restraints on the liberty of the subject.

Mr. Smith.

## Special Problems in Labour Law

An examination of concrete examples of problems of contract formation; specific problems in collective agreement observance. Participants in the seminar will be provided with evidence and argument relating to the range of problems which arbitration boards are called upon to consider and will produce and defend solutions to them.

Mr. Herbert.

#### Criminology

An examination of selected topics of criminal law and criminology including the extent of the crime problem in Canada; Canadian criminal statistics; causes of criminal behaviour; nature, purpose and scope of the criminal law; the enforcement of morals; the theories and purpose of punishment; sentencing; probation; correctional institutions and practices; parole and aftercase; control and treatment of special types of offenders such as juvenile delinquents, drug addicts, sexual psychopaths, and habitual criminals.

Mr. Atrens.

## Family Law Reform

A critical examination of changes made or proposed in the law relating to marriage and divorce, matrimonial property and custody of children. Participants will be asked to consider (1) The general question of the role of the law in family life; (2) Problems of methodology in formulating policy and drafting legislation dealing with family life; (3) Specific proposals to amend the law.

Mr. MacDougall.

Note: This seminar will alternate with the seminar "Conflict of Laws".

#### Conflict of Laws

An examination of methods and objectives in conflict of laws. Students participating in the seminar will be required to study contemporary American work in conflicts and to use their theoretical learning to suggest solutions to conflict problems arising out of actual B.C. legislation. Each student will be asked to prepare two papers. One will be concerned with the solution of a particular conflict problem; the other will involve a general discussion of the several methods suggested for the solution of conflict problems.

Mr. MacDougall.

# D. Moot Court or Legal Writing

Each student in the third year will be required to argue a moot case (including preparation of pleadings and oral argument) or with the prior approval of the Faculty, to submit a case comment or other piece of legal research. Although this requirement is not given a grade which is included in the year's average, the performance of the student mus be satisfactory to the Faculty and will be entered on the student' record. It is expected that those electing the writing option will mak their work available to the Law Review, although it may not neces sarily be selected. Students who have exercised the option to write in the second year must moot in the third year.

#### Graduate Studies

The degree offered is the Master of Laws (LL.M.).

Purpose: The programme provides graduates with the opportunity for advanced legal education in preparation for law teaching, legal researce public service and the practice of law.

Standard of Admission: A candidate for admission to the graduate pr

gramme must demonstrate that he is qualified to engage in creditable research in law by possessing an adequate academic foundation and a capacity for superior performance. He must have a Bachelor of Laws degree or its equivalent from an approved law school, and must have obtained First Class standing (deemed to be 75% in legal studies in the Faculty of Law) or its equivalent in at least two of the courses and at least Second Class standing or its equivalent in the remaining courses of the final year of work that is accepted by the Faculty of Law as prerequisite to the Master's programme.

A candidate's admission is not complete until his application has been accepted and his course of study has been approved by the Faculty of Law.

Requirements of the Programme: The graduate programme in law is administered by the Faculty of Law. The requirements for the LL.M. are:

- (a) Full-time residence at the University for a minimum of one academic year (September to May).
- (b) Lectures and seminars amounting to eight class hours per week, chosen in consultation with the Faculty of Law. These may be courses presently offered by the Faculty of Law or may be arranged specially for candidates for the LLM. A candidate must obtain an overall average of 65% on the work of the year. He may have no more than one mark falling below 65% and no mark below 60%.
- (c) A thesis of satisfactory quality prepared under the direction of a member of the Faculty of Law on a subject related to the general programme of study of the candidate. Its preparation should occupy half of the candidate's time in the programme. It should normally be completed within the period of residence, but in exceptional circumstances permission may be granted for its completion after the period of residence.
- (d) An oral examination covering the course work, the written work, or both. This requirement may be waived by the Faculty of Law.

The programme for each candidate will be designed to meet his special needs, interests, and previous experience. Special courses may be arranged to cover various areas of the law in which the Faculty has special library or other facilities. Various members of the Faculty are prepared to supervise students writing their thesis in the specific fields of law outlined in the courses of study for the three undergraduate years, problems arising out of these courses, and such additional fields of study as may be arranged with the Faculty.

A candidate may be allowed to select courses in other faculties of the University in substitution for those mentioned in (b) above, but it is expected that the major part of his programme will be undertaken in the Faculty of Law. Some possible courses for the graduate law student are listed below, grouped under headings which indicate the relevant field of legal study.

#### Administrative Law:

Political Science 302 (Public Administration)
Political Science 502 (Public Administration)
Sociology 352 (Theory of Organizations)

# Government Regulation of Business:

Agricultural Economics 501 (Advanced Marketing)

#### Constitutional Law:

History 420 (Evolution of the Canadian Constitution)

Political Science 401 (half-course) (Legislative and Executive Processes in Canada)

Political Science 402 (half-course) (Canadian Parties and Political Processes)

Political Science 403 (half-course) (Federalism in Canada)

Political Science 404 (half-course) (Local Government)

Political Science 407 (American Government and Politics)

Political Science 501 (Seminar in Canadian Government & Politics)

Political Science 506 (Political System)

#### Criminal Law:

Social Work 629 (Contemporary Issues in Corrections)

#### International Law:

Political Science 308 (International Organization since 1919)

Political Science 409 (Comparative Foreign Policies)

Political Science 410 (International Violence and Its Control)

Political Science 509 (International Organization)

### Jurisprudence:

Philosophy 212 (Logic and Scientific Reasoning)

Philosophy 301 (Ethics)

Philosophy 313 (Mediaeval Philosophy)

Philosophy 402 (Symbolic Logic)

Philosophy 424 (Philosophy of Social Science)

Political Science 500 (Political Theory)

Philosophy 521 (Political Philosophy)

#### Labour Law:

Commerce 322 (Labour Relations)

Economics 407 (Economics of Labour)

Economics 507 (Economics of Labour)

# Municipal Law:

Political Science 404 (half-course) (Local Government)

#### Land Use Control:

Commerce 307 (Urban Land Markets)

Commerce 309 (Urban Land Investment)

Commerce 407 (Land Value and Valuation)

Commerce 507 (Seminar in Contemporary Land Investment Problems)

Commerce 508 (Seminar in Government Policy in Urban Land Ownership)

#### Natural Resources:

Economics 409 (Economics of Natural Resources)

Economics 509 (Economic Analysis and Natural Resources)

Forestry 363 (Principles of Forest Management)

Forestry 463 (Forest Land Management)

Geography 337 (half-course) (Political Geography)

Geography 437 (half-course) (Political-Geographic Analysis)

#### Taxation:

Economics 310 (Government Finance)

Economics 510 (Government Finance)

Commerce 552 (Income Determination)

Application: Candidates seeking admission to the graduate programme should obtain application forms and other information from the Registrar of the University. Completed forms must be received by the Registrar by March 1 preceding the academic year for which admission is sought.

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#### Awards and Financial Assistance

Subject to change. Full corrected statement for the year 1969-70 will appear in the publication "Awards and Financial Assistance."

The complete list of scholarships and prizes in each Faculty, and bursaries and loans open to students in all faculties, is available in the section of the Calendar entitled "Awards and Financial Assistance". This section, which may be obtained on request from the Registrar's office, should be consulted by all students who wish to obtain fuller information or to submit applications. It should be noted that most awards do not require the submission of an application, and further, that the following partial list is subject to amendment. Applications for bursaries must be submitted by July 15 to the Dean of Inter-Faculty and Student Affairs, on forms obtainable from his office.

### Entrance Scholarships

The Diana and P.AE Irving Scholarship Trust Fund—From this fund, bequeathed by the late Diana Ogilvy Irving, two scholarships of \$1000 each, will be awarded annually to students entering the First Year of Law. The scholarships will be awarded by the Joint Committee on Prizes, Scholarships and Bursaries, designated as the Trustees, to deserving students of promise and distinction, who without financial assistance would have difficulty in pursuing their studies. Preference is given to native born British Columbians. Provided the winner maintains good academic standing and is in need of assistance, his award may be renewed in each of the Second and Third Years.

Applications for the Irving Scholarship Trust Fund and other financial assistance must be submitted not later than July 15 to the Dean of Inter-Faculty and Student Affairs, on forms available from his office.

Students entering the first year of the Faculty of Law are eligible to apply for a number of the bursaries listed in the general bursary section.

# Scholarships and Prizes

The Allan S. Gregory Memorial Prize—Prizes totalling \$200, the gift of Ladner, Downs, Ladner, Locke, Clark and Lenox, will be awarded annually to the two students in Third Year law, who, in the opinion of the Faculty, have displayed greatest merit in Moot Court work. A first prize of \$125 will be paid to the most outstanding student and a second prize of \$75 to the other student.

The Armstrong, Brawner and Speton Scholarship—This scholarship of 300, gift of Armstrong, Brawner and Speton, Barristers and Solicitors, will be warded to a deserving Second Year Law student who, in the opinion of the election Committee of the Faculty of Law, has shown good scholastic abily and proven character, responsibility and initiative, and who is not the ecipient of any other legal scholarship.

The Boughton, Anderson, Dunfee & Mortimer Prize in Law—A prize of 100, the gift of Boughton, Anderson, Dunfee & Mortimer, Barristers and plicitors, Vancouver, B.C., is offered annually in the Faculty of Law. It ill be awarded to a student in the Faculty with a good academic record and with proficiency in a field or fields of legal studies.

Campney, Owen & Murphy Scholarship—A scholarship of \$300, gift of ampney, Owen & Murphy, Barristers and Solicitors, Vancouver, B.C., is fered annually in the Faculty of Law. It will be awarded to a student in

Second Year for excellence in legal studies and superior academic accomplishment.

The Canada Law Book Limited Prizes—A book prize to the value of \$50, the gift of the Canada Law Book Company Limited, is available annually for students in each year of the Law course. The awards will be made to students obtaining high marks in one or more courses.

The Canada Permanent Mortgage Corporation Prize—A prize of \$50, the gift of the Canada Permanent Mortgage Corporation, will be awarded annually to the student in the Third Year of Law obtaining the highest standing in the course on Mortgages.

Canada Permanent Trust Company Prize in Trusts—A prize of \$100, the gift of Canada Permanent Trust Company, will be awarded to the student in the Third Year of Law obtaining the highest standing in the course on Trusts.

The Carswell Company Limited Prizes—The Carswell Company Limited, Law Publishers, Toronto, offers annually three book prizes of the value of \$35 each. Of these prizes, one will be awarded in each year of the Law course to the student obtaining highest standing in that year.

The Class of Law '53 Scholarship Fund—A scholarship of \$200, gift of the Class of Law '53, will be awarded to a student in Law. The winner will be selected on the basis of scholastic achievement combined with need for financial assistance. Contributions from members of the Class are used to provide the annual scholarship and to establish a fund for maintaining the scholarship in the future.

The David Neil Hossie, Q.C., Scholarship in Corporation Law—This scholarship of \$150, given by his wife and family in memory of David Neil Hossie, D.S.O., Q.C., B.A. (Sask.), Rhodes Scholar, B.A., M.A. (Oxford), serves to pay tribute to his fine personal qualities, his distinguished military record in the First World War, and his outstanding record in the legal profession. To commemorate his special professional interests, this scholarship will be awarded, on the recommendation of the Faculty of Law, to a student attaining high proficiency in the field of Corporation Law.

The Faculty of Law Legal Writing Prize—A prize of \$100 provided by the Faculty of Law is awarded annually for the best piece of legal writing done by a law student. The work submitted may be on any subject relating to law and may be done independently or to fulfil a course requirement. All contributions will be made available to the editors of the Law Review. Further details of the competition will be announced at the beginning of the session.

The Farris, Farris, Vaughan, Wills & Murphy Scholarship—A scholarship of \$200, gift of Farris, Farris, Taggart, Wills & Murphy, Barristers and Solicitors, Vancouver, B.C., will be offered in the Faculty of Law. It will be awarded to a student with an outstanding academic record.

The Griffiths, McLelland & Co. Prize in Torts—This prize of \$100, th gift of Griffiths, McLelland & Co., Barristers and Solicitors, is offere annually to the student in Law obtaining the highest standing in the law of torts.

The Harold and Anne Joseph Prize in Law—This prize of \$25, gift a Harold R. Joseph, LL.B., is open to first year students. It will be awarded after the mid-term examinations to a student selected by the Faculty of Law on the basis of character on enthusiasm for, and promise of success in, the practic of law, and who is not recipient of other scholarship awards.

The Harper, Gilmour, Grey & Co. Scholarship—This scholarship of \$100, the gift of Harper, Gilmour, Grey & Co., Barristers and Solicitors, Vancouver, B.C., will be awarded annually for proficiency in the First Year of Law.

The H. Carl Goldenberg Book Prize—This book prize, the gift of H. Carl Goldenberg, Esq., S.M., O.B.E., Q.C., LL.D., Montreal, Que., will be awarded annually to a deserving student in the Faculty of Law.

The Hon. R. L. Maitland Memorial Scholarship—A scholarship of \$280, initiated by the Primrose Conservative Club of Vancouver on behalf of friends of the late Hon. R. L. Maitland, K.C., will be awarded to the student who attains the highest standing in the Second Year of the Law course and is proceeding to the Third Year of that course.

The Insurance Company of North America Prize in Law—H. C. Mills Memorial Award—A prize of \$200, gift of the Insurance Company of North America, is offered annually in the Faculty of Law. It will be awarded to the student obtaining the highest standing in the final examinations in the subject of Insurance Law. In the event of a tie, the award will be divided.

Judge Schultz Prize in Criminal Law—A prize of \$100, the gift of His Honour Judge William A. Schultz, a Judge of the County Court of Vancouver, will be awarded to the student in the Second Year of Law who obtains highest standing, as determined by the final examinations, in the subject of Criminal Law.

The Ladner Prizes in Law—Prizes to the total of \$100, the gift of Leon J. Ladner, Esq., Q.C., LL.D., will be awarded annually to students in the Faculty of Law. The awards will be made on the recommendation of the Faculty to students who have obtained high standing either in special fields or in the whole year's work.

Malcolm MacIntyre Prizes in Law—Three prizes, gift of Best Printer Co. Ltd., are offered annually in the Faculty of Law. Each award consists of \$50 lus certain case books produced by Best Printer Co. The awards offered are a) the Malcolm MacIntyre Proficiency Prize which will be awarded to a tudent in any year with good overall standing; (b) the Malcolm MacIntyre 'rize in Legal Institutions for highest standing in Legal Institutions 1 (First ear); and (c) the Malcolm MacIntyre Succession Prize, for highest standing 1 Succession (Third Year).

The MacIntyre Memorial Fund—To honour the memory of Malcolm I. MacIntyre, Professor in the Faculty of Law at this University from 348 to 1964, and to pay tribute to his outstanding abilities as a teacher, is kindness and generosity to students, and his exceptional courage and evotion to duty, members of the legal profession, colleagues and students are established a fund which provides an award, at present in the amount approximately \$100, to be presented annually to a promising student proeding to Second or Third Year Law. The award will be made to a student 100, though not necessarily among the leaders of his class, is in the opinion the selection committee deserving of financial assistance.

The Norman MacKenzie Prize in Public International Law—In honour Dr. Norman MacKenzie a prize of \$125, established and endowed by an onymous donor, is offered annually to the student in Law obtaining the thest standing in Public International Law.

The Panvini Scholarship Fund in Law—The income on a bequest from late Frank Panvini provides scholarships and bursaries annually for dents in the Faculty of Law. Awards will be made by the Joint Faculty

Committee of the University and the Dean of the Faculty of Law, to students with outstanding academic records, or with high scholastic standing combined with need for financial assistance.

Patrons of the Law Review Prize—A prize of \$100, the gift of the Patrons of the University of British Columbia Law Review, will be awarded annually to a student in the Faculty of Law of the University of British Columbia. To be eligible the candidate must display the following qualities: (a) He must have obtained a satisfactory academic standing at the University of British Columbia. (b) If he is a student in the first or second year of law, he must give assurance that, if selected, he will continue in the next regular session in a full programme of studies in the Faculty of Law at the University of British Columbia. (c) If a student is in the third year of a Bachelor of Laws programme, he must give assurance that, if selected, he will continue in the next regular session in a full programme of graduate legal studies at a university. (d) He must be in financial need. Preference will be given to students who, in addition to meeting the above requirements, have been active in the affairs of the Law Students Association, the University of British Columbia Law Review, or other student activities in connection with the Faculty of Law. The winner of the prize will be selected by the Scholarship Committee of the University of British Columbia on the recommendation of the Faculty of Law. To be eligible for consideration students must apply for the Law Review prize to the Faculty of Law on or before February 1st. The application should be accompanied by a statement by the candidate of the reasons why he should receive the scholarship.

The Robie L. Reid Scholarship—This scholarship, gift of Sutton, Braidwood, Morris, Hall & Sutton, Barristers and Solicitors, Vancouver, B.C., is in honour of the memory of Robie L. Reid, K.C., who served with W. A. Sutton, Q.C., and other predecessors of the present firm and won distinction for his scholarly interest in Canadian literature and history. In the amount of \$200, it will be awarded annually to an outstanding student in the Faculty of Law.

The Russell & DuMoulin Scholarship—A scholarship of \$400, the gift o Russell & DuMoulin, Barristers and Solicitors, Vancouver, B.C., will b awarded annually to an undergraduate in Law. The winner will be selected on the basis of hard work and achievement coupled with need for financial assistance.

Special Book Prize—A book prize of the value of \$25, the gift of a anonymous donor, will be awarded in May to a student in the Secon Year, who obtains high scholastic standing and is not the recipient another scholarship or prize.

The Superior Courts Judges' Scholarship—A scholarship of \$300, provide by Members of the Court of Appeal and the Supreme Court of Britic Columbia, is offered annually in the Faculty of Law. It will be award on the basis of proficiency to a student who has completed the First Second Year with high standing and is proceeding to the next higher ye. At the discretion of the Faculty the sum may be divided to provide to scholarships of \$150 each.

The Thomas Francis Hurley Prize—A prize of \$150, gift of Isaac Shulms Esq., in memory of Thomas Francis Hurley, is offered annually in 1 Faculty of Law. It will be awarded on the recommendation of the Facu to the student obtaining the highest mark in the Criminology Seminar offe in the Third Year.

The Law Society Gold Medal and Prize—A gold medal, presented by the Law Society of British Columbia, will be awarded to the student obtaining the highest aggregate marks in the Final Year in the Faculty of Law. This award will be accompanied by a cash grant equivalent to the individual's Call and Admission Fee.

#### **Bursaries**

Applications for bursaries must be submitted not later than July 15 to the Dean of Inter-Faculty and Student Affairs on forms obtainable from his office.

The Buell, Ellis, Sargent & Russell Bursary—A bursary of \$150, gift of Buell, Ellis, Sargent & Russell, Barristers and Solicitors, Vancouver, B.C., is offered annually to students beginning or continuing studies in Law. It will be awarded to a student with a good academic record who needs financial assistance.

Bull, Housser & Tupper Bursary—A bursary of \$300, gift of Bull, Housser & Tupper, Barristers and Solicitors, Vancouver, B.C., is offered annually to students beginning or continuing studies in Law. It will be awarded to a student with a good academic record who needs financial assistance.

The Cariboo Bar Association Bursary (in memory of P. E. Wilson, Q.C.)—A bursary of \$250, offered in memory of P. E. Wilson, Q.C., is given annually by the Cariboo Bar Association. It will be awarded by the University to a student in any year of Law who has good academic standing and needs financial assistance. Preference will be given to a student from the area of the Province served by the Cariboo Bar Association.

The Clark, Wilson & Co. Bursary—A bursary of \$200, gift of Clark, Wilson, and Company, Barristers and Solicitors, Vancouver, B.C., is offered annually to students beginning or continuing studies in Law. It will be awarded to a student with a good academic record who needs financial assistance.

The Davis & Company Bursary—A bursary of \$400, the gift of the law firm of Davis, Hossie, Campbell, Brazier & McLorg, Vancouver, B.C., is offered annually to students in the First or Second Year in the Faculty of Law. At the discretion of the Bursary Committee it may be divided to provide assistance in the amount of \$200 each for two students. These bursaries will be awarded to students with good academic standing and promise who need financial assistance to continue their studies.

The Douglas, Symes & Brissenden Bursary in Law—A bursary of \$300, gift of the firm of Douglas, Symes & Brissenden, Vancouver, is offered annually in the Faculty of Law. It will be awarded to a student who has good academic standing, shows promise of success in legal studies, and needs financial assistance.

The Esmond Lando Bursary—A bursary of \$100, the gift of Mr. Esmond Lando, will be available annually to a student in Law. The award will be made to a student with a good academic record who shows good promise his field of studies, and who, without financial assistance, would be unable continue with his studies.

The Fraser Valley Bar Association Bursary—Through the generosity of the Fraser Valley Bar Association a bursary of \$300 is awarded annually in the Faculty of Law. Students with good scholastic standing, who have completed at least one year in Law, and who need financial assistance to continue their studies, are eligible for consideration.

The Freeman, Freeman, Silvers & Koffman Bursary in Law-This bursary

of \$100, the gift of Messrs. Freeman, Freeman, Silvers & Koffman, is available annually for a student registered in the Faculty of Law. It will be awarded to a student who has good scholastic standing and is worthy and deserving of financial assistance.

The Lawrence, Shaw, Stewart & McLoughlin Bursary—A bursary of \$300, gift of Lawrence, Shaw, Stewart & McLoughlin, Barristers and Solicitors, Vancouver, B.C., is offered in the Faculty of Law. It will be awarded annually to a student of promise who needs financial assistance.

The Saint Thomas More Law Burses—Three bursaries of \$250 each, sponsored by the Catholic Lawyers' Guild and provided by the Catholic Archdiocese of Vancouver, are offered to Catholic students entering, or presently in, the Faculty of Law. The winners will be selected by the Guild. Information may be obtained from Thomas O. Griffiths, President, Catholic Lawyers' Guild, 816-821 Rogers Building, 470 Granville St., Vancouver 2, B.C.

William C. Moresby, Q.C., Bursary—A bursary of \$150, the gift of the Victoria Bar Association, will be awarded in the session 1968-69 to a student in the Faculty of Law. Preference will be given to students coming from the Victoria area, Awards will be based on scholastic standing

and financial need.

The Plimsoll Club Bursary for Law (donated by the Anglo-Canadian Shipping Company Limited)—This bursary of \$300 is available for students registered in any year of the Law course. It will be awarded to a student or students who, by their records, show promise of success in Law, and who not only would be unable to continue their courses without financial assistance, but are also worthy and deserving of it.

The Vancouver Bar Association Bursaries—Three bursaries of \$200 each, the gift of the Vancouver Bar Association, will be awarded in the session 1969-70 to students in the Faculty of Law. One bursary will be available for a student entering each of the three years of the course in Law. Awards will be based on scholastic standing and financial need.

Graduate Fellowship

The Law Society of British Columbia Fellowship—A fellowship up to \$3000, provided by the Law Society of British Columbia, is offered in competition to graduates or graduating students of the Faculty of Law, University of B.C., or of other Canadian Law Schools, who are proceeding to a full programme of graduate studies in a field of law at a recognized institution. The fellowship will not necessarily be offered every year, and when offered will be awarded only if there is a highly qualified applicant. Applications will be considered only from applicants who, on completion of their graduate programme are willing, if offered the opportunity, to join the staff of the Faculty of Law at the University of B.C., and who have outstanding and other qualifications. Each applicant must apply by letter, which must be received by the Dean of Inter-Faculty and Student Affairs, University of B.C., not later than March 15th. The letter must contain the essential details of the applicant's academic career to date, his proposed plans for graduate study, and the assurance of his willingness to join the Faculty of Law, University of B.C., if he is offered a position. Supporting documents, which the applicant must arrange to be forwarded, should include an official transcript of his academic record, and three confidential letters of recommendation from the dean and instructors of the Law School from which he has graduated or will graduate.

Students wishing further information about financial assistance available for post-graduate studies in law should contact a member of the Faculty of

Law scholarship committee.

# THE FACULTY OF MEDICINE

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA ANCOUVER 8 • BRITISH COLUMBIA CANADA

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#### **HEALTH SCIENCES**

JOHN F. McCreary, M.D. (Toronto), D.Sc. (Memorial), F.R.C.P. (C), Professor and Interim Coordinator, Health Sciences.

Division of Continuing Education in the Health Sciences

DONALD H. WILLIAMS, B.Sc., M.D. (Man.), M.Sc. (Minn.), Professor and Director of the Division.

Office of the Committee on Interprofessional Education in the Health Sciences George Szasz, M.D. (Brit. Col.), Assistant Professor and Chairman of the Committee.

# FACULTY OF MEDICINE Office of The Dean

JOHN F. McCREARY, M.D. (Toronto), D.Sc. (Memorial), F.R.C.P.(C), Professor and Dean of the Faculty.

DONALD C. GRAHAM, M.D. (Toronto), F.R.C.P.(C), F.A.C.P., Assistant Professor and Associate Dean.

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RALPH A. BARNARD, Ph.C., Assistant Director—Programme Administration.

EDWIN C. McCoy, B.A., M.D., C.M. (McGill), Honorary Lecturer.

WILLIAM G. McClure, M.D. (Toronto), Honorary Lecturer.

LAWRENCE E. RANTA, M.D., D.P.H. (Toronto), Honorary Lecturer.

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JOSEPH A. M. HINKE, M.D. (Brit. Col.), Professor.

Joseph M. Odiorne, Ph.D. (Harvard), Associate Professor.

WILLIAM A. WEBBER, M.D. (Brit, Col.), Associate Professor.

CONSTANCE L. FRIEDMAN, M.Sc., Ph.D. (McGill), Research Associate Professor.

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CARL T. FRIZ, Ph.D. (Minnesota), Assistant Professor.

CHARLES E. SLONECKER, D.D.S., Ph.D. (Washington), Assistant Professor.

ARTHUR W. SPIRA, B.S. (New York), M.S., Ph.D. (Michigan), Assistant Professor.

LUL MILLER, M.Sc., M.D., C.M. (McGill), Clinical Associate Professor in Radiological Anatomy.

OLAND RADCLIFFE, M.A. (Brit. Col.), M.D., C.M. (Queen's), Clinical Assistant Professor.

R. C. JOHNSTONE, M.B., Ch.B., F.R.C.S. (Edinburgh), Lecturer (Part-time). (On leave of absence to October 1, 1969.)

Sanderson, M.B., B.S. (London), Teaching Fellow.

Frederic D. Garrett, A.B., Ph.D. (Cornell), Visiting Professor.

GORDON H. SCOTT, Ph.D. (Minnesota), D.Sc. (Southwestern), Visiting Professor.

VLADIMIR PALATY, Ing., C.Sc. (Prague), Visiting Associate Professor.

#### Department of Biochemistry

MARVIN DARRACH, M.A. (Brit. Col.), Ph.D. (Toronto), Professor and Head of the Department.

CHARLES T. BEER, D.Phil. (Oxon.), A.R.I.C., F.R.I.C. (M.R.C. Associate), Professor.

GORDON HENRY DIXON, B.A. (Cantab.), Ph.D. (Toronto), Professor.

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Albert F. Burton, B.Sc. (Man.), M.Sc. (West. Ont.), Ph.D. (Sask.), Associate Professor.

James F. Richards, M.A. (Queen's), Ph.D. (West. Ont.), Associate Professor Michael Smith, B.Sc., Ph.D. (Manchester), Associate Professor.

PHILIP D. BRAGG, B.Sc., Ph.D. (Bristol), (M.R.C. Scholar), Assistant Professor.

BLYTHE EAGLES, B.A. (Brit. Col.), M.A., Ph.D. (Toronto), F.C.I.C., F.R.S.C. F.A.I.C., Dean Emeritus, Lecturer (Part-time).

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S. C. Sung, M.D. (Taiwan), D.M.Sc. (Kyushu), Honorary Lecturer.

# Cancer Research Centre of the University of British Columbia

ROBERT L. NOBLE, M.D. (Toronto), Ph.D., D.Sc. (London), F.R.S.C., Direct and Professor of Physiology.

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HANS F. STICH, Ph.D. (Wurzburg), Professor of Zoology.

JOHN W. JULL, B.Sc., Ph.D. (Leeds), Associate Professor of Physiology.

James F. Richards, M.A. (Queen's), Ph.D. (West. Ont.), Associate Profes of Biochemistry.

ALBERT F. BURTON, B.Sc. (Man.), M.Sc. (West. Ont.), Ph.D. (Sask.), A ciate Professor of Biochemistry.

Nelly Auersperg, M.D. (Washington), Ph.D. (Brit. Col.), Assoc. Profe of Zoology.

Susan M. Coupey, B.Sc. (Queen's), Research Assistant.

MAUREEN GARLAND, B.S.A., M.Sc. (Brit. Col.), Research Assistant.

BARBARA GOUDY, B.Sc. (Brit. Col.), Research Assistant.

PETER W. GOUT, M.Sc. (Leiden, Holland), Research Assistant.

H. Frances Hebden, B.Sc. (Brit. Col.), Research Assistant.

BETTY G. MOBBS, M.Sc. (Edinburgh), Ph.D. (London), Research Assistant.

B. Louise Parker, B.Sc. (Brit. Col.), Research Assistant.

JUDY STORR, B.Sc. (Nottingham), Research Assistant.

MARNIE THOMSON, B.Sc. (Brit. Col.), Research Assistant.

JOHN R. HADFIELD, B.Sc., Ph.D. (Liverpool), N.C.I. Research Fellow.

#### Department of Health Care and Epidemiology

Donald O. Anderson, B.A., M.D. (Brit. Col.), S.M. in Hyg. (Harvard), F.R.C.P.(C), Professor and Head of the Department.

James M. Mather, M.D., D.P.H. (Toronto), C.R.C.P.(C), Professor Emeritus.

JAMES D. MAXWELL, B.A., Dip.H.A. (Toronto), Assistant Professor.

George Szasz, M.D. (Brit. Col.), Assistant Professor and Milbank Faculty Fellow.

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MILDRED E. FRANCIS, B.S. (D.C. Teachers' College), Sc.M., Sc.D. (Johns Hopkins), Instructor. (National Health Grant Research Position in Epidemiology and Biometry.)

Jessie G. MacCarthy, B.A.Sc. (Brit. Col.), M.P.H. (Berkeley), R.N., Instructor.

ROBERT W. MORGAN, M.D. (Brit. Col.), Instructor.

HART G. SCARROW, M.D. (Man.), C.R.C.P.(C); Research Associate.

OHN H. DOUGHTY, B.Com. (Brit. Col.), M.A. (Toronto), Clinical Instructor.

INTHONY A. LARSEN, B.A. (Brit. Col.), M.D. (Alta.), D.P.H. (Toronto), M.P.H. (Minn.), C.R.C.P.(C), Clinical Instructor

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энн Н. Smrth, M.B., B.Ch., B.A.O. (Queen's, Belfast), D.I.H. (London), D.P.H. (Toronto), C.R.C.P.(С), Clinical Assistant Professor.

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MURRAY CATHCART, B.A. (Sask.), M.D. (Alta.), Clinical Instructor.

ILLIAM J. CORBETT, B.A. (Sask.), M.D. (Toronto), Clinical Instructor.

CONRAD MACKENZIE, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Instructor.

BERT A. STANLEY, M.D. (Man.), Clinical Instructor.

M C. WALDIE, B.A. (Brit. Col.), M.D. (Alta.), Clinical Instructor.

- ALBERT W. WALLACE, B.Sc. (Sask.), M.D. (Man.), Clinical Instructor and Lecturer in Medical Ethics.
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- JOHN J. ZACK, M.D. (Alta.), Clinical Instructor.

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- J. A. TAYLOR, B.A. (Brit. Col.), M.D. (Alta.), D.P.H. (Toronto), C.R.C.P.(C), Honorary Lecturer in Public Health Administration.
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- CHARLOTTE G. DAVID, B.A. (Texas), M.A. (Columbia), Ph.D. (Portland)
  Professor, Faculty of Education (Project Coordinator of the B.C. Menta
  Retardation Institute).
- ELEANOR J. BRADLEY, Dip.S.W. (Brit. Col.), C.S.W. (Smith), R.N., Assistar Professor, Supervisor of Social Work.
- JOAN D. MORISON, B.A.Sc. (Brit. Col.), M.A. (Columbia), R.N., Instructo Supervisor, Public Health Nursing.
- KATHLEEN E. BELANGER, B.A., Dip.S.W., M.S.W. (Brit. Col.), Research Associate.

#### Lecturers from other Departments

- LLOYD F. DETWILLER, M.A. (Brit. Col.), M.H.A. (Minn.), Consultant-Admir strator, Health Sciences Centre.
- MELVIN LEE, B.A. (U.C.L.A.), M.A., Ph.D. (Berkeley, Calif.), Professor a Director of the School of Home Economics.
- Douglas J. Yeo, D.D.S. (Toronto), M.P.H. (Michigan), Associate Profes and Head of the Department of Public and Community Dental Heal
- DONALD H. WILLIAMS, B.Sc., M.D. (Man.), M.Sc. (Minn.), Director—Contining Education in the Health Sciences.

# Department of the History of Medicine and Science

WILLIAM C. GIBSON, B.A. (Brit. Col.), M.Sc. (McGill), D.Phil. (Oxon M.D., C.M. (McGill), F.A.C.P., M.R.C.P., Professor and Head of Department.

- ROBERT E. McKechnie, M.D., C.M. (McGill), M.Sc. (Minn.), F.A.C.S., Woodward Lecturer.
- Donald C. Graham, M.D. (Toronto), F.R.C.P.(C), Honorary Assistant Professor.
- E. Horne Craigie, B.A., Ph.D. (Toronto), Honorary Lecturer.
- CLAUDE E. DOLMAN, M.R.C.S. (England), M.B., B.S., D.P.H., Ph.D., F.R.C.P. (London), F.R.C.P.(C), F.A.P.H.A., F.R.S.C., Honorary Lecturer.
- BLYTHE EAGLES, B.A. (Brit. Col.), M.A., Ph.D. (Toronto), F.C.I.C., F.A.I.C., F.R.S.C., Honorary Lecturer.
- S. WILLIAM A. GUNN, C.F.E.M., M.D., M.Sc. (Geneve), Honorary Lecturer.
- WILLARD E. IRELAND, B.A. (Brit. Col.), M.A. (Toronto), Honorary Lecturer. HONOR M. KIDD, B.A. (Brit. Col.), M.D., C.M. (McGill), Honorary Lecturer.
- ANNA R. LEITH, B.A. (Brit. Col.), M.Lib. (Wash.), Honorary Lecturer.
- EDWARD L. MARGETTS, B.A. (Brit. Col.), M.D., C.M. (McGill), Honorary Lecturer.
- WILLIAM E. K. MIDDLETON, M.Sc. (Sask.), D.Sc. Hon. (Boston), F.R.S.C., Honorary Lecturer.
- H. Peter Oberlander, B.Arch. (McGill), M.C.P., Ph.D. (Harvard), A.R.I.B.A., A.M.T.P.I., M.R.A.I.C., Honorary Lecturer.
- VLADIMIR J. OKULITCH, M.A.Sc. (Brit. Col.), Ph.D. (McGill), F.G.S.A., F.P.S., F.R.S.C., Honorary Lecturer.
- MARGARET A. ORMSBY, M.A. (Brit. Col.), Ph.D. (Bryn Mawr), LL.D. (Man.), Honorary Lecturer.
- F. N. L. POYNTER, Ph.D., F.L.A. (London), F.R.S.L., Honorary Lecturer.
- HAROLD V. RICE, M.D., Ph.D. (Toronto), Honorary Lecturer.
- THEODORE F. Rose, M.A. (Harvard), M.D.C.M. (McGill), Honorary Lecturer.
- ISER STEIMAN, M.D. (Man.), Honorary Lecturer.
- S. E. C. Turvey, M.D. (Man.), M.R.C.P. (England), F.R.C.P.(C), F.A.C.P., Honorary Lecturer.
- Donald H. Williams, B.Sc., M.D. (Man.), M.Sc. (Minn.), Honorary Lecturer.

# Department of Medicine

- ROBERT B. KERR, O.B.E., B.A., M.D., M.A. (Toronto), F.R.C.P. (London), F.R.C.P.(C), F.A.C.P., Professor and Head of the Department.
- ENNETH A. EVELYN, B.Sc., M.D., C.M. (McGill), F.R.C.P.(C), F.A.C.P., Professor (Director, G. F. Strong Laboratory for Medical Research).
- AMISH W. McIntosh, M.B. (Cantab.), M.D., C.M., M.Sc. (McGill), F.R.C.P.(C), Professor.
- ONALD M. WHITELAW, B.A. (Brit. Col.), M.D., C.M. (McGill), F.R.C.P. (C), Professor.
- THUR W. BAGNALL, B.A. (Brit. Col.), M.D. (Toronto), F.R.C.P. (C), M.R.C.P. (London), Associate Professor (Part-time).
- BERT R. Cox, B.A., M.D. (Brit. Col.), F.R.C.P.(C), Associate Professor.
- and Director of the School of Rehabilitation Medicine.
- NYS K. FORD, B.A., M.B., M.D. (Cantab.), F.R.C.P.(C), Associate Professor (Canadian Arthritis and Rheumatism Society Research).

- STEFAN GRZYBOWSKI, M.B., Ch.B., M.D. (Edin.), M.R.C.P. (London), F.R.C.P.(C), Associate Professor (Respiratory Disease).
- ROBERT T. MORRISON, B.Sc., M.D., M.Sc. (Alta.), Ph.D. (Iowa), F.R.C.P.(C), Associate Professor.
- DONALD S. MUNROE, B.Sc. (Sask.), M.D. (Man.), M.R.C.P. (London), F.R.C.P.(C), F.A.C.P., Associate Professor.
- JOHN D. E. PRICE, B.Sc., M.D., C.M. (McGill), F.R.C.P.(C), Associate Professor.
- ALEXANDER R. M. CAIRNS, M.D. (Brit. Col.), F.R.C.P.(C), Assistant Professor.
  BRUCE M. CARRUTHERS, M.D., C.M. (Queen's), F.R.C.P.(C), Assistant Professor.
- J. PHILIP GOFTON, M.D., C.M. (McGill), F.R.C.P.(C), Assistant Professor.
- DONALD C. GRAHAM, M.D. (Toronto), F.R.C.P.(C), Assistant Professor.
- ROLAND W. LAUENER, M.D. (Brit. Col.), F.R.C.P.(C), Assistant Professor, (Part-time).
- IAN H. PLENDERLEITH, B.Sc. (Michigan State), M.D. (George Washington), F.R.C.P.(C), Assistant Professor.
- JAMES W. MORTON, B.A. (Brit. Col.), M.D., C.M. (McGill), Instructor.
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- STEPHEN C. THORSON, B.Sc.Med., M.D. (Man.), F.R.C.P.(C), Instructor.
- ALLAN D. TOBE, M.D. (Alta.), F.R.C.P.(C), Instructor.
- MUKUL N. VYAS, M.B.B.S., M.D. (Bombay), M.R.C.P. (London), Instructor. GWENDOLYN FAYE QUEN CHAN, Ph.D. (Brit. Col.), Research Associate.
- R. WALLACE BOYD, B.Sc. (Alta.), M.D., C.M. (McGill), F.A.C.R., Clinical Associate Professor (Radiology).
- GORDON F. KINCADE, M.D., C.M. (McGill), Clinical Associate Professor.
- H. Ormond Murphy, M.D., C.M. (Queen's), Clinical Associate Professor.
- ABRAHAM BOGOCH, M.D., B.Sc. (Med.) (Toronto), D.Sc. (Penn.), F.R.C.P.(C) F.A.C.P., Clinical Assistant Professor.
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- Walter C. MacDonald, M.D. (Brit. Col.), F.R.C.P.(C), Clinical Assistan Professor.
- W. W. SIMPSON, B.A. (Brit. Col.), M.A., Ph.D., M.D. (Toronto), F.A.C.P F.R.C.P.(C), Clinical Assistant Professor.
- J. P. Wallace Thomas, M.D., C.M. (Dalhousie), Clinical Assistant Prefessor (Clinical Microscopy).
- JOHN E. WALKER, M.B. (Toronto), Clinical Assistant Professor.
- CRAIG R. ARNOLD, B.A. (Sask.), M.D. (West. Ont.), Clinical Instructor.
- RICHARD E. BECK, M.D., C.M. (Queen's), F.R.C.P.(C), Clinical Instructo
- ERNEST A. BOXALL, M.D., C.M. (Queen's), F.R.C.P.(C), Clinical Instructi
- KENNETH C. BOYCE, B.A. (Brit. Col.), M.D., C.M. (Queen's), Clinic Instructor.
- ELMER F. CHRISTOPHERSON, B.Sc. (Sask.), M.D. (Man.), F.R.C.P.(CF.A.C.P., Clinical Instructor.
- CARLETON C. COVERNTON, B.A. (Brit. Col.), M.D., C.M. (McGill), Clini Instructor.
- THOMAS W. DAVIS, M.D. (Brit. Col.), F.R.C.P.(C), Clinical Instructor.

- JOHN DICK, M.B., Ch.B. (Glasgow), Clinical Instructor.
- EDWARD G. DONOVAN, M.B., Ch.B. (Liverpool), M.R.C.P. (London), Clinical Instructor (Radiology).
- Sherold Fishman, B.A. (Sask.), M.D. (Brit. Col.), Ph.D. (McGill), F.R.C.P.(C), Clinical Instructor.
- F. O. Roswell, Garner, B.A. (Brit. Col.), M.D., D.P.H. (Toronto), Clinical Instructor.
- DAVID G. GARROW, M.B., Ch.B. (St. Andrew's), Clinical Instructor (Radiology).
- GEORGE R. GRAY, M.D., C.M. (Queen's), Clinical Instructor.
- James H. Greig, M.B., Ch.B., M.R.C.P., D.M.R.C. (Edinburgh), F.R.C.P.(C), Clinical Instructor (Radiology).
- VICTOR O. HERTZMAN, M.D. (Toronto), F.R.C.P.(C), F.A.C.P., Clinical Instructor.
- ROGER M. HALL, M.D. (Toronto), D.M.R., Clinical Instructor (Radiology).
- JOHN D. HORAN, M.D. (Toronto), F.R.C.P.(C), Clinical Instructor.
- J. W. IBBOTT, B.A. (Brit. Col.), M.D., C.M. (McGill), F.R.C.P.(C), Clinical Instructor.
- ARCHIBALD M. JOHNSON, M.D. (West. Ont.), F.R.C.P.(C), Clinical Instructor.

  DORIS M. M. KAVANAGH-GRAY, M.D. (Ottawa), F.R.C.P.(C), Clinical Instructor.
- W. James Knickerbocker, M.D. (Man.), Clinical Instructor.
- JOHN A. LEROUX, B.Sc. (Sask.), M.D. (Man.), D.P.H. (Toronto), F.R.C.P.(C), Clinical Instructor.
- J. D. Longley, B.A. (Brit. Col.), M.D., C.M., M.Sc. (McGill), Clinical Instructor (Radiology).
- CHARLES EDWARD McDonnell, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Instructor.
- CHARLES A. MACLEAN, B.A. (Brit. Col.), M.D., C.M. (McGill), F.R.C.P.(C), Clinical Instructor.
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- RODERICK IAN McPHERSON, M.D., B.Sc. (Man.), F.R.C.P.(C), Clinical Instructor.
- IRNE K. MATHISEN, B.A. (Brit. Col.), M.D., C.M. (McGill), F.R.C.P.(C), F.A.C.C.P., Clinical Instructor.
- 'HOMAS K. MAYBEE, D.V.M. (Toronto), M.D. (Alta.), F.R.C.P.(C), Clinical Instructor.
- LPHONSO L. MOLARO, B.A., M.D. (Man.), Clinical Instructor.
- IICHAEL VICTOR MORIARTY, M.R.C.P. (London), F.R.C.P.(C), Clinical Instructor.
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- IRNARD B. MOSCOVICH, M.D. (Alta.), Clinical Instructor.
- AVID MOWAT, M.D. (Man.), F.R.C.P.(C), Clinical Instructor.
- ORGE J. NORTON, M.D. (Alta.), D.A.B.R., Clinical Instructor (Radiology).
- ANK A. OLACKE, M.D. (Man.), Clinical Instructor (Radiology).
- HN A. OSBORNE, B.Sc., M.D. (Alta.), F.A.C.C., Clinical Instructor.
- UCE PAIGE, M.B.B.S. (Sydney), Clinical Instructor.

- DWIGHT I. PERETZ, M.D. (Brit. Col.), M.Sc., F.R.C.P.(C), Clinical Instructor. JOHN L. PARNELL, B.A. (Brit. Col.), M.B., Ch.B. (Edinburgh), F.R.C.P.(C), F.A.C.P., Clinical Instructor.
- ALEXANDER C. PINKERTON, M.B., Ch.B. (Glasgow), Clinical Instructor.
- KARL K. PUMP, M.D. (Alta.), M.Sc. (McGill), F.R.C.P.(C), Clinical Instructor.
- CHARLES R. RALLY, B.A. (Brit. Col.), M.D., C.M. (McGill), F.R.C.P.(C), Clinical Instructor.
- CHARLES EDWARD REEVE, M.D., C.M. (McGill), F.R.C.P.(C), Clinical Instructor.
- JOHN A. G. REID, B.A., M.D. (Toronto), F.R.C.P.(C), Clinical Instructor. Charles S. Rennie, M.D. (Man.), M.R.C.P. (London), Clinical Instructor.
- CECIL E. G. ROBINSON, M.D., C.M. (Queen's), F.R.C.P.(C), Clinical Instructor.
- HAROLD S. ROBINSON, B.Sc., M.D., C.M. (McGill), Clinical Instructor.
- JACOB ROSENBLATT, M.D., C.M. (Queen's), F.R.C.P.(C), Clinical Instructor.
- HENRY SCOTT, B.Sc. (Alta.), M.D., C.M. (McGill), Clinical Instructor.
- MARIO SERAGLIA, M.D. (Padua), Clinical Instructor.
- MELVILLE H. SHAW, M.D., C.M. (Queen's), F.R.C.P.(C), Clinical Instructor. CECIL SIGAL, M.D. (Brit. Col.), F.R.C.P.(C), Clinical Instructor.
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- HUGH STANSFIELD, M.Sc., M.D. (Alta.), Clinical Instructor.
- SANFORD N. STORDY, B.A., M.D., C.M. (McGill), Clinical Instructor.
- J. ALAN TRAYNOR, B.A. (Sask.), M.D. (Toronto), F.R.C.P.(C), Clinical Instructor.
- GORDON E. TRUEMAN, B.A., M.D. (Man.), Clinical Instructor (Radiology).
- GEORGE C. WALSH, B.A. (Brit. Col.), M.D., C.M., M.Sc. (McGill), F.R.C.P.(C), F.A.C.P., Clinical Instructor.
- MAX B. WALTERS, M.D. (Man.), F.R.C.P.(C), Clinical Instructor.
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- H. CLYDE SLADE, M.D., C.M. (Dalhousie), F.R.C.P.(C), Honorary Associat Professor.
- ALBERT W. WALLACE, M.D. (Man.), M.C.G.P., Demonstrator.

# Division of Dermatology

- DONALD H. WILLIAMS, B.Sc., M.D. (Man.), M.Sc. (Minn.), Associate Professa (Dermatology) and Head of the Division.
- JOHN C. MITCHELL, M.D., M.R.C.P. (London), F.R.C.P.(C), Assistant Prefessor (Part-time) (Dermatology).
- ROBERT L. COUPE, M.B., Ch.B. (Liverpool), F.R.C.P.(C), Instructor (Derm tology).
- WILLIAM D. STEWART, M.D. (Wash.), F.R.C.P.(C), Clinical Assistant Pr fessor (Dermatology).
- WILLIAM S. WOOD, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Assista Professor (Dermatology).
- Bernard J. Bendl, M.D. (Toronto), F.R.C.P.(C), Clinical Instructor (Dern tology).

- H. W. L. Buck, M.D. (Alta.), F.R.C.P.(C), Clinical Instructor (Dermatology).
- W. A. H. Dodd, M.D. (Brit. Col.), F.R.C.P.(C), Clinical Instructor.
- MARGARET M. JOHNSTON, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Instructor (Dermatology).

#### Division of Neurology

DONALD J MACFADYEN, B.A., M.Sc. (Sask.), M.D. (Toronto), F.R.C.P.(C), Associate Professor (Neurology), and Head of the Division.

Morton David Low, M.D., C.M. (Queen's), F.R.C.P.(C), Assistant Professor (Neurology).

VINCENT P. SWEENEY, M.B., Ch.B. (Glasgow), F.R.C.P.(C), Assistant Professor (Neurology).

DAVID P. JONES, M.B., Ch.B., M.D. (Liverpool), M.R.C.P. (London), Clinical Assistant Professor (Neurology).

BARBARA M. ALLAN, M.D. (Brit. Col.), F.R.C.P.(C), Clinical Instructor (Neurology).

NORMAN L. D. AUCKLAND, B.A. (Sask.), M.D. (Man.), Clinical Instructor (Neurology).

Paul J. A. Bratty, M.D. (Toronto), F.R.C.P.(C), Clinical Instructor (Neurology).

Kenneth Berry, M.D. (Brit. Col.), F.R.C.P.(C), Clinical Instructor (Neurology).

KENNETH S. Poser, M.D., F.R.C.P.(C), Clinical Instructor (Neurology).

LUDMILA ZELDOVICZ, M.D. (Warsaw), Clinical Instructor (Neurology).

# Department of Microbiology—(Faculty of Science)

Division of Medical Microbiology

DONALD M. McLean, B.Sc., M.D. (Melbourne), F.R.C.P.(C), Professor and Head of the Division.

J. E. BISMANIS, M.D. (Riga), C.R.C.P.(C), Associate Professor.

JAMES B. HUDSON, B.Sc. (London), Ph.D. (Alta.), Assistant Professor.

BARBARA L. ROBINSON, M.D. (Alta.), Assistant Professor.

Ernest J. Bowmer, M.C., M.D. (Liverpool), C.R.C.P.(C), Clinical Assistant Professor.

W. H. COCKCROFT, M.D. (Toronto), C.R.C.P.(C), Clinical Assistant Professor.

ERICA P. CRICHTON, M.B. (Glasgow), C.R.C.P.(C), Clinical Assistant Professor.

G. Donald M. Kettyls, B.Sc., M.D. (Alta.), C.R.C.P.(C), Clinical Instructor. James D. Munroe, M.B. (Liverpool), C.R.C.P.(C), Clinical Instructor.

A. Hugh Pontifex, B.A., M.D. (Brit. Col.), F.R.C.P.(C), Clinical Instructor. Frederick J. Roberts, B.A., M.D. (Sask.), F.R.C.P.(C), Clinical Instructor.

# Department of Obstetrics and Gynaecology

Fred E. Bryans, B.Sc., M.D. (Toronto), F.R.C.S.(C), Professor and Head of the Department.

MOLLY E. TOWELL, M.B., B.S. (London), M.R.C.O.G., F.R.C.S.(C), Assistant Professor.

CHARLES W. CARPENTER, M.Sc., M.D., C.M. (Queen's), F.R.C.S.(C), Assistant Professor (Part-time).

A. DAVID CLAMAN, M.D., C.M. (Queen's), F.R.C.S.(C), Assistant Professor (Part-time).

BETTY J. POLAND GRZYBOWSKI, M.B., B.S. (London), M.R.C.O.G., Assistant Professor.

HERMINIA S. SALVADOR, M.D. (Philippines), Instructor.

JOHN BOOTH, M.D. (Brit. Col.), F.R.C.S.(С), Teaching Fellow.

WILLIAM D. THOMAS, M.D. (Brit. Col.), F.R.C.S.(C), Teaching Fellow.

W. F. Bie, B.Sc. (Sask.), M.D., C.M. (McGill), Clinical Associate Professor. Archie Herstein, M.D. (Man.), M.R.C.O.G., Clinical Assistant Professor.

JOHN W. MILLAR, M.D. (Man.), Clinical Assistant Professor.

Kenneth G. Nickerson, B.Sc. (Alta.), M.D., C.M. (McGill), F.R.C.S.(C), Clinical Assistant Professor.

MICHAEL TURKO, M.D. (Toronto), Clinical Assistant Professor.

F. WILLIAM TYSOE, B.Sc., M.D. (Alta.), Clinical Assistant Professor.

DAVID A. BOYES, M.D., C.M. (Queen's), Clinical Instructor.

MADELINE HUANG CHUNG, M.D. (Yale Medical College in China), Clinical Instructor.

CLAUDE H. CRONHELM, M.B., B.Ch., B.A.O. (Queen's Belfast), F.R.C.S.(C), Clinical Instructor.

JOHN H. DICKINSON, M.D. (Toronto), F.R.C.S.(C), Clinical Instructor.

VICTOR GOMEL, M.D. (Istanbul), F.R.C.S.(C), Clinical Instructor.

A. Krisman, M.D. (Man.), F.R.C.S.(C), Clinical Instructor.

JOHN E. McDonagh, M.D. (Man.), Clinical Instructor.

WM. R. MacEwan, M.D. (Alta.), Clinical Instructor.

JOHN E. Ross, B.A. (Brit. Col.), M.D., C.M. (Queen's), Clinical Instructor GLEN G. SMITH, M.D. (Toronto), F.R.C.S.(C), Clinical Instructor.

H. G. WADMAN, M.D., C.M. (McGill), F.R.C.S.(C), Clinical Instructor.

G. C. WINCH, M.B., Ch.B. (St. Andrews), F.R.C.S.(C), Clinical Instructor

# Department of Ophthalmology

Alfred J. Elliot, B.A. (Brit. Col.), M.D. (Toronto), Med.Sc.D. (Columbia D.O.M.S. (London), F.R.C.S.(C), Professor and Head of the Deparment.

STEPHEN M. DRANCE, M.B., Ch.B., M.D. (Edinburgh), F.R.C.S. (Eng. Professor.

Andrew Q. McCormick, M.D., C.M. (McGill), F.R.C.S.(C), Instructor.

KENSHIRO UENOYAMA, M.D. (Wakayama), Instructor.

DEREK G. SIMPSON, M.B., Ch.B. (New Zealand), F.R.C.S. (Eng.), F.R.C.S. (Edinburgh), D.O.M.S. (London), Clinical Associate Profess

JOHN A. IRVING, M.D., C.M. (Queen's), Clinical Assistant Professor.

JAMES F. MINNES, M.D., C.M. (McGill), Clinical Assistant Professor.

A. James Stewart, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Assist Professor.

- WILLIAM M. G. WILSON, B.A. (McMaster), M.D. (Toronto), Clinical Assistant Professor.
- ALVIN COHEN, M.D. (Man.), Clinical Instructor.
- Kelvin Orr Fleming, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Instructor.
- GORDON S. HARRIS, B.A. (Brit. Col.), M.D. (Toronto), F.R.C.S.(C), Clinical Instructor.
- A. C. JOHNSTON, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Instructor.
- W. D. McKinlay, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Instructor.
- R. J. PAINE, B.A. (Brit. Col.), M.S. (Minnesota), M.D., C.M. (McGill), Clinical Instructor.
- JOHN A. PRATT-JOHNSON, M.B., Ch.B. (Witwatersrand), D.O.(R.C.P.&S. [Eng.]), F.R.C.S. (Edinburgh), F.R.C.S.(C), Clinical Instructor.
- ERIC L. SMITH, B.A.Sc., B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Instructor.
- DAVID M. WARNER, M.B., B.S. (London), Clinical Instructor.

# Department of Paediatrics

- SYDNEY ISRAELS, B.Sc. (Sask.), M.D. (Man.), F.R.C.P.(C), F.A.C.P., Professor and Head of the Department.
- JOHN F. McCreary, M.D. (Toronto), F.R.C.P.(C), Professor.
- HENRY G. DUNN, B.A., M.B., B.Ch., M.A. (Cantab.), M.R.C.P., D.C.H. (London), Professor.
- GEOFFREY C. ROBINSON, M.D., C.M. (Queen's), F.R.C.P.(C), Professor.
- Sydney Segal, B.Sc. (McGill), M.A. (Brit. Col.), M.D., C.M. (Queen's), Professor.
- MARGARET MULLINGER, M.D. (Toronto), Associate Professor.
- [. MAVIS TEASDALE, M.B., Ch.B. (Leeds), D.C.H., Associate Professor.
- DENNIS J. VINCE, M.D. (Toronto), F.R.C.P.(C), Associate Professor.
- MAURICE D. YOUNG, M.A., M.B., B.Ch. (Cantab.), M.R.C.P. (London), F.R.C.P.(C), Associate Professor.
- DEREK A. APPLEGARTH. B.Sc., Ph.D. (Dunelm), Assistant Professor.
- OHN A. BIRKBECK, M.B., Ch.B. (Edinburgh), Assistant Professor.
- DHN R. BRUMMITT, M.D. (Brit. Col.), Assistant Professor.
- OHN U. CRICHTON, M.B., Ch.B., M.R.C.P. (Edinburgh), D.C.H. (London), Assistant Professor.
- HN DEAN, M.B., B.Ch. (Cantab.), M.R.C.P. (London), Assistant Professor. (Part-time).
- HN H. V. GILBERT, M.Sc., Ph.D., L.C.S.T. (Purdue), Assistant Professor.
- AVID C. KENDALL, M.A. (Cantab.), Ph.D. (Manchester), Assistant Professor (Part-time).
- AVID S. LIRENMAN, B.Sc., M.D. (Man.), F.R.C.P.(C), Assistant Professor.
- DRDON E. PIRIE, B.A. (Sask.), M.D., C.M. (McGill), (B.C. Tuberculosis Fellowship in Paediatric Chest Disease), Assistant Professor.
- DBERT H. HILL, M.A., M.B. (Oxon.), Instructor.
- rce D. Edwards, L.C.S.T. (Dip.) (London), M.S. (Syracuse), Instructor. (Leave of absence to Dec. 31, 1969.)

Patricia A. Baird, B.Sc. (Hons.), M.D., C.M. (McGill), Instructor, Part-time. Hawa Patel, M.B., Ch.B. (Capetown), D.C.H. (London), M.R.C.P.E. (Edin.), F.R.C.P.(C), L.M.C.C., Instructor.

CAROLE N. S. JONES, M.Sc. (Wayne State), Lecturer.

SHIRLEY SCHUTTE (Speech Therapist), Lecturer.

JOHN W. WHITELAW, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Professor.

REGINALD A. WILSON, B.A. (Brit. Col.), M.D., C.M. (McGill), M.R.C.P. (London), F.R.C.P.(C), Clinical Professor.

ARCHIBALD F. HARDYMENT, M.D. (Alta.), Clinical Professor.

JOHN PITERS, B.A. (Brit. Col.), M.D. (Toronto), Clinical Associate Professor.

HARRY BAKER, M.D. (Toronto), Clinical Assistant Professor.

GEORGE R. GAYMAN, B.A., M.D. (Toronto), Clinical Assistant Professor.

HAROLD KRIVEL, M.D. (Alta.), Clinical Assistant Professor.

J. ROBERT MACLEAN, M.D. (Toronto), Clinical Assistant Professor.

BEN SHUMAN, M.D. (Toronto), Clinical Assistant Professor.

BETTY J. WOOD, M.D. (Man.), Clinical Assistant Professor.

KENNETH BERRY, M.D. (Brit. Col.), F.R.C.P.(C), Clinical Instructor.

KENNETH A. CAMPBELL, M.D., C.M. (McGill), Clinical Instructor.

LAMBERTUS C. DEGROOT, M.D. (Amsterdam), Clinical Instructor.

GERALD EVANS, M.D. (Alta.), F.R.C.P.(C), Clinical Instructor.

SHIRLEY HAZELL, B.A., M.D. (Toronto), Clinical Instructor.

James Hingston, M.D. (N.U.I.), D.C.H., F.R.C.P.(I), M.R.C.P. (Edinburgh), Clinical Instructor.

JAMIL MASHAL, BA., M.D., C.M. (Beirut), Clinical Instructor.

FEREIDOUN MIRHADY, M.D. (Vienna), Clinical Instructor.

PETER SYDENHAM MOORE, M.B., Ch.B. (Oxon.), Clinical Instructor.

ANDREW B. MURRAY, B.Sc., M.B. (Capetown), M.R.C.P. (Edinburgh), D.C.H. (London), Clinical Instructor.

C. DUNELLA MACLEAN, B.Sc., M.D., C.M. (McGill), Clinical Instructor.

H. E. McLean, M.D. (Brit. Col.), Clinical Instructor.

JEAN M. MACLENNAN, M.B., Ch.B., M.D. (Edinburgh), Clinical Instructor.

Hamish Nichol, B.A. (Hons.), M.A., M.B., B.Chir. (Cantab.), Clinica Instructor.

Peter H. Padwick, M.B., B.S. (London), M.R.C.S. (England), Clinical Ir structor.

ROBERT K. PARIS, M.D. (Laval), Clinical Instructor.

JOHN K. POOLE, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Instructo

Louis J. Posener, B.Sc. (Cantab.), M.B., B.S. (London), M.R.C.S. (Eng. Clinical Instructor.

JOHN MICHAEL RIGG, M.A., M.B., B.Chir. (Cantab.), D.C.H., Clinical Instrutor.

C. P. Shah, B.S., M.D. (India), Clinical Instructor.

W. HAROLD S. STOCKTON, M.D. (Toronto), Clinical Instructor.

BLUMA TISCHLER, M.D. (Munich), Clinical Instructor.

ROGER S. TONKIN, M.D., C.M. (McGill), Clinical Instructor.

CHARLES J. TREFFRY, M.D. (Toronto), Clinical Instructor.

PETER K. WILL, M.B.B.S., M.R.C.S., L.R.C.P. (London), D.Obst., R.C.O.G., F.R.C.P.(C), Clinical Instructor.

GERRY YU, M.D. (Man.), Clinical Instructor.

JOCK M. H. WONG, M.B., Ch.B. (Edinburgh), Demonstrator.

MARGARET Cox, M.D. (Brit. Col.), Research Fellow.

FRED YING TOY LEUNG, Ph.D. (Brit. Col.), Research Fellow.

OPHELIA H. O. MARCOS, M.D. (Manila), Research Fellow.

ANN-MARIE ROBERTSON, B.S.P. (Brit. Col.), M.D. (Toronto), Research Fellow.

JOHN S. SMITH, M.A., M.B., B.Ch. (Oxon.), Research Fellow.

ALISTAIR O. THORES, M.B., Ch.B. (Aberdeen), D.C.H. (Glasgow), Dip. (Obst.) (London), Research Fellow.

ENID M. TREDGER, B.A., M.D. (Alta.), Research Fellow.

WILLIAM J. D. ARNOLD, B.A., M.D. (Brit. Col.), Teaching Fellow.

GEORGE A. F. DAVIDSON, B.Sc., M.D. (Brit. Col.), Teaching Fellow.

BERNARD P. J. DEJONG, M.D. (Brit. Col.), Teaching Fellow.

JAMES E. JAN, M.D. (Alta.), Fellow in Ped. Neurology.

KENNETH G. CAMBON, B.A., M.D., C.M. (McGill), Consultant Otolaryngologist.

Peter Hahn, M.D., Ph.D. (Prague), Research Associate.

TERRANCE COLLINS, M.A. (Alta.), Clinical Educational Psychologist, Part-time.

# Division of Medical Genetics

JAMES R. MILLER, B.A., M.A. (Toronto), Ph.D. (McGill), Professor and Head of the Division.

ROBERT B. LOWRY, M.D. (Queen's, Ireland), D.C.H. (London), Assistant Professor.

MARGARET JEAN COREY, B.A. (New Brunswick), M.S. (Maine), Ph.D. (McGill), Assistant Professor.

# Lecturers from Other Departments

BETTY J. POLAND (Obstetrics and Gynaecology), Research Fellow.

GRAHAM FRASER, (Surgery), Research Fellow.

# Department of Pathology

HAROLD E. TAYLOR, M.D., C.M. (Dalhousie), F.R.C.P. (Edinburgh), F.R.C.P.(C), Professor and Head of the Department.

Paris Constantinides, M.D. (Vienna), Ph.D. (Montreal), Professor.

JOHN D. SPOUGE, M.D.S. (Sheffield), F.D.S.R.C.S., M.R.C.S. (Eng.), L.R.C.P. (London), Professor.

P. S. VASSAR, M.B., B.S. (London), F.C.A.P., M.C. Path. (Eng.), Professor.

W. H. CHASE, B.Sc., M.D., C.M. (McGill), Associate Professor.

WILLIAM L. DUNN, B.Sc., M.D. (West. Ont.), Ph.D. (London), Associate Professor.

R. H. PEARCE, M.Sc., Ph.D. (West. Ont.), Associate Professor.

RALPH SPITZER, A.B. (Cornell), Ph.D. (Cal. Tech.), M.D. (Man.), Associate Professor (Part-time).

DAVID HARDWICK, M.D. (Brit. Col.), Associate Professor.

PHILIP E. REID, B.Sc. (Bristol), M.Sc., Ph.D. (Queen's), Assistant Professor and Medical Research Council of Canada Scholar.

DONALD B. RIX, B.A., M.D. (West. Ont.), Assistant Professor.

C. F. A. Culling, F.I.M.L.T. (London), Senior Instructor.

JOHN EDEN, M.B., B.S. (Durham), Clinical Professor.

HERBERT K. FIDLER, B.Sc., M.D. (Man.), Clinical Professor.

JOHN A. STURDY, M.D. (Alta.), Clinical Professor.

CAMPBELL J. COADY, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Associate Professor.

CLARISSE L. DOLMAN, B.A. (Brit. Col.), M.D. (Toronto), Clinical Associate Professor.

GEORGE B. ELLIOTT, M.B.B.S. (Durham), M.R.C.S. (England), F.C. Path. (England), L.R.C.P. (London), Clinical Associate Professor.

T. R. HARMON, M.D. (Alta.), Clinical Associate Professor.

W. E. Shepherd, B.Sc., M.D. (Man.), Clinical Associate Professor.

A. E. W. TRITES, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Associate Professor.

F. L. STURROCK, M.B., Ch.B. (Edinburgh), Clinical Assistant Professor.

ANN J. WORTH, M.D. (Brit. Col.), Clinical Assistant Professor.

JOHN BELL, M.D., C.M. (McGill), Clinical Instructor.

JEFFREY D. BURTON, M.D. (Brit. Col.), Clinical Instructor.

R. A. ENGLISH, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Instructor IOHN C. GRIFFITHS, B.Sc., M.B., Ch.B. (Wales), Clinical Instructor.

CLIFFORD K. HARRIS, B.A., M.Sc. (Brit. Col.), Ph.D. (Toronto), Clinica Instructor.

JOHN I. PHINNEY, B.A., B.Sc. (Acadia), M.Sc. (Dalhousie), Clinical In

A. Hugh Pontifex, B.A., M.D. (Brit. Col.), F.R.C.P.(C), Clinical Instructo

ALI SYED, M.B., B.S. (Punjab, King Edward Med. Coll.), Clinical Instructor.

VIRGINIA WRIGHT, B.Sc., M.D. (Brit. Col.), Clinical Instructor.

M. VIOLA RAE, B.Sc. (Toronto), M.D. (Alta.), Museum Curator.

C. PAUL OSMANSKI, D.D.S. (Buffalo), M.S., Ph.D. (Illinois), Honorary Assitant Professor.

JOHN J. LEDERMAN, LL.B., M.D. (Brit. Col.), Honorary Lecturer.

GLEN McDonald, LL.B. (Brit. Col.), Honorary Lecturer — Medical Juri prudence.

# Department of Pharmacology

JAMES G. FOULKS, B.A. (Rice), Ph.D. (Johns Hopkins), M.D. (Columbia Professor and Head of the Department.

GEORGE I. DRUMMOND, B.Sc., M.Sc. (Alta.), Ph.D. (Wisc.), Professor.

THOMAS L. PERRY, A.B. (Harvard), B.A. (Oxon.), M.D. (Harvard), Profess Gordon E. Dower, M.R.C.S. (England), L.R.C.P. (London),

M.B., B.S. (London), F.A.C.C., Associate Professor.

Morley C. Sutter, B.Sc., M.D., Ph.D. (Man.), Associate Professor.

RUDOLF VRBA, Ing. Chem., Dr. tchn. Sc., C.Sc. (Prague), Associate Professor.

FLORENCE PERRY, B.Sc., M.Sc. (Dalhousie), Ph.D. (Toronto), Assistant Professor.

HARVEY D. SANDERS, B.S.P., M.S.P. (Brit. Col.), Ph.D. (Man.), Assistant Professor.

ESTHER R. ANDERSON, B.Sc. (Toronto), Ph.D. (Glasgow), Instructor.

SHIRLEY HANSEN, B.A. (Brit. Col.), Research Associate.

WILLIAM D. LAHAY, M.D. (Brit. Col.), Teaching Fellow.

JAMES P. HARWOOD, B.Pharm. (London), M.P.S., M.Sc. (Alta.), Demonstrator.

KANJI NAKATSU, B.Sc., M.Sc. (Alta.), Demonstrator.

DONALD S. Teiser, B.Sc. (Louisville), Demonstrator.

# Department of Physiology

D. HAROLD COPP, B.A., M.D. (Toronto), Ph.D. (Calif.), F.R.S.C., Professor and Head of the Department.

HUGH McLENNAN, M.Sc., Ph.D. (McGill), Professor.

ROBERT L. NOBLE, M.D. (Toronto), Ph.D., D.Sc. (London), F.R.S.C., Professor.

CARL F. CRAMER, M.S. (New Mexico), Ph.D. (Calif.), Associate Professor.

JOHN W. JULL, B.Sc., Ph.D. (Leeds), Associate Professor.

RALPH KEELER, B.Sc., Ph.D. (Birmingham), Associate Professor.

JOHN R. LEDSOME, M.B., Ch.B., M.D. (Edinburgh), Associate Professor.

JOHN C. Brown, B.Sc. (Durham), Ph.D. (Newcastle), Assistant Professor.

Franco Lioy, M.D. (Rome), Ph.D. (Minnesota), Assistant Professor.

C. Owen Parkes, B.Sc., M.Sc. (Wales), Ph.D. (Alta.), Assistant Professor.

James Anthony Pearson, B.Sc. (Durham), Ph.D. (Newcastle), Assistant Professor.

WILLIAM D. LAHAY, M.D. (Brit. Col.), Fellow.

LEON KRAINTZ, A.B. (Harvard), M.A., Ph.D. (Rice), Honorary Professor.

James W. Morton, B.A. (Brit. Col.), M.D., C.M. (McGill), Honorary Instructor.

JACK R. SIDDALL, M.D. (West. Ont.), Honorary Demonstrator.

Sun Shir Shim, M.D. (Severance), M.Sc., Ph.D. (Brit. Col.), Honorary Assistant Professor.

# Department of Psychiatry

JAMES S. TYHURST, B.Sc., M.D., C.M., D.Psych. (McGill), Professor and Head of the Department.

EDWARD L. MARGETTS, B.A. (Brit. Col.), M.D., C.M., D.Psych. (McGill), Professor.

WILLIAM T. Brown, B.Sc., Ph.D. (McGill), M.D. (Brit. Col.), Assistant Professor.

A. Martin Marcus, B.A. (Hons.), M.A. (Cantab.), L.M.S.S.A. (London), D.Psych. (McGill), Assistant Professor.

JAMES E. MILES, B.A. (Sask.), M.D., C.M. (McGill), D.P.M. (London), Assistant Professor.

Hugh L. Parfitt, M.B., B.S. (London), D.Psych. (McGill), M.R.C.S., L.R.C.P. (London), Assistant Professor

CONRAD J. SCHWARZ, M.B., Ch.B. (Glasgow), Assistant Professor.

RALPH SHULMAN, M.B., Ch.B. (Glasgow), M.R.C.P. (Edinburgh & Glasgow), D.P.M. (London), Assistant Professor.

Paul E. Termansen, M.D. (Brit. Col.), D.Psych. (McGill), Assistant Professor.

WINSTON J. MAHABIR, B.A., M.D., C.M. (McGill), Instructor.

RICHARD L. NEWMAN, B.A. (Brit. Col.), M.D. (Leiden), Instructor (Part-time).

VIVIAN BAKER, M.B., Ch.B. (Bristol), D.P.H. (Toronto), Teaching Fellow.

MAN PANG LAU, M.B., B.S., M.D. (Hong Kong), Teaching Fellow.

JOHN E. PHILLIPS, M.B., B.Ch. (Wales), D.P.M. (London), Teaching Fellow.

DAVID P. YEUNG, M.B., B.S. (Hong Kong), D.P.M. (London), Teaching Fellow.

GEORGE A. DAVIDSON, M.D. (Man.), M.R.C.P. (London), F.R.C.P.(C), F.A.C.P., Clinical Professor.

JOSEPH C. THOMAS, M.A., M.B. (Toronto), Clinical Associate Professor.

LIBUSE TYHURST, M.D. (Prague), Clinical Associate Professor.

HENRY ZELDOWICZ, M.D. (Rome), Clinical Associate Professor.

Harvey Breen, M.D. (Brit. Col.), Clinical Assistant Professor.

Joseph E. Boulding, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Assistant Professor.

MOHAMAD-ALI GHAED, M.D. (Tehran), Clinical Assistant Professor.

GORDON H. HUTTON, M.D., D.P.H. (Toronto), Clinical Assistant Professor.

ROY SLAKOV, B.Sc., M.D. (Oregon), Clinical Assistant Professor.

GORDON H. STEPHENSON, M.D. (Toronto), Clinical Assistant Professor.

ALFRED J. WARREN, M.D. (Man.), D.P.M. (London), Clinical Assistant Professor.

DAVID M. BACHOP, M.B., Ch.B. (Edinburgh), Clinical Instructor.

BRUCE F. BRYSON, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Instructor.

KENNETH J. DAVIES, M.D. (Man.), Clinical Instructor.

ROBERT HALLIDAY, M.B., B.Ch., B.A.O. (Queen's, Belfast), D.P.M. (Man chester), Clinical Instructor.

F. WILLIAM HANLEY, B.A., M.D. (Toronto), Clinical Instructor.

EARL D. HARDIN, M.D. (Alta.), Clinical Instructor.

ROBERT W. HARRINGTON, B.A. (Sask.), M.D. (Alta.), Clinical Instructor.

NORMAN B. HIRT, B.A. (Sask.), M.D., C.M. (Queen's), Clinical Instructo Sidney Kaplan, M.D. (Toronto), Clinical Instructor.

George Kovacs, M.D. (Budapest), Clinical Instructor.

Alison M. Lapage, Dipl. Assoc. Occupational Therapists (Oxon.), Clinic Instructor.

ERIC E. LEYLAND, M.B., B.S. (London), Clinical Instructor.

LAWRENCE E. MATRICK, M.D. (Man.), D.P.M. (England), Clinical Instruct Gerald M. McDougall, M.D. (Alta.), Clinical Instructor.

WILLIAM J. G. McFarlane, B.A., M.D. (Brit. Col.), D.Psych. (Toront Clinical Instructor.

FRANK E. McNair, B.A. (Brit. Col.), M.D., C.M. (McGill), Clinical Instructor.

RICHARD L. NEWMAN, B.A. (Brit. Col.), M.D. (Leiden), Clinical Instructor.

RAYMOND PARKINSON, B.A., M.D. (Brit. Col.), Clinical Instructor.

Frances M. Richards, B.Sc., M.D. (Alta.), Clinical Instructor.

MIGUEL P. TECSON, M.D. (Manila), Clinical Instructor.

JOHN WALSH, M.B., Ch.B., B.A.O. (N.U.I.), Clinical Instructor.

RODERICK L. WHITMAN, B.Sc. (Sask.), M.D., C.M. (McGill), D.P.M. (London), Clinical Instructor.

JOHN ROBERT WILSON, M.D., C.M. (Queen's), Clinical Instructor.

MICHAEL WOLOCHOW, B.Sc., M.D. (Alta.), Clinical Instructor.

ERNEST WONG, B.A. (Sask.), M.D. (Alta.), Clinical Instructor.

ALEX R. YARROW, M.D. (Toronto), Clinical Instructor.

BRYCE G. YOUNG, M.B., C.L.B. (Glasgow), D.P.M. (Scottish Conjoint), Clinical Instructor.

H. CLYDE SLADE, M.D., C.M. (Dalhousie), F.R.C.P.(C), Honorary Assistant Professor.

RICHARD GUY RICHMOND, M.R.C.S. (England), L.R.C.P. (London), Honorary Lecturer.

#### Division of Child Psychiatry

HAMISH NICHOL, M.A., M.B., B.Chir. (Cantab.), M.R.C.S. (England), L.R.C.P. (London), D.P.M. (Conjoint), Associate Professor and Head of the Division.

Andrew N. McTaggart, B.A. (Brit. Col.), M.D., C.M., D.P.M. (McGill), Assistant Professor.

P. Susan Stephenson, M.B., B.S. (London), Instructor.

Valerie MacBean, B.A., M.A. (Arizona), Lecturer.

FLORENCE M. AYRE, B.A., B.Ped., B.Ed. (Manitoba), Research Associate.

C. HEGLER GUNDRY, M.D. (Toronto), Clinical Assistant Professor.

Carl L. Kline, B.A. (Illinois), M.B., M.D. (Northwestern), Clinical Assistant Professor.

James S. Bland, B.A., M.B., B.Chir. (Cantab.), M.R.C.S., L.R.C.P., D.P.M. (Conjoint), Clinical Instructor.

ALAN CASHMORE, M.B., B.S., M.D. (London), Clinical Instructor.

Walter W. Mitarewski, B.A., M.D. (Brit. Col.), D.Psych. (McGill), Clinical Instructor.

ROBERTA J. McQueen, M.D., C.M. (Manitoba), D.Psych. (Toronto), Clinical Instructor.

PHILIP GORDON NEY, M.D. (Brit. Col.), D.Psych. (McGill), D.P.M. (London), M.A. (Illinois), Clinical Instructor.

# Division of Neurological Sciences

PATRICK L. McGEER, B.A. (Brit. Col.), Ph.D. (Princeton), M.D. (Brit. Col.), Associate Professor and Head of Division. (On leave of absence.)

Louis I. Woolf, B.Sc., Ph.D. (London), Associate Professor and Acting Head of Division.

Str John Eccles, M.B., B.S. (Melbourne), M.A., D.Phil. (Oxon.), Distinguished Visiting Professor in Neurophysiology.

JUDA H. QUASTEL, Ph.D. (Cantab.), D.Sc. (London), Professor of Neurochemistry.

SHAN C. SUNG, M.D. (Taiwan), D.M.Sc. (Kyushu), Associate Professor of Neurochemistry.

JUHN WADA, M.D., D.M.Sc. (Hokkaido), Associate Professor.

WILLIAM C. GIBSON, B.A. (Brit. Col.), M.Sc. (McGill), D.Phil. (Oxon.), M.D., C.M. (McGill), F.A.C.P., Research Professor.

EDITH G. McGeer, B.A. (Swarthmore), Ph.D. (Virginia), Research Associate.

DAVID A. V. PETERS, B.Sc., Ph.D. (St. Andrews), Research Associate.

ROBERT H. WRIGHT, B.A. (Brit. Col.), M.Sc., Ph.D. (McGill), Honorary Research Associate.

Frances M. Woolf, B.Sc. (Hons. Zoology), B.Sc. (Botany), University College of Wales, Honorary Research Assistant.

AKIRA TERAO, M.D., Ph.D. (Okayama), Post-Doctoral Fellow.

ROBERT L. JONES, B.Sc., Ph.D. (London), Post-Doctoral Fellow.

Division of Psychology

HARRY KLONOFF, B.A. (Man.), M.A. (Toronto), Ph.D. (Wash.), Associate Professor and Head of Division.

G. Alan Marlatt, B.A. (Brit. Col.), Ph.D. (Indiana), Assistant Professor.

Paul Spong, M.A. (New Zealand), Ph.D. (U.C.L.A.), Assistant Professor.

ROBERT P. PARIS, M.D. (Laval), Clinical Instructor.

Priscilla Bernard, M.A. (Wisconsin), Lecturer, Part-time.

LINDA CRAWFORD-EAVES, M.A. (Washington), Lecturer.

LORETTE K. TOEWS, B.A. (Hons.), M.A. (Alberta), Lecturer, Part-time.

PATRICIA A. DIEWOLD, B.A., M.A. (Alberta), Lecturer.

DAVID J. CROCKETT, A.A., B.A. (Wash.), M.A. (Brit. Col.), Demonstrator.

Terence A. Collins, M.A. (Alberta), Clinical Educational Psychologist (Parttime).

Division of Social Psychiatry

Peter Bunton, B.Sc. (Hons.) (Manchester), M.B., B.S. (London), N.R.C.P. L.R.C.S. (Conjoint), D.P.M. (McGill), Assistant Professor.

ROY MAKEPEACE, B.Sc. (Hons.) (Rhodes), M.B., Ch.B. (Capetown), Instructo and Acting Head of Division.

# Department of Surgery

R. C. Harrison, M.D. (Alta.), M.S. (Toronto), F.R.C.S.(C), F.A.C.S., Professor and head of the Department.

F. R. C. JOHNSTONE, M.B. (Edinburgh), M.Sc. (Brit. Col.), F.R.C.S. (Edinburgh), F.A.C.S., Professor.

ALLAN D. McKenzie, M.D. (Alta.), F.R.C.S.(C), F.A.C.S., Clinical Professo Wallace B. Chung, M.D., C.M. (McGill), F.R.C.S.(C), F.A.C.S., Associa Professor.

P. G. ASHMORE, M.D. (Toronto), F.R.C.S.(C), Clinical Associate Professor ROBERT H. GOURLAY, M.D., C.M. (McGill), F.R.C.S.(C), Clinical Associa Professor.

JOHN A. MACDOUGALL, M.D. (Man.), F.R.C.S. (England), F.R.C.S.(C), Clin cal Associate Professor.

WILLIAM H. SUTHERLAND, B.A. (Brit. Col.), M.D., C.M. (McGill), F.R.C.S.(C), Clinical Associate Professor.

- ROGER WILSON, M.D., C.M. (McGill), F.R.C.S.(C), F.R.C.S. (England), F.A.C.S., Clinical Associate Professor.
- A. MAXWELL EVANS, M.D., C.M. (McGill), D.M.R.E. (Cantab.), Clinical Assistant Professor (Therapeutic Radiology).
- D. B. ALLARDYCE, M.D. (Brit. Col.), F.R.C.S.(C), Assistant Professor.
- I. B. HOLUBITSKY, M.Sc., M.D. (Alta.), F.R.C.S.(C), Assistant Professor.
- R. M. CHRISTENSEN, B.A., M.D. (Brit, Col.), F.R.C.S.(C), Assistant Professor, Part-time.
- FRANK B. THOMSON, B.A., M.D. (Toronto), F.R.C.S.(C), Clinical Assistant Professor.
- R. M. BAIRD, M.D. (Brit. Col.), M.Sc. (McGill), F.R.C.S.(C), Clinical Instructor.
- WILLIAM J. CHARLTON, M.D. (Man.), F.R.C.S.(C), Clinical Instructor.
- M. G. CLAY, M.D. (Brit. Col.), F.R.C.S.(C), Clinical Instructor.
- PETER COY, M.B., B.Ch. (Wales), D.M.R.T. (London), Clinical Instructor (Therapeutic Radiology).
- GLEN M. CRAWFORD, M.D. (West. Ont.), Clinical Instructor (Therapeutic Radiology).
- Lucille Ellison, M.D. (Man.), Clinical Instructor (Therapeutic Radiology).
- I. R. FARISH, B.A. (Brit. Col.), M.D., C.M. (McGill), F.R.C.S.(C), Clinical Instructor.
- W. D. M. Forbes, B.B., Ch.B. (Edinburgh), F.R.C.S.(C), Clinical Instructor.
- ALAN D. FORWARD, M.D. (Brit. Col.), F.R.C.S.(C), Clinical Instructor.
- LEONARD B. FRATKIN, B.Sc., M.D. (Alta.), F.R.C.S.(C), Clinical Instructor.
- JOHN W. FROST, B.A. (Brit. Col.), M.D., C.M. (McGill), F.R.C.S. (Edinburgh), F.R.C.S.(C), Clinical Instructor.
- J. M. W. Gibson, B.Sc., M.B., Ch.B. (Glasgow), Clinical Instructor (Therapeutic Radiology).
- G. B. GOODMAN, M.B., Ch.B. (Edinburgh), D.M.R.T. (London), Clinical Instructor (Therapeutic Radiology).
- E. J. Gray, M.D. (Ottawa), F.R.C.S.(C), F.A.C.S., Clinical Instructor.
- R. J. HANCOCK, B.A., M.D. (Brit. Col.), F.R.C.S.(C), Clinical Instructor.
- H. D. HILDEBRAND, M.D. (Man.), F.R.C.S.(C), Clinical Instructor.
- PAUL P. JACKSON, B.S. (E. Central State Coll.), M.D. (Oklahoma), F.A.C.S., Clinical Instructor.
- M. R. KLIMAN, B.A. (Sask.), M.D. (Toronto), F.R.C.S. (Eng.), F.R.C.S.(C), F.A.C.S., Clinical Instructor.
- H. K. LITHERLAND, B.A., M.A., B.Chir., M.B. (Cantab.), F.R.C.S.(C), Clinical Instructor.
- R. H. MARSHALL, M.D. (Toronto), F.R.C.S.(C), F.A.A.P., Clinical Instructor.
- J. E. Muscrove, M.D. (Man.), F.R.C.S.(C), Clinical Instructor.
- THOMAS R. OSLER, M.D., C.M. (McGill), F.R.C.S.(C), Clinical Instructor.
- J. D. RANDALL, M.B., B.S. (London), F.R.C.S. (England), Clinical Instructor. Peter Rees-Davies, M.R.C.S. (England), L.R.C.P. (London), F.R.C.S. (England), F.R.C.S. (C), F.I.C.S., F.A.C.S., Clinical Instructor.
- RICHARD E. ROBINS, M.D. (West. Ont.), F.R.C.S.(C), Clinical Instructor. J. T. M. SANDY, M.D. (West. Ont.), F.R.C.S.(C), Clinical Instructor.
- JOSEPH G. SLADEN, M.D. (Toronto), F.R.C.S.(C), Clinical Instructor.

- J. W. Wilson, M.D., C.M. (McGill), F.R.C.S.(C), Clinical Instructor.
- G. C. Fraser, M.B., B.S. (Aberdeen), F.R.C.S. (Eng.), F.R.C.S. (Edinburgh), Teaching Fellow.

JOHN C. Brown, B.Sc., Ph.D., Honorary Assistant Professor.

J. L. STOLLER, M.B., Ch.B. (St. Andrews), F.R.C.S. (Glasgow), F.R.C.S. (Edinburgh), Research Fellow.

Division of Anaesthesiology

L. C. Jenkins, B.S., M.D., C.M. (McGill), F.R.C.P.(C), Associate Professor. Horace B. Graves, B.A., M.D., C.M. (McGill), F.R.C.P.(C), Clinical Associate Professor.

JONE CHANG, M.D. (Toronto), F.R.C.P.(C), Clinical Assistant Professor.

W. A. Dodds, M.D. (Toronto), Clinical Assistant Professor.

G. W. Sleath, B.A., M.D. (Brit. Col.), F.R.C.P.(C), Clinical Assistant Professor.

MARION BERRY, M.B., B.S. (London), F.R.C.P.(C), Clinical Instructor.

JOHN JAMES CARROLL, B.A. (Bishop's), M.D., C.M. (McGill), Clinical Instructor.

Lois Davies, M.D. (Toronto), Clinical Instructor.

W. A. Doll, B.Sc., M.D. (Alta.), Clinical Instructor.

W. L. ESDALE, B.Sc., M.D. (Alta.), Clinical Instructor.

J. B. Fulton, B.A., M.D. (Alta.), Clinical Instructor.

A. K. Gibbons, B.Sc., M.D. (Alta.), Clinical Instructor.

EDWIN ROBERT HALL, B.Sc., M.D. (Alta.), Clinical Instructor.

WILLIAM M. HALL, M.D. (Alta.), Clinical Instructor.

P. W. Hudson, M.D. (Alta.), Clinical Instructor.

JEAN T. HUGILL, B.Sc., M.D. (Alta.), Clinical Instructor.

HAROLD ANDERSON KESTER, B.A., M.D. (West. Ont.), Clinical Instructor.

K. M. Leighton, M.B., Ch.B. (Aberdeen), F.R.C.P.(C), Clinical Instructor.

Donald Matheson, M.B., Ch.B. (Aberdeen), F.F.A.R.C.S. (England), Clinical Instructor.

- J. P. Munroe, M.D., C.M. (McGill), F.R.C.P.(C), Clinical Instructor.
- F. W. McCaffrey, B.A. (Montreal), M.D. (Laval), Clinical Instructor.
- J. A. McConnell, B.A. (Brit. Col.), M.D. (West Ont.), Clinical Instructor.
- J. E. NIXON, M.D. (West. Ont.), Clinical Instructor.

JOHN L. OULTON, B.Sc., M.D., C.M. (McGill), Clinical Instructor.

I. S. PATERSON, M.B., B.S. (London), F.F.A.R.C.S.(England), Clinical In structor.

Peter B. Percheson, M.D., C.M. (Queen's), F.R.C.P.(C), Clinical In structor.

JOHN CRANSTON POOLE, M.D. (Man.), Clinical Instructor.

T. E. Powell, B.A., M.A. (Oxon.), L.M.S.S.A. (London), Clinical Instructo Herbert Samuel Randall, B.A. (New Bruns.), M.D., C.M. (McGill), Clinic Instructor.

COLIN A. SANDS, B.A. (Sask.), M.D. (Toronto), Clinical Instructor.

R. C. Schofer, B.A., M.D. (Brit. Col.), Clinical Instructor.

M. H. Schultz, M.D., C.M. (Queen's), Clinical Instructor.

- R. E. SIMPSON, B.A., M.A. (Brit. Col.), M.D., C.M. (Queen's), Clinical Instructor.
- G. E. SLEATH, B.A. (Brit. Col.), M.D. (Alta.), Clinical Instructor.
- M. R. TURNER, B.A., M.B. (Cambridge), F.R.C.P.(C), Instructor.

ERIC WEBB, M.D. (West. Ont.), Clinical Instructor.

RALPH STAPLES WOODSWORTH, M.D. (Man.), Clinical Instructor.

Division of Neurosurgery

GORDON B. THOMPSON, B.Sc. (Man.), M.D., C.M. (McGill), F.R.C.S.(C), Clinical Assistant Professor.

JOSEPH W. CLUFF, B.Sc. (Sask.), M.D. (Man.), F.R.C.S.(C), Clinical Assistant Professor.

L. M. TURNBULL, M.D. (Brit Col.), FR.C.S.(C), Assistant Professor.

Peter O. Lehmann, M.D. (Man.), Clinical Instructor.

P. D. Moyes, M.B., B.S. (London), M.S. (Minn.), F.R.C.S.(C), Clinical Instructor.

FRANK A. TURNBULL, B.A. (Brit. Col.), M.D. (Toronto), F.R.C.S.(C), Clinical Instructor.

E. W. Skwarok, M.D. (Alta.), Demonstrator.

Division of Orthopaedics

FRANK P. PATTERSON, M.D., C.M. (McGill), F.R.C.S.(C), F.A.C.S., Associate Professor (Part-time).

S. S. Shim, M.D. (Yonsei), M.Sc., Ph.D. (Brit. Col.), M.R.C. Scholar, Assistant Professor.

CAMERON S. ALLEN, M.D., Ch.M. (Man.), M.S. (Minn.), F.R.C.S.(C), F.A.C.S., Clinical Assistant Professor.

K. S. Morton, B.A., M.Sc. (Brit. Col.), M.D., C.M. (McGill), F.R.C.S.(C), Clinical Assistant Professor.

ARTHUR S. McConkey, M.D. (Alta.), Clinical Assistant Professor.

WILLIAM J. THOMPSON, B.Sc. (Sask.), M.D. (Man.), F.R.C.S.(C), Clinical Assistant Professor.

H. MICHAEL BELL, M.D. (Brit. Col.), F.R.C.S.(C), Instructor, Part-time.

J. K. Browne, M.B., Ch.B., B.A.O., B.A. (Trinity), F.R.C.S. (Edinburgh), F.R.C.S.(C), Clinical Instructor.

C. E. Cook, M.D. (Alta.), F.R.C.S.(C), Clinical Instructor.

W. HARRY FAHRNI, M.D. (Man.), M.Ch.Orth. (Liverpool), F.R.C.S. (Edinburgh), F.R.C.S. (C), Clinical Instructor.

HECTOR S. GILLESPIE, M.D. (Toronto), F.R.C.S.(C), Clinical Instructor.

A. M. Inglis, M.D. (Man.), F.R.C.S.(C), Clinical Instructor.

ERIC C. H. LEHMANN, M.D. (Toronto), F.R.C.S.(C), Clinical Instructor.

R. G. MacLachlan, M.D. (West. Ont.), F.R.C.S.(C), Clinical Instructor.

G. D. McPherson, M.D. (West. Ont.), M.Sc. (Brit. Col.), F.R.C.S.(C), Clinical Instructor.

J. W. Sparkes, M.D. (Toronto), Clinical Instructor.

J. G. WATT, M.D. (Brit. Col.), F.R.C.S.(C), Clinical Instructor.

H. S. MILLER, B.A. (Brit. Col.), M.D., C.M. (McGill), F.R.C.S.(C), Teaching Fellow.

R. W. McGraw, M.D. (Brit. Col.), F.R.C.S.(C), Teaching Fellow.

HUGH C. MACNIEL, M.D. (Toronto), F.R.C.S.(C), Teaching Fellow.

Division of Otolaryngology

R. A. McNeill, M.B., B.Ch., M.Ch. (Belfast), M.D. (Edin.), F.R.C.S. (Eng.), Associate Professor

GORDON H. FRANCIS, B.A., M.D. (West. Ont.), Clinical Associate Professor. BENJAMIN W. TANTON, M.D., C.M. (McGill), Clinical Assistant Professor.

GARNET A. BADGER, M.D. (Alta.), Clinical Instructor.

M. P. BANNO, M.D. (Brit. Col.), Clinical Instructor.

NATHANIEL J. BLAIR, M.Sc., M.D. (Man.), Clinical Instructor.

KENNETH G. CAMBON, B.A., M.D., C.M. (McGill), Clinical Instructor.

GLEN P. KONG, B.A. (Wash.), M.D. (Brit. Col.), Clinical Instructor.

HENRY B. LOCKHART, B.Sc. (New Bruns.), M.D. (Toronto), F.R.C.S.(C), Clinical Instructor.

WILLIAM J. PATTERSON, M.D. (Ottawa), Clinical Instructor.

E. F. J. RUEBEN, M.D. (Heidelberg), F.R.C.S.(C), Clinical Instructor.

ALFRED O. STEBNICK, B.Sc. (Man.), M.D. (Laval), Clinical Instructor.

#### Division of Plastic Surgery

R. J. Cowan, M.D. (Toronto), F.R.C.S.(C), Clinical Associate Professor.

ALBERT D. COURTEMANCHE, M.D. (Toronto), F.R.C.S.(C), Clinical Instructor.

#### Division of Thoracic Surgery

GEORGE D. SAXTON, M.D. (Man.), F.R.C.S. (Edinburgh), Clinical Associate Professor.

Peter Allen, M.D. (Toronto), F.R.C.S.(C), Clinical Assistant Professor.

W. G. TRAPP, M.D., C.M. (McGill), F.R.C.S.(C), F.A.C.C.P., Clinical Assistant Professor

#### Division of Urology

JOHN A. BALFOUR, M.D. (Alta.), F.R.C.S.(C), Clinical Associate Professor.

Leslie R. Williams, M.D., C.M. (McGill), F.R.C.S. (Edinburgh), F.R.C.S.(C), Clinical Assistant Professor.

G. J. ANKENMAN, M.D., C.M. (Queen's), F.R.C.S.(C), Clinical Instructor.

JOHN W. Arbuckle, Jr. M.D., C.M. (McGill), F.R.C.S.(C), Clinical Instructor.

HAROLD LEO CHAMBERS, B.A. (Sask.), M.D. (Toronto), Clinical Instructor.

HARRY G. COOPER, B.A., M.D. (Alta.), Clinical Instructor.

P. J. Moloney, M.D. (Wash.), F.R.C.S.(C), Instructor.

DONALD A. MACDONALD, M.D., C.M. (McGill), F.R.C.S.(C), Clinical Instructor.

HOWARD A. SMITH, B.A. (Cantab.), M.B., B.Ch. (Belfast), F.R.C.S. (Edin burgh), F.R.C.S. (C), Clinical Instructor.

LORNE G. WOOD, M.D. (Alta.), F.R.C.S.(C), Clinical Instructor.

H. W. Johnson, M.D. (Man.), F.R.C.S.(C), Teaching Fellow.

#### General Information

The medical course extends through four academic sessions and leads to the degree of Doctor of Medicine (M.D.).

At present the academic sessions in each of the first three years of the course are of 32 weeks' duration and that in the final year is of 30 weeks' duration. An increase in duration of the academic term in the final two years of the course is under consideration by a special committee of the Faculty of Medicine appointed to study curricular revision.

The first two years of the course, devoted to the fundamental or preclinical medical sciences, are mainly given on the campus of the University. However, during the second year, instruction is transferred in part to the Vancouver General Hospital, Shaughnessy Hospital and St. Paul's Hospital.

The Third and Fourth Years of the course, the clinical years, are designed, not only to bring the student into contact with patients and to give him a knowledge of the natural history of disease, but also to provide him with the essentials of modern diagnosis and treatment. During the clinical years, the facilities of the Children's Hospital, Grace Hospital, the Provincial Mental Hospital, B.C. Cancer Institute, and the G. F. Strong Rehabilitation Centre are also utilized for clinical teaching.

Three buildings with well equipped teaching and research laboratories were completed on the University campus in 1961. These provide facilities for the Departments of Anatomy, Biochemistry, Pharmacology and Physiology and research space for the Department of Pathology, the Department of Psychiatry (Kinsmen Laboratory for Neurological Research), and the Cancer Research Centre (National Cancer Institute of Canada).

The Woodward Biomedical Library, opened in November 1964, houses, on campus, library facilities including medical reference sections and study areas. A branch library is maintained at the Vancouver General Hospital. Construction has begun on extensions to the Woodward Biomedical Library.

In addition, plans are being developed for construction of an extensive modern Instructional Resources Centre to be used by all of the Health Science disciplines.

To add to the University facilities for medical research, the G.F. Strong Laboratory for Medical Research was established in January 1959. This laboratory provides facilities for medical research conducted by members of the staff of the Faculty of Medicine and other qualified persons, subject to the approval of the committee of the Laboratory and the Director. The Kinsmen Laboratory for Neurological Research was established September 1, 1960, and is now located in extensive modern quarters in the new Health Sciences Centre. A large Cancer Research Centre, a unit of the National Cancer Institute of Canada, was established on the campus in September, 1961.

The School of Rehabilitation Medicine, also established in 1961, is a part of he Faculty of Medicine and offers training in physical and occupational herapy. However, it issues its own calendar and enquiries should be sent to he Director of the School.

Planning is now well advanced for the construction of a Health Sciences lenter, including a 410-bed hospital, on campus. The Psychiatric wing of the lealth Sciences Centre hospital is due to open at an early date.

#### Admission to the Faculty of Medicine

Admission to the Faculty of Medicine is based primarily on ability and remedical achievement as demonstrated by scholastic records and aptitude tests, and on qualities of character and personality as evidenced by interviews and letters of recommendation.

It is required that candidates shall have completed (as a minimum) three full years in the Faculty of Arts or in the Faculty of Science at the University of British Columbia or its equivalent. The minimum acceptable scholastic average is second class standing (a minimum of 65%).

Classes entering the first year of Medicine are limited to a maximum of

sixty (60) students.

A candidate is required to take the Medical College Admission Test by the fall of his third year of premedical training. Arrangements to take the test should be made with the counselling or premedical advisory service of the institution at which the student is taking his premedical work. Information regarding this test may be obtained from the Psychological Corporation, 304 East 45th Street, New York 17, or from the Office of Student Services of this University. At the time the test is taken, the student should request that the scores be sent to the Admissions Committee, Faculty of Medicine, the University of British Columbia, Vancouver 8, B.C. Failure to take the test by the time indicated above will result in relatively late consideration of the applicant's credentials by the Screening Committee.

No applicant will be accepted if he has been required to withdraw from another medical school for academic reasons.

Application blanks will be available in the Faculty of Medicine office from August 15 to December 15. Completed applications should be received by that office as early as possible, and in any case not later than December 31. It is the responsibility of the applicant to see that all official transcripts of university or college credits, (including Grade 13 marks if applicable) are received in the Faculty of Medicine office not later than December 31.

University regulations require that a fee of \$10.00 be charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.

An applicant with physical handicaps requiring periodic medical attention or interfering with normal activities must submit a medical certificate with his application. In this certificate, the examining physician should describe the extent of the disability and estimate its effect upon the applicant's future ability to practise medicine.

A personal interview with members of the Admissions Committee may be required of any applicant.

A small number of outstanding applicants may be issued tentative acceptance about Christmas time or shortly thereafter. A larger group of acceptances will be issued after transcripts of results of Christmas examinations have been received and processed, usually by the Spring. The remaining places in the entering first year class will be filled after transcripts of results of spring examinations have been received. This is usually completed by early July.

All tentative acceptances are subject to confirmation only upon satisfactor;

completion of current courses.

An applicant who is accepted must submit a deposit of \$100.00 within four weeks of notification of his acceptance at this University. This deposi is non-refundable and shall be applied toward the tuition of the first tern of the session for which the student has been accepted.

An accepted applicant who is taking his premedical work at the Universit of British Columbia is required to have a physical examination at the Un versity Health Service preceding admission. An accepted applicant from

another institution must submit, prior to registration, a medical certificate from his own physician, on the form provided by the University Health Service. Immunization against smallpox is required.

#### Premedical Requirements

The requirements listed below apply to the student taking his premedical work in the Faculty of Arts or in the Faculty of Science at the University of British Columbia. An applicant from another university must submit evidence of having successfully completed equivalent prerequisite courses.

English: English 100 (Literature and Composition).

Mathematics: Mathematics 100 (Calculus I) and Mathematics 121 (Introduction to Vectors and Matrices) (OR Mathematics 130—Finite Combinatorial Mathematics).

Chemistry: (1) Chemistry 110 or 120 (Principles of Chemistry) (or Chemistry 103—General Chemistry);

(2) Chemistry 205 (Physical, Inorganic and Analytical Chem-

istry), or Chemistry 210 or 220 (Physical, Inorganic Chemistry);

(3) Chemistry 203 or 230 (Organic Chemistry).

Fhysics: Physics 110 (Mechanics, Electricity and Atomic Structure), or Physics 120 (Matter and Mechanics), or Physics 130 (Elements of Physics).

Biology: Biology 101 (Principles of Biology) or equivalent. If a student has been granted exemption from Biology 101 by the Faculty of Science it will be accepted that he has met the Biology requirement of the Faculty of Medicine.

The student should select other courses to conform with the requirements for a baccalaureate degree. In general, medical school courses should not be anticipated.

The prospective applicant should realize that these are the minimal requirements for entrance to the Faculty of Medicine. In the selection of his courses during his premedical preparation, the student should always keep in mind that he may wish to take further courses or complete degree requirements prior to his entrance to the Faculty of Medicine. It is urged that he seek advice from the appropriate department before he selects a course.

# Combined B.Sc. degree and M.D. degree programme

Students who have completed three years in the Faculty of Science and the first year in the Faculty of Medicine at this University, and who have completed all the course requirements for the B.Sc. degree, including up to 15 units of course work in the Faculty of Medicine recognized for credit in the Faculty of Science, may on application and with approval of the Dean of Science receive the appropriate B.Sc. degree.

Students registered in the first year of the Faculty of Medicine who have already obtained satisfactory standing in Biochemistry 400 (or the equivalent) and Physiology 400 (or the equivalent) may with approval of the Dean of Medicine substitute equivalent units of other course work. Students expecting o qualify for an Honours B.Sc. degree in Biochemistry, Physiology or other cience department must, in addition, meet the Honours requirement of that lepartment and obtain the prior approval of the head of the science department concerned.

#### Idmission of Students by Transfer

A student who has successfully completed one or two years of the medical ourse at an accredited medical school may apply for transfer to this Faculty

of Medicine as a second or third year student as applicable. No student will be accepted by transfer after the beginning of the third year.

The acceptance of transfer students will depend up on the existence of

vacancies.

An applicant for transfer must present credentials covering the pre-medical and medical courses completed at the institution of his first registration.

#### Transfer of Students from the Faculty of Dentistry

The number of qualified applicants seeking admission to the Faculty of Medicine and the Faculty of Dentistry at the University of British Columbia generally exceeds the normal class capacity of these Faculties. A student who gains admission to one of these Faculties with the intent of eventually transferring with advanced standing to the other Faculty may be depriving another qualified student of the opportunity to obtain a dental or medical education. For this reason applications for transfer between the Faculties of Medicine and Dentistry are discouraged by the University and will be entertained only in the light of special circumstances.

#### Registration

The academic year of the Faculty of Medicine begins on the first Tuesday after Labour Day.

Students in each year of the medical course will be notified of the time and place for their registration. On the opening day of the new session, students must personally obtain registration cards and complete their registration procedure.

No student will be allowed to register after the first day of instruction in the term, nor will he be admitted to any class after its first session, except by permission of the Dean.

#### Fees—Subject to change without notice

Tuition and incidental fees in first and second years of the medical course are \$673. (First Term \$351, including the A.M.S. fee, and Second Term \$322). Tuition and Incidental fees in the third and fourth years of the medical course are \$644. (First Term \$322 and Second Term \$322.) Additional fees include the Graduating Class Fee of \$7.00, payable by all students in their final year, and the Hospital Fee of \$5.00 where applicable.

Students in the Faculty of Medicine must conform to the general regulations of the University with respect to payment of fees at the office of the

Accountant on the day of registration.

Student Expense

The following instruments and supplies will be required during the course; it is recommended that no purchases be made until details concerning the equipment required are furnished at the beginning of the courses by the departments concerned.

First Year:	Approximate Price
Microscope—an approved model	\$250.00
Instruments for anatomy and physiology	\$15.00
Stethoscope	\$25.00
Laboratory coats (4)	\$20.00
Second Year	
Ophthalmoscope with otolaryngological attachments	\$80.00
Sphygmomanometer	
Third Year	
Haemoglobinometer	\$14.00
Haemocytometer	

#### **Textbooks**

Information regarding textbooks will be given at the first class period in each course. Not less than \$130.00 per year should be available for purchasing textbooks and expendable supplies.

#### Financial Aid

For descriptions of bursaries, fellowships, scholarships and loans see later section of this calendar and the separate publication Awards and Financial Assistance, which may be obtained from the Registrar's office.

#### Time Tables

Time tables will be provided at the time of registration.

#### Courses Leading to the M.D. Degree

The subjects in which instruction is given in the four academic sessions leading to the M.D. degree are as follows:

#### First Year:

Anatomy (including Embryology and Histology), Biochemistry, Physiology, Preclinical Sessions, Statistics in the Health Sciences, History of Health Sciences.

#### Second Year:

Introduction to Epidemiology, Introduction to Medicine, Introduction to Obstetrics, Introduction to Paediatrics, Introduction to Psychiatry, Introduction to Surgery, Medical Genetics, Medical Microbiology, Neuroanatomy, Neurophysiology, Parasitology, Pathology, Pharmacology, Permissible Electives.

#### Third Year:

Health Care and Epidemiology, Medicine and Therapeutics, Obstetrics and Gynaecology, Ophthalmology, Paediatrics, Psychiatry, Radiology, Surgical Pathology, Surgery (including specialties), Clinical Microscopy.

#### Fourth Year:

Medicine and Therapeutics (including specialties), Medical Jurisprudence, Obstetrics and Gynaecology, Ophthalmology, Paediatrics, Health Care, Psychiatry, Physical Medicine, Radiology, and Surgery (including specialties).

The First, Second, and Third Years of the medical course are divided into two terms; the Fourth Year is divided into three terms.

#### Examinations and Advancement

#### Attendance

Regular attendance is expected of students in all their classes (including ectures, laboratories, tutorials, seminars, etc.). Students who neglect their leademic work and assignments, may, on the recommendation of the Head of the Department, be excluded by the Dean of the Faculty from the final examinations. Students who are unavoidably absent because of illness or disbility should report to their instructors on return to classes.

Students who, because of illness, are absent from a term or final examilation, must submit a certificate, obtained from a physician, to the University Iealth Service as promptly as possible.

A student planning to be absent from classes for any reason must obtain revious permission from the Dean's office.

#### Withdrawal

Any student who after registration decides to withdraw from the University must report to the Registrar's office. He will be required to obtain clearance from the University, to the satisfaction of the Registrar, before being granted *Honourable Dismissal* or before being recommended, where applicable, for refund of fees.

#### Examinations

Examinations in the Faculty of Medicine may be held at various times throughout the year. These examinations are obligatory for all students.

Should a student find that he will be unavoidably absent from a sessional examination, he or someone familiar with his situation must notify the Dean's office of the facts in the case before the end of the period during which the examination is scheduled. Failure to observe this rule may result in a failure being recorded in the course.

When a sessional examination has been missed through illness or some other justifiable cause, application for deferred examination or special consideration must be made in writing to the Dean not later than 48 hours after the close of the examination period. If the absence was for reasons of health, a physician's certificate indicating the nature and duration of the illness must be submitted to the University Health Service.

A student may be denied the privilege of writing a sessional examination in any subject because of unsatisfactory work or attendance, and in this case he will be considered to have failed in the course.

In any course which involves both laboratory work and written examinations, a student is required to achieve satisfactory standing in both parts of the course. If the course is repeated, no exemption will ordinarily be granted from the work in either part.

Term essays and examination papers may be refused a passing mark if they are illegible or noticeably defective in English.

The passing mark in the Faculty of Medicine is 60%. Examinations will be graded as follows: First Class, 80% or more; Second Class, 65-79%; Pass, 60-64%; Fail, below 60%.

All results of final examinations will be passed upon by a Promotions Committee and approved by Senate. Final examination results will be released by the Registrar and will not be communicated through any other channel.

#### Advancement

The Faculty will determine the student's fitness for promotion at the end of each session. No student with defective standing will be promoted.

A student whose academic standing is unsatisfactory may be required either to withdraw from the Faculty or to repeat the entire work of the year.

If the progress of a student has been unsatisfactory in any given session, the Faculty may permit a supplemental examination in the subject failed, provided that: (i) his attendance has been satisfactory; (ii) he has not faile in more than two subjects; and (iii) he has an average of at least 60% in the work of the year including the failed subjects. The department or departments concerned may direct such work as will be necessary to prepare for the supplemental examination. It is the responsibility of the student to consume the heads of the departments concerned about such arrangements. If the student satisfies the requirements of the departments concerned and passe each supplemental examination with a mark of at least 65% he will be promoted.

A student in the first year who fails to be promoted will not be permitted to repeat the year except under special circumstances.

A student will not be permitted to repeat more than one year except under special circumstances.

A student who repeats a year is required to attain a mark of at least 65% in the examination in each subject.

Although satisfactory academic performance is prerequisite to advancement it is not the sole criterion in the consideration of the suitability of a student for promotion or graduation. The Faculty reserves the right to require a student to withdraw from the Faculty if he is considered to be unsuited to proceed with the study or practice of medicine.

#### Subjects of the Final Examinations

#### First Year:

Anatomy (including Radiological Anatomy), Histology (including Embryology), Biochemistry, Physiology.

#### Second Year:

Anatomy (Neuroanatomy), Introduction to Clinical Medicine, Medical Microbiology, Pathology, Pharmacology, Parasitology, Physiology (Neurophysiology).

#### Third Year:

Medicine, Clinical Microscopy, Obstetrics and Gynaecology, Paediatrics, Psychiatry, Preventive Medicine (including questions on Statistics and Epidemiology), and Surgery.

Note: Questions on Radiology may be asked on the papers in Medicine, Surgery, Paediatrics or Obstetrics.

#### Fourth Year:

Health Care and Epidemiology (Public Health and Preventive Medicine), Medicine (including Therapeutics), Obstetrics and Gynaecology, Paediatrics, Psychiatry, and Surgery.

All written and oral examinations will be held in late April or in May.

All persons writing the Medical Council of Canada examinations are required to submit a separate examination fee to that body. This fee is set by the Council and is payable to The Registrar, Medical Council of Canada.

#### **Enabling Certificates**

An Enabling Certificate is required for admission to the examinations of the Medical Council of Canada. This certificate is obtained from the provincial College of Physicians and Surgeons.

If a students plans to practise in British Columbia, he should make application to the Registrar, College of Physicians and Surgeons of British Columbia, to receive the required Enabling Certificate. Application should be made not later than February 1 in the final year of the medical course. Forms will be made available in the Dean's office.

A student planning to practise medicine outside this province should comply vith the regulations of the appropriate licensing body, including the requirenents of other Colleges of Physicians and Surgeons.

A student who has registered in another province should ordinarily obtain is Enabling Certificate from the province of his student registration.

#### Requirements for the Degree of M.D.

A candidate for the M.D. degree must be at least twenty-one years of age. He must have fulfilled all the requirements for entrance to the Faculty of Medicine and have attended the four full years of instruction which comprise the medical course. No one will be admitted to candidacy for the M.D. degree who has not been in attendance for the final two years in the Faculty of Medicine at the University of British Columbia.

Each candidate for graduation must have passed all the required examinations in the subjects comprising the medical course, and have received acceptable ratings in Preclinical Sessions, and in certain other courses for which

satisfactory completion is required but specific marks are not assigned.

The Faculty will recommend to Senate the granting of the M.D. degree to a student who has completed satisfactorily the academic requirements.

Each candidate for the M.D. degree must make formal application, on a form obtainable at the Registrar's office, for graduation at least one month prior to the Congregation at which he expects to obtain the degree.

#### Regulations Regarding Licence to Practise Medicine

The possession of an M.D. degree does not, in itself, confer the right to practise medicine in any province in Canada. Each province has a College of Physicians and Surgeons, as mentioned previously, and these Colleges have the final authority to grant a licence to practise medicine within their jurisdictions. The possession of the Licentiate of the Medical Council of Canada (L.M.C.C.) is one of the major requirements of the Provincial Colleges of Physicians and Surgeons for registration.

In British Columbia, the College of Physicians and Surgeons requires that in addition to holding the Licentiate of the Medical Council of Canada an applicant must have served a one-year interneship in an approved hospital

before being eligible for a licence to practise.

#### Interneship

The serving of an interneship is not prerequisite to graduation from the Faculty of Medicine in this university. In all but exceptional cases, however, it is in the best interests of the medical graduate to interne for at least one year. This is true even if he plans a career which does not involve the care of patients. Basic medical education is not considered complete without the serving of an interneship.

The Faculty of Medicine assists in the arranging for interneships and advises on the merits of those available. The office of the Dean should be consulted early in the Fourth Year before students apply to the hospitals

in which they are interested.

It should be clearly understood that the Faculty of Medicine does not undertake interne placement or the assignment of graduating students to interneships. The Canadian Association of Medical Students and Interneshowever, operates a placement service.

#### Division of Continuing Medical Education

A Division of Continuing Medical Education has been established withir the Office of the Dean to assist hospitals in intern-residency education and in crease medical enrolment in the Faculty of Graduate Studies. The Division serves to integrate and expand the programme of continuing education of practising physicians. Assistance is available to coordinate medical postgraduat education programmes with those of allied professional and technical groups is the health care field through the Division of Continuing Education in the Health Sciences.

#### Courses of Instruction

Medical students are offered courses numbered 400 to 424 in the First Year of the medical course, 425 to 449 in the Second Year, 450 to 474 in the Third

Year, and 475 to 499 in the Fourth Year.

Courses offered to non-medical students, numbered below 500, are intended primarily for students at pre-baccalaureate levels in the University. Courses numbered 500 or higher are normally for postgraduate students in the Faculty of Medicine and candidates for advanced degrees in the Faculty of Graduate Studies. Registration in these courses is at the discretion of the department concerned.

Courses numbered 900 and above are non-credit courses and do not count

toward a degree.

# Department of Anatomy

- 390. (3) Basic Human Anatomy.—A lecture course dealing with the basic structure of cells, tissues and organs of the human body in relation to their function. Prerequisites: Chemistry 103, 110 or 120 and Biology 101 or equivalent; exemptions may be arranged for Honours or Graduate students. Permission of the Department is required. [3-0; 3-0]
- 400, 401. Human Anatomy.—A correlated course of study for medical and dental students of the structure of the human body including gross, microscopic and radiological anatomy and embryology. Clinics are held in cooperation with the Departments of Medicine and Surgery. Both terms. Textbooks: (1) R. J. Last, Anatomy, Regional and Applied; (2) Grant, Atlas of Anatomy, or Jamieson, Illustrations of Regional Anatomy; (3) Friedman, Visual Anatomy; (4) Cunningham, Manual of Practical Anatomy; (5) Ham, Textbook of Histology.
- 425. Elements of Neuroanatomy.—An introduction to the structure of the human nervous system. First term. Textbooks: Strong, Elwyn, *Human Neuroanatomy*. Given only in conjunction with Physiology 425.

#### Graduate Courses

500. (6) Gross Human Anatomy.—An advanced laboratory course in the structure of the human body.

501. (3) Microscopic Human Anatomy.—An advanced laboratory course in

the microscopic structure of the human body.

502. (4) Microscopic Anatomy.—The microscopic anatomy of tissues and organs in man. Prerequisite: Anatomy 401 or equivalent.

504. (1) Seminars in Ultrastructure.

- 505. (3) General Cytological Biophysics.—An examination of the architecture and molecular organizations of the cell as a basis for critical evaluation of turrent biophysical theories. (To be given in 1969-70 and alternate years.)
- 506. (3) Biophysics of Cell Membranes.—A comprehensive study of the tructural, electrical, osmotic, transport and regulatory properties of biological nembranes. (To be given in 1970-71 and alternate years.)
- 510. (2) Neuroanatomy.—The gross and microscopic study of the nervous ystem in man.
- 511. (3) Neuroanatomy.—Selected advanced topics.
- 548. (1-3) Directed Studies in Anatomy.
- 549. (6) M.Sc. Thesis.
- 649. Ph.D. Thesis.
- 903. Surgical Anatomy.—A review course in human anatomy as applied surgery.

#### Department of Biochemistry

- 400. General Biochemistry.—A laboratory, lecture and conference course dealing with the chemical and physical-chemical phenomena underlying the functioning of the normal human body. For Medical and Dental students. Honours students may be admitted to the course after consultation with the Department.
- 410. (3) Outlines of Biochemistry.—A lecture course dealing with the structure, function and metabolic reactions of proteins, carbohydrates, nucleic acids, lipids and steroids; enzymology and bioenergetics; biochemical transfer of genetic information and protein synthesis; regulatory mechanisms; control of cellular activity. Prerequisite: Chemistry 203 or 230. [3-0; 3-0]
- 411. (1½) Biochemistry Laboratory.—A course to demonstrate the chemical and physical properties of the fundamental components of cells and some of the techniques by which these properties are studied. [0-3; 0-3]
- 430. (1) Perspectives in Biochemistry.—A seminar course on the history of biochemistry. Prerequisite: Biochemistry 400 or 410.
- 449. (3) Thesis.—A laboratory research problem under the direction of a staff member.

#### Graduate Courses

Biochemistry 410 and 411, or the equivalent, is prerequisite to all graduate courses in Biochemistry. Students are advised not to take graduate courses in Biochemistry unless they have obtained at least 65% in Biochemistry 410 and 411, or the equivalent.

- 500. (1-6) Biochemical Methods.—A study of the principles of modern advanced biochemical techniques and their application to the solution of biochemical problems. The lecture section of the course has a unit value of (1) and registration is not limited. Admission to the laboratory section of the course is by permission of the Head of the Biochemistry Department.
- 502. (1½) The Biochemical Function of Proteins.—Modern concepts of the relationship between macromolecular structure and biochemical function. Given in 1970-71 and alternate years.
- 503. (1½) Biochemistry of the Nucleic Acids.—The chemical, physical and biological properties of nucleotides and nucleic acids, the elucidation of nucleic acid structures and modern concepts of their function and replication in the cell. Given in 1970-71 and alternate years.
- 504. (1½) Biochemistry of Amino Acids and Proteins.—Metabolism of individual amino acids and modern concepts of the biosynthetic mechanisms leading to the formation of proteins by cellular components. Given in 1970-71 and alternate years.
- 505. (1½) Biochemistry of Carbohydrates.—The pathways, reactions, regulatory mechanisms and dynamic control of carbohydrate and energy metabolism. Given in 1969-70 and alternate years.
- 506. (1½) Biochemistry of Lipids.—Modern concepts of the metabolism and biochemical function of fats, phospholipids and cholesterol. Given in 1969-70 and alternate years.
- 507. (1½) Biochemistry of Steroids and Hormones.—Modern concepts c the metabolism and biochemical function of the sterois, bile acids, steroi hormones, catecholamines and peptide hormones. Given in 1969-70 an alternate years.
- 530. (1) Seminar in Biochemistry.—Attendance is required of all graduate students in Biochemistry. Normally each will present one paper per ye

on a topic approved by his research advisor or committee or on the results of his research.

548. (1-3) Directed Studies.—In special cases, with approval of the Head of the Department, advanced courses may be arranged for graduate students in attendance.

549. (6) M.Sc. Thesis.

649. Ph.D. Thesis.

# Department of Health Care and Epidemiology

- 400. Introduction to Statistics in the Health Sciences.—A survey course by lecture and demonstration of the fundamentals, functions and limitations of statistical methods as applied to the health sciences. (Second term)
- 425. Introduction to Epidemiology.—A review by lecture and seminar exercises of descriptive, analytic and experimental epidemiologic principles and methods. (Second term)
- 450. Preventive Medicine.—The principles and application of epidemiology to the prevention, control and measurement of acute and chronic disease; occupational health and industrial medicine. Both terms.
- 475. Health Care.—Social medicine, including the community approach to health, rehabilitation, dental health, public health organization and law, environmental medicine and the principles of medical care. Both terms.

#### Department of the History of Medicine and Science

- 400. History of the Health Sciences.—Introduction to the history of discovery in the medical and allied sciences, with emphasis on the discoverers and the social background of their times.
  - 501. (1) History of Medicine.

# Department of Medicine

- 425. Clinical Diagnosis.—The methods and application of techniques of clinical history-taking and physical examination, covered by lecture demonstrations and bedside clinics. Correlation of disordered function and anatomical changes as well as analysis of symptoms and signs. Close integration with the Department of Surgery is maintained in the presentation of this subject. Textbooks: required—Leopold, Principles and Methods of Physical Diagnosis; recommended—Chamberlain, Symptoms and Signs in Clinical Medicine; Major, Physical Diagnosis; MacBryde, Signs and Symptoms.
- 450. Principles of Medicine and Clerkship in Medicine.—1. Systematic lectures and clinics covering the broad range of the medical disorders of he following groups—cardiovascular, dermatological, endocrinological and netabolic, gastro-intestinal, haematological, infections, neurological, renal, espiratory including pulmonary tuberculosis, and rheumatic. Application of the basic medical sciences to clinical medicine is stressed. 2. Individual vork and instruction of small groups on the medical wards. Students record ase histories, perform physical examinations and carry out laboratory tudies. Textbooks: Harrison, Principles of Internal Medicine; Beeson, Mc-bermott, Cecil-Loeb, Textbook of Medicine; Brainerd, Margen, Chatton, Jurrent Diagnosis and Treatment. Both Terms.
  - 451. Introduction to Therapeutics.—A course of didactic lectures and class recises to introduce systematic therapeutics and the use of drugs for secific disease processes. Practice in prescription writing is included in secourse. (Subject to examination at the end of the Third and Fourth ears.) Both terms.

- 452. Clinical Microscopy.—A course of lectures and laboratory periods in which methods used in haematological diagnosis are studied, with emphasis particularly on their clinical application and significance. First term.
- 465. Principles of Radiological Diagnosis.—A course of lectures to acquaint the student with the use of X-ray in diagnosis. The basic physics of roent-genology is dealt with. (Questions may be included on papers in Medicine, Obstetrics, Paediatrics, or Surgery.) Both terms.
- 475. Medicine.—Outpatient service: the student is assigned new patients for study and takes part in the general medical clinic and specialty clinics including neurology and dermatology. Inpatient service: the student takes part in the activities of the service by having assigned patients, attending ward rounds and clinics. Social Service aspects of medicine are discussed with the students. Members of the Department of Medicine take part in discussions concerning various topics in conjunction with other departments at the weekly comprehensive seminars presented for final year students. Textbooks: as for Medicine 450.
- 476. Therapeutics.—Further presentation of lectures and class exercises covering systematic therapeutics and the proper employment of drugs. Case presentations are used to demonstrate specific treatment problems. (Questions will be included on paper in Medicine.)
- 490. Principles of Therapeutic Radiology.—Lectures and conferences covering the physical principles employed in therapeutic radiology. First term.

# Department of Microbiology (Faculty of Science) Division of Medical Microbiology

- 425. Bacteriology, Mycology and Virology.—All groups of microorganisms pathogenic for man will be described as follows: Clinical features, pathogenesis and pathology, epidemiology, properties of the agents (bacteria, fungi, viruses including Chlamydiae and Rickettsiae), immunological reactions, laboratory diagnosis, therapy, preventive measures. Antibiotics. Defence mechanisms of the body. Sterilization. First term.
- 426. Parasitology.—Clinical features, pathogenesis, life cycles, epidemiology, laboratory diagnosis, therapy and control of common unicellular and multicellular parasites of man. Second term.

# Department of Obstetrics and Gynaecology

- 425. Introduction to Obstetrics.—A course of lectures encompassing anatomy and physiology of the reproductive tract, fertilization, implantation and development of the embryo and placenta, maternal and fetal physiology Recommended textbooks for all obstetrics courses in Second, Third and Fourtl Years: Eastman, Obstetrics; Reid, Textbook of Obstetrics; Douglas and Stromme, Operative Obstetrics.
- 450. Principles of Obstetrics.—A series of lectures in the first half of th year covering the field of normal and abnormal obstetrics. During two of th four quarters, small group seminars as well as outpatient and ward instruction at the patient's bedside are conducted.
- 451. Principles of Gynaecology.—A series of lectures and demonstration which deal with the more common gynaecological diseases. Teaching ar demonstrations to small groups of students supplement the didactic wor Recommended textbook: Behrman and Gosling, Fundamentals of Gynaec logy. Second term.

- 475. Obstetrics.—Each student lives in the maternity pavilion for a period of five weeks during which he takes histories and examines patients in the Outpatient Department, arranges for their admission to the wards and continues to observe them through delivery up to their discharge from hospital. Ward rounds and teaching clinics are scheduled.
- 476. Gynaecology. During the living-in-hospital period, the student attends Gynaecology Outpatient Department clinics, is assigned patients on the ward for study, and is required to assist at operations.

# Department of Ophthalmology

Third Year: Instruction will be given by lectures, outpatient and bedside clinics. Classes will be divided into sections. In each section the applied anatomy and physiology of the eye and orbit will be studied. The emphasis in the lectures and clinics will be on ophthalmoscopy and will be largely devoted to the relation of ophthalmoscopic lesions and general medicine. Each student should have his own ophthalmoscope. A written examination will be held at the end of each sequence of instruction.

Fourth Year: The student is assigned to the Department of Ophthalmology for a period of one week. Intensive instruction in the diagnosis and treatment of the commoner diseases of the eye will be given including the ophthalmic indications of systemic disease. The student attends ward rounds and is given clinical instruction by the staff clinicians. He will be assigned to the specialty eye clinics which include eye pathology, neuro-ophthalmology, glaucoma, corneal, ocular radiotherapy and retina clinics. An oral and written examination will be given at the end of each sequence of instruction.

# Department of Paediatrics

- 425. Introduction to Paediatrics.—Fifteen hours of lectures and eight four-hour clinical sessions, which serve as an introduction to growth and development, clinical appraisal of sick and well children, and certain aspects of paediatric health care. Textbook: J. G. Hughes, Synopsis of Pediatrics, 2nd Ed.
- 430. (3) Human Genetics.—A course of lectures, seminars and directed studies related to the investigation of genetic variations in man. Prerequisites: Biology 334 or equivalent. [3-0; 3-0]
- 440. Medical Genetics.—A course of lectures and demonstrations outlining the fundamental principles of genetics as they relate to medical practice.
- 450. Principles of Paediatrics and Clerkship in Paediatrics.—1. This is a systematic series of lectures and clinics devoted to the essential principles of paediatrics. No attempt is made to cover the entire field of paediatrics, but emphasis is placed on the normal and abnormal newborn physiology, infant and child feeding, metabolic derangements, acute infectious diseases, cardiac abnormalities, blood diseases, respiratory problems, etc. Students are as far as possible taught in small groups. 2. As clinical clerks, students are assigned to the Department of Paediatrics for four afternoons a week for an eight-week period. This time is devoted primarily to methods of history-taking and physical examination of infants and children. The students are encouraged to follow up their cases in so far as the four afternoons a week allow this. They also visit schools for the mentally retarded, the Sunnyhill Hospital for Children.
- 475. Paediatrics.—Students are assigned to the Department of Paediatrics for five weeks. They spend half their time in the paediatric outpatient department and half in the inpatient department including the newborn nursery. On the inpatient service students are assigned individually to one of four

clinical teaching teams. They are responsible for history-taking, examination, and the general investigation of cases assigned to them and take part in the ward rounds with members of the resident and active staff. In the evenings they are on duty with their respective associate residents to observe and assist with the care of acute cases admitted, and during these times they receive instruction on clinical problems. Paediatric therapeutics is presented twice weekly. In the outpatient department, special emphasis is placed on the more common types of disease and students are introduced to comprehensive care for the handicapped child and community facilities available such as the school health programme. Seminars and discussions are held each day and each student spends at least one afternoon with a practising paediatrician in the community.

#### **Graduate Courses**

530. (3) Advanced Human Genetics.

549. (3-6) M.Sc. Thesis.

## Department of Pathology

425. Human Pathology.—This course covers the basic principles of general pathology and their application on a systemic basis as an introduction to the study of clinical medicine. Emphasis is placed on the etiology, pathogenesis and natural history of disease. Disordered physiology and applied clinical chemistry are correlated with the pathologic lesions that comprise organic disease. The course consists of lectures and correlated laboratory periods which include gross and histopathology, autopsy demonstrations, clinical biochemistry, clinical pathological conferences, and student seminars. Both terms.

450. Surgical Pathology.—A series of pathology demonstrations in conjunction with various clinical departments designed to illustrate the role of pathology in the diagnosis and management of various diseases.

475. Medical Jurisprudence.—A general survey of medico-legal problems likely to be encountered by physicians. The role of forensic medicine and toxicology in the administration of justice is emphasized.

#### Graduate Courses

Registration in any graduate course in pathology requires the consent of the department. Candidates with the B.Sc. degree intending to proceed to the M.Sc. or Ph.D. would require as prerequisites Biochemistry 400 or 410 Physiology 301 and 302 or 400 and a course in General and Microscopic Anatomy (e.g. Anatomy 501) or their equivalents.

- 500. (2) General Principles of Pathology.—This course is intended for can didates without the M.D. or D.M.D. degree. The general principles under lying the etiology, pathogenesis, disordered physiology and pathologic anatomy of common disease processes will be discussed in lectures and practical tutorials. A basic knowledge of Histology is recommended.
- 502. (3) Histopathology.—A lecture and laboratory course that encon passes the theory and the practice of currently available histochemical techniques as applied to pathological material. A basic knowledge of Histology preferable but not essential.
- 506. (1) Ultrastructural Pathology.—A review of fine structure as seen i various pathological conditions. Prerequisite: a knowledge of Microscopic Antomy and Pathology 425 or 500.
- 510. (2) Analytical Methods in Chemical Pathology.—A survey of t'application of the principles of analytical chemistry to the investigation disease. A knowledge of basic analytical chemistry is a prerequisite.

512. (2) Chemical Pathology.—A critical survey of current knowledge relating to the physiological and metabolic disturbances underlying disease.

515. (4) Experimental Pathology.—A lecture and laboratory course designed to develop in the student the laboratory skills necessary to do critical research in experimental pathology. Prerequisite: Pathology 500 and 502.

520. (2) Recent Advances in Bio-Pathology-Morphological Aspects.—A series of lectures with related reading designed to cover advancing knowledge concerning new concepts in Biopathology with emphasis on Morphological and structural alterations in disease. Prerequisites: M.D. or D.M.D. degree or Pathology 500 or equivalent. Offered 1969-70 and alternate years.

521. (2) Recent Advances in Bio-Pathology.—Chemical Aspects. A series of lectures with directed reading designed to cover advancing knowledge concerning new concepts in Pathology with emphasis on chemical aspects of disease states. Prerequisites: M.D. or D.M.D. degree or Pathology 500 or equivalent. Offered 1968-69 and alternate years.

525. (1) Immunopathology.—A lecture course which deals with those immunologic events which can cause tissue injury. Prerequisite: Pathology 500

or 425.

- 535. (1) Seminar.—Attendance is required of all graduate students in Pathology.
  - 548. (1-3) Directed Studies.—In various fields of Pathology.

549. (6) M.Sc. Thesis.

649. Ph.D. Thesis.

# Department of Pharmacology

- 410. (1½) Biological Effects of Chemicals and Drugs.—An introductory course on the actions of chemicals and drugs on biological systems ranging from subcellular particles to the intact organism. Principles of drug metabolism. Prerequisites: Biology 101, Chemistry 120, 203 or 230 or equivalent. Zoology 304 or Physiology 301 and Biochemistry 410 or their equivalents also are recommended.
- 425. Medical Pharmacology.—A lecture and laboratory course covering the fundamental pharmacological actions of drugs. Both terms.

#### Graduate Courses

500. (2) Advanced Pharmacology.—Lectures, conferences, and supervised eading in the pharmacological literature. Prerequisite: Pharmacology 425 or ts equivalent.

511. (2) Pharmacology Seminar.

512. (4) Advanced Pharmacological Techniques.—Lectures, conferences, ssigned readings and laboratory exercises in methods and instrumentation vailable for studying various types of drug actions. Prerequisite: Pharmacol-

gy 425 or its equivalent.

- 513. (2) Pharmacology of Anaesthesia.—Advances in the pharmacological spects of anaesthesiology. Conferences, assigned reading and laboratory xercises demonstrating the actions of drugs as currently applied in the ractices of anaesthesiology. Prerequisite: Pharmacology 425 or its equivalent.
- 514. (5) Neuropharmacology. Chemical mediation of central synapses and the action of drugs on the central nervous system will be emphasized. onferences, assigned reading, and laboratory exercises. Prerequisite: Pharmalogy 425 or its equivalent.

549. (6) M.Sc. Thesis.

649. Ph.D. Thesis.

# Department of Physiology

The department offers opportunities for study leading to doctoral, master's and bachelor's degrees. For information on the Ph.D. and M.Sc. degree courses, see the Faculty of Graduate Studies calendar. Information on the B.Sc. degree may be found in the calendar of the Faculty of Science.

Chemistry 103 or 110, or 120, and 203 or 230; Physics 110 or 120, or 130, and Biology 101 or the equivalents are prerequisite to all courses in Physiology.

- 301. (3) Human Physiology.—A lecture course on body function with particular reference to mammalian and human physiology. Normally taken concurrently with Physiology 302. Open to Honours students and others with high academic standing. Credit will normally be given for only one of the following: Physiology 301 and 302; Zoology 303 or Zoology 304. Prerequisites: Biology 101 and Chemistry 203 or 230. [3-0; 3-0]
- 302. (1½) Human Physiology Laboratory.—A laboratory course designed to illustrate physiological principles and to provide training in physiological techniques. Must be taken in conjunction with Physiology 301. Enrollment limited and subject to consent of the department. [0-3; 0-3]
- 400. Human Physiology.—A lecture and laboratory course on body function with particular reference to human physiology. The functions of muscle, nerve, metabolism, circulation, respiration, excretion, digestion, and the endocrines are dealt with. Correlation clinics are held in cooperation with the Department of Medicine. Textbooks: Davson and Eggleton, Starling's Human Physiology; Ganong, Medical Physiology; Guyton, Textbook of Medical Physiology; Ruch and Patton, Physiology and Biophysics. Both terms.

[3-6; 3-6] Physiology 301 or Zoology 304, and Biochemistry 410, or the equivalents, are prerequisites for all courses numbered 421-426.

- 421. (1½) Advanced Topics in Renal and Respiratory Physiology.—A lecture and seminar course in which certain aspects of these fields will be considered in detail. (1968-69 and alternate years). [3-0; 0-0]
- 422. (1½) Advanced Topics in Cardiovascular Physiology.—A lecture and seminar course (1969-70 and alternate years). [0-0; 3-0]
- 423. (1½) Advanced Topics in Gastrointestinal Physiology.—A lecture and seminar course with special emphasis on the control of digestion and motility. (1968-69 and alternate years). [0-0; 3-0]
- 424. (1½) Advanced Topics in Endocrinology.—A lecture and seminar course with special emphasis on the analysis of homeostatic control systems. [3-0; 0-0]
- 425. (1½) Elements of Neurophysiology.—An introduction to the functions of the nervous system. Anatomy 425 must be taken concurrently. [2-3; 0-0]
- 426. (1½) Advanced Topics in Neurophysiology.—Advanced studies of functions of the central nervous system, with special emphasis on mechanisms of synaptic transmission and information processing. Physiology 425 and Anatomy 425 are additional prerequisites for this course. (1969-70 and alternate years). [0-0; 2-3]

Physiology 302 or the equivalent, and the consent of the Department are required for the following laboratory courses in which enrollment will be limited.

431. (1½) Advanced laboratory in Renal and Respiratory Physiology.—Given only in conjunction with Physiology 421. (1968-69 and alternate years). [0-6; 0-0]

- 432. (1½) Advanced Laboratory in Cardiovascular Physiology.—Given only in conjunction with Physiology 422. (1969-70 and alternate years).

  [0-0; 0-6]
- 433. (1½) Advanced Laboratory in Gastrointestinal Physiology.—Given only in conjunction with Physiology 423. (1968-69 and alternate years).

  [0-0; 0-6]
- 434. (1½) Advanced Laboratory in Endocrinology.—Given only in conjunction with Physiology 424. (1969-70 and alternate years). [0-6; 0-0]
- 440. (1½) Seminar.—Open to Honours students in Physiology and graduate students. [1-0; 1-0]
  - 448. (1-3) Directed Studies in Physiology.
- 449. (3) Graduating Essay.—Prior to graduation, students in the Honours course will be required to carry out an investigation approved by the Head of the Department and to submit a satisfactory graduating essay based on this work.

#### Graduate Courses

Physiology 301, 302, Biochemistry 410, or the equivalent, or consent of the Department, are prerequisite to all graduate courses.

- 511. (1-3) Seminar in Mammalian Physiology.—Seminar in selected topics in mammalian physiology.
  - 549. (6) M.Sc. Thesis.
  - 649. Ph.D. Thesis.

# Department of Psychiatry

- 425. Introduction to Psychiatry.—Lectures and supervised clinical experience. (a) Psychopathology and signs and symptoms in psychiatry; (b) psychiatric examination of the patient, including taking of the personal and family history and the mental status examination; (c) interview procedures and processes and interviewing under supervision; (d) history of psychiatry. Textbooks: Mayer-Gross, Slater and Roth, Clinical Psychiatry; Redlich and Friedman, The Theory and Practice of Psychiatry; Gregory, Psychiatry—Biological and Social. In addition, reading lists are provided for courses and areas of study.
- 450. Principles of Psychiatry and Clerkship in Psychiatry.—Based upon naterial covered in the first year and second year, the student is expected o learn various aspects of the diagnostic process in psychiatry through ectures and supervised clinical experience. (a) Systematic review of psychitric syndromes and reaction-types; (b) introduction to concepts of etiology ncluding psychodynamics; (c) introduction to certain aspects of treatment. Textbooks: Besides textbooks already listed under Psychiatry 425, students hould have Diagnostic and Statistical Manual Mental Disorders, prepared y the Committee on Nomenclature and Statistics of the American Psychitric Association.
  - 475. Psychiatry.—Emphasis is upon bringing together material learned in revious years on psychopathology, etiology and psychodynamics, and therapy the development of a diagnostic formulation and a treatment plan. Under opervision, students carry out diagnostic interviews on patients in the utpatient Department, arranging for treatment or referral. Lectures are incerned with further material on etiology and therapy, and with special pics in psychiatry—addiction, forensic psychiatry, child psychiatry, comunity psychiatry, ageing, mental deficiency, etc. Textbooks: see list given uder Psychiatry 425 and reading lists provided.

#### **Graduate Courses**

500. (1) The History of Psychiatry.—A series of lectures and seminars given on alternate years in the second half of the year and concerned with an historical review of psychiatry from earliest times to the present.

501. (1) Psychopathology.—A series of lectures and seminars concerned with a presentation for graduate students of signs, symptoms and syndromes

in psychiatry. Texts and readings are assigned.

- 502. (1) The Interview and the Examination of the Patient.—Lectures and demonstrations concerned with the concepts, processes and clinical skills required in interviewing both for diagnosis and for treatment. Texts and readings are assigned.
- 503. (2) Psychotherapy I.—Lectures, demonstrations and tutorials with an introduction to processes and techniques of individual psychotherapy. Texts and readings are assigned. Psychiatry 501 and 502 are prerequisites.
- 504. (1) Drugs and Somatic Treatments in Psychiatry.—Lectures and demonstrations concerned with a presentation of the rationale and use of drugs and somatic treatments. Texts and readings are assigned. Psychiatry 501 and 502 are prerequisites.
- 505. (1) Methods in Evaluation and Research.—A course of seminars and demonstrations dealing with methods and techniques for the evaluation of programmes and treatment in Psychiatry, with research design and research procedures, including such problems as the use of controls in psychiatric research, the use and interpretation of statistics, etc. Texts and readings to be assigned. The course is given in alternate years.
- 506. (1) The Province and Functions of Psychiatry.—A course of lectures and seminars dealing with roles, responsibilities and functions assumed by and assigned to psychiatry in medicine and in the community. The course deals with the patterns by which care has been made available in the past, with contemporary patterns now emerging, with the assumptions underlying these developments, and with the problems and issues that appear to be of relevance to psychiatry in the future. Given in alternate years.

507. (2) Psychotherapy II.—An advanced course concerned with the processes, techniques and theories of individual psychotherapy. Prerequisite: Psychotherapy I. Texts and readings are assigned. The course includes three

hours of individual tutorial per week.

508. (1) Group Therapy and Milieu Therapy.—This course of lectures and demonstrations given in the third year deals with the theoretical and practical issues met with in the use of various social groupings—the therapeutic small group, the family, the ward and the community—in psychiatric treatment. Psychiatry 503 and 507 are prerequisites.

509. (1) Theories and Etiology.—This course deals with the dynamic of human behaviour and the etiology of mental illness in a comprehensiv manner at three levels of organization—molecular and cellular, psychological

and social.

510. (2) The Neurological Basis of Human Behaviour.—Concerned wit the structure, development and function of the human nervous system an the relationship of these to normal and abnormal human behaviour, thinkir and emotions. Given through the second year. Psychiatry 501 and 504 a prerequisites. Texts and readings are assigned.

511. (1) The Neurological Basis of Human Behaviour (Laboratory). Dissections and demonstrations of the structure and functions of the human

nervous system. Prerequisite: Psychiatry 510.

512. (1) Problems of Cerebral Function.—A dissertation in a field relat to the content of Psychiatry 510. Prerequisite: Psychiatry 510.

513. (1) Behaviour Physiology.—An advanced course of lectures and seminars provided on an elective basis in the second half of the year and concerned with a survey of experimental work on the process of the nervous system underlying normal and abnormal behaviour in humans and primates; with special emphasis on the physiological correlates of higher nervous activity. Prerequisite: Psychiatry 501. Texts and readings to be assigned.

514. (1) Neurochemistry.—An advanced course provided on an elective basis elaborating chemical principles underlying mental functions. Current findings and theories on chemical aspects of mental illness and certain neurological disorders are presented and discussed. Prerequisite: Psychiatry

501.

515. (1) Psychopharmacology.—An advanced elective course presenting current facts and theories relating the use of various drugs, experimental and therapeutic, to basic chemical and enzymatic processes in brain and nervous tissue, with special reference to mental illness and research in psychiatry. Prerequisite: Psychiatry 501. Texts and readings to be assigned.

520. (2) Social Psychiatry.—A course of lectures and seminars dealing with the relationships between mental illness and a range of social and ecological variables, and with current epidemiological knowledge about the frequency and distribution of mental illness. Texts and readings are assigned.

530. (2) Development and Learning.—This course deals with individual development as related to personality growth, mental health, and mental illness. This is a required course for the second year. Texts and readings are assigned.

531. (1) Child Psychiatry.—This course deals with diagnosis, prevention and treatment of mental illness and mental retardation in children. Psy-

chiatry 530 is a prerequisite.

- 540. (1) Psychological Measurement.—This deals with the rationale and administration of various psychological tests and measurements in the clinical setting, and with personality and other theories underlying their use. The course has been developed for both psychiatrists and clinical psychologists in training. Given in the first year. Readings and texts are assigned.
- 550. (3) Directed Studies.—This provides for a programme of directed reading and study in such special area or areas as may be relevant to the student engaged in some particular area of study and research in Psychiatry. 560. (6) Master's Thesis.

#### Department of Surgery

- 425. Introduction to Surgery.—A series of lectures designed to illustrate he basic surgical principles. Bedside and outpatient clinics illustrating the rinciples of physical diagnosis are given in cooperation with the Department f Medicine and surgical specialties. Students are given the opportunity pexamine patients. A series of lectures and demonstrations in first aid schnique is given. Textbooks: Hamilton Bailey, Physical Signs in Clinical urgery; Dunphy and Botsford, Physical Examination of the Surgical Patient. merican Orthopaedic Association: Manual of Orthopaedic Surgery. Second rm.
- 450. Principles of Surgery and Clerkship in Surgery.—Systematic lectures id clinics in general surgery, orthopaedic surgery, otorhinolaryngology, ology, neurosurgery, plastic surgery, chest surgery, and anaesthesiology, hich emphasize the relationships of the basic sciences to an understanding surgical conditions. The students are expected to acquire some knowledge the whole field of surgery during their Third Year. Surgical diagnosis emphasized rather than surgical techniques.

On the surgical wards of the Vancouver General Hospital, Shaughnessy Hospital and St. Paul's Hospital and at the B.C. Cancer Institute, individual work and instruction of small groups of students is carried on.

As clinical clerks, the students record case histories, perform physical examinations and carry out assigned laboratory studies on the general surgical

and orthopaedic wards. Both terms.

Textbooks: Cole and Elman, Textbook of General Surgery; Christopher Textbook of Surgery; Moseley, Textbook of Surgery; Allen, Harkins and Rhoads, Surgery—Principles and Practice; Bailey and Love, Short Practice of Surgery; J. Crawford Adams, Outline of Fractures; Boies, Fundamentals of

Otolaryngology,

475. Surgery.—In fourth year each student receives surgical instruction in the Department of Surgery for a ten-week period during which he rotates through the services of general surgery, orthopaedic surgery, otorhinolaryngology, neurosurgery, urology and anaesthesiology. The student enters into the routine work of these services, attends the Outpatient and Emergency Departments, and is assigned to operating rooms, etc. The members of the Department of Surgery take part in discussions of various topics in conjunction with other departments at the weekly comprehensive seminars presented to final year students.

903. Surgery Review.—A thirty lecture-demonstration course in general surgery alternating with a similar series in specialty surgery. For postgraduate students proceeding to Certification or Fellowship of the Royal College of Physicians and Surgeons of Canada. One evening per week

throughout the winter session.

904. Seminar in Orthopaedics.—A series of 60 seminars in orthopaedics and traumatic surgery given over a two-year period—thirty sessions in each of the two years. One evening per week throughout the winter session. For postgraduate students proceeding to Certification or Fellowship of the Royal College of Physicians and Surgeons of Canada.

# Interdepartmental Requirements

400. Preclinical Sessions.—Each student is assigned to a family in which there are young children, in order to permit observation of the growth and development of the children and the interpersonal relations of a growing family. The student visits the family at regular intervals and a half-day a weel is set aside for discussion of problems which may arise. The tutors who guide the discussion with small groups of students are experienced clinicians.

426. Introduction to Clinical Medicine.—At the end of the Second Term in Second Year there will be a comprehensive written examination set by the clinical departments. In addition, each department may, at its discretion conduct such further oral and clinical examinations as it may desire. Satis factory performance in this series of examinations is a prerequisite to promotio to the Third Year.

#### Thesis

Students, especially those who have taken part in research projects durir their summer vacations, are encouraged to submit a thesis in competitic for one of the available prizes. Regulations governing the preparation such theses may be obtained from the office of the Dean.

#### Electives

During the Second Term of the Second Year, each student will be given t opportunity to participate in an elective subject which will occupy one h day each week. Students will be supplied with a list of elective subjects ave able.

# MEDALS, FELLOWSHIPS, SCHOLARSHIPS, PRIZES BURSARIES, AND LOANS

Full corrected statement for the year 1969-70 will appear in the publication "Awards and Financial Assistance."

For information relative to awards available to all students in the University reference should be made to appropriate sections of the University calendar.

Faculty of Medicine

The Arthur Crease Award—This prize of \$300, the gift of the Section of Psychiatry of the British Columbia Medical Association, is offered to the student in the graduating class of the Faculty of Medicine who presents the best graduating thesis or essay on a psychiatric subject.

The B.C. Federation of Women Doctors Scholarship in Medicine—A scholarship of \$100, the gift of the B.C. Federation of Women Doctors, is offered annually in the Faculty of Medicine to a woman student who has completed at least one year of the medical course. It will be awarded to a student who has high standing, and shows promise of success in the medical profession. The winner will be selected by the Faculty of Medicine in consultation with the University Scholarship Committee.

B.C. Oto-Ophthalmological Society Prize—A prize of \$125, gift of the B.C. Oto-ophthalmological Society, is offered annually to the final year student who, during his academic year, has attained the best aggregate standing in the Department of Ophthalmology. Another prize of \$125 is offered annually by the Society to the final year student who, during his academic years, has attained the best aggregate standing in Otolaryngology.

The Bristol Laboratories Medical Prize—This prize, donated by Bristol Laboratories of Canada Limited, consists of medical texts and/or books, the contents of which deal at least in part with the disciplines of Therapeutics and Pharmacology. Selection of the books, to the value of \$125, will be made by members of the clinical Faculty. This prize will be awarded annually to a student in the third year class in the Faculty of Medicine who has exhibited superior general scholastic ability throughout the first two years of the nedical course.

British Pacific Life Insurance Company Scholarships in Medicine—Two cholarships of \$125 each, the gift of the British Pacific Life Insurance Lompany of Vancouver, are offered annually to students in Medicine proceeding from the Third to the Final Year. They will be awarded, on the ecommendation of the Faculty, to students who have a better than average cademic record, have shown promise and ability in the medical field, and ho require financial assistance.

The Burroughs Wellcome Fellowship in Anaesthesiology and Applied harmacology—This fellowship of \$1000, the gift of Burroughs Wellcome Co. (Canada) Ltd., is available for postgraduate study and research in naesthesiology. The award will be made on the recommendation of the sculty of Medicine.

The Charles Leonard Gorvich Memorial Scholarship—To honour the emory of Charles Leonard Gorvich, Fairview Branch No. 178 of the Royal madian Legion offers annually a scholarship of \$100. This scholarship ll be awarded on the basis of academic merit to an outstanding student to has completed pre-medical requirements and is continuing studies in st Year Medicine.

CIBA Company Limited Medical Prize—This prize, gift of CIBA Company Limited (Dorval, Quebec), consists of six volumes of medical illustrations on the nervous system, reproduction system, digestive system, and endocrine systems. It is awarded annually on the recommendation of the Faculty of Medicine.

The CIBA Prize in Psychiatry—A prize of \$100, the gift of CIBA Company Limited, Montreal, is offered annually to students in the Final Year of the course leading to the degree of M.D. It will be awarded to the student who is considered to be the most outstanding in the subject of Psychiatry. The award will be made on the recommendation of the Department.

The College of Physicians & Surgeons Medical Entrance Scholarship—A scholarship of \$750 a year for two years, the gift of the College of Physicians & Surgeons of British Columbia, is offered annually in competition to students entering First Year Medicine, University of B.C. It will be awarded by the Faculty of Medicine to a student with outstanding academic and other qualifications. Renewal of the award for the Second Year will be subject to maintenance by the winner of good standing during the First Year.

Crown Zellerbach Canada Limited Scholarship in Medicine—A scholarship of \$600, the gift of Crown Zellerbach Canada Limited, will be awarded annually to a student who has completed at least the first two years in Medicine and is proceeding to his Third or Fourth Year. Selection of the winner will be made by the Faculty on the basis of academic record, character and personality, and promise in his chosen field.

The C. V. Mosby Company Prizes—Five prizes, each consisting of the choice of a book up to the value of \$30, are offered annually by C. V. Mosby Company, Toronto, Ontario, to medical students showing excellence or promise in a field or fields of their studies. Names of winners will be announced at the end of the session.

The Dean M. M. Weaver Medal—A silver medal, awarded initially by the late Dean M. M. Weaver on the occasion of the graduation of the first class in Medicine and made possible by him through a permanent endowment, will be awarded annually to a student in the graduating class whose record and progress throughout the four years have been outstanding.

The Dr. A. B. Schinbein Memorial Scholarship—This scholarship of \$250 was established by Mrs. A. B. Schinbein and Dr. John E. Schinbein in memory of Austin Birrel Schinbein, O.B.E., M.B., F.A.C.S., F.R.C.S.(C), who was for many years Chief Surgeon at Shaughnessy Hospital and Consultin Surgeon at Vancouver General Hospital. Dr. Schinbein was outstanding in his profession and, as a member of Senate and the Board of Governors of the University, took an active part in the establishment of the Faculty of Medicin This scholarship is awarded annually to the medical student of the Fourt Year obtaining the highest standing in the subject of Surgery.

The Dr. A. E. Trites Memorial Prize—From a fund, established by friend and colleagues of Dr. A. E. Trites to honour his memory, a prize of \$150 offered annually to the student in the Third Year with highest standing in Obstetrics and Gynaecology. The award will be made on the recomme dation of the Department.

The Dr. A. M. Agnew Memorial Scholarship—To honour the memorial Dr. Alec M. Agnew, first Head of the Department of Obstetrics a Gynaecology, this scholarship of the annual value of \$200 has be established by his friends, colleagues, and family. It will be awarded

the student in the Final Year who is most proficient in Obstetrics and Gynaecology.

Dr. Ernest Roland Myers Scholarship Fund—This fund, a bequest from the late Dr. E. R. Myers, provides annual scholarships for promising and deserving students who are pursuing studies in the Faculty of Medicine and who merit financial assistance. The awards will be determined at the discretion of the Joint Faculty Committee on Prizes, Scholarships and Bursaries.

The Dr. Frank Porter Patterson Memorial Scholarship—This scholarship of \$150 has been established by the Primrose Club of Vancouver in memory of the late Dr. Frank Porter Patterson, Chief of Orthopaedic Surgery at the Vancouver General Hospital and one-time member of the Board of Governors of the University of British Columbia. It will be awarded to a student graduating from the Faculty of Medicine who, in the Fourth Year, has meritoriously pursued the course in Surgery and displayed a special interest in Orthopaedic Surgery, and is proceeding to his internship.

The Dr. H. A. Henderson Memorial Medal—A silver medal, the gift of friends and colleagues in memory of Dr. H. A. Henderson, will be awarded to the student recommended by the Department who has demonstrated proficiency and promise in Obstetrics and Gynaecology in the Third Year.

The Dr. H. L. W. Turnbull Memorial Scholarship—In memory of Dr. H. L. W. Turnbull (1880-1950) and in testimony of his marked devotion to the study and practice of medicine as a measure of help to men and women, this scholarship has been founded by his family. The scholarship has a value of \$500 and will be awarded annually to the student in the Faculty of Medicine who completes the Second Year with the highest aggregate standing in the pre-clinical subjects and is proceeding to a higher year.

The Dr. J. H. McDermot Award—In honour of Dr. Jack McDermot, who for many years gave devoted service to the development of medical journalism in British Columbia, the British Columbia Medical Association in 1967 established an annual award of \$100. This award will be made to the Faculty of Medicine Undergraduate Journal to provide prizes for articles or, in some imilar manner, to encourage improved standards in medical writing.

The Dr. Lavell H. Leeson Memorial Scholarship—As a memorial to Dr. Lavell H. Leeson, and as a tribute, both to his devotion to the study and tractice of medicine and also to his public and private friendships, a cholarship has been established in the Faculty of Medicine by his family, olleagues and friends. This scholarship, in the annual amount of \$100, will e awarded by the Faculty to a student with high academic standing who nows promise in his chosen profession.

The Dr. Lachlan Neil MacKechnie Memorial Entrance Scholarship—As a emorial to Dr. L. N. MacKechnie (1863-1926), a modest, highly esteemed a self-effacing man, who first practised his profession in Victoria and Vanuver as early as 1893, and as a tribute to his devotion in public and private e, a scholarship has been established by his widow, Mrs. L. N. MacKechnie, d family. This award in the amount of \$500 is offered annually to students tering First Year Medicine, University of British Columbia, with consideran not only of academic standing, but also of character, financial circumnees and the promise of success in a Medical career.

The Dr. Peter H. Spohn Memorial Prize—As a memorial to Dr. Peter ward Spohn, F.R.C.P. (C), who lost his life in a drowning accident in

1960, and as a tribute to the high esteem in which he was held, his many friends and colleagues have endowed a prize in the field of Paediatrics. A former student of the University of British Columbia, a graduate in Medicine of Toronto and, at the time of his death, Clinical Associate Professor of Paediatrics in the Faculty of Medicine at this University and Chief of the Paediatric Service at St. Paul's Hospital, Dr. Spohn had won the respect and admiration of those in his profession, not only for his enthusiastic leadership, but also for his energetic interest in the special field of adolescent medicine. The prize, in the amount of \$150. will be awarded annually to a student in the graduating class who is outstanding in paediatrics.

The Dr. Wallace Wilson Leadership Award—An award to the value of \$100, given in appropriate form, such as books, has been established and endowed by Dr. Wallace Wilson. It is offered annually to a graduate of the Faculty of Medicine of the University of British Columbia who, in the ten years following graduation, has demonstrated high ethical standards and outstanding leadership to the profession. In making this award factors such as professional community leadership, teaching, research, and personal participation in postgraduate education will be considered. The selection of the winner will be made by the Dean of the Faculty of Medicine and the Medical Alumni.

The Dr. Walter Stewart Baird Memorial Medal—This medal, the gift of Mrs. W. S. Baird and Mrs. W. C. Gibson, will be awarded annually for the best student essay on a topic related to the History of Medicine, the winner to be selected by the Head of the Department of the History of the Health Sciences.

The Dr. W. A. Whitelaw Scholarship—As a memorial to Dr. W. A. Whitelaw his family has endowed a scholarship of \$250 which is offered to a student in the Final Year of Medicine who has good scholastic standing and needs financial assistance.

Dr. W. T. Kergin Memorial Scholarship—As a memorial to Dr. William Thomas Kergin and as a tribute to his fine personal qualities and outstanding public service in the practice of his profession, this scholarship of \$250 has been established in the Faculty of Medicine. It will be awarded to ar undergraduate with a good academic record who is worthy and deserving of financial support. In making the award, preference will be given to students from Northern British Columbia or the Upper Coastal areas.

The Elizabeth K. Craig Memorial Scholarship—A scholarship of \$30 established as a memorial to Mrs. Charles E. Craig (B.A., U.B.C., 1942) b her husband, sisters and brother, is offered to a graduate or undergraduat student who has a good academic record and shows ability and promise for research in medical fields. The award will be made to a student undertakin directed research in the summer period or in the winter session in the are of cancer or in some other area where medical investigation is important to human welfare.

Government of British Columbia Scholarships—These awards are availabte students of the Province of British Columbia who are beginning continuing a full programme of undergraduate studies at the University British Columbia. Students taking the one-year teacher training course f graduates, the one-year course in Librarianship, and the course in Soc Work are also eligible. Awards are not available for graduate study or students registered as unclassified. Candidates for awards applicable to t session 1968-69 were considered on the basis of standing received in 1 final examination (excluding supplementals) in a full programme for 1

session 1967-68. Candidates in the University of British Columbia were required to take the final written examinations conducted by the University in April; those in Grade XII or XIII were required to write the scholarship examinations conducted in June by the Department of Education, B.C. Candidates were considered only if they fulfilled requirements of being domiciled in British Columbia, to the satisfaction of the Government Awards Committee. Eligible applicants who obtained First Class standing (an overall average of at least 80%) received a grant of one-half of the tuition fee. Awards, amounting to one-third the tuition fee, were also made to the top Second Class students. All candidates were required to submit applications on special forms. Fuller and more precise details concerning these awards will be available in a special circular issued by the Department of Education, B.C. Students at the University should consult the Dean of Inter-Faculty and Student Affairs. High school students must apply through their schools before June 1st; University students must apply through the University before July 1st.

The G. F. Amyot and S. Stewart Murray Prizes—Two cash prizes of \$100 each have been provided by a fund established and maintained by donations from the Health Officers of British Columbia to honour these two public health physicians who contributed greatly to the development of public health services in British Columbia and assisted in the establishment of the Department of Health Care and Epidemiology, Faculty of Medicine. The prizes will be given to students, who have demonstrated leadership and academic or research ability, selected by the Department after consultation with the Health Officers' Council of British Columbia. The S. Stewart Murray Prize will be awarded for meritorious scholarship in the field of public health, preventive medicine or epidemiology; the G. F. Amyot Prize will be awarded for meritorious scholarship in the field of health care research and administrative medicine.

The Hamber Gold Medal and Prize—A gold medal and a cash prize of \$250, presented by the late Honourable Eric W. Hamber, C.M.G., B.A., LL.D., Chancellor of this University from 1944 to 1951 and Chancellor Emeritus from 1951 to 1960, will be awarded annually to the student raduating in the Faculty of Medicine with the most outstanding record hroughout the medical course. The winner of this medal and prize is not recluded from being considered for the Hamber Scholarship.

The Hamber Scholarships in Medicine—Three scholarships of \$750 each, he gift of the late Honourable Eric W. Hamber, C.M.G., B.A., LL.D., hancellor of this University from 1944 to 1951 and Chancellor Emeritus om 1951 to 1960, are offered annually to students in the Faculty of Iedicine. One of these scholarships will be awarded to the top ranking udent in the Final Year who is proceeding to an internship. The other vo will be awarded to top ranking students proceeding to the Final Year.

The Hamish Heney McIntosh Memorial Prize—This prize, the gift of Villiam George McIntosh, Vancouver, in memory of his brother, Dr. amish Heney McIntosh, will be awarded to the student in the Final Year Medicine who, in the opinion of the Faculty, is best qualified in every spect to practice his profession. The prize consists of specially bound lumes of Cushing's "Life of Sir William Osler".

The Health Officers' Prizes—Two cash prizes of \$100 each, have been provil by a fund established and maintained by donations from the Health Offis of British Columbia, will be awarded to two students in the graduating ss of Medicine. The prizes will not necessarily be awarded annually. Both

prizes will be given to students who have demonstrated leadership and academic or research ability, selected by the Department of Health Care and Epidemiology after consultation with the Health Officers' Council of British Columbia. One prize will be awarded for meritorious scholarship in the field of public health, preventive medicine or epidemiology; the other will be awarded for meritorious scholarship in the field of health care research and administrative medicine.

The Hoffmann-La Roche Limited Scholarship—This scholarship of \$200, the gift of Hoffmann-La Roche Limited, Montreal, will be awarded to an outstanding student for proficiency in pharmacology.

The Horner Prize and Gold Medal.—This medal, known as the "Horner Gold Medal", and a cash prize of \$100, is awarded annually by Frank W. Horner Limited of Montreal, to the Fourth Year student with the highest aggregate standing in the four-year course in Medicine.

The H. Rocke Robertson Prize in Surgery—In recognition of the contribution made to the Faculty and to the Department of Surgery by Dr. Rocke Robertson, as first Professor and Head of Surgery, this prize is awarded annually to the Third Year student showing outstanding ability in the field of surgical studies.

The Ingram & Bell Limited Prize—A prize donated by Ingram & Bell Limited, Vancouver, will be awarded to a student in the graduating class of the Faculty of Medicine. This prize will be awarded to the student who, in the opinion of the Faculty, has the best overall qualifications in terms of standing, interest and participation in student affairs, character, and promise.

Irving Clinic Medical Entrance Scholarship—An award of \$500, consisting of a scholarship of \$250 and a bursary-loan of \$250, is offered annually by Irving Clinic, Kamloops, to a student entering First Year Medicine. It will be awarded to a student in Kamloops School District No. 24 who has resided in that area for five years. The winner will be selected on the basis of academic standing, promise of success in medical studies, and need for financial assistance by the Medical Screening Committee of the University of B.C., in consultation with the Irving Clinic. The bursary-loan portion of the award is to be repaid by the recipient one year after he has complete his medical training (including interneship). If, in any year, there is no qualified candidate, the amount of the scholarship will be placed in the Irving Clinic Scholarship Fund and may be used, with the consent of the donors, to provide additional awards in a future year to assist previous winners in higher years of their medical course, or for similar purposes.

The Dr. Jack Margulius Memorial Prize—To honour the memory of D Jack Margulius who, between the years 1937 to 1965, served with distinctic and devotion as a specialist in the field of internal medicine, this prize h been established by his son-in-law and daughter, Dr. and Mrs. S. Mortc Schloss. A graduate of the University of Manitoba in 1937, Dr. Marguli practiced in New Westminster until 1941. He then entered the Royal Can dian Army Medical Corps, and served overseas as Second-in-Command wi Number Six General Hospital. In 1946 he resumed his practice in New Weminster. For eight years he was Chief of Medicine at Royal Columbian Hopital and between 1948 and 1954, headed the Department of Cardiolo which he himself had organized. Later he became Medical Advisor to t Director of the Department, and, at the time of his death, he was Chief Staff at St. Mary's Hospital. In the amount of \$100, this prize will be award annually to a student in the Third or Fourth Year who has an outstand record in internal medicine.

The Janet Hatfield Medical Scholarship—A scholarship of the annual value of \$200, the gift of Miss Janet Hatfield of Vancouver, is available for a student in the Faculty of Medicine. It will be awarded on the recommendation of the Joint Faculty Committee on Prizes, Scholarships, and Bursaries to a student who has a good academic record, has shown promise and ability in the medical field, and is worthy of financial assistance.

The Jean Guskin Memorial Scholarship—This scholarship, in memory of Jean Guskin, pays tribute to her outstanding qualities of character and honors her unselfish devotion to her family, friends and associates. Established by her husband and the firm of Aljean of Canada Limited, in the amount of \$1000, it is awarded annually to a graduate or undergraduate in Medicine whose academic record and personal attributes indicate promise of achievement in the treatment or investigation of human diseases, especially cancer. The winner will be selected by the Faculty.

The Joseph L. Jackson Prize in Anatomy.—A prize consisting of a copy of the Pernkopf Atlas of Topographical Anatomy will be awarded to a student in First Year with high standing in Anatomy. The prize is awarded in honour of Dr. Joseph L. Jackson, long-time Professor of Anatomy at the University of Saskatchewan, by a former student.

The J. R. Neilson Memorial Book Prize—This award, in the amount of \$50, for the course Surgery 450, has been established by a friend of the late Dr. Neilson to commemorate his services to the Faculty of Medicine in its ormative stages and particularly in the field of paediatric surgery.

Lange Medical Publications Award—Twenty books will be awarded annully by Lange Medical Publications. A choice of four books will be awarded beach of the two graduating students selected for excellence in their studies, choice of any two publications will also be given to two outstanding tudents from each of the First, Second and Third Years of the medical burse. Names of the winners will be announced at the end of the session.

Lederle Medical Student Research Fellowships—These awards, provided y Lederle Research Division, American Cyanamid Company, enable selected udents to devote their summers to research in the preclinical departments. election is made by the Faculty.

The Louis Lipsey Toohill Scholarships—From a fund established by a quest, from the late Louis Lipsey Toohill, four scholarships of \$500 each e available annually for students in the Faculty of Medicine. In accordace with the terms of the bequest the Joint Faculty Committee on Prizes, holarships, and Bursaries gives preference to students requiring financial sistance and showing aptitude for study related to research in cancer, thritis and rheumatism.

Max and Susie Dodek Medical Scholarship—A scholarship of \$100, gift of ix and Susie Dodek, is offered annually in the Faculty of Medicine to dents proceeding to the degree of M.D. It will be awarded annually, on recommendation of the Faculty, to a student who has completed at least year and who has an outstanding record of achievement.

Mead Johnson of Canada Ltd. Prize in Paediatrics—A prize of \$100, the t of Mead Johnson of Canada Ltd., is offered annually in the Faculty of dicine. It will be awarded to the student in the Fourth Year obtaining hest standing in Paediatrics.

he Metropolitan Bio-Medical Laboratories Ltd. Prize in Clinical Pathor—This prize is awarded to a student with an excellent record in clinical 10logy in Second Year.

he M. M. Weaver Prizes in the History of Medicine-A prize or prizes

to the total of approximately \$75, endowed by the late Dr. M. M. Weaver, first Dean of Medicine at this University, will be awarded annually to the student or students in the Faculty of Medicine who submit the best essays on topics in the history of medicine. It was the expressed desire of the donor that the prizes be used by the winners for the purchase of books, selected in consultation with the instructors of the course.

The M.S.A. Medical Entrance Scholarships—Two scholarships, each of \$750 a year for two years, are awarded annually to students beginning studies in the Faculty of Medicine toward the M.D. degree. The awards will be made, on the recommendation of the Dean of Medicine and the Medical Screening Committee, to two students selected on the basis of outstanding academic achievement, promise, and personal qualities. Renewal of the scholarship in the Second Year will be subject to maintenance of satisfactory standing and progress.

The Myron M. Weaver Memorial Scholarship—The Medical Board of the Vancouver General Hospital has established an annual scholarship of the value of \$200 as a tribute to the services, leadership and inspiration given by the late Dr. M. M. Weaver as first Dean of Medicine of this University. This scholarship, which serves as a recognition of Dr. Weaver's special interest in the values which the humanities and the arts can contribute to medical training and the practice of medicine, will be awarded to the student in the Second, Third or Fourth Year of the course who in the opinion of the Faculty of Medicine has best exemplified these values and contributed to their realization within the Faculty.

The Okanagan Medical Entrance Scholarship—A scholarship of \$500 a year for two years, the gift of the medical staffs in the Okanagan Valley, is offered annually to students entering First Year Medicine, University of B.C. The winner will be selected by the Faculty of Medicine on the basis of academic distinction and promise of success in a medical career. The financial circumstances of those considered may be a factor in the selection. Renews of the award for the second year will be subject to maintenance by the winner of good standing during the First Year. It is the hope of the donor and the University that the recipient of this award will, if circumstance permit, contribute to the maintenance and perpetuation of this fund whe he has completed his training.

The Osler Society of Vancouver Scholarship—This scholarship of \$200, tl gift of the Osler Society of Vancouver, will be awarded annually to tl student or students who are proceeding to the Fourth Year and who, in tl opinion of the Faculty, have the most outstanding records in the study Internal Medicine.

The Poulenc Fellowship in Applied Physiology—This fellowship of \$50 established by Poulenc Limited, Montreal, is offered to individuals interest in anaesthesiology and related fields in medicine who will engage in pograduate training in physiology. The award will be made on the recomendation of the Faculty of Medicine.

The Richard and Mary Legh Trophy—This trophy is awarded annually the undergraduate class in medicine considered by the Faculty to have me the best all-round contribution during the academic year. The trophy mains in the permanent possession of the Faculty.

The Richard Owen Memorial Prize—As a memorial to Richard Ower member of the Class of 1962 who, in the summer of 1960, lost his life in accident, a fund has been established by his friends in the Faculty Medicine to provide a prize. This prize will be awarded annually t

student with outstanding personal qualities who has achieved high rank in the first two years of the medical course.

The Roche Entrance Bursary—Donated by Hoffman-La Roche Limited provides a bursary of \$750 per year for two years and is awarded annually to a student beginning studies in the Faculty of Medicine toward the M.D. degree. The award will be made on the recommendation of the Dean of Medicine and the Medical Screening Committee to a student selected on the basis of satisfactory academic achievement, promise and personal qualities. Renewal of the scholarship in the second year will be subject to maintenance of satisfactory standing and progress.

The Samuel and Rebecca Nemetz Memorial Scholarship—This scholarship of \$200, the gift of the Hon. Mr. Justice N. T. Nemetz, in memory of his parents, Samuel and Rebecca Nemetz, will be awarded in 1968 and alternate years in the Faculty of Medicine to a student in the graduating class who, in

his Final Year, has shown special aptitude for medical research.

The Shane Fellowship—This fellowship of \$6000 annually is a gift of the Grand Chapter of British Columbia, Order of the Eastern Star. It is for postgraduate study and research in cancer. The fellowship is tenable at the British Columbia Cancer Institute in cooperation with the clinical departments of the Faculty of Medicine, and a candidate will be selected by a committee appointed by the Dean of the Faculty of Medicine and the Director of the British Columbia Cancer Institute.

The Signus Club of Vancouver Prize—A prize of \$100, donated by the Signus Club of Vancouver in honour of its founder, Mrs. William Mc-Dougall Holland, is offered annually in the Faculty of Medicine. It will be awarded to the graduating student who, in the opinion of the Faculty, has submitted the best graduation thesis on a subject in the field of nervous diseases, with preference to the field of cerebral palsy.

The Vancouver Medical Association Medical Entrance Scholarship—A scholarship of \$750, to be known as the John Mawer Pearson Scholarship, provided by the Vancouver Medical Association, will be awarded annually to a promising student entering First Year Medicine who is worthy and deserving of assistance. The financial circumstances of those considered will be a factor in the selection. The award will be made on the recommendation of the Dean and the Screening Committee of the Faculty of Medicine.

The Vancouver Women's Canadian Club Scholarship in Medicine—This scholarship of \$100, endowed by the Vancouver Women's Canadian Club, has been established as a memorial to the Honourable Tilly Jean Rolston, Minister of Education for the Province of British Columbia from August 1, 1952 to October 12, 1953, and first woman cabinet minister with portfolio in Canada. In establishing this award, the Vancouver Women's Canadian Club pays tribute to her fine personal qualities, her distinguished public service, and her outstanding contributions in education and other fields. This scholarship is offered annually to a student in the Faculty of Medicine who not only attains high standing but who also shows promise of ability in research.

The Vera and Dudley Myers Prize—This prize of \$500, in memory of Vera and Dudley Myers, will be awarded annually to the postgraduate resident in his second year of psychiatric training under the University Program whose ability, promise and record in the field of Psychiatry is considered by the Faculty of Medicine to be the most outstanding.

The V.G.H. Department of Psychiatry Attending Staff Prize—This prize of \$75, given annually by the Attending Staff of the Department of Psychiatry of the Vancouver General Hospital, will be awarded to the student who is generally the most proficient during his Third Year. The

award will be based on examination results and on clinical ability judged on performance during the academic year.

The W. S. Berryman Memorial Scholarship Fund—This fund, established in memory of her husband by the late Mrs. Berryman, provides an annual scholarship of approximately \$250 for a worthy and promising medical student or students needing financial assistance. It will be awarded by the Joint Faculty Committee on Prizes, Scholarships and Bursaries from among the applicants who submit applications for bursaries.

#### BURSARIES

#### For the Winter Session

Students in Medicine are eligible for a number of named bursaries open to the student body at large. These bursaries are listed in the University calendar. Further information may be obtained by writing to the Dean of Inter-Faculty and Student Affairs.

The following is a list of bursaries specifically designated for students proceeding to a degree in Medicine.

Applications for bursaries awarded by the University and tenable in the winter session, must be received by the Dean of Inter-Faculty and Student Affairs not later than July 15. Application forms may be obtained at the office of the Dean of Inter-Faculty and Student Affairs after June 1. See also "Government Bursaries" below.

Unless announced otherwise in the Calendar description, bursaries are awarded only to undergraduates who are beginning or continuing a full course of study in Vancouver at the University of British Columbia. To be eligible for a bursary, a student must normally show evidence of financial need and have at least Second Class standing in the full year's work most recently taken.

Bursaries and Loans are not normally awarded to students entering the University for the first time from outside British Columbia. Such students become eligible for consideration after attending the University for a full winter session.

Government Bursaries—The Government of the Province of British Columbia (with a contribution also from the Federal Government) provides funds annually for the award of bursary assistance to selected capable persons who can show financial need and who fulfil certain requirements of being domiciled in British Columbia. These awards will be made to assist students entering their first year of undergraduate studies at the University of British Columbia, from Grade 12 or 13. If funds permit, however, awards may be made for undergraduate studies in higher years. Awards are normally in the range of \$100 - \$200. Applications must be submitted to the Department of Education, Victoria, B.C., by August 5. Application forms may be obtained from the Department of Education, Victoria, B.C., from the Dean of Inter-Faculty and Student Affairs of the University of B.C., from the University of Victoria, or, where the student is attending school, from the principals of senior secondary schools.

University Bursaries—For the Session 1969-70—A University Bursaries Fund has been made available by the Board of Governors to enable a limited number of undergraduates to attend the University who would not otherwise be able to do so. Applications from students taking the one-year Teacher Training Course, the course in Librarianship, and Social Work will also be considered. To be eligible for an award from this fund a student must have attained at least Second Class standing in the full year's work last

taken, and must give evidence of need. Applications, on forms available at the office of the Dean of Inter-Faculty and Student Affairs, must be received not later than July 15.

The B.C. Society of Internal Medicine Bursary—A bursary of \$550, the gift of the B.C. Society of Internal Medicine, will be awarded annually to a student or students in the Faculty of Medicine who have good scholastic standing and need financial assistance. The award is open to dependents of deceased physicians and to students proceeding to a career in fundamental medical science, or showing aptitude for and interest in a career in internal medicine. Preference will be given to students in the Final Year.

The British Columbia Medical Association Bursary Fund—This fund, established by the British Columbia Medical Association, and maintained by contributions at the level of \$1000 annually, provides financial assistance for undergraduate students in the Faculty of Medicine. Those who are assisted are asked to accept a moral obligation to reimburse the Fund when they are able to do so.

The British Columbia Surgical Society Bursary Fund—Through annual contributions of \$500 the British Columbia Surgical Society has established a fund to assist promising and deserving students in the Faculty of Medicine. Students receiving assistance are asked to assume a moral obligation to reimburse the Fund on completion of their training.

The Canadian Anaesthetists' Society, British Columbia Division, Bursaries —Two bursaries of \$100 each, the gift of the British Columbia Division of the Canadian Anaesthetists' Society and given to honour the memory of Dr. Angus Alexander MacMillan and Dr. Neil A. Stewart, are offered to students in the Faculty of Medicine. They will be awarded by the University to worthy and deserving students who have a good record, show promise, and need assistance. Those who are assisted, although not required to undertake a legal obligation, are asked to assume a moral responsibility to reimburse the fund after completion of their studies, if circumstances permit.

The Canadian Cancer Society, British Columbia and Yukon Division, Bursary—This bursary of \$500, the gift of the Canadian Cancer Society, British Columbia Division, will be available for worthy and deserving students who are bona fide pre-medical students, or who will have completed the pre-medical stage of their training and will be entering medical school. To be eligible for this award an applicant must be a graduate of a secondary school in British Columbia. It is hoped that those students who are assisted by this bursary will in the future contribute in some way to assist other medical students in a similar situation. Although not required to undertake a legal obligation, are asked to assume a moral responsibility to reimburse the fund after completion of their medical studies.

The Cowichan Valley Medical Society Bursary—A bursary of \$300, the gift of the Cowichan Valley Medical Society, is offered annually to a student from the Cowichan Valley area who is taking premedical or medical studies at the University of British Columbia. The award will be made to a student who has good academic standing and needs financial assistance. If, in any year, no applicant qualifies, the funds contributed will be available either to provide a larger award or several awards in a future year.

The Dr. Ernest Billig Memorial Bursary—This bursary, established as a memorial to Dr. Ernest Billig by his wife, is offered to students proceeding to a degree in Medicine or in Education. It will be awarded annually, in the amount of \$150, to a student who needs financial assistance, has good academic standing, and shows promise of success in his or her chosen field.

The Dr. Rolf S. Manson Memorial Bursary—A bursary of \$500, established and endowed as a memorial to Dr. Rolf Stuart Manson by Mrs. Manson and her son, Rolf S. Manson Jr., is offered annually to a worthy and deserving student in the Faculty of Medicine. Augmented by contributions from friends and colleagues, it serves to pay tribute to his professional skill and to his generous and devoted public service. It is the hope of the donors that those who benefit from this fund will themselves, if and when circumstances permit, contribute to this or similar funds to give assistance to other students.

Dr. William Campbell Memorial Bursary—The Class of Medicine 1954 (University of British Columbia) decided on the occasion of its tenth anniversary reunion to establish a bursary as a memorial to Dr. William Campbell. The annual bursary of approximately \$100 will be awarded to a student who is entering his Third Year of Medicine, has satisfactory scholastic standing, and needs financial assistance.

The Edith Cavell Hospital Bursary—A bursary of \$50, the gift of the Edith Cavell Hospital Ltd., Vancouver, is offered to a worthy and deserving student beginning or continuing studies in the Faculty of Medicine. Preference will be given to a student with financial need who has a special interest or excels in studies concerning diseases peculiar to the ageing process.

The Florence E. Heighway Medical Bursary Fund—This fund, endowed by a bequest from the late Florence E. Heighway, and named to honour her memory, provides bursaries for students taking medical training at this University.

The Jack Aron Memorial Bursary—A bursary of \$50 given by Mrs. Jack Aron as a memorial to her husband, is offered to undergraduates in the Faculty of Medicine. It will be awarded to a student with a good academic record who shows promise in the field of Medicine and has need of financial assistance.

Kiwanis Club of Uptown Vancouver Ted Lewis Memorial Medical Bursary —A bursary of approximately \$300, the gift of the Kiwanis Club of Uptown Vancouver, is offered annually to students of the Faculty of Medicine. This bursary will be awarded by the University to a student who has a good academic record, who shows promise in the field of Medicine, and who needs financial assistance to continue his studies.

Association for Retarded Children of British Columbia Bursaries—Bursaries in various amounts are offered by the Association for Retarded Children of British Columbia to students in education, medicine, nursing, psychology, and social work in graduate or undergraduate programmes who: (a) are undertaking a full year, part-time or summer school course at a recognized University or College; and (b) intend to pursue studies related to mental retardation. Awards will be made on the basis of combined academic standing and need. Closing dates for submission of application forms are July 15 and December 15. Forms of application may be obtained from: Association for Retarded Children of British Columbia, Room 221, 119 West Pender St., Vancouver 3, R.C.

Langley Memorial Hospital Medical Staff Bursary—A scholarship of \$100 open to graduates of Langley or Aldergrove High Schools, proceeding to First Year Medicine at the University of British Columbia or other approved university. Applications required by June 15.

The North Shore Medical Society Bursary—This bursary of \$300, the gift of the North Shore Medical Society, is available for a student in the Faculty of Medicine who has good academic standing and needs financial assistance to proceed with his course. It will be awarded to a student whose permanent

residence is and has been for some time in the City or District of North Vancouver, or the District of West Vancouver.

The Plimsoll Club Bursary in Medicine (donated by the Empire Steve-doring Company Limited)—This bursary of \$300 is available for award in the Faculty of Medicine at the University of British Columbia. It will be awarded to a worthy and promising woman student who is registered in the Faculty of Medicine and is continuing in studies leading to the degree of M.D.

The R.A.F. Silver Jubilee Chapter, I.O.D.E., Bursary—A bursary of \$100, the gift of the R.A.F. Silver Jubilee Chapter, Imperial Order Daughters of the Empire, is offered in the Faculty of Medicine. It will be awarded to a promising and deserving male student in the Fourth Year who has high standing and needs financial assistance.

The R.C.A.F. Chapter, I.O.D.E., Bursary in Medicine—A bursary of \$150, gift of the R.C.A.F. Chapter, I.O.D.E., will be awarded in the winter session to a student in the First Year of the Faculty of Medicine. The award will be made to a student who, without financial assistance, would have been unable to continue in the course.

The Sam Bass Bursary—In honour of Sam Bass, and to commemorate in 1965 his birthday on April 25, this bursary was established and endowed through the gift to the University of \$1,000 by his wife and children. The income provides an annual bursary for a worthy and deserving student in the Faculty of Medicine who has a good record in pharmacology.

The St. Paul's Hospital Medical Staff Bursary—An annual bursary in the sum of \$300 will be granted by St. Paul's Hospital Medical Staff to a student in the Faculty of Medicine, University of British Columbia, who has shown satisfactory scholastic attainment and is deserving.

The Section of General Practice, B.C. Division, C.M.A., Student Aid Fund—The income of this fund, established by contributions from the Section of General Practice, B.C. Division, Canadian Medical Association, provides bursaries for medical students who have good academic standing and require financial assistance.

The Upper Vancouver Island Medical Society Bursary—A bursary of \$400, the gift of the Upper Vancouver Island Medical Society, is offered annually to a student in the Faculty of Medicine. The award will be made to a promising student who needs financial assistance to begin or continue his or her medical studies. Preference will be given to a student from Upper Vancouver Island.

The West Kootenay Medical Association Bursary—A bursary of \$250 from the West Kootenay Branch, B.C. Division, Canadian Medical Association, is offered to students registered in the Faculty of Medicine and taking a full course leading to the degree of M.D. It will be awarded to a promising and deserving student who requires financial assistance. First preference will be given to students from the West Kootenay area of the Province. The recipient is asked to assume a moral obligation to reimburse the fund when he has completed his training.

Westminster Medical Association Bursary—This bursary of \$500, the gift of the Westminster Medical Association, will be awarded to a student in the Faculty of Medicine for study in the winter session. The award will be made to a promising student of good ability who, without financial assistance, would be unable to begin or continue his studies in the Faculty of Medicine. The winner is asked to assume a moral obligation to reimburse the fund when he has completed his training.

The Willard Kitchen Memorial Bursaries—Three bursaries of \$500 each, given by the daughters of Willard Kitchen, are available for male students in the Faculty of Medicine proceeding to the degree of M.D. These bursaries have been established to assist worthy and deserving male students of academic distinction who, because of their character and ability, give promise of outstanding achievement in the field of medical studies.

#### LOAN FUNDS

Inquiries relating to the following loan funds, and all applications for loans, should be addressed to the Dean of Inter-Faculty and Student Affairs, Room 207, Buchanan Building, unless the description indicates otherwise.

Applications for loans should be made in advance of the opening of the session. Although loans in limited amounts may also be made during the session, provided funds are available, students should not begin attendance on the assumption that they will be eligible for or receive assistance. In particular, they must meet academic requirements acceptable to the Loan Committee. Students with weak academic records, or who have failed in the previous year of attendance at school or university, or who are on probation, will not be granted loans.

Loans are not normally made to students outside British Columbia until they have attended the University for at least one winter session.

Students are also advised that adult guarantors satisfactory to the Accountant's office are required.

Maude Abbott Memorial Scholarship Loan Fund—This fund was established by the Federation of Medical Women of Canada. Loans up to three hundred and fifty dollars are available to any woman medical student or first year interne. A second loan up to three hundred and fifty dollars may be granted to a previous recipient. In special cases, a loan up to one thousand dollars may be granted to a medical woman for recognized post-graduate training. Loans are payable within seven years of date of issue, after which time, interest will be charged at the rate of 5% compounded annually. Information regarding these loans may be obtained from the Dean of Inter-Faculty and Student Affairs.

Dr. A. E. H. Bennett Medical Student Aid Fund—This fund, established by a bequest from the late Dr. Allan Edward Hingston Bennett, provides loans for students registered in the Faculty of Medicine. Loans from this fund are interest-free until the completion of medical training and internship. Further information is available from the Dean of Inter-Faculty and Student Affairs.

The Christmas Seal Medical Student Loan Fund—From this fund, the gift of the British Columbia Tuberculosis Society, loans are available to deserving medical students in any year of the medical course. Terms of repayment will be recommended by the Committee after a review of the financial circumstances of the applicant.

The Medical Students Loan Fund—This fund, initiated by a donation to the University Development Fund from Mr. W. Clarke Gibson, and increased by contributions from other donors, was established to assist worthy and deserving students in the Faculty of Medicine. Loans will be made in accordance with the individual needs of applicants.

The Mr. and Mrs. P. A. Woodward's Foundation Medical Students' Fund—A gift from Mr. and Mrs. P. A. Woodward's Foundation provides assistance in the form of loans for undergraduate medical students in attendance at this University. Loans from this fund, repayable within a reasonable period after graduation, are arranged to meet the individual needs of applicants.

#### LECTURESHIPS AND SPECIAL FUNDS

The British Columbia Heart Fund Grant—A generous grant from the British Columbia Heart Foundation to the Department of Continuing Medical Education assists in providing a comprehensive continuing education programme in British Columbia for physicians in the field of cardiovascular disease.

The British Columbia Medical Association Grant—A generous grant from the British Columbia Medical Association to the Department of Continuing Medical Education assists in providing a comprehensive continuing education programme for physicians in British Columbia.

British Columbia Tuberculosis-Christmas Seal Society Grant—A generous grant from the British Columbia Tuberculosis-Christmas Seal Society to the Department of Continuing Medical Education assists in providing a comprehensive continuing education programme in British Columbia for physicians and allied professional personnel in the field of tuberculosis and respiratory disease.

The Canadian Arthritis and Rheumatism Society Grant for Professional Education—A generous grant from the Canadian Arthritis and Rheumatism Society (British Columbia) to the Department of Continuing Medical Education assists in providing a comprehensive continuing education programme in British Columbia for physicians and allied rehabilitation personnel in the field of rheumatic disease. This programme includes lectureships, symposia, special courses and the inclusion of rheumatic disease topics in general courses in the health sciences.

Canadian Cancer Society Grant—A generous grant from the Canadian Cancer Society, B.C. and Yukon Division, to the Department of Continuing Medical Education assists in providing a comprehensive continuing education programme in British Columbia for physicians in the field of cancer.

Canadian Cancer Society, British Columbia Division, Lectureship—Through the generosity of the Canadian Cancer Society, B.C. and Yukon Division, a lectureship has been established in the Faculty of Medicine in the field of cancer work. The annual lecture provided by this contribution will be arranged to coincide with the Annual Meeting of the B.C. and Yukon Division of the Canadian Cancer Society.

The CIBA Lectureship—Through the generosity of CIBA Company Limited, a lectureship has been established on an annual basis to provide a distinguished speaker on some topic connected with medical education or research.

The Dr. J. W. Thomson Fund in Surgery—In memory of Dr. J. W. Thomson, a member of Convocation of this University and a pioneer surgeon of Vancouver who was greatly interested in surgical education and medical problems throughout a busy and productive career, this Fund has been established by his wife. The purpose of the Fund is to assist in surgical education and research, at the discretion of the Department of Surgery.

The Merck Sharp & Dohme Lectures—Through the generosity of Merck Sharpe and Dohme of Canada Limited, annual lectures have been established in the Faculty of Medicine in the field of medicine and allied sciences, including biochemistry, physiology, pathology, bacteriology and pharmacology.

The Simmons and McBride Lectureship—Through the generosity of Simmons & McBride Ltd., a lectureship has been established on an annual basis which will bring to the University a distinguished lecturer in some field of medical research.

# THE SCHOOL OF REHABILITATION MEDICINE

For the Academic Year see colored centre section

THE UNIVERSITY OF BRITISH COLUMBIA
ANCOUVER 8 • BRITISH COLUMBIA CANADA

# The School of Rehabilitation Medicine calendar, 1969-70

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For topics not listed above, see the General Information bulletin.

#### Financial Assistance

A list of Fellowships, Scholarships, Bursaries and Loans open to students in the University will be found in the publication "Awards and Financial Assistance" which may be obtained from the Registrar's office. For details, consult this publication. In general, application must be made to the Dean of Inter-Faculty and Student Affairs.

# ACADEMIC STAFF

- BROCK M. FAHRNI, M.D. (Man.), F.R.C.P.(C), F.A.C.P., Director of the School and Associate Professor of Medicine.
- Miss Winifred L. Grayston, Dip. Occupational Therapy (Toronto), Instruc-
- MISS MARGARET R. HOOD, Dip. Occupational Therapy (Toronto), Instructor.
- Miss W. Jane Hudson, Dip. Physiotherapy, Dip. Teaching Physiotherapy (Toronto), Instructor.
- H. S. Howard, Dip. Physiotherapy, Dip. Teaching Physiotherapy (Chartered Society of Physiotherapy, England), Instructor.
- MISS MARGARET J. G. HUNTER, Dip. Teaching Physiotherapy (Chartered Society of Physiotherapy, England), Instructor.
- Mrs. Alison Lapage, Dip. Occupational Therapy (London), Instructor.
- Miss B. Louise McGregor, B.A. (Brit. Col.), Dip. Physiotherapy (McGill), Dip. Teaching Physiotherapy (Toronto), Instructor.
- Miss Beverley McConnell, Dip. Physiotherapy and Occupational Therapy (Toronto), Instructor.
- Miss Margaret J. Robertson, Dip. Physiotherapy, Dip. Teaching Physiotherapy (Chartered Soc. of Physiotherapy, England), Instructor.
- Miss Hazel M. Southard, Dip. Physiotherapy, Dip. Teaching Physiotherapy (Chartered Society of Physiotherapy, England), Dip. Occupational Therapy (Kingston), Instructor.
- MRS. D. STYRA, Dip. Occupational Therapy (Toronto), Instructor.

# Lecturers from other Departments:

- P. Allen, Clinical Assistant Professor, Surgery.
- H. M. Bell, Instructor part-time, Orthopedics.
- Miss E. J. Bradley, Assistant Professor, Supervisor of Social Work, Preventive Medicine.
- P. J. A. Bratty, Clinical Instructor, Neurology.
- W. T. Brown, Assistant Professor, Psychiatry.
- W. H. Chase, Associate Professor, Pathology.
- R. M. Christensen, Assistant Professor, part-time, Surgery.
- W. B. Chung, Associate Professor, Surgery.
- J. W. Cluff, Clinical Assistant Professor, Neurosurgery.
- A. D. Courtemanche, Clinical Instructor, Plastic Surgery.
- J. Dean, Assistant Professor, part-time, Paediatrics.
- W. A. H. Dodd, Clinical Instructor, Dermatology.
- K. R. Donnelly, Assistant Professor, Anatomy.
- W. H. Fahrni, Clinical Instructor, Orthopedics.
- G. H. Francis, Clinical Associate Professor, Otolarynology.
- V. O. Hertzmann, Clinical Instructor, Medicine.
- R. H. Hill, Instructor, Paediatrics.
- I. B. Holubitsky, Assistant Professor, Surgery.
- A. M. Johnson, Clinical Instructor, Medicine.
- A. M. Marcus, Assistant Professor, Psychiatry.

- H. S. Miller, Teaching Fellow, Orthopedics.
- J. C. Mitchell, Assistant Professor, Dermatology.
- P. D. Moyes, Clinical Instructor, Neurosurgery.
- Miss E. K. McCann, Associate Professor and acting Director of the School of Nursing.
- Miss F. A. McCubbin, Associate Professor, Social Work.
- D. J. MacFadyen, Associate Professor and Head of the Neurology Division.
- G. D. McPherson, Clinical Instructor, Orthopedics.
- A. N. McTaggart, Assistant Professor, Child Psychiatry.
- H. Nichol, Associate Professor and Head of Child Psychiatry.
- R. L. Newman, Instructor, part-time, Psychiatry.
- G. E. Pirie, Assistant Professor, Paediatrics.
- R. L. Ramsay, Associate Professor, Physical Education.
- D. J. Randall, Assistant Professor, Zoology.
- H. S. Robinson, Clinical Instructor, Medicine.
- D. B. Rix, Assistant Professor, Pathology.
- G. D. Saxton, Clinical Associate Professor, Thoracic Surgery.
- W. W. Simpson, Clinical Assistant Professor, Medicine.
- H. E. Taylor, Professor and Head, Pathology.
- G. B. Thompson, Clinical Assistant Professor, Neurosurgery.
- Miss M. E. Towell, Assistant Professor, Obstetrics.
- W. G. Trapp, Clinical Assistant Professor, Surgery.
- J. S. Tyhurst, Professor and Head, Psychiatry.
- L. Tyhurst, Clinical Associate Professor, Psychiatry.
- P. S. Vassar, Professor, Pathology.
- W. A. Webber, Associate Professor, Anatomy.
- H. D. Whittle, Professor, Physical Education.
- W. A. Young, Clinical Instructor, Medicine.
- Lecturers from other Institutions:

Name

- L. G. Andrews, G. F. Strong Rehabilitation Centre.
- A. C. Pinkerton, G. F. Strong Rehabilitation Centre.
- W. S. J. Buckler, Vancouver General Hospital.
- M. W. Chepesuik, Shaughnessy Hospital.
- D. E. MacKay, B.C. Hospital Insurance Society.
- W. E. Milbrandt, Workmen's Compensation Board.

# List of Clinical Supervisors of School of Rehabilitation Medicine Studen

Hospital

Mrs. E. Vuorinen, M.C.P.A.	Burnaby General Hospital.
Mrs. P. Phillips, M.C.P.A.	Canadian Arthritis and Rheumatism Society.
Miss P. McBain, O.T.Reg.	Canadian Arthritis and Rheumatism Society.
Mrs. G. S. Hilliard, O.T.Reg.	Cerebral Palsy Association, Victoria.
Mrs. M. L. Peterson, M.C.P.A.	Children's Hospital.
Mrs. S. Robertson, O.T.Reg.	Children's Hospital.

Mrs. J. Owen, M.C.P.A. Mrs. H. Nicholson, O.T.Reg. Mrs. Hilary Brown, M.C.P.A. Mrs. B. Hunter, O.T.Reg. Mrs. M. Wiesman, M.C.P.A. Mrs. J. Andrew, O.T.Reg. Miss Shirley Ogden, O.T.Reg. Mrs. Rosemary Hardy, O.T.Reg. Mrs. B. Meredith, O.T.Reg. Miss E. Watkins, M.C.P.A. Mrs. D. N. Jellema, M.C.P.A. Mrs. M. Reynolds, M.C.P.A Miss Joan Johnson, M.C.P.A. Miss Audrey Kelly, M.C.P.A. Mrs. P. Phillips, O.T.Reg. Miss E. Fairgrieve, O.T.Reg. Miss B. Jones, M.C.P.A. Miss M. Schouten, M.C.P.A.

Miss M. Secret, O.T.Reg. Mrs. A. Sykanda, M.C.P.A. Supervisor of Occupational Therapy Mrs. R. Fortune, M.C.P.A. Miss D. Tulley, O.T.Reg.

Ars. B. Dawson, O.T.Reg.

Ir. J. Smythe, M.C.P.A.

Gorge Road Hospital, Victoria. Gorge Road Hospital, Victoria. Holy Family Hospital. Holy Family Hospital. Lions Gate Hospital. Lions Gate Hospital. Riverview Hospital. Burnaby Mental Health Centre. Woodlands School. Woodlands School. Royal Columbian Hospital. St. Joseph's Hospital, Victoria. St. Paul's Hospital. Shaughnessy Hospital. Shaughnessy Hospital.
G. F. Strong Rehabilitation Centre.
G. F. Strong Rehabilitation Centre.
G. F. Strong Rehabilitation Centre, C. P. Centre. Sunnyhill Hospital for Children. Sunnyhill Hospital for Children.

Vancouver General Hospital. Vancouver General Hospital. Vancouver General Hospital, Department of Psychiatry. Workmen's Compensation Board Rehabilitation Centre. Workmen's Compensation Board Rehabilitation Centre.

# THE SCHOOL OF REHABILITATION MEDICINE

# Combined Course in Physical and Occupational Therapy

The rehabilitative aspects of medical and surgical treatment assume greater importance as the profession becomes more interested in the problems of of long-term illness. Increased awareness of the value of the therapist's work leads to increased use of her services by physicians at all levels of care, acute as well as chronic. As the practising physician is asked to take more responsibility for these community services, it becomes apparent that he will require competent assistants in order to discharge this responsibility adequately. The present course is medically oriented to produce a well-qualified therapist who, along with the nurse and physician, can fill an increasingly important role as the third member of the medical treatment team at hospital, rehabilitation centre, out-patient and home levels. It is anticipated that fresh interest in this field will place all branches of therapy in a more prominent position and create many more opportunities for those wishing to avail themselves of this training.

#### General Information

The course offered at the School of Rehabilitation Medicine consists of combined training in physical and occupational therapy. The purpose of this course is to provide basic knowledge and technical skills required to practise these therapies.

The first two years are given mainly on campus. During the summe sessions and in third year increasing amounts of clinical experience and in struction will be obtained in the occupational and physiotherapy department under the guidance of University-appointed instructors.

On completion of the clinical experience following third year, a student wi have obtained sufficient credits to meet the academic and practical require ments of the professional organizations for practice in these fields.

The fourth year of this course is largely academic, the successful con pletion of which will qualify a student for a Bachelor's degree (Bachelor Science in Rehabilitation).

Both men and women are accepted. Recommended age of entry is 18years, but exceptions may be made in special circumstances.

# Academic Requirements

Grade 13 or completion of the First Year in the Faculty of Arts or Scien at the University of British Columbia or its equivalent at another approx college or university. Required subjects are:

English 100 or equivalent

Mathematics 130 or 100 and 121 (120, 1968-69 or earlier) or equivalen Chemistry 103 or 110 or 120

Biology 101 or Grade 13 Zoology 105

One other credit course.

It is considered advisable for students to have some background in phy preferably, at least, to the Grade 12 (British Columbia) level.

Students are not admissible to the School of Rehabilitation Medi directly from Grade 12 in any Canadian province. Such students should admission to a pre-Rehabilitation Medicine year of study in the Facult Science if they are B.C. residents, otherwise they should complete the Rehabilitation Medicine requirements at their own provincial university.

# Physical Fitness Requirements

Each applicant must present a certificate of physical fitness from a physician in accordance with the regulations of the University Health Service.

# Personal Suitability

The Faculty reserves the right of selection of all students admitted to the School. Unless distance from the University makes it impractical, a personal interview is required prior to acceptance.

# Application and Registration

All inquiries relating to admission and personal interviews made to the School of Rehabilitation Medicine, should be addressed to: The Director, The School of Rehabilitation Medicine, The University of British Columbia, Vancouver 8, B.C.

- (a) For new students. A student applying for registration for the first time in the University must obtain an Application for Admission form and an application form for the School of Rehabilitation Medicine. The completed forms, together with necessary certificates in duplicate, two recent passport-type photographs, a medical certificate, and letters of reference. should be submitted to the School by August 1.
- (b) For students who have previously attended this University. A student who has previously attended the University of British Columbia must obtain an application form from the School of Rehabilitation Medicine and submit it to the School of Rehabilitation Medicine. Because of limited enrolment, students are requested to apply by February or March, and complete all forms pending final marks. This should be accompanied by one recent passport-type photograph, a medical certificate and letters of reference.

# Degree Year Students

Application forms should be submitted to the School of Rehabilitation Medicine by June 15. Programme will be provided for not less than three applicants.

*Note*—The School opens the day after Labour Day.

Further inquiries and the arrangements for a personal interview should be made to the School of Rehabilitation Medicine. Because of limitations on enrolment, it is advisable that students make early application.

# **Fees**—subject to change without notice

First Term Fees, \$219 (includes A.M.S. fee of \$29), payable in full at the time of registration. However, students may pay full fees of \$409 at time of registration. Fourth Year students are assessed an additional \$7 to cover the graduating fee.

Second Term Fees, \$190, payable in full on or before the first day of lecsures in the second term. Students should mail cheques for second term fees the Accounting Office before this date with a note showing name and registration number.

A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application or admission form when submitted with supporting documents. The fee is non-refundable and is not applicable to tuition.

Students will receive a small interning salary during the summer sessions fifter second and third years.

# **Books and Supplies**

Textbooks: Information regarding textbooks will be given during the first class period in each course.

Two white laboratory coats.

White shoes and stockings at the end of first year (regulation nurses' shoes).

Instruction regarding purchase of white uniforms, blue shorts and white cotton blouses will be given by the school.

#### Curriculum

#### First Year

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#### Fourth Year

361. Social Stratification	3 units 1 unit
Rehabilitation Medicine Courses 401. Medicine IV	l unit 1½ units
Rehabilitation Therapy Courses  404. Rehabilitation I	3 units 3 units

#### Attendance

- 1. Students are required to attend all lectures and laboratory periods in each course. Admission to lectures or laboratories and credit for attendance may be refused by an instructor for lateness, misconduct, inattention or neglect of duty.
- 2. A student absent from classes because of illness must comply with the regulations of the University Health Service.
- Unavoidable absence of one day or less for reasons other than sickness must be explained to the instructor or instructors concerned when the student returns. If absence is longer than one day, the student must receive a re-admission slip from the School of Rehabilitation Medicine office.
- 4. A student planning to be absent from classes for any reason must obtain previous permission from the School of Rehabilitation Medicine office.

#### Withdrawal.

Any student who after registration decides to withdraw from the Univerity must report to the Registrar's office. He will be required to obtain clearnce from the University, to the satisfaction of the Registrar, before being ranted Honourable Dismissal or recommended, where applicable, for refund f fees.

#### xaminations and Advancement

- 1. Examinations in the School of Rehabilitation Medicine may be held at rious times throughout the year, with final examinations being written at e end of each academic year. These examinations are obligatory for all idents.
- 2. If a student is unavoidably absent from a sessional examination, he ast notify the School of Rehabilitation Medicine office before the end of the amination period. Failure to observe this rule may result in the recording a failure for the course.
- 3. When a sessional examination has been missed through illness or domic affliction, application for a deferred examination or for special consideran must be made in writing to the School of Rehabilitation Medicine office later than forty-eight hours after the close of the examination period. If absence was for reasons of health, a physician's certificate indicating the ure and duration of the illness must be submitted to the University alth Service.
- . A student may be denied the privilege of writing a sessional examinain any subject because of unsatisfactory work or attendance, and may be sidered to have failed in the course.

- 5. In a course which involves both laboratory work and written examinations, a student is required to make satisfactory standing in both parts. If the course is repeated, no exemption will ordinarily be granted from the work in either part.
- 6. Term essays and examination papers may be refused a passing mark if they are illegible or noticeably deficient in English.
- 7. (a) The minimum passing mark in any subject is 50%. Examinations will be graded as follows: First Class—80%; Second Class—65%; Pass—50%; Fail—below 50%.
- (b) The Promotions Committee will determine a student's fitness for promotion at the end of each session.
- (c) A student whose academic standing is unsatisfactory may be asked to withdraw from the School, or to repeat the entire work for the year.
  - (d) A student may not repeat more than one year.
- (e) A student who fails twice will be required to withdraw from the University.

#### **Examination Results**

Results of the sessional examinations in April are mailed to students in the graduating classes about the time of Congregation, and to students in the lower years by approximately June 15. Any student who must meet an application date for another institution prior to June 15 should inform the transcript clerk in the Registrar's office in order that arrangements may be made to meet the deadline.

## Review of Assigned Standing

Reviews of assigned standing are governed by the following regulations:

- 1. Any request for the review of an assigned grade, other than for a supple mental examination (in which a request for a review will not be granted) must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each cours concerned which will be refunded only if the mark is raised.
- 2. Each applicant for a review must state clearly why he believes the courdeserves a higher grade than it received; pleas on compassionate ground should not form part of this statement. Prospective applicants should remembe that an examination with less than a passing mark has been read at least second time before results are announced. For this reason an applicant grant a supplemental should prepare for the examination since a change in the original mark is unlikely and the result of the review may not be available beforthe end of the supplemental examination period. A review will not be grant where the standing originally assigned is consistent with the student's terwork and record in other subjects.
- 3. Reviews will not be permitted in more than two courses (6 units) the work of one academic year, and in one course (3 units) in a partial course 9 units or less or in the work of one summer session.

# Supplemental Examinations

1. A student who obtains sufficiently high standing in his year may permitted, on the recommendation of the Promotions Committee, to w supplemental examinations in any subject or subjects failed. Notice will sent to all students who have been granted the privilege of writing splemental examinations.

2. Application for supplemental examinations must be made to the Registrar by July 8.

Supplemental examinations may be written in August at the following centres:

Cranbrook, Dawson Creek, Kamloops, Kitimat, Ocean Falls, Penticton, Powell River, Prince George, Prince Rupert, Trail, Victoria; and at Whitehorse, Y.T. Other centres outside of British Columbia are restricted to universities or their affiliated colleges.

In unusual circumstances a student working in a remote area may be permitted to write supplemental examinations at a special centre if satisfactory arrangements can be made. Since permission is contingent on completion of arrangements, only early applications will be considered.

The fee for each supplemental examination written at the University is \$7.50; at a regular outside centre, \$10.00; at a special centre, \$20.00. In the event that a candidate does not appear for an examination a refund will be authorized only if, within 10 days after the scheduled examination, the candidate submits to the Registrar an adequate explanation for the failure to write the examination; if such refund is made, it will be \$5.00.

# Transcript of Academic Record

A transcript of a student's academic record will, on request of the student, be mailed direct to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the inscription "official transcript only if presented with seal unbroken". On graduation or withdrawal a student may obtain for his own use a copy of his record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of midterm examinations.

Student records are confidential. Transcripts are issued only at the request of students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made arrangements satisfactory to the Accountant's office to meet any outstanding indebtedness.

Granted Honourable Dismissal indicates that the student is in no disciplinary difficulty at the time the transcript is issued; the term has no reference to scholastic status.

Application for a transcript should be made at least one week before the document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

#### Graduation

Every candidate for a degree must make formal application for graduation. Application for graduation must be made not later than March 15. Special forms for this purpose are provided by the Registrar's office.

#### Descriptions of Courses

The number of units assigned to a course is given in round brackets immediately following the course number. Thus 104 (3) under Rehabilitation Medicine indicates that Rehabilitation Medicine 104 is a three-unit course.

The hours assigned for laboratory, lectures and tutorials in a course are indicated as follows:

2 lectures and 3 hours laboratory per week, both terms	[2-3; 2-3]
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1 lecture and 2 hours laboratory per week, first term [1-2; 0-0]

1 lecture and 2 hours laboratory per week, second term [0-0; 1-2]

2 lectures, 3 hours laboratory and 2 hours tutorial or discussion per week, both terms [2-3-2; 2-3-2]

#### Rehabilitation Medicine Courses

- 100. (2) Practical and Applied Anatomy I.—Laboratory course of study on the structure of the human body. Detailed gross anatomy of upper and lower extremities. Laboratory course will be spent in a study of prepared dissections. [0-4; 0-4]
- 200. (3) Practical and Applied Anatomy II.—Lecture and Laboratory course with emphasis on the structure of the nervous system. (Neuro-anatomy). [2-3; 2-2]
- 300. (½) Practical and Applied Anatomy III.—Continuation of study with detail on structure of systems and organs of particular importance to the therapist. [0-1; 0-0]
- 101. (1) Medicine I.—A series of lectures to be given by specialists in medicine, to introduce the student to the broad aspects of these disciplines and to an understanding of total medical care; to be followed by more detailed lectures and clinical demonstrations, covering various diseases that a therapist will meet in clinical practice, from a comprehensive point of view.

  [1-0; 1-0]
- 201. (2) Medicine II and Surgery II.—A series of lectures and clinical demonstrations on various diseases and surgical procedures. [2-0; 2-0]
- 301. (2) Medicine III and Surgery III.—More advanced series of lectures and demonstrations on various diseases that therapists will meet clinically on pre- and post-operative basis. Includes instruction in Speech Pathology and Audiology. [2-0; 2-0]
- 401. (1) Medicine IV.—Advanced course of study given by specialists in medicine to further enhance the therapist's understanding of total medical care. [1-0; 1-0]
- 102. (1½) Surgery I.—A course similar to Medicine 101, in which lectures will be given in Surgery and Pathology. [1-0; 2-0]
- 103. (1½) Psychiatry I (Growth and Development).—Lectures on genetics and behaviour, development of C.N.S., the family, personality development, and the life cycle. Clinical demonstrations relating to family and growth and development. [1-1; 1-1]
- 203. (1½) Psychiatry II (Introduction to Psychiatry).—Lectures on interviewing and group functions, normality, signs and symptoms, history of psychiatry, and introduction to syndromes. Clinical—small group teaching on interviewing, signs and symptoms. [1-1; 1-0]

- 303. (11/2) Psychiatry III (Clinical Psychiatry).—Lectures—Etiology including psychodynamics, major syndromes including child psychiatry and mental retardation. Treatment procedures. Clinical experience with patients in a psychiatric setting under psychiatric and occupational therapy super-[1-0; 1-1]
- 403. (1½) Psychiatry IV (Special topics).—Lectures—the role of the therapist in diagnosis, and treatment in the clinical team. Clinical—continuity with patients under supervision in a clinical setting. Experience in the role of the therapist in practice, taking some responsibility for patient care. [0-1; 0-0]. (plus additional block interning—8 weeks).

## Rehabilitation Therapy

- 104. (3) Remedial Exercises I.—Lectures and practical classes will be given on the basic principles of movement, body mechanics, posture, and methods of progression of remedial exercises. A practical course on identification of anatomical structures that can be palpated will be included, together with massage techniques that may be used in medical and surgical conditions, and early re-education in movement. Applying these principles an introduction is made to the treatment of certain medical and surgical conditions such as arthritis, fractures and orthopedics. **[2-2: 2-2]**
- 204. (4) Remedial Exercises II.-A series of lecture-demonstrations and practical classes will be given related to the treatment procedures which may be used in the conditions discussed in lectures on rehabilitation medicine and surgery; will include posture, neurological disorders, further study of fractures and other orthopedic conditions. [2-4; 2-2]
- 304. (3) Remedial Exercises III.—Seminars and practical classes will be given which will correlate with clinical experience which is in progress. Further study on pre- and post-operative treatment in thoracic and neurosurgery, cerebral palsy and the training of the mother during pre- and postnatal periods. [2-3; 2-4]
- 404. (3) Remedial Exercises IV.—Advanced seminar course in which case tudy evaluations will be presented and new concepts of treatment procedure vill be discussed. [0-3; 0-3]
- 105. (11/2) Medical Electricity and Electrotherapy.—Mechanics of movenent including levers and pulleys. Basic physics of electricity, which is then elated to basic production of currents used in electrotherapy. Practical asses relating to the application of constant current and interrupted current or stimulation of nerve and muscle. Infra-red techniques, wax baths, and an troduction to short-wave treatment will also be included.
- 205. (1) Medical Electricity and Electrotherapy II.—Lectures, demonstraons and practical classes on production and application of short-wave, ultraolet and further consideration of stimulating currents. [1-1; 1-1]
- 305. (1) Electro-, Thermo- and Hydrotherapy III.-A series of lecturemonstrations and practical classes on the production and therapeutic use ultra-sonics, micro-wave diathermy and special ionizations. Theory and [1-1; 0-1]plication of hydrotherapy.
- 106. (2) Therapeutic Occupations I. Laboratory.—Practical classes in techuse used in instruction and practical application of the basic techniques ceramics, woodworking, needlework, rugmaking, basketry and seagrass ting. [0-3; 0-3]

- 206. (3) Therapeutic Occupations II. Laboratory.—Practical classes in additional techniques such as weaving, cordwork, metalwork, leatherwork, and construction of remedial adaptations for tools and equipment. [0-6; 0-5]
- 306. (2) Therapeutic Occupations III. Laboratory.—Practical classes of instruction in techniques used in children's hospitals, pre-vocational assessment, retraining the disabled homemaker, designing and fabrication of self-help devices.

  [0-4; 0-4]
- 406. (3) Therapeutic Occupations IV.—Practical classes in application and further practise in techniques covered in previous three years. Some research and refinement of techniques will be special projects. [0-3; 0-3]
- 107. (2) Therapeutic Occupations I.—Lectures introducing theory, scope and general principles of occupational therapy. These lectures correlate the use of the therapeutic activities as they apply to the medical, surgical and psychiatric aspects of rehabilitation. [1-0; 1-0]
- 207. (2) Therapeutic Occupations II.—Lectures dealing with methods of occupational therapy in rehabilitation for the physically disabled and psychiatric patients. Stress is placed upon the use of adapted equipment, self-help devices and training of the amputee. [2-0; 2-0]
- 307. (2) Therapeutic Occupations III.—Lectures on further aspects of rehabilitation. [2-0; 2-0]
- 208. (1) Clinical Training.—Three half-days a week in the spring term will consist of observation and supervised participation in Physical and Occupational Therapy Departments in local hospitals and rehabilitation centres. [0-0; 0-10½]
- 308. (4) Clinical Training.—Five half-days a week in both terms will consist of supervised participation in rehabilitation procedures in the Physica and Occupational Therapy Departments of the Vancouver hospitals and rehabilitation centres.

  [0-17½; 0-17½]
- 309. (1/2) Supervision and Administration.—Lecture course on methods o supervising staff and students in training as well as department managemen and organization. [1-0; 0-0
- 408. (1) Basic Design course.—An understanding of principles of design applied to the construction of adapted equipment, to designing self-hel devices, and to structural alterations in the home or community building for the handicapped patient. [1-0; 1-6]

#### Courses in other Faculties

#### Anatomy

390. (3) Elementary Human Anatomy.—An elementary course dealing with the basic structure of the human body. Prerequisites: Chemistry 103 or 110 or 120, and Biology 101 or Zoology 105 or equivalent. [3-0; 3-0]

#### Physical Education and Recreation

203. (1) Conditioning Programmes (men/women).—Conditioning exercises, fitness assessment, adaptation of exercise programmes, teaching methods and techniques.

#### **Physiology**

303. (3) Elementary Vertebrate Physiology.—Introductory organic physiology for students not taking the Major or Honours B.Sc. programme. Prerequisite: First Year Chemistry. Students will get credit for one only of Zoology 303, 304, and Biology 400. [2-2; 2-2]

#### Sociology

- 200. (3) Introduction to Sociology.—A general introduction to the sociological analysis of selected topics (such as religion, work, politics, stratification, bureaucratic organizations, kinship, socialization, and particular social roles.

  [3-0; 3-0]
- 306. (3) Socialization.—Analysis of the acquisition and loss of membership in social groups, stages in the learning of social roles, and of the institutions concerned with the socialization of adults and children. [3-0; 3-0]
- 361. (3) Social Stratification.—The study of tendencies toward equality and inequality. Manifestations of inequality occupation, education, ethnic group, income power and their consequences. Theories of social class; functionalist, neo-Marxist, etc. [3-0; 3-0]

# 522. (3) Small Groups.

[3-0; 3-0]

The hours quoted in the above description are based on a thirty-week year. Additional hours are taught in blocks during the extra two-three weeks of each year of the course. This allows an additional seventy hours in Occupational Therapy subjects and forty hours in Physiotherapy.

Nursing week: One week will be spent on the wards in hospitals observing and assisting in nursing programmes.

Clinical Practice: Clinical training will be given in accredited departments under University appointed physicians, surgeons and therapists. Equal experience will be offered in physical and occupational therapy in rehabilitation centres, mental health institutions, and home visiting services, as well as in general hospital physical medicine departments.

8 weeks between First and Second Years — 304 hours 3 units 12 weeks between Second and Third Years — 456 hours 3½ units 16 weeks at end of Third Year 608 hours 4½ units Included within academic years (see curriculum) 675 hours.

# General Professional Information

On successful completion of the Third Year, a student is eligible to apply for membership in the Canadian Association of Occupational Therapists

and/or the Canadian Physiotherapy Association. These Associations have world-wide affiliations. Information regarding the profession may be obtained from:

The Canadian Physiotherapy Association, 64 Avenue Road, Toronto 5, Ontario.

The Canadian Association of Occupational Therapists, 57 Bloor Street West, Toronto 5, Ontario.

As these Associations set the regulations regarding interning periods, the University of British Columbia will not be responsible for any changes that may occur from time to time in these regulations.

#### **BURSARIES**

Canadian Arthritis and Rheumatism Society—Repayable and non-repayable bursaries. Information may be obtained from the Canadian Arthritis and Rheumatism Society (British Columbia Division), 645 West Broadway, Vancouver 9, B.C.

Canadian Physiotherapy Association, British Columbia Branch—Two bursaries of \$50 each, the gift of the members of the Canadian Physiotherapy Association, British Columbia Branch, will be awarded to second and third year students who have good scholastic standing and are in need of financia assistance. Application for the above should be made in November of the academic year to: School of Rehabilitation Medicine, University of British Columbia, Vancouver 8, B.C.

British Columbia Society of Occupational Therapy.—One bursary of \$50.0 for a student in Second or Third Year, will be awarded to the applicant deeme most worthy of financial assistance. Applications invited before January 1 each year, to the School of Rehabilitation Medicine, University of Britis Columbia, Vancouver 8, B.C.

The Helen Grimmer Scholarship in Physiotherapy.—A Scholarship \$125, the gift of the Business and Professional Women's Club of New Wes minster, is offered annually to women students beginning or continuing stu ies in Physiotherapy in the School of Rehabilitation Medicine at the Unive sity of B.C. The Scholarship will be awarded to a student with a good ac demic record and with promise in the field. Financial circumstances may albe a factor in the award. Special preference will be given to students residi in New Westminster.

# THE FACULTY OF PHARMACEUTICAL SCIENCES

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA
ANCOUVER 8 • BRITISH COLUMBIA CANADA

# The Faculty of Pharmaceutical Sciences calendar, 1969-70

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For topics not listed above, see the General Information bulletin.

#### ACADEMIC STAFF

- Bernard E. Riedel, C.D., B.Sc., M.Sc. (Alta), Ph.D. (Biochem.) (Western Ont.), Professor and Dean of the Faculty.
- FINLAY A. MORRISON, M.B.E., C.D., B.S.P. (Sask.), M.Sc. (Maryland), Pharm.D. (Calif.), Professor of Pharmaceutics and Assistant to the Dean.
- JOHN E. HALLIDAY, B.S.P. (Sask.), M.S. (Purdue), Ph.D. (Wash.), Professor of Pharmacology.
- Modest Pernarowski, B.S.P. (Sask.), M.S., Ph.D. (Purdue), Associate Professor of Pharmaceutical Chemistry.
- TERENCE H. BROWN, B.S.P. (Brit. Col.), M.S., Ph.D. (Wash.), Associate Professor of Pharmaceutical Chemistry.
- ALAN G. MITCHELL, Ph.C., Ph.D. (London), Associate Professor of Pharmaceutics.
- ALLAN M. GOODEVE, Phm.B. (Toronto), B.S.P. (Sask.), M.Sc.Phm. (Toronto), Ph.D. (Purdue), Assistant Professor of Pharmacognosy.
- JANIS O. RUNIKIS, M.S., Ph.D. (Wash.), Assistant Professor of Pharmaceutics.
- J. GLEN MOIR, B.S.P. (Brit. Col.), M.S. (Michigan), Assistant Professor of Hospital Pharmacy.
- Frank S. Abbott, B.S.P., M.S. (Sask.), Ph.D. (Purdue), Assistant Professor of Pharmaceutical Chemistry.
- Gail D. Bellward, B.S.P., M.S.P., Ph.D. (Brit. Col.), Assistant Professor of Pharmacology.
- John G. Sinclair, B.S.P. (Sask.), Ph.D. (Purdue), Assistant Professor of Pharmacology.
- LEONA R. GOODEVE, B.S.P. (Sask.), M.Sc.Phm. (Toronto), Senior Instructor in Pharmaceutics.
- NORMAN C. ZACHARIAS, B.S.P. (Brit. Col.), Instructor in Pharmaceutics.
- RALPH O. SEARL, B.Sc., B.S.P., M.S.P. (Brit. Col.), Instructor in Pharmaceutical Chemistry.
- Anne M. Beynon, B.S.P. (Brit. Col.), Assistant in Pharmaceutics.
- SHEILA C. DANTOW, B.S.P. (Sask.), Instructor and Hospital Pharmacist.
- ROSEMAREE GENTLES, B.S.P. (Sask.), Research Assistant and Assistant in Pharmaceutics.
- Adele Runikis, B.S.P. (Brit. Col.), Pharmacist, Student Health Services Pharmacy.
- Douglas A. Denholm, B.S.P. (Brit. Col.), Lecturer (Part-time).
- GORDON B. HEWITT, B.A., B.S.P. (Brit. Col.), Lecturer (Part-time).
- A. Whitney Matthews, B.Sc. (Pharm.) M.Sc. (Alta.), Ph.D. (Florida), LL.D. (Alta.), D.Sc. (Brit. Col.), Dean Emeritus.

#### Clinical Instructors

ARDEN ASHDOWN, B.S.P. (Sask.), Ph.C.

Archie Baker, B.S.P. (Brit. Col.), Ph.C.

WILLIAM F. BAKER, B.S.P. (Brit. Col.), Ph.C.

JOHN E. BURCHILL, B.S.P. (Brit. Col.), Ph.C.

JOYCE COOK, B.S.P. (Brit. Col.), Ph.C.

ANDREW E. DAEM, B.S.P. (Brit. Col.), Ph. C.

E. HARRY FALK, Ph.C.

Kenneth R. Fee, Ph.C.

EVELYN M. HILTON. Ph.C.

W. JAMES INCE, Ph.C.

JOHN E. LITTLE, B.S.P. (Brit. Col.), Ph.C.

ELMER S. MEIER, Ph.C.

KEITH W. PAYZANT, B.S.P. (Brit. Col.), Ph.C.

ROBERT Y. PORTE, B.S.P. (Brit. Col.), Ph.C.

TREVOR M. WATSON, B.A., B.S.P. (Brit. Col.), Ph.C.

#### Lecturers from other Departments

- J. Biely, M.S.A. (Brit. Col.), M.S. (Kansas State), F.A.I.C., F.P.S.A., F.R.S.C., Professor of Poultry Science.
- W. D. Krrrs, M.S.A. (Brit. Col.), Ph.D. (Iowa State), Professor and Head of the Division of Animal Science.
- A. J. Renny, B.S.A. (Brit. Col.), M.S. (Calif.), Ph.D. (Oregon State), Professor, Plant Science.
- George Szasz, M.D. (Brit. Col.), Assistant Professor, Health Care and Epidemiology.
- MARGARET S. M. NEYLAN, B.N. (McGill), M.A. (Brit. Col.), Assistant Professor, Nursing.
- B. J. Twarres, C.D., B.A. (Brit. Col.), R.T., Art (Hist.), Technician Path ology.
- H. G. Goodwin, B.A. (Mt. Allison), M.S.W. (Brit. Col), Assistant Professo Social Work.
- MRS. E. STOLAR, B.A., M.A., M.S.W. (Brit. Col.), Instructor, Social Work.
- D. B. Rix, B.A., M.D. (West. Ont.), Assistant Professor, Pathology.

#### Members of Faculty representing other Departments:

J. J. STOCK, B.S.A., M.Sc., Ph.D.; S. H. ZBARSKY, B.A., M.A., Ph.D.; W. E. YE MENS, B.A. (Mount Allison), M.A. (Toronto); A. M. PERKS, M.A. (Cantab Ph.D. (St. Andrew's); E. PIERS, B.Sc., Ph.D. (Alta.), A. BEEDLE, B.Com. (Lc don), F.C.A.; C. F. CRAMER, M.S. (New Mexico), Ph.D. (Calif.).

# THE FACULTY OF PHARMACEUTICAL SCIENCES

The Faculty of Pharmaceutical Sciences offers courses leading to the degree of Bachelor of Science in Pharmacy, B.Sc. (Pharm.) and to the degree of Master of Science (M.Sc.) and Ph.D. (The B.Sc.) (Pharm.) hood is dark green with scarlet cord.)

#### Programme of Study

The course leading to the Bachelor of Science in Pharmacy degree is designed to prepare graduates to enter a wide variety of careers associated with pharmacy in retail establishments and hospitals, in industry and government service and other specialized fields. This course satisfies the requirement of the Pharmacy Act for academic qualification for licensing in the Province of British Columbia. It also meets the requirements of the standard curriculum as approved by the Canadian Conference of Pharmaceutical Faculties.

#### Admission

The general requirements for admission to the University are given in the General Information bulletin.

For admission to the Faculty it is required that the student shall have completed the First Year in Arts or Science with credit for the courses shown below and an average grade of at least 60%, or that he shall have fulfilled the equivalent of these requirements by Grade 13 or junior college, or by equivalent work taken in an approved university. (Students planning to enter Pharmacy are advised to present Chemistry 12, Mathematics 12 and either Physics 12 or Biology 12 for Secondary School graduation.)

Students are not admissible to the Faculty directly from Grade 12 obtained in any Canadian province. Such students should seek admission to a pre-Pharmacy year of study in the Faculty of Arts or the Faculty of Science if they are residents of B.C., otherwise they should complete the pre-Pharmacy requirements at their own provincial university.

The required pre-Pharmacy subjects are Chemistry 103 or 110 or 120 (or Grade 13 Chemistry 112); English 100 (or Grade 13 English 100/101); Mathematics 100 and 121 or 120 (1968-69 session or earlier) (or Grade 13 Mathematics 113); one of Physics 110 or 120 or 130 (or Grade 13 Physics 101), or Biology 101 (or Grade 13 Zoology 105 or Botany 105), and one optional subject to be chosen from non-science courses of the first year.

Candidates who expect to complete the requisite entrance standing through University or Grade 13 (British Columbia) supplemental examinations, held in August, may apply for admission and their applications will be considered subject to the results of these examinations.

Students, with otherwise satisfactory standing, who have credit for Chemistry but lack a second required science course, may be admitted to the course but must consult the Dean's Office with regard to an approved programme of electives. Students transferring to the course from another faculty or university, and who have prerequisites equivalent to those outlined above also must consult the Dean's Office with regard to an approved programme of electives.

Advanced Standing: Any student who has taken scheduled courses or their equivalent in another faculty or university may, upon application, be granted such standing as the Faculty may determine.

Students who have completed the equivalent of second year Science may be admitted to the second year of Pharmacy and will take Pharmacy 110 and 210 concurrently.

Because of limited accommodation, the number of students admitted to the First Year in the Faculty of Pharmaceutical Sciences may be restricted to 75. Graduate Studies.

For details of Graduate Studies see the Faculty of Graduate Studies calendar. Fees—Subject to change without notice

F	irst Term	2nd Term	Total
First Year	\$243	\$214	<b>\$</b> 457
Other Years	282	253	535

First Term fees, which includes the A.M.S. fee of \$29, are payable in full at the time of registration. However, students may pay full fees at time of registration.

Fourth Year students are assessed an additional \$7 to cover the graduating fee.

Second Term Fees are payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Finance Department before this date with a note showing name and registration number.

A fee of \$10.00 is charged for evaluating educational documents issued by institutions not in British Columbia. The fee must accompany the application for admission form when submitted with supporting documents. The fee i non-refundable and is not applicable to tuition.

Partial Students—Consult the General Information bulletin.

Every candidate for a degree must make formal application for graduation Application for graduation must be made not later than March 15. Specia forms for this purpose are provided by the Registrar's office.

#### Attendance

Regular attendance is expected of students in all their classes (includit lectures, laboratories, tutorials, seminars, etc.). Students who neglect the academic work and assignments may be excluded from the final exam nations. Students who are unavoidably absent because of illness or disabili should report to their instructors on return to classes.

Students, who because of illness are absent from a December or Ap examination, must submit a certificate, obtained from a doctor, to t

University Health Service as promptly as possible.

#### Withdrawal

Any student who after registration decides to withdraw from the U versity must report to the Registrar's Office. He will be required to obtain clearance from the University, to the satisfaction of the Registrar, bef being granted Honourable Dismissal or recommended, where applicable, refund of fees. (See General Information bulletin.)

The Senate of the University may require a student to withdraw from University at any time for unsatisfactory conduct, for failure to abide regulations, for unsatisfactory progress in his programme of studies or traing, or for any other reason which is deemed to show that withdrawal is

the interests of the student and/or the University.

#### Requirements for Licensing

The possession of a B.S.P. does not, in itself, confer the right to prapharmacy in any province of Canada. In order to practise Pharmacy in Province of British Columbia it is necessary to be registered as a member the Pharmaceutical Association of the Province. The requirements for

registration include a period of twenty weeks of practical training following graduation; further details may be obtained from the Pharmaceutical Association of the Province of B.C. The bylaws of the Council of the Pharmaceutical Association provide that every person desirous of becoming a registered student of the Association shall, before commencing his period of practical training or his attendance at the Faculty of Pharmaceutical Sciences, send to the Registrar of the Pharmaceutical Association an application on the form provided by the Association, together with the fee for such registration.

Details of these requirements may be obtained from the Registrar of the Pharmaceutical Association, 410 Dominion Bank Bldg., 207 West Hastings

St., Vancouver 3, B.C.

#### Pharmacy Examining Board of Canada

The Pharmacy Examining Board of Canada was created by Federal Statute, assented to on December 21, 1963, to establish qualifications for pharmacists acceptable to participating Pharmacy licensing bodies. The Board provides for annual examinations and issues a certificate to the successful candidate which may be filed with a Canadian provincial licensing body in connection with an application for licence to practise Pharmacy under the laws of that province. Attainment of the Board's certificate is an indication of academic qualification and is to be considered an achievement of merit.

Information relative to the dates of examinations, application forms, etc., may be obtained through the Dean's office.

#### Examinations and Advancement

- 1. Examinations are held in December and April. December examinations are obligatory in all subjects of the First and Second Years and in all courses which are terminal at this time. April examinations are obligatory for all students. Applications for special consideration on account of illness or domestic affliction must be submitted in writing to the Dean not later than two days after the close of the examination period. (See the General Information bulletin.)
- The passing mark is 50 per cent. in each subject and successful candidates taking the number of units required in any one year will be graded as follows: First Class, an average of 80 per cent. or over; Second Class, 65 to 80 per cent.; Pass, 50 to 65 per cent.
- In any course which involves laboratory work, a student must complete the laboratory assignments with a satisfactory record before being admitted to the written examination of the course. A student may be required by the Faculty to discontinue such a course during any term if he fails to maintain a satisfactory standing in laboratory work, or if he is absent from an appreciable number of laboratory periods through illness or other causes.

Students who fail for a second time in a year's work will be required to withdraw.

Students who have failed to complete the requirements of any one year will be permitted to register only in courses in the succeeding year for which they have the necessary prerequisites.

Students will not be permitted to register in more than eighteen units in any one year without the special permission of the Dean.

Any student whose academic record, as determined by the tests and examinations of the first term, is found to be unsatisfactory, may be required to discontinue attendance at the University for the remainder of the session.

8. Term essays and examination papers may be refused a passing mark if they are noticeably deficient in English.

#### **Examination Results**

Results of the sessional examinations in April are mailed to students in the graduating classes about the time of Congregation, and to students in the lower years by approximately June 15. Any student who must meet an application date for another institution prior to June 15 should inform the transcript clerk in the Registrar's Office in order that arrangements may be made to meet the deadline.

#### Review of Assigned Standing

Reviews of assigned standing are governed by the following regulations:

- 1. Any request for the review of an assigned grade, other than for a supplemental examination (in which a request for a review will not be granted), must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each course concerned which will be refunded only if the mark is raised to a passing mark.
- 2. Each applicant for a review must state clearly why he believes the content of his paper deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicant should remember that an examination with less than a passing mark habeen read at least a second time before results are announced. For this reasor an applicant granted a supplemental should prepare for the examination since a change in the original mark is unlikely and the result of the review may no be available before the end of the supplemental examination period. A reviewell not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.
- 3. Reviews will not be permitted in more than two courses (6 units) in th work of one academic year, and in one course (3 units) in a partial course (9 units or less or in the work of one summer session.

# Supplementals

- 1. A student who has obtained an average of at least 50 per cent. in the final examinations of the session may be granted supplemental examinations in the subject or subjects in which he has failed provided he hobtained a final grade of not less than 40 per cent. Notice will be set to students to whom such supplemental examinations have been granted.
- In any one session no candidate will be granted supplemental privile; in more than 3 units.
- 3. A student who has failed in more than 6 units of a required year's we will be considered to have failed in the work of that year, and will receive credit for any of the courses passed in that year.
- 4. If a supplemental granted in a course is passed with a grade of at le 50 per cent. credit will be given for the course. In the computation the overall average in the work of a session or for a degree, the gr in a supplemental, if passed, will be considered as 50 per cent. Similar the overall average will not be changed if a subject already passed written for higher standing.
- 5. In all but the Final Year a candidate who has been granted a plemental may write it only once. If he fails, he must repeat the co or take a permissible substitute. In the Final Year he may write it to

6. Supplemental examinations will be held in August. Applications must be made to the Office of the Registrar on or before July 8, and must be accompanied by the required fee.

Supplemental examinations may be written in August at the following centres:

Cranbrook, Dawson Creek, Kamloops, Kitimat, Ocean Falls, Penticton, Powell River, Prince George, Prince Rupert, Trail, Victoria; and at Whitehorse, Y.T. Other centres outside of British Columbia are restricted to universities or their affiliated colleges.

In unusual circumstances a student working in a remote area may be permitted to write supplemental examinations at a special centre if satisfactory arrangements can be made. Since permission is contingent on completion of arrangements, only early applications will be considered.

The fee for each supplemental examination written at the University is \$7.50; at a regular outside centre, \$10.00; at a special centre, \$20.00. In the event that a candidate does not appear for an examination a refund will be authorized only if, within 10 days after the scheduled examination, the candidate submits to the Registrar an adequate explanation for the failure to write the examination; if such refund is made, it will be \$5.00.

#### Transcript of Academic Record

A transcript of a student's academic record will, on request of the student, be mailed direct to the institution or agency indicated in the request. An official transcript will not be given to a student except in special circumtances when the transcript will be issued in a sealed envelope carrying the nscription "official transcript only if presented with seal unbroken". On raduation or withdrawal a student may obtain for his own use a copy of is record marked "unofficial".

Each transcript must include the student's complete record at the Uni-ersity of British Columbia. Since credit earned is determined on the sults of the sessional examinations a transcript will not include results f other examinations.

Student records are confidential. Transcripts are issued only at the quest of students or appropriate agents or officials.

No transcript will be issued to or for a student who has not made rangements satisfactory to the Finance Department to meet any outstanding

Granted Honourable Dismissal indicates that the student is in no discipnary difficulty at the time the transcript is issued; the term has no reference scholastic status.

Application for a transcript should be made at least one week before document is required.

Fees for transcripts of academic record: first one free-of-charge, except lowing graduation when the first three are free-of-charge; additional nscripts \$1.00 each, except that when two or more additional copies are lered at one time the fee shall be \$1.00 for the first and 25 cents for h remaining copy. Fees for transcripts are payable in advance; transcripts l not be provided until payment is received.

# CURRICULUM First Year

Subject		Term Lab.	Second Lect.	
¹Chem. 205, Physical Inorganic and Analytical Chemistry	3	4	3	4
Chem. 230, Organic Chemistry	3	3	3	3
<sup>2</sup> Biology 101, Principles of Biology	3	3	3	3
English 150, Composition	2		2	
Elective	3	—	3	
Pharm. 110, Pharmaceutics I	3	3	3	3
<sup>2</sup> Physics 130, Elements of Physics, or	3	3	3	3

<sup>1</sup>Chem. 200 will be accepted.

<sup>2</sup>The student presenting Physics as an entrance requirement will take Biology in this year and vice-versa.

<sup>8</sup>Chemistry 230 is a prerequisite for all subsequent Pharmacy courses with the exception of Pharmacy 350.

# Second Year

Subject	First'		Second Lect.	
Biochem. 410, Outlines of Biochemistry	3	0	3	0
Biochem. 411, Biochemistry Laboratory	0	3	0	3
Elective	3		3	_
Microbiol. 201, Principles of Microbiology	3	2	3	2
Pharm. 210, Pharmaceutics II	3	3	3	3
Physiology 301, Human Physiology	3	0	3	0
Physiology 302, Human Physiology Laboratory	0	3	0	3

# Third Year

Subject		Term Lab.	Second Lect.	
English 305, Literature of Ideas or an elective	2	0	2	0
Pharm. 310, Pharmaceutics III	3	3	3	3
Pharm. 320, Organic Medicinal Products			3	
Pharm. 325, Pharmaceutical Chemistry		4	3	4
Pharm. 330, General Pharmacognosy	3	3	3	0
Pharm. 340, General Pharmacology	3	3	3	3
Pharm. 350, Pharmaceutical Law and Ethics	1		1	

#### Fourth Year

Subject		Term Lab.	Second Lect.	
Pharm. 410, Biopharmaceutics	2		2	
Pharm. 411, Applied Pharmaceutics		3	_	3
Pharm. 420, Drug Identification and Synthesis		4		4
Pharm. 440, Applied Pharmacology	3		3	_
*Pharm. 450, Thesis or Essay			_	_
†Electives—12 units (see below)	3	_	3	

<sup>\*</sup>Graduation essay or thesis, acceptable to the Faculty, will be required of all students.

#### Areas of Interest

- 1. Community Pharmacy.
- 2. Hospital Pharmacy.
- 3. Governmental and Industrial Pharmacy.
- 4. Graduate Studies.

<sup>†</sup>The student should elect an area of interest from those listed below and select his courses, with the approval of the Dean and Faculty Advisors.

#### COURSES OF INSTRUCTION

The number of units assigned to a course is given in round brackets immediately following the course number. Thus 310 (3) indicates that Pharmacy 310 is a three-unit course.

The hours assigned for laboratory, lectures and tutorials in a course are

indicated as follows:

2 lectures and 3 hours laboratory per week, both terms. [2-3; 2-3] I lecture and 2 hours laboratory per week, first term. [1-2; 0-0]

I lecture and 2 hours laboratory per week, second term. [0-0; 1-2] 2 lectures, 3 hours laboratory and 2 hours tutorial or discussion per week, both terms. [2-3-2: 2-3-2]

An asterisk (\*) indicates alternate weeks.

#### **Pharmaceutics**

- 110. (3) Pharmaceutics I.—Pharmaceutical technology procedures, basic principles and processes involved in the production of pharmaceutical preparations. [3-3; 3-3]
- 210. (3) Pharmaceutics II.—A study of physical, chemical and biological concepts as they apply to dosage forms. [3-3; 3-3]
- 310. (3) Pharmaceutics III.—A study of physical, chemical and biological concepts as they apply to dosage forms. T3-3; 3-31
- 410. (2) Biopharmaceutics.—The study of the physiological availability of drugs from dosage forms. [2-0; 2-0]
- 411. (1) Applied Pharmaceutics.—The application of pharmaceutical sciences to professional practice. [0-3; 0-3]
- 412. (2) Sterile Pharmaceutical Products.—A study of theory and methods of sterilization, and the considerations involved in the preparation of various types of sterile products.
- 414. (3) Problems in Pharmaceutics and Biopharmaceutics.—Individual assignments involving library and laboratory investigation of problems involved in the development of pharmaceutical dosage forms.
- 415. (2) Topics in Pharmaceutics and Biopharmaceutics.—A study of selected topics in the field of pharmaceutics and biopharmaceutics. [2-0; 2-0]
- 416. (3) Pharmaceutical Manufacturing.—The formulation and production of pharmaceuticals and a study of industrial processes and equipment. Laboratory includes some individual formulation problems. Registration limited.

# Pharmaceutical Chemistry

- 320. (3) Organic Medicinal Products.—The chemistry of natural and synthetic organic medicinal compounds and their physico-chemical relationships; the relation of chemical structure to biological activity.
- 325. (3) Pharmaceutical Chemistry.—An introduction to the quality control and analysis of drugs in dosage form; separatory techniques used in drug analysis; measurement techniques of importance in the quality control of drugs, including an introduction to colorimetry, potentiometry, and ultraviolet and infrared spectrophotometry; the use of radioisotopes in pharmaceutical research. Prerequisites: Chemistry 205 or 200, and Chemistry 230. [3-4; 3-4]
- 420. (1) Drug Identification and Synthesis.—A laboratory course involving the identification and synthesis of representative organic drugs.

- 424. (2) Quality Control.—A survey course involving discussions of various methods of analysis and control. Selected demonstrations will be given to [2-0: **2-**0] illustrate various procedures.
- 425. (3) Drug Testing and Assaying.—Modern analytical techniques applied to separation and analysis of pharmaceutical preparations and special methods employed in pharmaceutical research. Registration limited. [1-4; 1-4]
- 426. (3) Problems in Pharmaceutical Chemistry.—Individual problems relating to the synthesis, identification and assay of medicinal compounds. [0-6; 0-6]
- 427. (2) Topics in Medicinal Chemistry.—A more detailed study of the relation of chemical and physical properties and structure to biological activity. The groups of drugs to be discussed will vary from year to year. [2-0; 2-0] (Prerequisite: Pharmacy 320.)

#### 

- 330. (3) General Pharmacognosy and Biopharmacy.—A study of products of plant and animal origin currently used in pharmacy and medicine; sources, constituents, isolation, production, physico-chemical properties, stor-[3-3; 3-3] age, standardization and uses.
- 434. (3) Problems in Pharmacognosy.—Individual library and laboratory investigations related to the isolation and the study of physical and chemical properties of compounds derived from biological sources. [0-6; 0-6]
- 437. (2) Topics in Pharmacognosy.—Topics chosen from such areas as biosynthesis of natural products, microbiological transformation products, isolation and purification methods, commercial aspects of crude drug production and other areas of current interest. (Prerequisite: Pharmacognosy [2-0; 2-0] 330.)

#### Pharmacology

- 340. (3) General Pharmacology.—A study of pharmacological principles; the actions of drugs on organs and tissues and the toxic effects of drugs. Prerequisite: Physiology 301 & 302. [3-3; 3-3]
- 435. (1) Pesticides.—Physiological action and chemical properties of insecicides, rodenticides, weedicides, etc. (This course is the same as Plant Science [2-0:0-0]332.)
- 440. (2) Applied Pharmacology.—Therapeutic applications of drugs. Important diseases and the role of drugs in their treatment will be discussed. Imphasis will be placed on potential dangers and possible toxic reactions of drugs. Various types of literature dealing with drug therapy will be tudied and oral reports presented. Prerequisite: Pharmacy 340. [2-0-1; 2-0-1]
- 444. (3) Problems in Pharmacology.—Individual assignments involving brary and laboratory investigation of certain aspects of drug action. [0-6; 0-6]
- 445. (1) Animal Hygiene.—Management and disease prevention; drugs [0-0; 2-0] sed in common animal and poultry diseases.

#### harmacy Administration

350. (1) Pharmaceutical Law and Ethics.—Early legislation pertaining to narmacy; Provincial and Federal legislation affecting the practice of phar-[1-0; 1-0] acy; ethical principles and responsibilities.

- 450: Selected Topics.—Thesis or Essay. No unit value.
- 454. (2) Hospital Pharmacy Administration.—History, development and organization of hospitals; supervision, control and economics of hospital pharmacy; and related topics. Field work and field work conferences will be conducted during the second term.
- 455. (2) Community Health.—The relationship of the practising pharmac-[2-0; 2-0] ist to community health and community health practices.

#### Courses for Graduate Studies

- 501. (3) Physical and Chemical Aspects of Pharmaceutical Systems.—A study of problems in formulation, production, stabilization, and preservation of pharmaceuticals. Laboratory demonstrations and special assignments may be included in the course.
- 520. (2) Advanced Medicinal Chemistry.—Conferences and supervised reading in the literature of medicinal chemistry. A consideration of recent theoretical advances in medicinal chemistry.
- 530. (2) Advanced Pharmacognosy.—A detailed study of selected compounds of biological origin useful in the fields of Pharmacy and Medicine.
- 540. (2) Topics in Pharmacology.—Lectures and supervised studies in selected areas of pharmacology.
- 548. (1) Seminar.—Attendance at regular seminars throughout the session and presentation of one or more papers on selected topics.
  - 549. (6) Master's Thesis.
  - 550. (1-3) Directed Studies.
  - 649. Doctor of Philosophy Thesis.

# Required Courses from Other Faculties:

# Biochemistry

- 410. (3) Outlines of Biochemistry.—A lecture course dealing with the structure, function and metabolic reactions of proteins, carbohydrates, nucleic acids, lipids and steroids; enzymology and bio-energetics; biochemical transfer of genetic information and protein synthesis; regulatory mechanisms; control of cellular activity. Prerequisite: Chemistry 203 or 230. [3-3; 3-3]
- 411. (1½) Biochemistry Laboratory.—A laboratory course designed to illustrate the general principles of Biochemistry. Biochemistry 410 must be taken concurrently. T0-3: 0-31

# Biology

101. (3) Principles of Biology.—An introductory course emphasizing principles of wide application to all living organisms, including cell structure and function, the mechanism of inheritance, evolution, and adaptation to environment. A comparative approach to the unity and diversity of organisms will be stressed. A one hour tutorial is required each week for those students who have not previously had Biology 11 or its equivalent in high school. [3-3; 3-3]

# Chemistry

205. (3) Physical-Inorganic and Analytical Chemistry. — Systematic inorganic chemistry, properties of matter from a molecular standpoint, equilibria in solution, physical chemistry useful in biological, medical, agricultural, and related sciences. [3-4; 3-4]

#### Commerce

- 358. (2) Elements of Accounting. (For Pharmacy students only.)— Accounting systems suitable for pharmacists' use; inventory records; departmental accounting; branch accounting; computation of losses and gains; elementary tax problems. [2-0; 2-0]
- 369. (3) Drug Store Retailing.—(For Pharmacy students only.)—Principles and practices involved in the organization and operation of the chain and independent drug store. Retail mathematics, credit, advertising, display, selling, public relations, personnel training. [3-0; 3-0]

#### English

- 150. (2) Composition.—The work consists of (1) essays, class exercises, and selected reading; (2) written examinations. Students will be required to make a passing mark in each. [2-0; 2-0]
- 305. (2) Literature of Ideas.—Students will be asked to read a half-dozen texts illustrating the theme of Utopian society. Seminars and essays will be required.

  [1-0-1; 1-0-1]

#### Microbiology

201. (3) Principles of Microbiology.—Similar to Microbiology 200 but with a slight medical emphasis. Recommended for students of Nursing, Pharmacy and other Health Sciences. Chemistry 230 or an acceptable alternative must precede or be taken concurrently. Credit will not be given for both Microbiology 200 and 201. [3-2; 3-2]

#### **Physics**

130. (3) Elements of Physics.—From Newton's mechanics to particle physics, a description of ideas, principles and their applications. [3-3\*; 3-3\*]

## hysiology

- 301. (3) Human Physiology—A lecture course on body function with parcular reference to mammalian and human physiology. Taken concurrently rith Physiology 302. [3-0; 3-0]
- rerequisites: Biology 101 and Chemistry 203 or 230.
- 302. (1½) Human Physiology Laboratory.—A laboratory course designed to lustrate physiological principles and to impart some training in physiological chniques. Taken in conjunction with Physiology 301. [0-3; 0-3]

#### Awards and Financial Assistance

Subject to change. Full corrected statement for the year 1969-70 will appear in the publication "Awards and Financial Assistance."

The complete list of scholarships and prizes in each Faculty, and bursaries and loans open to students in all faculties, is available in the section of the Calendar entitled "Awards and Financial Assistance". This section, which may be obtained on request from the Registrar's office, should be consulted by all students who wish to obtain fuller information or to submit application. It should be noted that most awards do not require the submission of an application and further, that the following partial list is subject to amendment. Applications for bursaries must be submitted by July 15 to the Dean of Inter-Faculty and Student Affairs, on forms obtainable from his office.

The Bristol Award—This award, given by Bristol Laboratories of Canada and consisting of Drs. L. S. Goodman and Alfred Gilman's manual, The Pharmacological Basis of Therapeutics, will be awarded to an outstanding student of the graduating class in Pharmacy.

The British Columbia Pharmaceutical Society Scholarship-This scholarship of \$200 will be awarded to a student in the Faculty of Pharmaceutical Sciences who is proceeding to the Final Year. The award will be made to a student who, in the opinion of the Faculty, shows a major interest and promise of combining a successful career in the practice of pharmacy with active participation in community and professional affairs.

The Burroughs Wellcome Scholarship—A scholarship of \$250 the gift of Burroughs Wellcome & Co. (Canada) Ltd., will be awarded annually to a student in the Faculty of Pharmaceutical Sciences who, in the opinion of the Dean of the Faculty, shows outstanding ability and is worthy of financial assistance.

The Canadian Foundation for the Advancement of Pharmacy Scholarships -Scholarships of \$100 each, the gift of the Canadian Foundation for the Advancement of Pharmacy, are available for students in Pharmaceutical ciences. The number of scholarships depends upon the registration. Although wards will be made primarily on merit, financial need will be considered.

The Charles E. Frosst Scholarship—A scholarship of \$250, together with medal, will be awarded annually to a student of special promise and ability 1 the Faculty of Pharmaceutical Sciences. Students entering the Final Year of ne degree course are eligible to compete and the award is made on the basis of holarship, leadership, and financial need.

The Cunningham Prize in Pharmacy—A cash prize of \$100, the gift of the te Mr. George T. Cunningham, will be awarded to the student in Pharmautical Sciences whose scholastic record in all years of the course has been e most outstanding.

The Cunningham Scholarship in Pharmacy—A general proficiency scholar-ip of \$250, the gift of the late Mr. George T. Cunningham, will be awarded nually to the student obtaining highest standing in the Second Year of armaceutical Sciences and proceeding to the Third Year of the course.

The Dean E. L. Woods Memorial Prize (donated by the Pharmaceutical Association of the Province of British Columbia)—A cash prize of \$50, the gift of the Pharmaceutical Association of the Province of British Columbia, will be awarded annually to a student completing the Final Year. The award will be made on the recommendation of the Dean of the Faculty to the student whose record during the entire course, in both the practical and theoretical parts of the pharmaceutical subjects, is considered to be the most outstanding.

The Edith and Jacob Buckshon Memorial Prize—A prize of \$100, given by Buckshon's Pharmacy in memory of Edith and Jacob Buckshon, is open to students in the Faculty of Pharmaceutical Sciences. It will be awarded to the student in the Final Year with the highest marks in the laboratory course in compounding and dispensing.

The George E. K. MacDonald Memorial Prize in Pharmacy—A book prize, given by the family in honour of Mr. George E. K. MacDonald, for many years a well-known pharmacist of Cranbrook, B.C., will be made to a student completing the Third Year, on the basis of academic record, interest in the affairs of the Pharmacy Undergraduate Society and the Pharmaceutical Association and participation in extra-curricular activities.

The Horner Gold Medal for Pharmacy—This medal, known as the "Horner Gold Medal", is awarded annually by Frank W. Horner Limited of Montreal to the head of the graduating class, Faculty of Pharmaceutical Sciences.

The Merck Sharp & Dohme Awards—Through the generosity of Merck Sharp & Dohme of Canada Limited, Montreal, two awards, each consisting of the Merck Index, the Merck Manual, and \$25, are available annually for students in Pharmaceutical Sciences. The awards will be made to the two students obtaining the highest standing in Pharmaceutical Chemistry.

National Drug and Chemical Company of Canada Ltd., B.C. Drug Division, Scholarship—A scholarship of \$200, the gift of National Dru and Chemical Company of Canada, B.C. Drugs Division, will be awarde annually to the student who obtains highest standing in the examinatior of First Year Pharmacy and is proceeding to the Second Year.

The Parke, Davis & Company Ltd. Awards—Through the generosity of the Parke, Davis & Company, Limited, several awards, each consisting of the illustrated history of pharmacy entitled Great Moments in Pharmacy, will be made available for outstanding students in the Faculty of Pharmaceutic Sciences.

The Pharmaceutical Association of the Province of British Columbia Sche arship—A scholarship of \$250, the gift of the Pharmaceutical Association the Province of British Columbia, will be awarded annually to the stude obtaining the highest standing in the examinations of Third Year Pharm ceutical Sciences and who is proceeding to the Fourth Year.

The Pharmaceutical Association of the Province of British Columi Entrance Scholarship—A scholarship of \$100, the gift of the Pharmaceuti Association of the Province of British Columbia, will be awarded to student entering First Year Pharmaceutical Sciences. The award will be me to the student with the highest entrance qualifications, as determined by standing in the examinations of Senior Matriculation or First Year I or Science.

The Poulenc Gold Medal—A gold medal, presented by Poulenc Limited, Montreal, will be awarded annually to the student graduating in Pharmaceutical Sciences with the highest standing in the Pharmacology courses.

The Poulenc Scholarship in Pharmacy—A scholarship of \$250, the gift of Poulenc Limited, Montreal, will be awarded annually to the student who has the most outstanding record in the biological sciences courses of the First and Second Years and who is proceeding to the Third Year in Pharmaceutical Sciences.

The Upjohn Company of Canada Scholarship—This scholarship of \$200 presented by the Upjohn Company of Canada, will be awarded annually for general proficiency in the First Year of the Pharmaceutical Sciences.

The W. Elgin Turnbull Memorial Scholarship—By a gift of his family, a scholarship in Pharmacy has been established in memory of W. Elgin Turnbull (1912-1941), who was a member of the pharmaceutical profession in British Columbia. This scholarship to the value of \$140 will be awarded annually on the basis of general proficiency, particularly in the practical aspects of pharmaceutical subjects of the Second Year. Preference will be given to a student showing aptitude in pharmaceutical economics and, in particular, merchandising.

#### Bursaries

The Alvin Cunningham Bursary—A bursary of \$200, the gift of Alvin Cunningham, is offered annually to a student entering the Second or Third Year of the course in Pharmaceutical Sciences. The award will be made on the recommendation of the Dean of the Faculty, to a student who has shown definite ability and has need of financial assistance.

The Dean A. W. Matthews Testimonial Bursary—As part of a testimonial tendered to Dr. A. W. Matthews, who retired as Dean of Pharmacy in June, 1967, this bursary was established through the Pharmaceutical Association of the Province of British Columbia by his friends and colleagues. It serves to mark the outstanding esteem in which he is held and to pay tribute to his effective leadership. This bursary, in the amount of \$100, will be awarded innually to a promising student in Pharmaceutical Sciences who needs finanial assistance.

The Hoffmann-LaRoche Canadian Centennial Bursary—A bursary of \$500, he gift of Hoffmann-LaRoche Limited, Montreal, will be available annually a student continuing studies in the Faculty of Pharmaceutical Sciences. The ursary will be awarded on the recommendation of the Dean of the Faculty to a tudent of high scholastic standing who has need of financial assistance.

The John MacRae Memorial Bursary—A bursary of \$250 will be awarded anually from the proceeds of an endowment made by Mrs. John MacRae commemorate the ideals of her husband, who was among the early practioners of pharmacy in this community. The award will be made to a udent of good academic standing in the Faculty of Pharmaceutical Sciences ho is in need of financial assistance and whose qualities of character indicate at he will regard his profession as a means of public service. It is the donor's ope that the recipient, without obligation, will in due course assist others a similar manner.

The Ladies Pharmaceutical Auxiliary Bursary in Pharmacy-A bursary of 00, the gift of the Ladies Pharmaceutical Auxiliary, Lower Mainland, is allable annually in the Faculty of Pharmaceutical Sciences. It will be awarded to a student with a good academic record who, without financial assistance, would be unable to begin or continue his studies in the Faculty of Pharmaceutical Sciences.

The Ladies Pharmaceutical Auxiliary (Victoria) Bursaries—Two bursaries of \$100 each, gift of the Ladies Pharmaceutical Auxiliary (Victoria), are offered annually to Vancouver Island students beginning or continuing studies in the Faculty of Pharmaceutical Sciences.

The Lambda Kappa Sigma Alumni Bursary—A bursary of \$100, donated by the Alpha Lambda Alumnae Chapter of the Lambda Kappa Sigma Sorority, will be available in the 1969-70 session to assist a female pharmacy student, with preference given to a member of the Sorority who is continuing her studies in the Faculty of Pharmaceutical Sciences.

Municipal Chapter, I.O.D.E. Bursary in Pharmaceutical Sciences-A bursary of \$100, gift of the Municipal Chapter, I.O.D.E., is offered to women students with good academic standing and with need for financial assistance. It will be awarded to a student proceeding to the degree of Bachelor of Science in Pharmacy.

The Pharmaceutical Association of the Province of British Columbia Entrance Bursary—A bursary of \$100, the gift of the Pharmaceutical Association of the Province of British Columbia, will be available annually to a student entering the First Year of the Pharmaceutical Sciences course, who has good scholastic standing and is in need of financial assistance.

The Sea Going Hacks Bursary—A bursary of \$200, given by the Sea Going Hacks, an association of drug travellers in British Columbia, will be awarded to a student in Pharmacy who is recommended to a Committee of the Association by the University Joint Faculty Committee on Prizes, Scholarships and Bursaries in consultation with the Dean of the Faculty of Pharmaceutical Sciences. The award will be made on the basis of scholarship and need

#### Loan Funds

The Dean E. L. Woods Memorial Loan Fund—In honour of the memor of Esli Longworth Woods, first Dean of the Faculty of Pharmaceutical Science at this University, the Pharmacy Alumni have established a loan fund to assis students registered in the Faculty. Loans from this fund will be available fc those who are recommended by the Dean of Pharmaceutical Sciences. Appl cation forms are available at the office of the Dean of Inter-Faculty an Student Affairs.

The G. T. Cunningham Memorial Loan Fund.—As a memorial to the la George T. Cunningham and in tribute to his services to the profession pharmacy, to his long and continued interest in the University, and to h outstanding contributions in many phases of public life, the Pharmaceutic Association of the Province of British Columbia has established a loan fun Loans from this fund will be made by the University Committee on Priz Scholarships, and Bursaries in consultation with the Dean of Pharmaceutic Sciences.

The Pharmaceutical Association of the Province of British Colum Student Aid Fund-This fund, established by the Pharmaceutical Associati of the Province of British Columbia, provides assistance in the form of los for students who have completed the First Year of Pharmaceutical Scien and are continuing with further studies in the Faculty. Only those who recommended by the Dean of the Faculty and the Scholarship Commiare eligible. Loans do not become repayable or bear interest until one year after graduation. Those who are assisted are invited to contribute, as their means may allow, to this fund.

#### Special Awards

The Aubrey A. Brown Memorial Award in Pharmacy (donated by the Canadian Foundation for the Advancement of Pharmacy)—A cash prize of \$100, together with a gold medal and a certificate of merit, will be awarded annually by the Canadian Foundation for the Advancement of Pharmacy to the student in the graduating class in any College, School, or Faculty of Pharmaceutical Sciences or Pharmacy in Canada, who, in the opinion of the Awards Committee appointed by the Foundation submits the best paper on some phase of pharmacy administration, pharmaceutical history (particularly Canadian), or on any topic having some clear connection with the practice of retail or hospital pharmacy. Further information may be obtained from the Dean of the Faculty of Pharmaceutical Sciences. The closing date for receiving applications is April 15.

The E. L. Woods Memorial Prize in Pharmacy (donated by the Canadian Foundation for the Advancement of Pharmacy)—A cash prize of \$100, together with a gold medal and a certificate of merit, will be awarded annually by the Canadian Foundation for the Advancement of Pharmacy to the student in the graduating class in any College, School, or Faculty of Pharmacy in Canada, who, in the opinion of the Awards Committee appointed by the Foundation submits the best paper on some phase of laboratory research in pharmacy. Papers entered for this award will be selected by the Faculty of Pharmaceutical Sciences from the theses submitted as part of the Fourth Year requirements. The closing date for receiving applications is June 1st.

The Canadian Pharmaceutical Association Centennial Scholarship-In commemoration of the Canadian Centennial Year the Canadian Pharmaceutical Association provided a scholarship of \$500, together with transportation, to enable a Third Year student to join with students from other Faculties of Pharmacy in Canada in attending the 1967 Convention of the Canadian Pharmaceutical Association and in visiting Expo 67, the Food and Drug Directorate and other governmental, industrial and academic institutions of interest to pharmacy.

# For Graduate Study

The Canadian Foundation for the Advancement of Pharmacy Graduate Study Fellowship—One grant is available each year in The University of British Columbia in the amount of \$500 and will be awarded on the basis of competition among graduates in the Faculty of Pharmaceutical Sciences pursuing graduate studies in pharmacy at U.B.C. Further information may be obtained from the Dean of the Faculty of Pharmaceutical Sciences.

The Canadian Foundation for the Advancement of Pharmacy Fellowships in Hospital Pharmacy—These fellowships of \$750 each have been established to assist graduates of Canadian schools of Pharmacy during a one-year programme of graduate studies in the field of hospital pharmacy, subject to the conditions outlined in the report of the Committee on Pharmaceutical Edueation and Research. Candidates should apply to the Secretary-Treasurer of the Foundation, 175 College Street, Toronto 2B, Ontario, prior to June 1,

setting out their plan of study and submitting a transcript of their academic record together with a letter of recommendation from their dean and at least one other person, preferably a practising pharmacist. The winners must agree to return to the practice of hospital pharmacy in Canada for at least one year.

The H. C. LePatourel Fellowship in Hospital Pharmacy—This fellowship of \$500, provided annually from the estate of the late H. C. LePatourel, is open to graduates of the Faculty of Pharmaceutical Sciences who intend to further their practical training through one year of hospital pharmacy interneship. The award will be made by the Faculty, after consultation with the hospital concerned, to a student who not only has a good academic record but who has shown interest and promise in the field of hospital pharmacy.

The Pfizer Fellowship in Hospital Pharmacy—Through the generosity of Pfizer Co. Ltd., a fellowship of \$500 is open annually to graduating students in the Faculty of Pharmaceutical Sciences. This award will enable the winner to further his practical experience through one year of hospital pharmacy interneship. In the selection of the winner, consideration will be given to academic record and to interest in, and aptitude for, hospital pharmacy. Final selection will be made by the Faculty in consultation with the hospital concerned.

The Warner-Lambert Research Fellowship in Pharmacy-A fellowship of \$1200, the gift of Warner-Lambert of Canada Limited, is offered annually for graduate study and research in the field of pharmacy. The winner will be selected by the Faculty of Pharmaceutical Sciences, with preference being given to graduates in Pharmacy of Canadian universities, and must enroll as a candidate for the degree of Master of Science in Pharmacy at this University. An additional \$300 will be paid to the Faculty toward the cost of materials and equipment required in the research undertaken.

# THE FACULTY OF SCIENCE

For the Academic Year see coloured centre section

THE UNIVERSITY OF BRITISH COLUMBIA
ANCOUVER 8 • BRITISH COLUMBIA CANADA

# The Faculty of Science calendar, 1969-70

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Vladimir J. Okulitch, Dean of the Faculty of Science

#### FACULTY OF SCIENCE

- VLADIMIR J. OKULITCH, M.A.Sc. (Brit. Col.), Ph.D. (McGill), F.G.S.A., F.P.S., F.R.S.C., Professor of Paleontology and Dean of the Faculty.
- ROBERT F. SCAGEL, M.A. (Brit. Col.), Ph.D. (Calif.), F.R.S.C., F.L.S., Professor of Botany and Associate Dean of the Faculty.
- N. J. DIVINSKY, B.Sc. (Manitoba), M.Sc., Ph.D. (Chicago), Professor of Mathematics and Assistant Dean of the Faculty.
- K. B. Harvey, B.A. (Toronto), D.Sc. (Laval), Associate Professor of Chemistry and Assistant Dean of the Faculty.

#### Department of Botany

- G. H. N. Towers, M.Sc. (McGill), Ph.D. (Cornell), F.L.S., F.R.S.C., Professor and Head of the Department.
- R. J. Bandoni, B.S. (Nevada), M.S., Ph.D. (Iowa), Professor, Curator of Mycological Herbarium.
- VLADIMIR J. KRAJINA, D.Sc. (Charles', Prague), Professor.
- C. O. Person, B.A. (Sask.), Ph.D. (Alta.), Professor.
- GLENN E. ROUSE, B.A., M.Sc., Ph.D. (McMaster), Professor.
- ROBERT F. SCAGEL, M.A. (Brit. Col.), Ph.D. (Calif.), F.R.S.C., F.L.S., Professor, Curator of Phycological Herbarium.
- D. J. Wort, M.Sc. (Sask.), Ph.D. (Chicago), Professor.
- MISS KATHERINE BEAMISH, M.S.A. (Brit. Col.), Ph.D. (Wisconsin), Associate Professor, Curator of Vascular Plant Herbarium.
- T. BISALPUTRA M.Sc. (New England), Ph.D. (Calif.), Associate Professor.
- Miss Kathleen Cole, M.A. (Brit. Col.), Ph.D. (Smith), Associate Professor.
- G. C. Hughes, B.S. (Georgia Southern), M.S., Ph.D. (Florida State), Associate Professor.
- W. B. Schofield, B.A. (Acadia), M.A. (Stanford), Ph.D. (Duke), Associate Professor, Curator of Bryophyte Herbarium.
- Miss Janet R. Stein, B.A. (Colorado), M.A. (Wellesley), Ph.D. (Calif.), Associate Professor.
- B. A. Bohm, B.S. (Alfred), M.S., Ph.D. (Rhode Island), Assistant Professor.
- Miss Beverly R. Green, B.Sc. (Brit. Col.), Ph.D. (Washington), Assistant Professor.
- J. R. Maze, B.A. (Humboldt), M.S. (Washington), Ph.D. (Calif.), Assistant Professor.
- F. J. R. TAYLOR, B.Sc., Ph.D. (Capetown), Assistant Professor.
- I. E. P. TAYLOR, B.Sc., Ph.D. (Liverpool), Assistant Professor.
- E. B. Tregunna, M.Sc., Ph.D. (Queen's), Assistant Professor.
- JOHN C. ANDREWS, B.Sc. (Brit. Col.), Lecturer.
- DONALD CAMERON, M.Sc. (Alta.), Lecturer.
- JACOB LUITJENS, B.A. (Brit. Col.), Lecturer.
- K. M. Patel, B.Sc. (Sardar Vallabhbhai, India), M.S. (Calif.), Lecturer.
- Mrs. E. Conway, B.Sc., Ph.D. (Liverpool), Visiting Professor.
- R. L. TAYLOR, M.Sc. (McGill), Ph.D. (Berkeley), Director of Botanical Garden and Honorary Professor.
- C. J. ANASTASIOU, B.A., M.Ed. (Brit. Col.), Ph.D. (Claremont), Honorary Research Associate.

- JOHN DAVIDSON, F.L.S., F.B.S.E., Professor Emeritus.
- FRANK DICKSON, B.A. (Queen's), Ph.D. (Cornell), Professor Emeritus.
- ANDREW H. HUTCHINSON, M.A. (McMaster), Ph.D. (Chicago), F.R.S.C., Professor Emeritus.
- T. M. C. TAYLOR, B.A. (Brit. Col.), M.S. (Wisconsin), Ph.D. (Toronto), Professor Emeritus.
- A. Bailey, B.Sc. (Liverpool), Ph.D. (Adelaide), Postdoctoral Fellow.
- V. Bednar, Ph.D. (Charles U. Prague), Postdoctoral Fellow.
- A. R. CHAPMAN, B.Sc., Ph.D. (Liverpool), Postdoctoral Fellow.
- B. Fritig, M.Sc., Ph.D. (Strasbourg), Postdoctoral Fellow.
- G. K. Gruendling, B.S. (Springfield), Ph.D. (New Hampshire), Postdoctoral Fellow.
- G. Mayo, B.Ag.Sc., Ph.D. (Adelaide), Postdoctoral Fellow.
- J. MAYO, M.Sc. (Melbourne), Ph.D. (Cambridge), Postdoctoral Fellow.
- T. MINAMIKAWA, M.Sc., Ph.D. (Nagoya, Japan), Postdoctoral Fellow.
- C. E. Seaforth, B.Sc. (London), Ph.D. (Swansea, Wales), Postdoctoral Fellow.
- B. SINGH, M.Sc. (Ranchi, India), Ph.D. (Brit. Col.), Postdoctoral Fellow.
- S. SRIVASTAVA, M.Sc., Ph.D. (Alta.), Postdoctoral Fellow.
- P. V. Subba Rao, M.Sc. (Andhra), Ph.D. (Indian Inst. of Sci., Bangalore), Postdoctoral Fellow.
- G. F. Otto, Honorary Curator of Lichen Herbarium.

# Lecturer from Another Institution

M. WEINTRAUB, B.A., Ph.D. (Toronto), Canada Department of Agriculture.

# Department of Chemistry

- C. A. McDowell, M.Sc., D.Sc. (Belfast), F.R.I.C., F.C.I.C., F.R.S.C., Professor and Head of the Department.
- B. A. DUNELL, M.A.Sc. (Brit. Col.), A.M., Ph.D. (Princeton), F.C.I.C., Professor.
- G. G. S. Dutton, M.A. (Cantab.), M.Sc. (London), Ph.D. (Minnesota), F.R.I.C., F.C.I.C., Professor.
- L. G. HARRISON, B.Sc., Ph.D. (Liverpool), Professor.
- L. D. HAYWARD, B.A. (Sask.), Ph.D. (McGill), F.C.I.C., Professor.
- J. G. HOOLEY, M.A. (Brit. Col.), Ph.D. (Mass. Inst. of Technology), F.C.I.C., Professor.
- J. P. KUTNEY, B.Sc. (Alta.), M.Sc. (Wisconsin), Ph.D. (Wayne), Professor.
- D. G. L. JAMES, M.A., Ph.D. (Cantab.), Professor.
- W. C. Lin, B.Sc., Ph.D. (McGill), Professor.
- N. L. PADDOCK, B.A. (Cantab.), Professor.
- G. B. PORTER, B.S. (Calif.), Ph.D. (S. Calif.), Professor.
- C. Reid, B.Sc., A.R.C.S., D.I.C., Ph.D. (London), F.C.I.C., Professor.
- L. W. Reeves, B.Sc., Ph.D., D.Sc. (Bristol), F.C.I.C., Professor.
- A. ROSENTHAL, B.Sc., B.Ed., M.Sc. (Alta.), Ph.D. (Ohio State University), F.C.I.C., Professor.
- R. Stewart, M.A. (Brit. Col.), Ph.D. (Washington), F.C.I.C., Professor.

- J. TROTTER, B.Sc. Ph.D., D.Sc. (Glasgow), F.R.I.C., F.C.I.C., Professor.
- N. Basco, B.Sc., Ph.D. (Birmingham), Ph.D. (Cantab.), Associate Professor.
- A. Bree, B.Sc., Ph.D. (Sydney), Associate Professor.
- J. A. R. COOPE, M.A. (Brit. Col.), D.Phil. (Oxon.), Associate Professor.
- W. R. Cullen, M.Sc. (New Zealand), Ph.D. (Cantab.), Associate Professor.
- J. B. FARMER, B.Sc., Ph.D. (Liverpool), Associate Professor.
- D. C. Frost, B.Sc., Ph.D. (Liverpool), Associate Professor.
- K. B. HARVEY, B.A. (Toronto), D.Sc. (Laval), Associate Professor.
- D. E. McGreer, M.Sc. (Alta.), Ph.D. (Illinois), F.C.I.C., Associate Professor.
- T. Money, B.Sc., Ph.D. (Glasgow), Associate Professor.
- E. A. Ogryzlo, M.Sc. (Man.), Ph.D. (McGill), Associate Professor.
- R. E. PINCOCK, B.A. (Amherst), Ph.D. (Harvard), Associate Professor.
- J. R. Sams, Jr., B.A. (Amherst), Ph.D. (Washington), Associate Professor.
- R. F. SNIDER, B.Sc. (Alta.), Ph.D. (Wisconsin), Associate Professor.
- D. C. WALKER, B.Sc. (St. Andrew's), Ph.D. (Leeds), Associate Professor.
- F. Aubke, Diplomchemiker Vorexamen, Diplomchemiker Hauptexamen, (Technische Hochschule), Assistant Professor.
- C. E. Brion, B.Sc., Ph.D. (Bristol), Assistant Professor.
- D. P. CHONG, B.S. (California), A.M., Ph.D. (Harvard), Assistant Professor.
- C. L. GARDNER, B.Sc., Ph.D. (Brit. Col.), Assistant Professor.
- M. C. L. GERRY, B.A., M.Sc. (Brit. Col.), Ph.D. (Cantab.), Assistant Professor.
- E. V. Grill, B.Sc. (Ohio State), M.Sc., Ph.D. (Wash.), Assistant Professor (Oceanography).
- L. D. Hall, B.Sc., Ph.D. (Bristol), Assistant Professor.
- F. G. HERRING, B.Sc., Ph.D. (London), Assistant Professor.
- B. R. JAMES, M.A., D.Phil. (Oxon.), Assistant Professor.
- P. Legzdins, B.Sc. (Carleton), Ph.D. (Mass. Inst. of Technology), Assistant Professor.
- K. A. R. MITCHELL, B.Sc., Ph.D. (London), Assistant Professor.
- L. MUENSTER, B.A. (Brit. Col.), Assistant Professor.
- E. PIERS, B.Sc., Ph.D. (Alberta), Assistant Professor.
- J. R. Scheffer, M.S. (Chicago), Ph.D. (Wisconsin), Assistant Professor.
- R. D. SPRATLEY, B.Sc. (Brit. Col.), Ph.D. (Calif.), Assistant Professor.
- A. STORR, B.Sc. (Nottingham), Ph.D. (Newcastle-upon-Tyne), Assistant Professor.
- R. C. THOMPSON, B.Sc. (Western), Ph.D. (McMaster), Assistant Professor.
- L. S. Weiler, B.Sc. (Toronto), Ph.D. (Harvard), Assistant Professor.
- MRS. M. BYLSMA, M.A. (Sask.), Lecturer.
- Mrs. M. Devenyi, Dipl. (Budapest), Lecturer.
- Miss K. Greening, B.Sc. (Brit. Col.), Lecturer.
- Mrs. M. M. Tong, B.Sc., Ph.D. (Brit. Col.), Lecturer.
- S. K. LEE, B.Sc., B.S.P. (Brit. Col.), Lecturer
- F. H. Allen, B.Sc., A.R.C.S. (Imperial College), Ph.D. (London Univ.), Postdoctoral Fellow.
- C. Bedford, M.Sc. (Manchester), Ph.D. (Glasgow), Postdoctoral Teaching Fellow.

- G. R. Branton, B.Sc., Ph.D. (Southampton), Postdoctoral Teaching Fellow.
- K. K. Chan, B.Sc. (Taiwan), Ph.D. (New Brunswick), Postdoctoral Teaching Fellow.
- F. M. CHEN, B.S. (Tunghai), M.S., Ph.D. (Illinois), Postdoctoral Fellow.
- O. CHIN, B.Sc., Ph.D. (McGill), Postdoctoral Fellow.
- T. CHIVERS, B.Sc., Ph.D. (Durham), Postdoctoral Teaching Fellow.
- C. Ehret, B.Sc., Ph.D. (Strasbourg), Postdoctoral Fellow.
- J. FAIRLI, B.Sc., Ph.D. (Glasgow), Postdoctoral Fellow.
- J. E. Fox, B. Pharm. (London), Ph.D. (Sussex), Postdoctoral Fellow.
- J. Fromson, B.Sc., Ph.D. (Queen's), Postdoctoral Fellow.
- Y. Fujise, M.Sc., Ph.D. (Tohoku), Postdoctoral Fellow.
- D. V. GARDNER, B.Sc., Ph.D. (Bristol), Postdoctoral Teaching Fellow.
- E. W. GRAY, B.Sc., Ph.D. (Queen's), Postdoctoral Fellow.
- U. HANDSCHIN, M.Sc., Ph.D. (Basel), Postdoctoral Fellow.
- D. A. HARBOURNE, B.Sc., Ph.D. (Bristol), Postdoctoral Teaching Fellow.
- G. F. HATHORN, Ph.D. (Cantab.), Postdoctoral Fellow.
- S. K. Hoffman, D.Phil. (Basel), Postdoctoral Fellow.
- H. S. Hsu, B.S. (National Taiwan), M.S., Ph.D. (Brown), Postdoctoral Fellow.
- R. N. JOHNSON, B.Sc., Ph.D. (New England), Postdoctoral Fellow.
- J. P. Joseleau, Licence de Science, Doctorat de 3me. cycle (Chimie), (Grenoble), Postdoctoral Fellow.
- W. S. Lin, B.Sc., (Provincial Chung-Hsing), M.Sc., Ph.D. (Waterloo), Post-doctoral Fellow.
- R. A. N. McLean, Ph.D. (Bristol), Postdoctoral Teaching Fellow.
- B. C. Menon, Ph.D. (Arkansas), Postdoctoral Fellow.
- K. S. Ong, Ph.D. (Ottawa), Postdoctoral Fellow.
- J. Riess, Dipl., D.Sc. (Zurich), Postdoctoral Fellow.
- J. J. M. Rowe, B.Sc., Ph.D. (Edinburgh), Postdoctoral Teaching Fellow.
- G. R. Ruxton, B.Sc. (St. Andrews), Ph.D. (Dundee), Postdoctoral Fellow.
- M. D. Sastry, Ph.D. (Kanpur), Postdoctoral Fellow.
- К. Shimokoshi, B.S. (Tokyo College), M.S., Ph.D. (Tokyo Institute of Tech.).
- M. Sprintzl, Ph.D. (Czech Academy), Postdoctoral Fellow.
- I. A. Stenhouse, B.Sc. (Edinburgh), Ph.D. (Cambridge), Postdoctoral Teaching Fellow.
- R. D. SUART, Ph.D. (Brit. Col.), Postdoctoral Fellow.
- J. Tномрson, B.Sc. (McMaster), Ph.D. (Alberta), Postdoctoral Fellow.
- J. THORHALLSSON, Dr. rer. nat. (Giessen), Postdoctoral Fellow.
- R. N. TOTTY, B.Sc., Ph.D. (Edinburgh), Postdoctoral Fellow.
- W. WARNOCK, B.Sc., Ph.D. (Glasgow), Postdoctoral Fellow.
- D. C. Wigfield, B.Sc. (Birmingham), Ph.D. (Toronto), Postdoctoral Teaching Fellow.
- B. C. Young, M.Sc. (New South Wales), Ph.D. (Cantab.), Postdoctoral Teaching Fellow.
- SALLOS, Dipl. Ing. (Budapest), P.Eng., Electronics Engineer.
- P. J. SALISBURY, B.S.A. (Brit. Col.), Mycologist.

#### Department of Computer Science

- J. E. L. Peck, M.Sc. (Natal), Ph.D. (Yale), Professor and Head of the Department (from July 1, 1969).
- MRS. CHARLOTTE F. FISCHER, M.A. (Brit. Col.), Ph.D. (Cantab), Professor.
- JAMES M. KENNEDY, M.A. (Toronto), Ph.D. (Princeton), Professor.
- J. R. H. DEMPSTER, M.A. (Brit. Col.), Ph.D. (Princeton), Assistant Professor.
- R. S. Rosenberg, M.A.Sc. (Toronto), Ph.D. (Michigan), Assistant Professor.
- P. E. Argyle, M.A., Ph.D. (Brit. Col.), Visiting Lecturer.
- M. FLOWER, B.Sc., Ph.D. (Sheffield), Visiting Lecturer.
- G. D. JOHNSON, B.Sc. (Stanford), M.A., Ph.D. (U.C.L.A.), Sessional Lecturer.

### Lecturers from other Departments

- Z. A. Melzak, M.Sc. (McGill), Ph.D. (Mass. Inst. of Technology), Professor of Mathematics.
- G. F. Schrack, M.A.Sc. (Brit. Col.), Dr. Math. (Swiss Fed. Inst. Tech., Zurich), Assistant Professor, Electrical Engineering.
- A. G. Fowler, B.A.Sc. (Brit. Col.), M.Sc. (Birmingham), Chief Analyst, Computing Centre.

#### Department of Geology

- Wm. H. Mathews, M.A.Sc. (Brit. Col.), Ph.D. (Calif.), F.G.S.A., F.R.S.C., Cominco Professor and Head of the Department.
- W. R. Danner, M.Sc., Ph.D. (Wash.), Professor.
- K. C. McTaggart, B.A., B.A.Sc. (Brit. Col.), M.Sc. (Queen's), Ph.D. (Yale), F.G.S.A., Professor.
- VLADIMIR J. OKULITCH, M.A.Sc. (Brit. Col.), Ph.D. (McGill), F.G.S.A., F.P.S., F.R.S.C., Professor of Paleontology and Dean, Faculty of Science. J. V. Ross, B.Sc., A.R.C.S., Ph.D., D.I.C. (Imperial College), Professor.
- GLENN ROUSE, B.A., M.Sc., Ph.D. (McMaster), Professor.
- H. V. WARREN, B.A., B.A.Sc. (Brit. Col.), B.Sc., D.Phil. (Oxon.), Assoc. Inst. M.M., F.G.S.A., F.R.S.C., Professor of Mineralogy.
- WM. HARRISON WHITE, M.A.Sc. (Brit. Col.), Ph.D. (Toronto), F.G.S.A., F.R.S.C., Professor.
- RAYMOND V. BEST, D.F.C., M.A.Sc. (Brit. Col.), Ph.D. (Princeton), Associate Professor.
- ROBERT E. DELAVAULT, B.Lett., L. es Sc., D.de l'Univ. (Paris), Associate Professor.
- J. A. GOWER, M.A.Sc. (Brit. Col.), Ph.D. (M.I.T.), Associate Professor.
- Hugh J. Greenwood, M.A.Sc. (Brit. Col.), Ph.D. (Princeton), Associate Professor.
- R. E. Kucera, M.Sc. (Ohio State), Ph.D. (Colorado), Associate Professor.
- Alastair J. Sinclair, B.A.Sc., M.A.Sc. (Toronto), Ph.D. (Brit. Col.), Associate Professor.
- W. C. Barnes, Geol. Engr. (Colorado), M.S. (Wyoming), Ph.D. (Princeton), Assistant Professor.
- R. L. St. L. Chase, B.Sc. (W. Australia), M.A., Ph.D. (Princeton), Assistant Professor.
- E. P. Meagher, B.S. (San José), Ph.D. (Pennsylvania State), Assistant Professor.

- J. W. Murray, B.Sc. (Alta.), M.A., Ph.D. (Princeton), Assistant Professor.
- ALFRED J. AKEHURST, B.E. (Sask.), M.S. (Alta.), Instructor.
- W. K. Fletcher, B.Sc., D.I.C., Ph.D. (Imperial College), Postdoctoral Research Fellow.
- Kimiyoshi Sada, D.Sc. (Hiroshima), Postdoctoral Fellow.
- Макото Shiikawa, D.Sc. (Tokyo), Visiting Professor.
- M. Y. WILLIAMS, B.Sc. (Queen's), Ph.D. (Yale), F.G.S.A., F.R.S.C., Professor Emeritus, Honorary Curator of the Museum.

Lecturer from another Department

J. R. MACKAY, B.A. (Clark), M.A. (Boston), Ph.D. (Montreal), F.R.S.C., Professor, Department of Geography.

#### Department of Geophysics

- R. Doncaster Russell, M.A., Ph.D. (Toronto), F.R.S.C., Professor and Head of the Department.
- M. W. Ovenden, M.A. (Cantab.), Ph.D. (London), F.R.A.S., F.R.S.E., Professor of Astronomy.
- ROBERT M. Ellis, M.Sc. (Western), Ph.D. (Alberta), Associate Professor.
- WILLIAM F. SLAWSON, B.Sc. (Michigan), Ph.D. (Utah), Associate Professor.
- TADEUSZ J. ULRYCH, B.Sc. (London), M.Sc., Ph.D. (Brit. Col.), Associate Professor.
- GORDON A. H. WALKER, B.Sc. (Edinburgh), Ph.D. (Cantab.), Associate Professor of Astronomy.
- TOMIYA WATANABE, B.S., Ph.D. (Tohoku), Associate Professor.
- JASON R. AUMAN, B.S. (Duke), Ph.D. (Northwestern), Assistant Professor.
- GARRY K. C. CLARKE, B.Sc. (Alberta), M.A., Ph.D. (Toronto), Assistant Professor.
- Douglas E. Smylie, B.Sc. (Queen's), M.A., Ph.D. (Toronto), F.R.A.S., Assistant Professor.
- JEAN K. PETRIE, B.A. (Alberta), M.S., Ph.D. (Michigan), Lecturer.

# Department of Mathematics

- R. D. James, M.A. (Brit. Col.), Ph.D. (Chicago), F.R.S.C., Professor and Head of the Department.
- W. H. GAGE, M.A., LL.D. (Brit. Col.), Professor.
- C. W. CLARK, B.A. (Brit. Col.), Ph.D. (Washington), Professor.
- D. Derry, B.A. (Toronto), D.Phil. (Göttingen), F.R.C.S., Professor.
- N. J. DIVINSKY, B.Sc. (Manitoba), M.Sc., Ph.D. (Chicago), Professor.
- Mrs. Charlotte Fischer, M.A. (Brit. Col.), Ph.D. (Cantab.), Professor.
- A. GOLDIE, B.A., M.A. (Cantab.), Visiting Professor.
- J. KANE, B.A. (Brooklyn), Ph.D. (New York), Professor.
- E. LEIMANIS, Mag. Math. (Riga), Dr. Rer. Nat. (Hamburg), Professor.
- Z. A. Melzak, M.Sc. (McGill), Ph.D. (Mass. Inst. of Technology), Professor.
- B. N. Moyls, M.A. (Brit. Col.), Ph.D. (Harvard), Professor.
- D. C. Murdoch, M.A. (Brit. Col.), Ph.D. (Toronto), Professor.
- W. Nash, B.A. (Coll. of Puget Sound), M.A., Ph.D. (Calif), Professor.
- REE, B.A. (Seoul), Ph.D. (Brit. Col.), F.R.S.C., Professor.
- A. RESTREPO, B.A. (Lehigh), Ph.D. (Calif. Inst. of Technology), Professor.

- M. Sion, M.S. (N.Y.U.), Ph.D. (Calif.), Professor.
- C. A. SWANSON, M.A. (Brit. Col.), Ph.D. (Calif. Inst. of Technology), Professor.
- L. P. Belluce, B.A., M.A., Ph.D. (Calif.), Associate Professor.
- A. T. Bui, Lic.Sc. (Saigon), Ph.D. (M.I.T.), Associate Professor.
- P. S. Bullen, M.Sc. (Natal), Ph.D. (Cantab.), Associate Professor.
- D. J. C. Bures, B.A. (Queen's), Ph.D. (Princeton), Associate Professor.
- R. R. Christian, B.S., M.A., Ph.D. (Yale), Associate Professor.
- E. E. Granirer, M.Sc., Ph.D. (Jerusalem), Associate Professor.
- K. Hoechsmann, B.A. (Brit. Col.), M.A. (McGill), Ph.D. (Notre Dame). Associate Professor.
- E. Luft, Dr.Rer.Nat. (Erlangen), Associate Professor.
- E. MACSKASY, Cand.Sc. (Budapest), Associate Professor.
- J. E. Smith, B.A., B.Ed. (Brit. Col.), Associate Professor.
- H. A. Thurston, B.A., Ph.D. (Cantab.), Associate Professor.
- Roy Westwick, M.A., Ph.D. (Brit. Col.), Associate Professor.
- I. V. WHITTAKER, Ph.D. (Calif.), Associate Professor.
- S. K. Aalto, B.A. (Portland State College), M.A. (Oregon), Ph.D. (Wiscorsin), Assistant Professor.
- R. Adams, B.Sc., M.A., Ph.D. (Toronto), Assistant Professor.
- C. T. Anderson, B.Sc., Ph.D. (Ohio State), Assistant Professor.
- M. Anvari, B.Sc. (Tehran), M.Sc., Ph.D. (Illinois), Assistant Professor.
- G. Bluman, B.Sc. (Brit. Col.), Ph.D. (Calif. Inst. of Technology), Assista: Professor.
- D. W. Bressler, Ph.D. (Calif.), Assistant Professor.
- G. A. Brosamler, Dipl. Math. (Freiburg), Ph.D. (Illinois), Assistant Professo
- A. H. CAYFORD, M.A., Ph.D. (Calif.), Assistant Professor.
- B. Chang, M.A. (Seoul), Ph.D. (Brit. Col.), Assistant Professor.
- T. E. Cramer, B.S. (Nevada), M.S. (Idaho), Ph.D. (Washington), Assista Professor.
- G. Crawford, B.S., M.S. (Oregon), M.A., Ph.D. (Princeton), Visiting Assi ant Professor.
- R. R. Douglas, M.A., Ph.D. (Calif.), Assistant Professor.
- J. J. F. FOURNIER, B.Sc. (Toronto), M.S., Ph.D. (Wisconsin), Assistant F fessor.
- A. Frei, Dipl. Math., Dr. Sc. Math. (Swiss Federal Institute), Assistant F fessor.
- J. Gamst, Dr. rer. nat. (Kiel), Assistant Professor.
- E. GERLACH, A.M. (Indiana), Ph.D. (Kansas), Assistant Professor.
- MRS. PRISCILLA E. GREENWOOD, M.S., Ph.D. (Wisconsin), Assistant Profes
- J. G. Heywoon, B.S. (Notre Dame), M.Sc., Ph.D. (Stanford), Visiting sistant Professor.
- G. Huige, B.Sc. (Brit. Col.), M.Sc., Ph.D. (N.Y.U.) Assistant Professor.
- L. E. Lefevre, M.A., Ph.D. (Oxon.), Visiting Assistant Professor.
- F. W. LEMIRE, B.Sc. (Windsor), M.A., Ph.D. (Queen's), Assistant Profe
- J. L. MacDonald, A.B. (Harvard), M.Sc., Ph.D. (Chicago), Assistant fessor.

- W. E. MEYERS, B.A. (Frankland and Marshall College), Ph.D. (Tulane), Assistant Professor.
- L. A. Mysak, M.Sc. (Adelaide), A.M., Ph.D. (Harvard), Assistant Professor.
- S. S. PAGE, B.S. (Oregon), Ph.D. (Washington), Assistant Professor.
- R. C. RIDDELL, M.S. (Chicago), Ph.D. (Calif.), Assistant Professor.
- L. G. ROBERTS, B.A. (Brit. Col.), M.A., Ph.D. (Harvard), Assistant Professor.
- G. L. Scheffer, Drs. (Amsterdam), Dr.Sc. (Utrecht), Visiting Assistant Professor.
- I. T. Schnute, B.S. (Indiana), M.S., Ph.D. (Stanford), Assistant Professor.
- R. S. SILVERMAN, B.A. (Reed College), M.S., Ph.D. (Oregon), Assistant Professor.
- D. K. SJERVE, B.A. (Brit. Col.), Ph.D. (Berkeley), Assistant Professor.
- E. L. Sobel, B.A. (Reed College), Ph.D. (Johns Hopkins), Assistant Professor.
- U. SUTER, Dipl. Math. Ph.D. (Swiss Federal Institute), Assistant Professor.
- H. R. Voegele, M.A., Ph.D. (Swiss Fed. Institute), Assistant Professor.
- 3. K. WHITE, M.A., Ph.D. (Toronto), Assistant Professor.
- . V. ZIDEK, B.Sc., M.Sc. (Alta.), Ph.D. (Stanford), Assistant Professor.
- OHN E. A. PARNALL, B.A., B.Ed. (Brit. Col.), M.A. (Toronto), Lecturer.
- . D. Promislow, B.Com. (Manitoba), F.S.A., Lecturer.
- L. D. Johnson, B.Sc. (Harvard), M.A., Ph.D. (Calif.), Sessional Lecturer.

#### ecturers from the Department of Computer Science.

- R. Hugh Dempster, Ph.D. (Princeton), Assistant Professor.
- M. Kennedy, B.A., M.A. (Toronto), Ph.D. (Princeton), Director of Computing Centre.

#### ecturers from the Faculty of Education

- F. Gray, B.A., M.Ed. (New Hampshire), Ph.D. (Calif.), Associate Professor.
- ISS A. JEAN KILGOUR, M.A. (Brit. Col.), Associate Professor.
- MacPherson, M.A. (Brit. Col.), Ph.D. (Washington State), Associate Professor.
- BATES, B.Sc. (London), M.Ed. (Brit. Col.), Assistant Professor.
- A. Howitz, B.S., M.S. (N. Dakota), Ph.D. (Minn.), Assistant Professor.
- G. Olley, B.A., M.Ed. (Brit. Col.), Assistant Professor.
- A. Rousseau, B.A., M.Ed. (Brit. Col.), Assistant Professor.
- YASUI, B.Ed. (Alta.), M.S., Ph.D. (Oregon), Assistant Professor.

#### partment of Microbiology

- R. CAMPBELL, B.S.A. (Brit. Col.), Ph.D. (Cornell), F.R.S.C., Professor and Head of the Department.
- E. DOLMAN, M.R.C.S. (England), M.B., B.S., D.P.H., Ph.D., F.R.C.P. (London), F.R.C.P.(C), F.A.P.H.A., F.R.S.C., Research Professor.
- A. McLean, B.Sc., M.B., M.D. (Melbourne), Professor.
- . WALDEN, B.A., M.A. (Sask.), Ph.D. (Minn.), Honorary Professor.
- BISMANIS, M.D., Dip. Bact. (U. of Latvia, Riga), C.R.C.P.(C), Associate Professor.
- Julia Gerwing, B.A. (Brit. Col.), Ph.D. (London), Associate Professor.

- J. J. STOCK, B.S.A. (Ont. Agric. Coll.), M.Sc., Ph.D. (McGill), Associate Professor.
- T. H. BLACKBURN, B.A., M.Sc. (Trinity), Ph.D. (Aberdeen), Assistant Professor.
- D. J. CLARK, B.Sc., M.S. (Washington), Ph.D. (Calif.), Assistant Professor.
- MRS. A. F. GRONLUND, B.A., M.Sc., Ph.D. (Brit. Col.), Assistant Professor.
- J. B. Hudson, B.Sc., M.Sc. (London), Ph.D. (Alta.), Assistant Professor.
- D. G. Kilburn, B.A.Sc. (Brit. Col.), Ph.D. (London), Assistant Professor.
- MISS BARBARA L. ROBINSON, M.D. (Alta.), Assistant Professor.
- MISS D. SYEKLOCHA, B.A. (Brit. Col.), M.Sc., Ph.D. (McGill), Assistant Professor.
- MISS JANICE M. VICKERSTAFF, B.Sc., Ph.D. (Birmingham), Assistant Professor.
- R. A. J. Warren, B.Sc. (Birmingham), M.Sc. (Brit. Col.), Ph.D. (Calif.) Assistant Professor.
- MRS. OLGA VOLKOFF, B.A., M.A. (Brit. Col.), Lecturer.
- E. J. BOWMER, D.C., M.C., M.B., Ch.B. (Liverpool), MRCS, LRCP, (London), LMCC, M.D. (Liverpool), M.C. Path., C.R.C.P.(C), Clinical Assistant Professor.
- W. H. Cockcroft, M.D., D.Ph. (Toronto), Clinical Assistant Professor.
- MRS. ENRICA P. CRICHTON, M.D. (Glas.), C.R.C.P.(C), Clinical Assista: Professor.
- G. D. M. Kettyls, B.Sc., M.D. (Alberta), D.Ph. (Toronto), C.R.C.P.(C Clinical Instructor.
- J. B. Munroe, M.D. (Liverpool), C.R.C.P.(C), Clinical Instructor.
- A. H. Pontifex, B.A., M.D. (Brit. Col.), F.R.C.P.(C), Clinical Instructor.
- F. J. ROBERTS, B.A., M.D. (Sask.), Clinical Instructor.
- J. TREMAINE, B.A., M.A. (McMaster), Ph.D. (Pittsburgh) Honorary Lectur

# Department of Physics

- GEORGE M. VOLKOFF, M.B.E., M.A. (Brit. Col.), Ph.D. (Calif.), D.Sc. (B Col.), F.R.S.C., Professor and Head of the Department.
- GORDON M. SHRUM, O.B.E., M.M., E.D., M.A., Ph.D. (Toronto), D.Sc. (F Col.), F.R.S.C., Honorary Professor.
- A. J. BARNARD, M.Sc. (Rhodes, S.A.), Ph.D. (Glasgow), Professor.
- ROBERT BARRIE, B.Sc., Ph.D. (Glasgow), Professor.
- M. Bloom, M.Sc. (McGill), Ph.D. (Illinois), F.R.S.C., Professor.
- RONALD E. BURGESS, B.Sc., D.Sc. (London), F.R.S.C., Professor.
- R. W. Burling, M.Sc. (New Zeal.), Ph.D. (London), Professor.
- A. M. CROOKER, B.A. (McMaster), M.A., Ph.D. (Toronto), Professor.
- F. L. Curzon, B.Sc., A.R.C.S., D.I.C., Ph.D. (London), Professor.
- F. W. Dalby, B.Sc. (Alta.), M.A. (Brit. Col.), Ph.D. (Ohio State), Profe
- K. L. ERDMAN, B.A., M.Sc. (Alta.), Ph.D. (Brit. Col.), Professor.
- A. V. Gold, B.Sc. (Edin.), Ph.D. (Cantab.), Professor.
- G. M. Griffiths, B.A.Sc. (Toronto), M.A., Ph.D. (Brit. Col.), Professo
- HERBERT P. GUSH, B.E., M.A. (Sask.), Ph.D. (Toronto), Professor.
- FRIEDRICH A. KAEMPFFER, Dipl. Phys., Dr. Rer. Nat. (Göttingen), Profess
- D. L. Livesey, B.A., Ph.D. (Cantab.), Professor.

- KENNETH C. MANN, O.B.E., B.A. (Sask.), M.A., Ph.D. (Toronto), Professor.
- ROY NODWELL, B.E. (Sask.), M.A.Sc., Ph.D. (Brit. Col.), Professor.
- W. OPECHOWSKI, Mag.Fil. (Warsaw), F.R.S.C., Professor.
- GEORGE L. PICKARD, M.B.E., M.A., D.Phil. (Oxon.), F.R.S.C., Professor, Director of the Institute of Oceanography.
- M. H. L. PRYCE, M.A. (Cantab.), Ph.D. (Princeton), F.R.S., Professor.
- ROBERT W. STEWART, M.Sc. (Queen's), Ph.D. (Cantab.), F.R.S.C., Professor.
- E. W. Vogt, M.Sc. (Man.), Ph.D. (Princeton), Professor.
- J. B. WARREN, B.Sc., D.I.C., Ph.D. (London), F.Inst.P., F.R.S.C., Professor.
- B. Ahlborn, Dipl. Phys. (Kiel), Dr. Rer. Nat. (Munich), Associate Professor.
- S. Alexander, M.Sc. (Jerusalem), Ph.D. (Jerusalem and Weizmann Inst.), Visiting Associate Professor.
- J. W. BICHARD, B.A.Sc. (Toronto), Ph.D. (Notre Dame), Associate Professor.
- M. K. CRADDOCK, M.A., D.Phil. (Oxon.), Associate Professor.
- GARTH JONES, B.A., M.Sc., Ph.D. (Brit. Col.), Associate Professor.
- I. M. McMillan, M.Sc. (Brit. Col.), Ph.D. (McGill), Associate Professor.
- P. W. MATTHEWS, B.Sc., Ph.D. (Bristol), Associate Professor.
- P. RASTALL, B.Sc., Ph.D. (Manchester), Associate Professor.
- C. F. Schwerdtfeger, B.S. (Villanova), Ph.D. (Notre Dame), Associate Professor.
- W. L. H. Shuter, M.Sc. (Rhodes), Ph.D. (Manchester), Associate Professor.
- L. DE SOBRINO, M.Sc., Sc.D. (Mass. Inst. of Tech.), Associate Professor.
- B. L. White, B.Sc. (New Zeal.), D.I.C., Ph.D. (London), Associate Professor.
- D. Ll. WILLIAMS, B.Sc. (N. Wales), Ph.D. (Cantab.), Associate Professor.
- E. G. AULD, M.A.Sc. (Brit. Col.), Ph.D. (Southampton), Assistant Professor.
- D. A. AXEN, B.A.Sc., Ph.D. (Brit. Col.), Assistant Professor.
- D. A. Balzarini, B.S. (Michigan State), Ph.D. (Columbia), Assistant Professor.
- D. S. Beder, B.Sc. (McGill), Ph.D. (Cal. Tech.), Assistant Professor.
- M. J. CROOKS, B.A. (Reed), M.A. (Brit. Col.), Ph.D. (Yale), Assistant Professor.
- J. E. Eldridge, B.Sc., Ph.D. (Birmingham), Assistant Professor.
- J. F. R. Gower, B.A., Ph.D. (Cantab.), Assistant Professor.
- ROSALIA GUCCIONE-GUSH, B.Sc. (Palermo), M.Sc., Ph.D. (Brit. Col.), Assistant Professor.
- BETTY HOWARD, B.Sc. (London), D.Phil. (Oxon.), Assistant Professor.
- ROGER HOWARD, B.Sc., Ph.D. (Nott.), Assistant Professor.
- R. R. Johnson, B.Phys., M.S., Ph.D. (Minnesota), Assistant Profesor.
- H. LE BLOND, B.A. (Laval), B.Sc. (McGill), Ph.D. (Brit. Col.), Assistant Professor.
- Marko, B.S. (M.I.T.), M.S., Ph.D. (Syracuse), Assistant Professor.
- W. Martin, B.Sc., Ph.D. (Glasgow), Assistant Professor.
- MEYER, Dr. Rer. Nat. (Kiel), Assistant Professor.
- M. MIYAKE, B.S. (Drexel), M.S., Ph.D. (Washington), Assistant Professor.
- STEPHAS, B.S. (Wash.), M.S. (Rensselaer), Ph.D. (Oregon), Assistant Professor.
- J. Sykes, B.A. (Brit. Col.), M.A. (Calif.), Assistant Professor.

- B. G. Turrell, M.A., D.Phil (Oxon.), Assistant Professor.
- W. Westphal, Diplom-Physiker (Freiburg), Dr. Rer. Nat., Habil (Kiel), Visiting Assistant Professor.
- D. L. LINDQUIST, Instructor.
- D. L. McLeod, B.Sc. (Brit. Col.), Instructor.
- W. V. Olson, B.Sc. (Brit. Col.), Instructor.
- G. G. PAGE, B.Sc. (Victoria), M.A. (Brit. Col.), Instructor.
- ANN C. Gower, M.A., Ph.D. (Cantab.), Lecturer.
- G. D. Putt, B.Sc., Ph.D. (Melbourne), Lecturer.
- H. F. Batho, B.A. (McMaster), S.M., Ph.D. (Chicago), Honorary Lecturer.
- R. J. CLARK, B.A. (McGill), Ph.D. (Cantab.), Honorary Lecturer.
- G. M. Bailey, M.Sc. (Melbourne), Ph.D. (Austr. N.U.), Research Associate.
- P. C. Bhargava, B.Sc., M.Sc. (Rajasthan), Ph.D. (McMaster), Post-Doctoral Fellow.
- D. J. Boyle, B.S. (Loras College), Ph.D. (Iowa State), Postdoctoral Fellow.
- J. F. CAROLAN, A.B. (Princeton), Ph.D. (Maryland), Postdoctoral Fellow.
- M. J. Freeman, B.Sc. (Brit. Col.), M.S. (Cal. Tech.), Ph.D. (Brit. Col.), Post-doctoral Fellow.
- P. W. Hewson, B.Sc., Ph.D. (Oxon.), Postdoctoral Fellow.
- C. F. Hojvat, Licenciado en Fisica (Universidad Nacional de Cuyo), Ph.D. (Brit. Col.), Postdoctoral Fellow.
- N. Kumar, B.Tech. (Hons.), M.Tech. (Indian Institute of Technology, Kharagpur), Ph.D. (I.I.T., Bombay), Postdoctoral Fellow.
- K. C. Lee, B.S. (Seoul), Ph.D. (Wash.), Postdoctoral Fellow.
- W. McCutcheon, M.Sc. (Queen's), Ph.D. (Manchester), Postdoctoral Fellow.
- M. A. Olivo, Licenciado en Fisica (Universidad Nacional de Cuyo), Ph.D. (Brit. Col.), Postdoctoral Fellow.
- H. M. OMAR, M.Sc., Ph.D. (Cairo), Postdoctoral Fellow.
- M. SALOMON, M.S. (Argentina), Ph.D. (Uppsala), Postdoctoral Fellow.
- S. N. Sharma, B.Sc. (Agra), M.Sc., Ph.D. (Brit. Col.), Postdoctoral Fellow.
- Hugh Siefken, A.B. (Greenville, Illinois), M.Sc., Ph.D. (Kansas), Postdoctoral Fellow.
- K. K. Tam, B.A.Sc. (Toronto), B.Sc. (Windsor), M.S.E. (Michigan), Ph.D. (Windsor), Postdoctoral Fellow.
- R. THOMSON, B.Sc., Ph.D. (St. Andrew's), Postdoctoral Fellow.
- M. H. TINKER, B.A., D.Phil (Oxon), Postdoctoral Fellow.
- H. J. TRODAHL, B.S. (Moravian College, Penna.), M.S., Ph.D. (Michigan State), Postdoctoral Fellow.
- G. Vertogen, B.Sc. (Free Univ. of Amsterdam), Ph.D. (Groningen), Post-doctoral Fellow.
- J. E. D. Pearson, B.Com. (Brit. Col.), Assistant to Head of Department.
- J. LEES, Senior Instructor.

# Lecturers from the Department of Geophysics

M. W. Ovenden, B.Sc. (London), M.A. (Cantab.), Ph.D. (London), Professor of Astronomy.

- R. M. Ellis, B.Sc., M.Sc. (Western Ont.), Ph.D. (Alta), Associate Professor.
- T. J. Ulrych, B.Sc. (London), M.Sc., Ph.D. (Brit. Col.), Associate Professor.
- D. E. Smylie, B.Sc. (Queen's), M.A., Ph.D. (Toronto), Assistant Professor.

## Department of Zoology

- W. S. Hoar, B.A. (New Brunswick), M.A. (Western Ontario), Ph.D. (Boston), D.Sc. (New Brunswick and Memorial), F.R.S.C., Professor and Head of the Department.
- IAN McTaggart Cowan, B.A. (Brit. Col.), Ph.D. (Calif.), F.R.S.C., Professor and Dean of the Faculty of Graduate Studies.
- Peter A. Larkin, M.A. (Sask.), D.Phil. (Oxon.), F.R.S.C., Professor and Director of The Institute of Fisheries.
- JAMES R. ADAMS, M.Sc., Ph.D. (McGill), Professor.
- Brian McK. Bary, M.Sc., Ph.D. (New Zealand), Professor of Biological Oceanography.
- DENNIS H. CHITTY, B.A. (Toronto), M.A., D.Phil. (Oxon.), Professor.
- PAUL A. DEHNEL, M.A., Ph.D. (Calif.), Professor.
- CYRIL V. FINNEGAN, B.A. (Bates), M.S., Ph.D. (Notre Dame), Professor.
- H. D. FISHER, B.A., M.A. (Brit. Col.), Ph.D. (McGill), Professor.
- Kenneth Graham, B.A. (Brit. Col.), M.Sc. (McGill), Ph.D. (Toronto), Honorary Professor of Forest Entomology.
- C. S. Holling, M.Sc. (Toronto), Ph.D. (Brit. Col.), Professor.
- JULIUS KANE, B.A. (Brooklyn College), Ph.D. (New York), Professor.
- GEOFFREY G. E. SCUDDER, B.Sc. (Wales), D.Phil. (Oxon.), F.R.E.S., Professor.
- H. F. STICH, B.A. (Jena), Ph.D. (Wurzburg), Professor.
- C. B. Weld, B.A. (Brit. Col.), M.D. (Toronto), Visiting Professor.
- N. J. WILIMOVSKY, B.S., M.A. (Mich.), Ph.D. (Stanford), Professor of Fisheries.
- A. B. Acton, M.A., D.Phil. (Oxon.), Associate Professor.
- Nelly Auersperg, M.D. (Washington), Ph.D. (Brit. Col.), Associate Professor.
- JAMES F. BENDELL, B.A. (Toronto), Ph.D. (Brit. Col.), Associate Professor.
- IAN EFFORD, B.Sc. (London), D.Phil. (Oxon.), Associate Professor.
- Peter Ford, B.Sc., Ph.D. (London), F.Z.S., F.L.S., Associate Professor.
- A. G. Lewis, B.Sc., M.Sc. (Miami), Ph.D. (Hawaii), Associate Professor.
- J. D. McPhail, M.Sc. (Brit. Col.), Ph.D. (McGill), Associate Professor.
- T. G. Northcote, M.A., Ph.D. (Brit. Col.), Associate Professor.
- A. M. Perks, M.A. (Cantab.), (Oxon.), Ph.D. (St. Andrews), Associate Professor.
- J. E. Phillips, M.Sc. (Dalhousie), Ph.D. (Cantab.), Associate Professor.
- D. J. RANDALL, B.Sc., Ph.D. (Southampton), Associate Professor.
- D. Suzuki, B.A. (Amherst), Ph.D. (Chicago), Associate Professor.
- J. Mary Taylor, B.A. (Smith), M.A., Ph.D. (Calif.), Associate Professor.
- R. H. DRENT, M.A. (Brit. Col.), Ph.D. (Groningen), Assistant Professor.
- D. W. Francis, B.A. (Harvard), M.Sc., Ph.D. (Wisconsin), Assistant Professor.
- J. R. Harger, M.Sc. (Auckland), Ph.D. (Calif.), Assistant Professor.
- P. W. HOCHACHKA, B.Sc. (Alta.), M.Sc. (Dalhousie), Ph.D. (Duke), Assistant Professor.

- D. G. Holm, B.Sc. (Brit. Col.), Ph.D. (Connecticut), Assistant Professor (from September 1, 1969).
- MARY JACKSON, B.A. (Toronto), M.A. (Brit. Col.), Assistant Professor.
- H. E. KASINSKY, A.B. (Columbia College, N.Y.), Ph.D. (Calif.), Assistant Professor (from July 1, 1969).
- N. R. LILEY, M.A., D.Phil. (Oxon.), Assistant Professor.
- H. Nordan, B.S.A., M.A. (Brit. Col.), Ph.D. (Oregon State), Assistant Professor.
- S. T. Smith, B.Sc. (Cardiff), Ph.D. (Bristol), Assistant Professor.
- C. J. Walters, B.S. (Humboldt State), M.S., Ph.D. (Colorado State), Assistant Professor (from July 1, 1969).
- C. F. Wehrhahn, M.Sc. (Alberta), Ph.D. (Calif.), Assistant Professor.
- P. ELLICKSON, B.Sc., M.Sc. (Brit. Col.), Instructor.

MISS ALINE B. REDLICH, M.A. (Brit. Col.), Instructor.

Susan Chivers, B.A. (Cantab.), Part-time Lecturer.

MARYANNE R. HUGHES, B.A. (Harpur College), M.A., Ph.D. (Duke), Part-time Lecturer and Research Associate.

HEATHER C. NORTHCOTE, B.A. (Brit. Col.), Part-time Lecturer.

ANN O'RIORDAN, Ph.D. (Cantab.), Part-time Lecturer.

M. J. Smith, B.Sc. (St. Mary's College), Part-time Lecturer.

N. E. GILBERT, B.A. (Cantab.), Visiting Lecturer.

Meredith C. Gould, B.A. (Mount Holyoke), Ph.D. (Stanford), Teaching Post doctoral Fellow.

- S. W. Borden, B.Eng. Phys. (Cornell), Computer Analyst.
- P. J. BANDY, M.A., Ph.D. (Brit. Col.), Research Associate.

HILDA CHING, B.Sc., M.Sc. (Oregon State), Ph.D. (Nebraska), Researc Associate.

- N. J. Antia, B.Sc. (Bombay), Ph.D. (Zurich), Research Associate.
- R. W. PARKER, B.Sc. (Washington), Ph.D. (Brit. Col.), Research Associate.
- W. E. VAN STONE, Ph.D. (McGill), Research Associate.
- D. M. CAMERON, B.S. (Maine), Ph.D. (Calif.), Postdoctoral Fellow.
- R. W. Davies, Ph.D. (Bangor), Postdoctoral Fellow.
- M. W. Dick, Ph.D. (London), Postdoctoral Fellow.
- G. K. Gruendling, B.S. (Springfield), Ph.D. (New Hampshire), Postdoctor Fellow.
- J. F. LEATHERLAND, B.Sc. (Sheffield), Ph.D. (Leeds), Postdoctoral Fellow.
- G. N. Somero, B.A. (Carleton), Ph.D. (Stanford), Postdoctoral Fellow.
- J. STIMSON, B.A. (Occidental), Ph.D. (Calif.), Postdoctoral Fellow.
- J. Sibert, B.A. (Univ. of Pacific), Ph.D. (Columbia), Postdoctoral Fellow.
- M. J. WINTERBOURN, M.A. (Auckland), Ph.D. (Massey), Postdoctoral Fello
- J. R. CALPRICE, M.Sc., Ph.D. (Calif.), Honorary Lecturer.

# THE FACULTY OF SCIENCE

The Faculty of Science offers courses leading to a B.Sc. degree in the following fields: Astronomy, Biochemistry, Biology, Botany, Chemistry, Geology, Geophysics, Mathematics, Microbiology, Physics, Physiology, Zoology. For information concerning the degrees of M.Sc. and Ph.D. see the Faculty of Graduate Studies calendar.

Students may proceed to the B.Sc. degree in one of three programmes:

Honours Programme: This is a programme of intensive specialization in a single field or a combination of fields. The Honours programme offers the normal entry into Graduate School. It requires maintenance of a high academic standing and may involve preparation of a graduating thesis.

Major Programme: This programme involves specialization in a single field. It may lead to graduate study (if sufficiently high standing is obtained), to additional study in the Faculty of Education or to employment in industry or government.

General Programme: This programme is designed for students wishing to obtain a broad education in science. The programme is not recommended for students intending to proceed into graduate work, however, by proper selection of courses and with a sufficiently high standing it is possible to gain admission to graduate studies from this programme. Normally it would be necessary to complete additional course work in a specialized field of study before completion of a graduate programme.

Note: Students who began a Bachelor's programme prior to the 1964/65 Session and who have not completed their degree requirements prior to the 1968/69 Session must transfer to and meet the course requirements of one of the above programmes to qualify for the B.Sc. degree.

# **Admission Requirements**

Secondary School students should prepare themselves for admission to the aculty of Science by presenting a Sciences Specialty on the Academic-Technial Programme for Senior Secondary School graduation.

Students from secondary schools in British Columbia planning to enter ne Faculty of Science at the University of British Columbia are strongly dvised as a minimum to have completed satisfactorily Chemistry 11, Mathenatics 12, Physics 11 and Biology 11. In addition, a student must have one Biology 12, Chemistry 12, or Physics 12 and, if possible, this course should chosen in the proposed area of specialization at the University. Students will not that without the equivalent of Chemistry 11 and Physics 11, as minimum, they may face major difficulties in meeting all the requirements First Year of the Faculty of Science and will find it particularly difficult complete in a minimum period of time a Major or Honours programme in the period of the Faculty of splied Science.

Grade 13 students should take English 100/1, Mathematics 113, Chemistry 2, Physics 101 and one of Botany 105 or Zoology 105. (Biology 12 should taken as an extra in Grade 13, if possible, if one of these other courses is not iilable).

Students planning to enter the University from Grade 13 in British lumbia should note that Biology 100 will not be accepted for credit in the ulty of Science. Depending upon his interest, a student should elect any 105 or Zoology 105, either of which will be accepted for credit as

equivalent to Biology 101 and be accepted as a prerequisite for admission to advanced courses in Botany, Microbiology, Physiology, and Zoology.

Students planning to enter the University from Grade 13 should also note that Chemistry 112 will be accepted for unit credit in the Faculty of Science as equivalent to Chemistry 103. However, Chemistry 112 will not be accepted as equivalent to Chemistry 110 or 120, except that a student with very high standing in Chemistry 112 may, with the permission of the Head of the Department of Chemistry, be allowed to proceed to courses for which Chemistry 110 is the normal prerequisite. Otherwise, unless a student has a high standing in Chemistry 112, he will be required to take Chemistry 110 or Chemistry 120 without unit credit before he can proceed on a Major or Honours programme in Chemistry. Chemistry 112 may, as Chemistry 103, be used as prerequisite to Chemistry 230.

Physics 101 will be accepted for credit as equivalent to Physics 110 or 130, but not Physics 120.

Mathematics 112 will be accepted for unit credit in the Faculty of Science as equivalent to Mathematics 130; Mathematics 113 will be accepted for unit credit as equivalent to Mathematics 100 and 121. A student who hopes to earn the B.Sc. degree will be seriously handicapped if he enters the Faculty of Science with only Mathematics 112. A student must have the equivalent of Mathematics 100, 120 and 121 to take a major or honours programme in Mathematics. For most other programmes in the Faculty of Science Mathematics 100 and 121 are required.

## Registration and Admission

The following is a summary only of the registration procedures for science students. Complete information may be obtained from the brochure mailer to the student with his authorization to register form.

- a) First-year students: All first-year students must consult an advisor designated by the Dean. Students may apply in person or by mail to the Dean's offic for programme approval at any time after receipt of the authorization to registe form up to and including August 29th. The scheduling of courses and completion of registration for first-year students will be carried out during the registration period September 2-6.
- b) Second, Third, and Fourth-year students: Students proposing to unde take an honours, pre-honours or major programme must consult a department advisor designated by the department of their field of specialization. Studen planning to undertake a general programme must consult an advisor designate by the Dean. Returning students are advised to obtain programme advice before the end of the spring term. Students in the Faculty of Science who wish pre-register may do so by submitting their proposed programme to the apprepriate advisor by mail or in person during the period July 2 to July 16 inclusion at other times by appointment with the appropriate advisor. Students we apply after July 16 may have their programmes approved, but scheduling a other registration procedures must be completed in person during the regist tion period September 2-6.
- c) All Years: After September 19, except in very special circumstances  $\varepsilon$  with the permission of the Dean, no student may change the programme which he has registered.

All changes in registration must be made by the student at the registrar's of Changes in programme must be approved by the Dean before submissior the registrar's office. A student may not take courses for which he has not re

tered, and will be considered as having failed in all courses dropped without permission.

### Summer Session and Other Credits

- 1. Although the B.Sc. degree is normally granted on completion of the required units in the winter session, credits obtained in summer session may be combined with those obtained in winter session to complete the required number of units.
- 2. The maximum credit for summer session work in any one calendar year is 6 units. It is not possible, however, to take two laboratory science courses in the same summer session.
- 3. The maximum credit for work other than that of the winter and summer sessions is 3 units in each academic year, not exceeding a total of 15 units subsequent to Grade 13 or First Year.
- 4. No credit will be granted for work done at colleges or other universities in the same academic year in which work has been attempted in this University, whether in the summer session, the winter session, or otherwise. Extra-mural work done at colleges or other universities prior to registration at this University may be accepted, if approved by the Dean, but may not exceed 3 units in respect of any one academic year or a maximum of 15 units subsequent to Grade 13.
- 5. Students in attendance at the University of British Columbia may not register for extension or correspondence work to be taken concurrently.

## General Regulations

- 1. Students who are accepted by transfer from other institutions must complete all further courses at the University of British Columbia. The University will normally not grant a degree for residence of less than two regular winter sessions or the equivalent. All students must complete the Final Year in residence at the University of British Columbia.
- 2. Without special permission of the Dean, no student may take more than 18 units or less than 12 units in each winter session. Any student taking fewer than 15 units in the winter session will not be eligible for scholarships or loans in that session, and may encounter timetable difficulties in subsequent years.
- 3. Students may not receive University credit for courses passed for Secondary School Graduation whether taken among the required credits or as extra subjects. Advanced placement is possible where appropriate, and the student should consult the department concerned.
- 4. Students are responsible for ensuring that their courses have been chosen in conformity with Calendar regulations. Students normally complete requirements in accordance with regulations in effect when they first registered. Students who have interrupted their studies must consult the Dean as to the further studies required of them.
- 5. Students applying for admission on the basis of educational documents issued outside the province of British Columbia are subject to an application fee of \$10.

## Examinations

I. Examinations in the winter session are held in December and April. In December they are held in First and Second Year courses, and except where special exemption has been granted by Faculty, in all upper year

courses. In April they are held in all courses except those final at Christmas. These examinations are obligatory for all students.

- 2. Applications for special consideration on account of illness or domestic affliction must be submitted in writing to the Dean as promptly as possible after the close of the examination period.
- 3. In any science course which involves both laboratory work and written examinations, students will be required to complete and make satisfactory standing in both parts.
- 4. Departments have the right to bar entrance to their third year courses to students who obtained only 50% in a second year prerequisite course in that department.

### Standing and Credit

- 1. Candidates taking at least 15 units of work, and obtaining at least 50% in each subject, will be graded as follows: First Class, an average of 80% or over; Second Class, 65 to 80%; Pass, 50 to 65%
- 2. Determination of degree standing will be based on the required courses for the honours or major rather than upon all the courses of the final two years
- 3. (a) A student taking 9 units or more who passes courses totalling less than 9 units in the winter session, will not receive unit credit for any of the courses passed, but will not be required to repeat a passed course. However, if the student wishes, he may repeat the course to raise his standing of to obtain unit credit for the course.
- (b) A student taking an approved partial programme of fewer than units in the winter session will receive credit for a course only if, as a result of the final examinations of that session, he passes in all his courses. A student may be denied a passing mark, however, for unsatisfactory work during the session.
- (c) A student in the summer session or in extra-sessional or correspondence courses will receive credit for each course in which he obtains grade of at least 50%. A student may be denied a passing mark, however, for unsatisfactory work during the session.
- 4. No course may be repeated more than once without special permissic of the Dean.
- 5. A student who fails his year but passes in one or two courses does r receive unit credit for these courses, but can consider the subject matt completed and may go on to more advanced work in the subject passed if is permitted to re-enroll in the Faculty.
- 6. Term essays, laboratory reports and examination papers may be refus a passing mark if they are deficient in English.

### **Examination Results**

Results of the sessional examinations in April are mailed to students the graduating classes about the time of Congregation, and to students in lower years by approximately June 15. Any student who must meet an apcation date for another institution prior to June 15 should inform the transc clerk in the Registrar's Office in order that arrangements may be made to n the dead-line.

### Review of Assigned Standing

Reviews of assigned standing are governed by the following regulation

1. Any request for the review of an assigned grade, other than for

supplemental examination (in which a request for a review will not be granted), must reach the Registrar within four weeks after the announcement of examination results and must be accompanied by a fee of \$5.00 for each course concerned which will be refunded only if the mark is raised.

- 2. Each applicant for a review must state clearly why he believes the course deserves a higher grade than it received; pleas on compassionate grounds should not form part of this statement. Prospective applicants should remember that an examination with less than a passing mark has been read at least a second time before results are announced. For this reason an applicant granted a supplemental should prepare for the examination since a change in the original mark is unlikely and the result of the review may not be available before the end of the supplemental examination period. A review will not be granted where the standing originally assigned is consistent with the student's term work and record in other subjects.
- 3. Reviews will not be permitted in more than two courses (6 units) in the work of one academic year, and in one course (3 units) in a partial course of 9 units or less or in the work of one summer session.

## Supplementals

- 1. Supplementals are not a right but a privilege granted by the Dean after a consideration of a student's complete academic record. A student who has written final examinations but failed a course or courses in the Winter or Summer Session, or an extra-sessional correspondence course, may be granted permission to write supplementals.
- (a) In the Winter Session, normally the student must have (i) written the final examination and obtained at least 40% standing in the course in which the supplemental is granted, and (ii) obtained a 60% average in 9 units of course work in the same academic session.
- (b) In the summer session, a candidate will be granted a supplemental in a subject which he has taken during that session provided (i) he has written the final examination and has obtained a final mark of not less than 40%, and (ii) he has obtained 3 units of credit in that session.
- (c) In an extra-sessional or correspondence course, a student will be granted a supplemental in a subject in which he has obtained a final mark of not less than 40%.
- 2. If a supplemental granted in a course is passed with a grade of at least 50%, credit will be given for the course. In the computation of the overall average in the work of a session or for a degree, the grade in a supplemental, if passed, will be considered as 50%. Similarly the overall average will not be changed if a subject already passed is written for higher standing.
- 3. In all but the Final Year a candidate who has been granted a supplemental may write it only once. If he fails, he must repeat the course or take a permissible substitute. In the Final Year he may write it twice.
- 4. Supplemental examinations, covering the work of both the first and second terms, will be held in August in respect of winter session examinations. Supplemental examinations for summer session students will be held in December.
- 5. If a student, because of exceptional circumstances, is permitted to postpone a supplemental beyond the first regular supplemental examination period, he will be responsible for the content of the course as currently offered. If the course is not offered or has been discontinued, the supplemental privilege will be cancelled. Attention is also drawn to section 3 ander "Standing and Credit".

6. Supplemental examinations may be written in August at the following centres: Cranbrook, Dawson Creek, Kamloops, Kitimat, Ocean Falls, Penticton, Powell River, Prince George, Prince Rupert, Trail, Victoria; and at Whitehorse, Y.T. Other centres outside of British Columbia are restricted to universities or their affiliated colleges.

In unusual circumstances a student working in a remote area may be permitted to write supplemental examinations at a special centre if satisfactory arrangements can be made. Since permission is contingent on completion of arrangements, only early applications will be considered.

7. The fee for each supplemental examination written at the University is \$7.50; at a regular outside centre, \$10.00; at a special centre, \$20.00. In the event that a candidate does not appear for an examination a refund will be authorized only if, within 10 days after the scheduled examination, the candidate submits to the Registrar an adequate explanation for the failure to write the examination; if such refund is made, it will be \$5.00.

Applications for supplemental examinations in respect of the winter session examinations, accompanied by the necessary fees, must be in the hands of the Registrar by July 8.

### Unsatisfactory Standing

- 1. A student with standing defective in respect of more than 3 units, although he will not be permitted to register in a higher year, may be allowed to continue by registering in the lower year and taking courses in accordance with section 3 under "Standing and Credit".
- 2. A student required to withdraw from another faculty may be permitted to register only by special permission. A student with unsatisfactory standing from another institution will not be admitted.
- 3. A student who fails in the first year of University following Grade 12 will not be permitted to re-enrol at University to repeat the studies of that year. Consideration will be given to re-admitting a student in this category following his satisfactory completion of at least two semesters at a junior college or its equivalent.
- 4. A student in the First Year who obtains credit for only nine units on a full programme will be re-admitted on probation but during the subsequent session may be required at any time to withdraw for unsatisfactory progress.
- 5. A student who passes in fewer than six units in Second Year will not be permitted to enrol to repeat the studies of that year. Consideration will be given to re-admitting a student in this category following his satisfactory completion of at least two semesters at a junior college subsequent to his failure at University.
- 6. A student at any level of University study who fails for a second time, whether in repeating a year or in a later year, will be required to withdraw from the University; he may be re-admitted after a period of at least one year if his appeal to Senate is supported by the Committee on Admissions of the Faculty concerned and upheld by Senate.
- 7. Any student whose academic record, as determined by the tests and examinations of the first term, is unsatisfactory, may be required to discontinue attendance at the University for the remainder of the session.

# Transcript of Academic Record

A transcript of a student's academic record will, on request of the student, be mailed direct to the institution or agency indicated in the request. An

official transcript will not be given to a student except in special circumstances when the transcript will be issued in a sealed envelope carrying the inscription "official transcript only if presented with seal unbroken". On graduation or withdrawal a student may obtain for his own use a copy of his record marked "unofficial".

Each transcript must include the student's complete record at the University of British Columbia. Since credit earned is determined on the results of the sessional examinations a transcript will not include results of midterm examinations.

Student records are confidential. Transcripts are issued only at the request of students or appropriate agencies or officials.

No transcript will be issued to or for a student who has not made arrangements satisfactory to the Accountant's Office to meet any outstanding indebtedness.

Granted Honourable Discharge indicates that the student is in no disciplinary difficulty at the time the transcript is issued; the term has no reference to scholastic status.

Application for a transcript should be made at least one week before the document is required.

Fees for transcripts of academic record: first one free-of-charge, except following graduation when the first three are free-of-charge; additional transcripts \$1.00 each, except that when two or more additional copies are ordered at one time the fee shall be \$1.00 for the first and 25 cents for each remaining copy. Fees for transcripts are payable in advance; transcripts will not be provided until payment is received.

#### Fees\*

First Term Fees, \$243 (includes A.M.S. fee of \$29), payable in full at the time of registration. However, students may pay full fees of \$457 at time of registration. Fourth Year students are assessed an additional \$7 to cover graduation fee.

Second Term Fees, \$214, payable in full on or before the first day of lectures in the second term. Students should mail cheques for second term fees to the Finance Department before this date with a note showing name and registration number.

Partial Courses—See General Information bulletin.

Application fee of \$10—this fee is assessed all applicants seeking admission on the basis of educational documents issued by institutions outside of British Columbia; this fee is not refundable.

\*Subject to change without notice.

#### Financial Assistance

A list of Fellowships, Scholarships, Bursaries and Loans open to students in the University will be found in the publication "Awards and Financial Assistance" which may be obtained from the Registrar's office. For details, consult this publication. In general, application must be made to the Dean of Inter-Faculty and Student Affairs.

## Graduation

Every candidate for a degree must make formal application for graduation. Application for graduation must be made not later than March 15. Special forms for this purpose are provided by the Registrar's office.

### Attendance

Regular attendance is expected of students in all their classes (including lectures, laboratories, tutorials, seminars, etc.). Students who neglect their academic work and assignments may, on the recommendation of the Head of the Department, be excluded by the Dean of the Faculty from the final examinations. Students who are unavoidably absent because of illness or disability should report to their instructors on return to classes.

Students who because of illness are absent from a December or April examination must submit a certificate, obtained from a doctor, to the University Health Service as promptly as possible.

#### Withdrawal

Any student who after registration decides to withdraw from the University must report to the Dean and to the Registrar's Office. He will be required to obtain clearance from the Dean and the Registrar before being granted *Honourable Dismissal* or recommended, where applicable, for refund of fees. (See the General Information bulletin.)

The Senate of the University may require a student to withdraw from the University at any time for unsatisfactory conduct, for failure to abide by regulations, for unsatisfactory progress in his programme of studies or training, or for any other reason which is deemed to show that withdrawal is in the interests of the student and/or the University.

### COURSES LEADING TO THE DEGREE OF B.Sc.

## General Requirements

- (a) For graduation in the General and Major programmes at least 60 units, and for Honours at least 66 units, of course work are required.
- (b) Of the above 60 or 66 units required for the degree, at least 36 units must be in courses offered by Departments in the Faculty of Science, and of these 36 units at least 15 units must be in courses numbered 300 or higher.
- (c) Of the above 60 or 66 units required for the degree, at least 9 units (including English 100) must be in courses offered by the Faculty of Arts.
- (d) Only courses offered by the Faculty of Science or the Faculty of Arts may be counted for credit towards a B.Sc. degree, except as specified in the list of "Courses from Other Faculties" (see p. T93), or in individual cases with the permission of the Dean of the Faculty of Science.
- (e) Not more than 9 units in courses numbered less than 300 may be counted for credit in the combined Third and Fourth Years of any B.Sc. programme.
- (f) In approving a student's programme, Faculty requirements must be given preference to Departmental requirements.

### The First Year

English 100, Mathematics 100 and 121, Chemistry 110 (120 or 103), Physics 110 (120 or 130) and an elective from the following (see p. T91 for descriptions of those courses offered by the Faculty of Arts):

Anthropology 100 Asian Studies 205, 206, 215 Biology 101 Chinese 100 Classical Studies 100 Creative Writing 202 Economics 100, 101 Fine Arts 125 French 100, 110 or 120, 115, 210 Geography 101, 102 Geology 105 German 100, 110 or 120 Greek 100 Hebrew 100 History 100-199 Italian 100 Japanese 100 Latin 100, 110 or 120 Music 100, 107, 120 Philosophy 100 Polish 110 Psychology 100 Russian 100, 110 Sociology 100 Spanish 100 Theatre 120

### Notes:

- (1) Certain Major and Honours programmes require that the additional course in the First Year be another course in a science. Specifically, Biology 101 is required in the First Year for a Major or Honours in the Life Sciences (Biochemisty, Biology, Botany, Microbiology, Physiology and Zoology); and Geology 105 is required for a Major or Honours in Geology or Geophysics. Students of good ability, especially those who wish to satisfy the prerequisites for a Major or Honours in two or more of the Life Sciences and Geological Sciences, are encouraged to take 18 units.
- (2) Students intending to do graduate work in the Sciences are reminded that competence in the reading of scientific literature in one or two foreign languages is usually required. For a Major or Honours in Mathematics, one course at the University level in a language other than English, chosen in consultation with the Department, is required before the graduating year.
- (3) Advanced credit or advanced placement may be granted where appropriate when any or all of these courses are completed by Grade 13 or equivalent.

# The Second and Higher Years

# (a) Honours Programme

A student must consult with the Department at the beginning of the Second Year and each subsequent year concerning the Honours Programme and the choice of courses. An average standing of at least 65% must be obtained in each year to remain in an Honours Programme. The sequence of courses is listed under each department in the calendar.

# (b) Major Programme

Students should select courses in consultation with departmental advisors at the beginning of the Second Year and each subsequent year. The sequence of courses is given under departmental headings in the calendar.

# (c) General Programme

A student in the General Programme who has completed the First Year must select his courses as follows:

- (1) At least one of Biology 101 or Geology 105 (if not already taken in First Year).
- (2) Of the minimum number of units in courses numbered 300 and above required in the Third and Fourth Years, at least 9 units must be taken in one department, at least 3 units in a second, and at least 3 units in a third department of the Faculty of Science.

Students intending to enter the Faculties of Applied Science, Forestry, Medicine, Dentistry, and Pharmacy should consult the calendars of these Faculties for entrance requirements.

Students in the Faculty of Arts should note that the following courses in Science may be of special interest to them in meeting their science requirements: Biology 101, 310, Botany 310, Geophysics 310, Mathematics 204, Physics 130, and Zoology 400.

## Combined B.Sc. degree and M.D. or D.M.D. degree programme

Students who have completed three years in the Faculty of Science and the first year in the Faculty of Medicine or the Faculty of Dentistry at this university, and who have completed all the course requirements for the B.Sc. degree, including up to 15 units of course work in the Faculty of Medicine or the Faculty of Dentistry recognized for credit in the Faculty of Science, may on application and with approval of the Dean of Science receive the appropriate B.Sc. degree.

Students registered in the first year of the Faculty of Medicine or the Faculty of Dentistry who have already obtained satisfactory standing in Biochemistry 400 (or the equivalent) and Physiology 400 (or the equivalent) may with approval of the Dean of Medicine or the Dean of Dentistry substitute equivalent units of other course work. Students expecting to qualify for an Honours B.Sc. degree in Biochemistry, Physiology or other science department must, in addition, meet the Honours requirement of that department and obtain the prior approval of the head of the science department concerned.

### Combined Biology and Forest Biology programme

A programme leading to the B.Sc. degree with combined honours in Biology and Forest Biology has been developed by the Faculty of Science and the Faculty of Forestry for students primarily interested in research and teaching in this field and planning to proceed to graduate work (see p. T54 for details of programme).

### **COURSE NOTATIONS**

The number of units assigned to a course is given in round brackets immediately following the course number. Thus 200 (3) under Chemistry indicates that Chemistry 200 is a three-unit course.

The hours assigned for laboratory, lectures and tutorials in a course are indicated as follows:

2 lectures and 3 hours laboratory per week, both terms.	[2-3; 2-3]
l lecture and 2 hours laboratory per week, first term.	[1-2; 0-0]
1 lecture and 2 hours laboratory per week, second term.	[0-0; 1-2]

2 lectures, 3 hours laboratory and 2 hours tutorial or discussion per week, both terms. [2-3-2; 2-3-2]

An asterisk (\*) indicates alternate weeks.

### COURSES OFFERED IN THE FACULTY OF SCIENCE

## Astronomy

The Department of Geophysics offers opportunities for study in Astronomy at the bachelor's, master's and doctoral levels. For information on the M.Sc. and Ph.D. degree courses, see the Graduate Studies calendar.

Requirements for the B.Sc. degree in Astronomy:—

	Major		Combined Honours Astronomy and Physics	
I R S	Mathematics 100 Mathematics 121 Physics 120 (or 110) Chemistry 120 (or 110 or 103) English 100 Elective*	(2) (1) (3) (3) (3) (3)	For Students presenting Physics 12 (or 92):† Physics 120 Mathematics 100 Mathematics 121 Chemistry 120 (preferably), or 110 or 103 English 100 Non-Science Elective	(3) (2) (1) (3) (3) (3)
		(15)	Total Units	(15)
SECOND	Mathematics 200 or 221 Mathematics 202 or 220 Physics 200 Physics 219 Elective** Elective	(3) (3) (2) (1) (3) (3)	Admission Requirements: A pass from First Year, with at Second Class standing in P 120, Mathematics and Chemist Physics 204 Physics 209 Physics 220 Mathematics 220 Mathematics 221 Science Elective** Non-Science Elective	least
st.		(15)	Total Units	(18)
	Geophysics 302 or Astronomy 200 Astronomy 320 Mathematics 300 or 321 or 323 Physics 300 Physics 319 Elective	(3) (3) (3) (2) (1) (3)	Astronomy 320 Mathematics 323 Physics 301 Physics 302 Physics 306 Physics 308 Physics 309 Physics 310	(3) (3) (2) (1) (2) (2) (1) (1)
		(15)	Total Units	(15)

F Physics 400	(3)	Astronomy 421	(3)
O Physics 308	(2)	Mathematics 423	(3) (3)
U Physics 318	(1)	Physics 401	(2)
R Astronomy 321/331	(3)	Physics 402	(2) (2)
T Astronomy 420	(3)	Physics 403	(3)
H Geophysics 406	(1)	5 units from:	• •
Elective	(2) or $(3)$	Astronomy 321	(2)
	., .,	Astronomy 331	(1)
		Astronomy 449	(1-3)
		Physics 409	(3)
		Physics 349/449	(1-3)
	(15)	m . 1	(10)
	(15) or (16)	Total Units	(18)

<sup>\*</sup>Students wishing to preserve entry into either Astronomy or a Geophysics programme should take Geology 105.

†Students without Physics 12 (or 92) may enter this programme by taking a modified First and Second year (see Physics Department).

- 200. (3) Astronomy.—Celestial sphere; dynamics of the solar system; sun, moon, planets, comets, meteorites; age and origin of solar system; structure of the galaxy; elementary cosmology. Textbook: Abell, Exploration of the Universe. Prerequisite: First Year Physics course. Mathematics 202 or 220 (concurrently). [3-0; 3-0]
- 320. (3) Astronomical Dynamics.—Analysis of the two-body problem applied to the motions of actual planets; artificial satellites and space-probe problems; precession and nutation; dynamics of binary stars; stability of star clusters; dynamics of the galaxy with brief introduction to non-gravitational forces. Prerequisites: Physics 200 or equivalent. Mathematics 300 or equivalent (concurrently). [3-0; 3-0]
- 321. (2) Astronomical and Astrophysical Measurements.—Theory of: measurement of stellar positions and motions; time systems, stellar photometry and spectrophotometry; principles of radio astronomy; design of astronomical instruments. Prerequisites: Physics 200 or equivalent, Mathematics 300 or equivalent (concurrently if necessary). [2-0; 2-0]
- 331. (1) Astronomical Laboratory:—Measurement of stellar astrographic plates, and stellar photographic photometry; photoelectric photometry; spectral type and luminosity classification; measurement of radial velocity and rotation; determination of chemical abundances in stellar atmospheres. Prerequisites: Astronomy 321 and/or Physics 308 (concurrently if necessary).

[0-3; 0-3]

- 420. (3) Review of Modern Astronomy.—A critical review of the present state of observational astronomy, from the solar system to the extragalactic nebulae (including observations at radio wavelengths and from satellites). Prerequisites: Mathematics 202 or 220, Physics 400 (or equivalent) (taken concurrently if necessary). [3-0; 3-0]
- 421. (3) Principles of Modern Astronomy.—An introduction to the interpretation of astronomical observations through physical principles. Topics include the internal structure of the Earth and planets; the solar atmosphere and solar wind; the origin of stellar spectra; stellar energy generation; interstellar matter; cosmology. (This course is intended for honours students,

<sup>\*\*</sup>Recommended—Astronomy 200.

and for graduate students with no formal astronomical instruction.) Prerequisites: third year Physics honours course, or equivalent. [3-0; 3-0]

449. (1-3) Directed Research in Astronomy:—(If elected for 3-unit credit, a thesis will be required.)

## **Graduate Courses**

- 501. (2) Topics in Geophysics and Astronomy.—This course is required of all graduate students enrolled in the Department of Geophysics. They will choose, in consultation with their supervisors, six of the eight topics: Astronomy, Cosmogony, Aeronomy, Geomagnetism, Seismology, Isotope Geophysics, Physics of the Earth's Interior, and Tectonophysics. Each of the eight sections will occupy about three weeks of lectures.
- 515. (1-2) Stellar Structure and Evolution.—Stellar models, cosmochemistry, and related problems.
- 561. (1-2) The Basic Data of Astronomy.—A critical survey of the accuracy of such basic data as stellar masses, luminosities, temperatures, distances, etc., with emphasis on the most important fields for future work.
- 562. (1-2) Stellar Spectroscopy and Stellar Atmospheres.—Quantitative measurement of stellar spectra, and the physical basis for the interpretation of such measurements.

# Chemistry

The department offers opportunities for study leading to bachelor's, master's and doctoral degrees. For information regarding facilities for graduate study see the Graduate Studies calendar.

It is assumed that all students entering courses of the Department have passed Chemistry 11 or the equivalent; those who have not must consult the Department before registering. All students who intend to take Honours or to major in Chemistry must consult the Head of the Department before registration each year.

Requirements for the B.Sc. degree:

Honours			
First Year		Second Year	
Chemistry 110 or 120 Mathematics 100 and 121 Physics 110 or 120	(3) (3) (3)	Chemistry 203 (1) Mathematics 202 (or 220) (2) Physics 200 and 219	(3) (3) (3)
English 100 Additional units	(3) (3)	Optional additional elective from: Mathematics 200 (or 221) Physics 209, 210 or 220 or other approved	(3)
	(15)	courses. Additional units  (1)  * Physics 209 also required if Physics 204 chosen.	(3) (3) (8)

Third Year		Fourth Year	
Chemistry 303 Chemistry 304 Chemistry 310 Chemistry 311 Chemistry 312 Chemistry 315 Chemistry 324 Mathematics 300 or 323 Additional units	(2) (2) (1) (2) (2) (2) (1) (3) (3) (18)	Chemistry 401 Chemistry 403 Chemistry 404 Chemistry 407 Chemistry 415 Chemistry 449 *Additional Chemistry units Additional units	(1) (1) (1) (2) (3) (3-6) (3-0) (15)

\*Chosen from Chemistry 410, 411, 413,

Note: Reading knowledge of French, German or Russian is highly desirable. Students who have taken French in High School should take German or Russian.

	Ma	ijor .	
First Year Chemistry 110 or 120 Mathematics 100 and 121 Physics 110 or 120 English 100 Additional units	(3) (3) (3) (3) (3) (15)	Second Year Chemistry 210 or 220 Chemistry 203 Mathematics 202 Physics 200 and 219 Additional units	(3) (3) (3) (3) (3) (15)
Third Year Chemistry 304 Chemistry 310 Chemistry 320 Chemistry 324 Mathematics 300 *Additional units	(2) (2) (1) (1) (3) (6)	Fourth Year Chemistry 311 Chemistry 312 Chemistry 321 *Chemistry 330 or **Chemistry 403 and 423 ***Additional Chemistry units Additional units	(1) (2) (1) (3) (2) (2-3) (6) (15)

May include Chemistry 303, 311 and 321 or 330. Note: Major students who have satisfactory academic standing may be permitted to enrol in Chemistry 449 Seminar and Thesis after receiving the permission of the Head of the Department.

<sup>\*</sup>If not taken in third year.

<sup>\*\*</sup>If 303 was taken in third year.

<sup>\*\*\*</sup>Chosen from one-unit fourthyear courses.

Combined (	Chemistry	and Physics Honours	
First Year Chemistry 110 or 120 Mathematics 100 and 121 Physics 110 or 120 English 100 Additional units	(3) (3) (3) (3) (3)	Second Year Chemistry 210 or 220 Chemistry 203 Physics 204 Physics 209 Physics 220 (or 210) Mathematics 220 (or 202) Additional units	(3) (3) (3) (1) (2) (3) (3)
Third Year Chemistry 304 Chemistry 310 Chemistry 312 Chemistry 320 Chemistry 324 Physics 301 Physics 308 Physics 309 Physics 310 Mathematics 300 (or 323)	(2) (2) (2) (2) (1) (1) (2) (2) (1) (1) (3)	Fourth Year Chemistry 401 Chemistry 404 Chemistry 407 Chemistry 427 *Chemistry additional units Physics 402 (or 452) (2) Physics additional units (5) Mathematics 410	(18) (1) (1) (1) (1) (2) or (3) or (4) (3)

<sup>\*</sup>Chosen from one-unit fourth-year courses.

Combined Ch	emistry an	d Mathematics Honours	
First Year		Second Year	
Chemistry 110 or 120 Mathematics 100 and 121 Physics 110 or 120 English 100 Additional units	(3) (3) (3) (3) (3) (3)	Chemistry 210 or 220 Chemistry 203 Mathematics 220 Mathematics 221 Approved Physics Course Elective	(3) (3) (3) (3) (3) (3) (18)
Third and Fourth Yea 15 units in Chemistry and in Mathematics in cons with the Departments con	18 units sultation		

- 103. (3) General Chemistry.—A study of the fundamental principles of chemistry including the molecular structures of both inorganic and organic compounds. Prerequisite: Mathematics 12 (or Mathematics 130 concurrently); Physics 11 or its equivalent is strongly recommended. [3-3; 3-3]
- 110. (3) Principles of Chemistry.—A study of the fundamental principles of chemistry with particular reference to the nature of solutions, the solid state and the molecular structure of both inorganic and organic substances. This course is intended for prospective Science and Engineering students who have not taken Chemistry 12. Prerequisites: Chemistry 11, Physics 11. Mathematics 100 and 121 and a first year Physics course 110 or 120 must precede or be taken concurrently.

  [3-3-1; 3-3-1]
- 120. (3) Principles of Chemistry.—Similar to Chemistry 110 but the subject matter is treated in somewhat more detail. This course is intended for those prospective Science and Engineering students who have taken Chemistry 12. Prerequisites: Chemistry 11 and 12, Physics 11. Mathematics 100 and 121 and a first year Physics course (110 or 120) must precede or be taken concurrently.

  [2-3-1; 2-3-1]

# Primarily for Second Year Students

Note: Students who have not taken a first year Chemistry course at the

<sup>\*</sup>Chemistry 303 if 203 taken in second year.

- University of British Columbia are assumed to have read Sienko and Plane, Chemistry, 3rd Edition (for students entering 205 or 230) or Mahan, College Chemistry (for students entering 212, 220 or 203).
- 203. (3) Organic Chemistry.—Fundamental principles of the chemistry of aliphatic, aromatic, alicyclic and heterocyclic organic compounds. This course is only for prospective Honours (or major) students in science. Prerequisites: Chemistry 110 or 120 and permission. (Chemistry 210 or 220 must precede or be taken concurrently.) [3-3; 3-3]
- 205. (3) Physical-Inorganic and Analytical Chemistry. Systematic inorganic chemistry, properties of matter from a molecular standpoint, equilibria in solution, physical chemistry useful in biological, medical, agricultural, and related sciences. This course is not intended for Honours in Science or for majors in Chemistry. Prerequisites: Chemistry 110, 120 (or 103 with standing of 65%). Credit will not be given for both Chemistry 205 and 210 or 220.
- 210. (3) Physical Inorganic Chemistry.—Introduction to quantum chemistry and to thermodynamics as applied to the structure of chemical compounds and to the study of chemical reactions. This course is intended only for those students intending to take an Honours degree in Science or to Major in Chemistry. Prerequisites: Chemistry 110 (Mathematics 202 or 220 concurrently) and permission. [2-4-1; 2-4-1]
- 220. (3) Physical Inorganic Chemistry.—This course deals with the applications of quantum chemistry and thermodynamics to the study of the structure and formation of chemical compounds. The subject matter will be treated in somewhat more detail than is the case with Chemistry 210. The laboratory experiments involve modern techniques of analytical, inorganic and physical chemistry. This course is designed for those who have completed Chemistry 120 and is intended only for those students planning to take an Honours degree in Science or to major in Chemistry. Prerequisites: Chemistry 120. Mathematics 202 or 220 must precede or be taken concurrently. The permission of the Head of the Department is required before enrolling. [2-4; 2-4]
- 230. (3) Organic Chemistry.—The fundamental principles of modern organic chemistry including a discussion of the main classes of organic compounds. Prerequisite: Chemistry 103, 110 or 120. Credit will not be given for both Chemistry 203 and 230. [3-3; 3-3]

# Primarily for Third Year Students

Note: Honours and Major Students taking Chemistry 303, 310, and 311 concurrently are required to take a special integrated laboratory course Chemistry 315. Students not taking the complete combination of Chemistry 303, 310 and 311, must take the corresponding laboratory courses: Chemistry 320 (with Chemistry 310) and Chemistry 312 (with Chemistry 311).

- 303. (2) Introductory Physical Organic Chemistry.—Conformational analysis, active methylene compounds, reaction intermediates, aromaticity and [2-0; 2-0] molecular rearrangements. Prerequisites: Chemistry 203.
- 304. (2) Physical Chemistry.—Elementary thermochemistry and electrochemistry; atomic structure and elementary quantum theory; chemical equilibria; chemical kinetics; surface chemistry and the physical chemistry of macromolecules. Prerequisites: Chemistry 210 or 220 (or Physics 200) and Mathematics 202 or 220. Chemistry 324 must be taken concurrently. Mathematics 300 or 323 taken concurrently is recommended. [2-0; 2-0]

- 305. (3) Physical Chemistry for Biologists.—Atomic and molecular structure; elementary thermochemistry, thermodynamics and electrochemistry; states of matter; chemical equilibria; chemical kinetics; colloid science, surface chemistry and physical chemistry of macromolecules. Prerequisites: Chemistry 210 or 220 or 205 and Mathematics 202 or 220. [3-3; 3-3]
- 310. (2) Inorganic Chemistry.—A systematic treatment of the chemistry of the elements based on the periodic classification, interpreted in terms of structure mechanism and theoretical principles. Prerequisite: Chemistry 210 or 220 or with permission 205. Either Chemistry 315 or 320 must be taken concurrently. [2-0; 2-0]
- 311. (1) Modern Analytical Methods.—An introduction to modern methods of analysis, including optical, electrochemical and radiochemical methods, magnetic resonance spectrometry, gas chromatography and mass spectrometry. Prerequisites: Chemistry 205 or 210 or 220. Either Chemistry 315 or 321 must be taken concurrently. [2-0; 0-0]
- 312. (2) Structural Chemistry.—Elementary crystal chemistry. An introduction to molecular structure determinations by the methods of X-ray and neutron diffraction, electron diffraction, dipole moments, ultra-violet and infra-red spectroscopy, and nuclear magnetic resonance spectroscopy. Prerequisite: Chemistry 210 or 220 or with permission 205. [2-0; 2-0]
- 315. (2) Practical Chemistry Laboratory.—An integrated laboratory course designed to illustrate the principles of modern organic, inorganic and analytical chemistry. This course *must* be taken by those students enrolled concurrently in Chemistry 303, 310 and 311. [0-8; 0-8]
- 320. (1) Inorganic Chemistry Laboratory.—This course involves practical work illustrating the preparation and characteristics of representative inorganic compounds. Chemistry 310 must be taken concurrently. This course is not available to students who are eligible to take Chemistry 315. [0-4; 0-4]
- 321. (1) Laboratory in Modern Analytical Methods.—A laboratory course in modern physical methods of chemical analysis. Chemistry 311 must be taken concurrently. This course is not available to students who are eligible to take Chemistry 315. [0-4; 0-4]
- 324. (1) Physical Chemistry Laboratory and Tutorial.—This course involves experimental work and tutorial sessions designed to illustrate the principles of modern physical chemistry outlined in Chemistry 304. Chemistry 304 must be taken concurrently. [0-3; 0-3]
- 330. (3) Advanced Organic Chemistry.—Synthetic methods, alicyclic and heterocyclic chemistry, natural products. Laboratory work: qualitative organic analysis and techniques or organic synthesis. Prerequisites: Chemistry 230 (or 203). [3-4; 3-4]

# Primarily for Fourth Year Students

Note: Honours and Major students taking Chemistry 403, 404, and 407 concurrently are required to take a special integrated laboratory course Chemistry 415. Students not taking the complete combination of Chemistry 403, 404 and 407 must take the corresponding laboratory courses: Chemistry 427 (with Chemistry 407) and Chemistry 423 (with Chemistry 403).

401. (1) Quantum Chemistry.—Elementary group theory. Hückel molecular orbital theory; applications and conservation of orbital symmetry. Introduction to ligand field theory; applications to transition metal ions.

[2-0; 0-0]

- 403. (1) Advanced Organic Chemistry.—Heterocyclic compounds, spectroscopic methods; and photochemical reactions in organic chemistry. [2-0; 0-0]
- 404. (1) Advanced Inorganic Chemistry.—Chemistry of selected groups of inorganic compounds, considered in relation to electronic and molecular struc-[0-0; 2-0] tures.
- 407. (1) Advanced Physical Chemistry.—Introductory statistical thermodynamics; chemical kinetics, including catalysis and catalysis photochemistry. [2-0; 0-0]
- 410. (1) Solid State Chemistry.—Introduction to the theory of electrons in solids; bands and zones. Absorption of light and excitons. Vacancies, interstitials, electronic defects and dislocations with particular reference to the roles of these types of defect in chemical reactivity.
- 411. (1) Synthesis and Chemistry of Natural Products.—A discussion of synthetic methods and their application to natural products, particularly in the areas of alkaloids, steroids and terpenes.
- 413. (1) Bio-Organic Chemistry.—A discussion of the chemistry of carbohydrates, amino acids, proteins, and biologically important heterocyclic systems. An introduction to the biosynthesis of major groups of natural products. [0-0; 2-0]
- 414. (1) Coordination Chemistry.—The bonding, stability and stereochemistry of coordination compounds, and the mechanisms of their reactions. [0-0; 2-0]
- 415. (2) Practical Chemistry Laboratory.—An integrated laboratory course designed to illustrate the principles of modern inorganic, organic and physical chemistry. Prerequisite: Chemistry 315. This course must be taken by eligible students enrolled concurrently in Chemistry 403, 404 and 407.
- 416. (1) Physical Organic Chemistry.—Substituent effects, solvent effects, energetics and catalysis in organic reactions. TO-0; 2-01
- 417. (1) Isotope and Nuclear Chemistry.—Nuclear structure and reactions. Separation of isotopes, measurement of radioactivity and applications of isotopes to chemical problems. Mossbauer effect and related phenomena. [2-0; 0-0]
- 418. (1) Organometallic Chemistry.—The chemistry of compounds containing organic groups directly bonded to metals and metaloids. Emphasis will be placed on the structure and bonding of the compounds and their use in synthetic chemistry. [0-0; 2-0]
- 419. (1) Chemical Thermodynamics.—Chemical potentials of nonelectrolyte solutions; ideal, regular and real solution. Electrolyte solutions; Debye-Huckel theory. Thermodynamics of electrochemical systems; cells, membrane equilibria. Thermodynamics of surfaces. Statistical Thermodynamics. [0.0; 2.0]
- 420. (1) Molecular Spectroscopy.—A detailed study of rotational, vibrational and electronic spectroscopy. TO-0: 2-01
- 423. (1) Advanced Organic Chemistry Laboratory.—Advanced analytical and preparative techniques. Chemistry 403 must be taken concurrently. This course is not available to students who are eligible to take Chemistry 415. [0-4:0-4]
- 427. (1) Advanced Physical Chemistry Laboratory.—Laboratory techniques of advanced physical chemistry. Chemistry 407 must be taken concurrently. This course is not available to students who are eligible to take Chemistry 415. 10-3; 0-31

449. (3) Seminar and Thesis.—All Honours students are required to take this course which consists of a weekly seminar dealing with developments in modern chemical science not normally covered in other lecture courses. In addition, each student is required to undertake original research work on a problem of current chemical interest under the direction of a staff member. Majors students who have satisfactory academic standing may be permitted to enrol in this course after receiving the permission of the Head of the Department.

[1-6; 1-6]

#### Graduate Courses

- 500. (2) Advanced Physical Chemistry.—Selected topics in Physical Chemistry including, molecular orbital theory and molecular properties, nuclear magnetic resonance spectroscopy, electron spin resonance spectroscopy, U.V. visible and infra-red spectroscopy, microwave spectroscopy, optical rotary dispersion, mass spectroscopy and molecular structure, X-ray diffraction, electron diffraction and neutron diffraction, and polarography, chromatography and electrophoresis.
- 501. (2) Topics in Physical Chemistry.—A discussion of some aspects of modern physical chemistry. The subject matter varies each year and is chosen to be suitable for all graduate students in Chemistry.
- 503. (1) Seminar in Special Topic.—A seminar course dealing with recent developments in the students special field of Chemical Science.
- 504. (1) Seminar in Chemistry.—This course is compulsory for all graduate students in Chemistry.
- 505. (1) Quantum Chemistry.—Application of quantum mechanics to chemistry. Group theory and molecular symmetry.
- 506. (1) Advanced Theoretical Chemistry.—An advanced course in which will be discussed more recent applications of quantum mechanics and statistical mechanics in chemistry.
- 507. (1) Transport Properties of Gases.—Fundamental aspects of the transport properties of gases: Boltzmann Equation, Chapman-Enskog method of solution, transport coefficients, recent developments.
- 508. (1) Topics in Chemical Physics.—Intermolecular forces, relaxation processes in chemistry, electron impact phenomena, electron spin resonance spectroscopy, nuclear magnetic resonance phenomena, energy exchange in molecular systems, theories of molecular interactions.
- 512. (1) Colloid Chemistry.—Properties of disperse systems, thermodynamics, molecular weight and shape, electrophoresis, viscosity, polyelectrolytes.
- 513. (1) Chemical Thermodynamics.—An advanced study of the principles and applications of chemical thermodynamics.
- 514. (1) Radiation Chemistry.—Interaction of ionising radiations with matter in gaseous, liquid and solid phases and chemical changes resulting therefrom.
- 515. (1) Advanced Electrochemistry.—Modern measurements of conductance, transport and electromotive force; thermodynamics of solutions; Debye-Huckel interionic attraction theory; electrode processes and polarography.
- 517. (2) Topics in Inorganic Chemistry. Selected topics of current interest in inorganic research and in applications of inorganic chemistry. The subject matter changes each year, and is suitable for all chemistry graduates.

- 518. (1) Advanced Inorganic Chemistry. Selected topics of inorganic stereochemistry, considered in relation to bond type and position in the Periodic Table. The chemistry of some of the less familiar elements.
- 519. (1) Radiochemistry.—An advanced course. Natural and artificial nuclides, nuclear reactions, trans-uranic elements, tracer techniques and applications.
- 520. (2) Spectroscopy and Molecular Structure.—An advanced study of the theory of physical methods for elucidating molecular structure.
- 521. (1) Statistical Mechanics.—Fundamental principles of classical and quantum statistical mechanics. Selected applications, with particular reference to gases, crystalline solids, and chemical reactions.
- 522. (1) Surface Chemistry.—Theories of the adsorption of gases and the kinetics of heterogeneous reactions. Recent advances in heterogeneous catalysis and the structure of solid surfaces.
- 523. (1) Chemical Kinetics.—Types of reactions, kinetic theory, energy transfer processes, transition state theory, chain reactions, reactions in solution, heterogenous processes, photochemistry.
- 524. (1) Chemistry of the Solid State.—Aspects of the structure of solids and the nature of defects in solids in relation to the mechanism of chemical reactions involving solids.
- 525. (1) Crystal Structures.—Crystal structures and structural analysis by the methods of X-ray diffraction, neutron diffraction, and nuclear magnetic resonance.
- 526. (1) Physical Chemistry of High Polymers.—Nature and kinetics of vinyl and condensation polymerization; molecular weight determination; distribution of molecular weights; introduction to kinetic theory of rubber elasticity; physical properties of polymers in the solid state and in solution.
- 527. (1) Photochemistry.—The primary photochemical process, including photodissociation, photoisomerization, fluorescence and phosphorescence; energy transfer processes; recent advances in the mechanisms of both steady state and flash photochemical reactions.
- 528. (1) Inorganic Reaction Mechanisms.—Substitution reactions of inorganic complexes, electron transfer reactions, free radical reactions, photochemical reactions of metal complexes. Catalytic reactions of metal carbonyls, hydrides, and organometallic complexes. Proton transfer reactions.
- 529. (1) The Chemistry of Organometallic Compounds.—The preparations, properties, and structures of aliphatic and aromatic derivatives of metals and metalloids, and of olefinic, acetylenic, and arene derivatives of the transition metals.
- 530. (2) Topics in Organic Chemistry.—Selected topics of current interest in organic chemistry. The subject matter changes each year and is suitable for all chemistry graduates.
- 531. (1) Organic Stereochemistry.—The determination of absolute configuration of synthetic organic compounds and natural products. Stereoselective syntheses. Conformational analysis and organic reaction mechanisms.
- 532. (1) Heterocyclic Compounds.—Advances in the chemistry of pyrrole, furan, thiophene and their derivatives. Heterocyclic compounds of biological importance.
- 533. (1) Carbohydrates.—Introduction to recent work in the field of carbohydrate chemistry.

- 535. (1) Alkaloid Chemistry.—Recent progress in structural and biosynthetic aspects of the chemistry of the alkaloids.
- 536. (1) Isoprenenoid Compounds.—Chemistry and biosynthesis of terpenes, steroids and carotenoids.
- 537. (1) Cellulose, Lignin and Related Compounds.—Analytical, physical and organic chemistry of these plant constituents.
- 538. (1) Physical Organic Chemistry.—Electronic and steric effects, acidity functions, isotope effects, linear free energy relations.
- 541. (1) Organic Reaction Mechanisms.—Ionic and free radical reaction mechanisms. The formation and stereochemistry of reaction intermediates.
- 542. (1) Structure of Newer Natural Products.—A discussion of recent developments in the chemistry of alkaloids, antibiotics, hormones and other recently discovered natural products.
- 543. (1) Recent Synthetic Methods in Organic Chemistry. Synthetic methods with particular reference to the use of modern reagents and techniques.
- 544. (1) Chemistry of Polysaccharides.—Structure and properties of the major groups of polysaccharides other than cellulose.
- 548. Research Conference.—Attendance is compulsory for all graduate students in each year of registration for the M.Sc. or Ph.D. in chemistry. No unit value.
  - 549. (6) M.Sc. Thesis.
  - 649. Ph.D. Thesis.

### Computer Science

The basic introductory course in Computer Science for students with the mathematical prerequisites is Computer Science 210. It is the prerequisite for Computer Science 300 and other advanced courses. Computer Science 200 and Computer Science 201 are intended primarily for students wanting a oneterm course in one aspect of Computer Science or for students who lack the prerequisites for Computer Science 210.

- N.B. Credit may not be obtained for both Computer Science 210 and either of Computer Science 200 or 201.
- 200. (1½) Elements of Computer Science.—Computer organization, the nature of theories and models, comparison of natural and artificial languages, algorithms, theory of automata, typical applications to numerical and nonnumerical problems. Prerequisite: At least two units of first year mathematics. [3-1; 0-0]
- 201. (1½) Automatic Programming.—A complete description of an automatic programming language with applications to various data-processing problems in statistics and accounting, as well as elementary scientific calculations. Prerequisite: At least 2 units of first year mathematics.
- 210. (3) Algorithms and Programming.—An introduction to the structure and use of digital computers. Binary number systems, machine organization, fundamentals of assembly language programming, complete description of an algebraic programming language. Applications to problems in elementary number theory, sorting, statistics, numerical methods, and simulation. Pre-

- requisite: Former Mathematics 120, or new Mathematics 100 and 121, or T3-1; 3-11 eguivalent.
- 300. (3) Advanced Programming and Data Processing.—Searching and sorting records, non-numeric concepts, assembly systems, interpreters and compilers. Prerequisites: Computer Science 210 and Mathematics 200 (or consent of the Department). [3-1; 3-1]
- 400. (3) Applied Combinatorial Analysis.—Systems of distinct representatives. enumeration, connected graphs, matching in graphs, planar graphs, networks. Prerequisite: Computer Science 300 (or consent of the Department). [3-0; 3-0]
- 410. (3) Systems Programming.—Computer organization and operating systems. Batch processing. Multi-programming, multi-processing, and time sharing systems. Computer file organization and management. Accessing, protection and maintenance of files. Communication between peripheral devices. Prerequisite: Computer Science 300. [3-0; 3-0]

#### Graduate Courses

Not all of these courses will be offered in any given year.

- 501. (3) Theory of Automata.—Application of logic to finite automata. Turing machines and computability. Techniques in the study of the relationship between structure and behaviour. Decomposition of sequential machines. Special automata.
- 502. (3) Adaptive Systems.—Organization, design, and programming of devices which change their structure and behaviour in order to adapt to environments confronting them. Game-playing programmes, pattern recognition, and theorem proving.
- 503. (3) Formal Languages.—Finite and non-finite state languages and their relation to corresponding automata. Phrase structure grammars and languages. Context-free and context-sensitive languages. Mathematical theories of grammar and semantics.
- 531. (1-3) Topics in the Theory of Automata.—Possible topics: homomorphisms; equivalences of sequential machines; algebraic structure of automata.
- 532. (1-3) Topics in Adaptive Systems.—Possible topics: induction and hypothesis formation; question-answering system; heuristic problem solving.
- 534. (1-3) Topics in Computer Systems.—Possible topics: problem in operating systems; time sharing; scheduling algorithms.
- 535. (1-3) Topics in Simulation.—Possible topics: construction of models of various natural and artificial systems and their computer simulations; Monte Carlo methods; simulation languages.
- 537. (1-3) Topics in Coding & Information Theory.—Possible topics: finite coding; theory of error checking and secrecy; linear codes; burst error correction; cyclic codes.
  - 538. (1-3) Topics in Information Processing.
  - 549. (3) Thesis for Master's Degree.

### Geology

The department offers opportunities for study leading to doctoral, master's and bachelor's degrees. For information on the Ph.D. and M.Sc. degree courses, see the Graduate Studies calendar.

Geology 105 (or 150) is prerequisite to all other courses in Geology. Specialization in Geology is possible through Honours or Majors programmes in the Faculty of Science or through Geological Engineering in the Faculty of Applied Science. An Honours programme in Geophysics and Geology is also available and listed under Geophysics.

## Requirements for the B.Sc. degree:

	Ma	njor	
First Year		Second Year	
Chemistry 103 or 110 or 120 English 100 Geology 105 Mathematics 100 and 121 Physics 110 or 120 or 130	(3) (3) (3) (3) (3)	Chemistry 205 or 210 Geology 204 Geology 210 Mathematics 202 or 220 Geophysics 201 and Physics or Biology 101	(3) (3) (3) (3) (219 (3) (15)
าเ		Fourth Years	<del></del>
Geology 320	(3)	Non Science electives	(6)
Geology 404	$(1\frac{1}{2})$	Free electives	(18)
Geology 419	$(1\frac{1}{2})$		(30)
	Hon	ours	<del></del>
W1 - W7	11011		
First Year	(2)	Second Year	(2)
Chemistry 103 or 110 or 120 English 100	(3)	Chemistry 205 or 210 Geology 204	(3)
Geology 105	(3) (3)	Geology 210	(3)
Mathematics 100 and 121	(3)	Mathematics 202 or 220	(3) (3)
Physics 110 or 120 or 130	(3)	Geophysics 201 and Physics	219
		or Biology 101	
		Non Science elective	(3)
	(15)		(18)
Tł	nird and l	Fourth Years	· · · · · · · · · · · · · · · · · · ·
Geology 306	(3)	Geology 410	$(1\frac{1}{2})$
Geology 320	(3)	Geology 412	$(\tilde{3})$
Geology 404	$(1\frac{1}{2})$	Geology 449	(3)
Geology 407	(3)	Non Science elective	(3)
Geology 408 Geology 419	(3)	Free elective	$(\frac{71/2}{2})$
	$(1\frac{1}{2})$		(33)

Notes: Students who have not taken Geology 105 in First Year but who wish to take either the Honours or Major programme will follow a special course sequence worked out in consultation with the Department of Geology.

Only the following courses are normally open to General Course students: Geol. 105, 204, 300, 306, 317, 324 and 412.

Geology students may select some of their elective courses from Geography 212, 213, 312, 313, 366, 370, 372, Oceanography 404, and Biology 300 and 301 or Plant Science 321 and 322. Credit will not be given for both Geography 213 and 313 and Geology 412 nor for Mineral Engineering 350 and Geology 408.

105. (3) Physical and Historical Geology.—Origin and structure of the earth, materials of the earth, diastrophism, erosion, land forms, mineral deposits, history of the earth and the development of life. Mr. Danner and [3-2; 3-2] Mr. Sinclair.

204. (3) Introduction to Stratigraphy and Structural Geology.—General principles of stratigraphy and descriptive structural geology. Texts: Dunbar and Rogers, Principles of Stratigraphy; Hills, Elements of Structural Geology. Prerequisites: Geology 105 or 150; Geology 300 or 210 concurrently. Mr. Barnes [2-3; 2-3] and Mr. Ross.

- 210. (3) Mineralogy.—Fundamentals of Crystal Chemistry as Applied to Minerals. Introduction to Crystallography. Physical and Chemical Properties of Minerals. Determinative Mineralogy. Mineral Relationship. Text: Berry and Mason, Mineralogy; Dennen, Principles of Mineralogy. Prerequisite: Geology 105; Chemistry 103, 110 or 120; Physics 110, 120 or 130; Mathematics 120 to precede or accompany. Mr. Gower, and Mr. Meagher. [2-3; 2-3]
- 300. (1½) Introduction to Mineralogy.—Methods of identification of minerals; the common rock forming and ore minerals. Intended for General Course and Education students. Text: Dana, Manual of Mineralogy, 17th edition, Wiley. Prerequisite: Geology 105 or 150. Mr. Warren. [2-2; 0-0]
- 306. (3) Paleontology.—Invertebrate, vertebrate and plant fossils, their classification, identification and evolutionary development. Text: Beerbower, Search for the Past, 2nd Ed., Prentice Hall. Prerequisite: Geology 105 or 150. For students majoring or taking Honours in Zoology or Botany, a reading course in historical geology may be substituted for Geology 105. Mr. Best.
- [2-2: 2-2] 309. (1) Hydrogeology.—Physics of fluid flow in a saturated, permeable medium; geology of ground water, pore pressure, salt water intrusion, conservation of ground water. Text: Todd, Ground Water Hydrology. Mr. Mathews.
- 311. (1) Natural Gas and Petroleum Geology.—Chemistry of natural gas and petroleum; source and reservoir rocks; tools and techniques used in exploration and exploitation; petroleum and natural gas traps; economics in the petroleum industry; frontiers of petroleum exploration in Canada. Prerequisites: Geology 309. Mr. Murray. [0-0; 2-0]
- 317. (1½) Petrology.—The common rocks, their minerals and the processes hat formed them. Text: Huang, Petrology, McGraw-Hill. Prerequisite: Geolgy 300 or 210 and 204 to precede or accompany. [0-0; 2-2]
- 320. (3) Optical Mineralogy and Petrology.—Theory and use of the polarzing microscope; nature and origin of the common igneous, sedimentary nd metamorphic rocks illustrated by hand-specimens and thin-sections in he laboratory. Prerequisites: Geology 210 or 300 to precede or accompany. exts: Williams, Turner, and Gilbert, Petrography, Freeman; Kerr, Optical *lineralogy*, McGraw-Hill. Mr. Greenwood. [2-2; 2-2]

- 324. (3) Introductory Geochemistry.—Chemical constitution of the Earth, distribution of elements, geochemical prospecting. Prerequisites: Geology 105, or 150, Chemistry 200 or 205. Geology 300 or 210, 204 and 317 to precede or accompany. Text: Mason, *Principles of Geochemistry*, Wiley. Mr. Delavault. [2-2; 2-2]
- 404. (1½) Structural Geology.—Studies of natural deformation using advanced techniques. Text: Hills, *Elements of Structural Geology*. Prerequisites: Geology 204 and 320. Mr. Ross. [2-2; 0-0]
- 407. (3) Petrology.—The descriptive and interpretative study of igneous and metamorphic rocks. Text: Williams, Turner and Gilbert, *Petrography*, Freeman. Prerequisites: Geology 320. Mr. McTaggart. [2-3; 2-3]
- 408. (3) Mineral Deposits.—Manner of occurrence, genesis, structure and distribution of the principal metallic and some non-metallic mineral deposits, with type illustrations. Text: Park and McDiarmid, Ore Deposits, 1964, Freeman. Prerequisites: Geology 204; 317 or 320 must precede or accompany. Mr. White.
- 409. (2) Mineralography.—Study and recognition of the opaque minerals by the reflecting microscope. Texts: Uytenbogaardt, Tables for Microscopic Identification of Ore Minerals, Hafner; Edwards, Textures of the Ore Minerals. Prerequisite: Geology 408 must precede or accompany this course. Mr. Sinclair. [1-3; 0-4]
- 410. (1½) Field Geology.—Methods of observing, recording, and correlating geological facts in the field. Prerequisites: Geology 204, 210, and 317 or 320. Two hours a week in the second term and three weeks in the field at the close of examinations in the spring of the junior year. As facilities are limited admission is normally restricted to Honours and Engineering students. The fee of \$60 is to be paid in January. The fee covers room, board, and instruction at the Field School for 3 weeks. Transportation to and from camp and liability insurance are the responsibilities of the students. Students taking this course in their Fourth Year will not graduate at the spring convocation. Mr. Best.
- 412. (3) Geomorphology. For advanced students in geography and geology; a study of the processes, principles, and laws of land formation, types of land forms, and their distribution. Text: Holmes, *Principles of Physical Geology*, 1965. Prerequisite: Geology 204. Mr. Mathews. [2-2; 2-2]
- 419. (1½) Stratigraphy and Sedimentation.—Description and interpretation of ancient and modern sediments. Text: Krumbein and Sloss, Stratigraphy and Sedimentation. Prerequisites: Geology 204, 306 and 320. Mr. Barnes.
- 449. (3) Thesis.—Honours students must submit a graduating thesis on some subject approved by the Department.

#### Graduate Courses

- 504. (1) Advanced Structural Geology. A course dealing with major problems of earth structure. Mr. Chase.
- 511. (3) Geology of North America.—Evolution of the continent of North America and stratigraphy, structure, and geomorphology of Alaska, Canada United States, Greenland, Mexico, Caribbean Area, Hawaiian Islands an the eastern Pacific Ocean. Emphasis on the study of geologic features c special interest in these areas including fossil localities and mineral deposit Mr. Danner. (Given in 1970-71 and alternate years.)
- 514. (3) Problems of Stratigraphy.—Seminar and laboratory. Problems clastic, nonclastic and volcanic-sedimentary deposition. Stratigraphic paleot tology. Emphasis on the stratigraphic associations of the eugeosynclinal

volcanic belts. Given in 1969-70 and alternate years. Mr. Danner, Mr. Murray, Mr. Ross.

519. (1½) Seminar in Sedimentology.—Principles of sedimentation as applied to modern and ancient deposits. Mr. Murray.

520. (1½) Problems in Sedimentology.—Directed studies of sediment and sedimentary rocks. Prerequisite: Geology 401 or equivalent. Mr. Barnes.

**521.** (3) Problems in Paleontology.—Seminar; principles of Paleontology, taxonomy and evolution applied to selected pre-Cenozoic metazoan invertebrate groups; alternates with 531. Prerequisite: Geology 306. Mr. Best.

524. (3) Advanced Geochemistry (Mineral Research).—Study of approved problems, using advanced techniques. Prerequisite: Geology 324 or equivalent. Mr. Delayault.

526. (3) Mineral Deposits.—Seminar; character, origin, and structure of

mineral deposits, with emphasis on ore deposits. Mr. White.

531. (3) Advanced Invertebrate Paleontology.—Selected groups of fossils, special problems of paleontology, paleontological techniques. Prerequisites: Geology 306. Mr. Okulitch.

533. (1½) X-ray Mineralogy.—Fundamentals of X-ray diffraction with emphasis on applications in mineralogy. Powder and single crystal methods are discussed and utilized in laboratory assignments. Mr. Meagher.

534. (1½) Mechanics of Natural Deformation.—Lectures and laboratory

problems. Mr. Ross.

541. (3) Paleobotany.—Origin and history of plants through the geologic time. The floras of Paleozic, Mesozoic and Cenozoic eras. Techniques of collecting, preparation and identification of fossil plants and pollen. The use of fossil plants as indicators of geological age and ecology. Prerequisite: Geology 306. (Given in 1969-70 and alternate years.) Mr. Rouse.

543. (1½) Advanced Mineralogy.—Seminars and lectures. Advanced study

of the crystal chemistry of minerals. Mr. Meagher.

544. (1½) Rheology and Analysis of Natural Deformation.—Lectures and laboratory and/or problems. Mr. Ross.

545. (1) Reading Course.—Assigned reading dealing with problems of

geology. Required of all graduate students.

**546.** (1-3) Directed Studies in Geology.—Advanced studies under the direction of a staff member may be arranged in special cases with the approval of the Head of the Department.

549. (3-6) Master's Thesis.

554.  $(1\frac{1}{2})$  Structure and Properties of Crystals and Crystal Aggregates.—Seminar and laboratory. Mr. Ross.

555. (1) Advanced Igneous Petrology.—Seminar and laboratory. Mr. Mc-

Taggart.

558. (3) Theory of Ore Search.—Lectures, seminars, and problem sessions in the selection and evaluation of areas of search for economic mineral deposits appraisal of geological, geophysical, and geochemical methods and data; economic considerations. Case histories. Prerequisite: Geology 408. Mineral Engineering 351 to be taken previously or concurrently.

565. (1) Advanced Metamorphic Petrology.—Seminar and laboratory. Mr.

McTaggart.

- 575. (1) Geological Phase Equilibrium.—Seminar and problems. Mr. Greenwood.
- 585. (1) Equilibria in Mineral Systems.—Seminar and problems. Mr. Greenwood.
  - 649. Ph.D. Thesis.

## Geophysics

The department offers opportunities for study leading to bachelor's, master's and doctoral degrees. For information on the M.Sc., M.A.Sc. and Ph.D. degree courses, see the Graduate Studies calendar. Astronomy courses offered by the Department are listed on page T27.

Rquirements for the B.Sc. degree in Geophysics:

Addresses for the BBC, degree in Geophysics.						
Majors	Combined Honours Geophysics and Physics	Combined Honours Geology and Geophysics				
Mathematics 100 (2) F Mathematics 121 (1) I Physics 110 (120 R or 130) (3) S Chemistry 120	Mathematics 100 (2) Mathematics 121 (1) Physics 120 (or 110) (3) Chemistry 120 (110 or 103) (3)	Mathematics 100 (2) Mathematics 121 (1) Physics 110 (120 or 130) (3) Chemistry 120				
T (110 or 103) (3) Geology 105* (3)	Elective (Geology 105	(110 or 103) (3) Geology 105* (3)				
English 100 (3) (15)	recommended) (3) English 100 (3) (15)	English 100 (3)				
(15)	(15)	(15)				
Mathematics 202 (3) S Geophysics 201 E (or Physics C 200) (2) O Physics 219 (1) N Geology 204 (3) D Electives (6) (15)	Mathematics 220       (3)         Mathematics 221       (3)         Physics 204       (3)         Physics 220       (2)         (or 210)       (2)         Physics 209       (1)         Arts (elec.)       (6)         (18)	Mathematics 202 (3) Geophysics 201 (or Physics 200) (2) Physics 219 (1) Geology 204 (3) Geology 210 (3) Arts (elec.) (6)				
Geophysics 301 (3) T Geophysics 302 (3) H Mathematics 300 I (or 323) (3) R Physics 300 (2) D Physics 319 (1) Elective (3)	Geophysics 302 (3) Geophysics 301 (or Physics 308 and 310) (3) Mathematics 323 (3) Physics 301, 309 (3) Physics 302 (1) Physics 413 (3)	Geophysics 301 (3) Geophysics 302 (3) Mathematics 300 (or 323) (3) Physics 300 (2) Physics 319 (1) Geology 320 (3)				
(15)	(16)	(15)				

	Majors	Combined Honours Geophysics and Physics	Combined Honours Geology and Geophysics
O U R	Geophysics 405 (1) Geophysics 402 (1) At least one of: Geophysics 404 (1) Geophysics 406 (1) At least one of: Physics 316 (3) Physics 400 (3) Physics 413 (3) At least 2 units from: Geology 300 (1½) Geology 317 (1½) Geology 319 (1) Geology 311 (1) Astronomy 320 (3) Electives (6-7)	Geophysics 449 (or Physics 409) (3) Mathematics 423 (3) At least 2 units from: Geophysics 404 (1) Geophysics 405 (1) Geophysics 406 (1) Astronomy 421 (3) At least 6 units from: Physics 402 (2) (or 452) (3) Physics 401 (2) Physics 457 (2) (or 406 and (1) one of 405, 408) (1) Electives (2-3)	One of: Geophysics 402 (1) or Geophysics 449 (3) Geology 309 (1) Geology 311 (1) Mathematics 410 (3) At least 3 units from: Geology 404 (1½) Geology 419 (1½) At least one of: Physics 316 (3) Physics 400 (3) Physics 413 (3) At least 2 units from: Geophysics 403 (1) Geophysics 404 (1) Geophysics 405 (1) Geophysics 406 (1) Electives (4-2)
	(15)	$\overline{(17)}$	(18)

- Special arrangements can be made for students who have been unable to take this course in the first year.
- 201. (2) Physics of the Earth.—Electricity, magnetism and thermal physics for students in the earth sciences. Heat flow; elementary thermodynamics; equilibria; basic field theory; geomagnetism and geoelectricity. N.B. Credit will not be granted for both Geophysics 201 and Physics 200. Prerequisite: Mathematics 202 (or 220), Physics 219 recommended (concurrently), Physics 110 (or 120). [2-0; 2-0]
- 301. (3) Waves and Seismology.—Ray theory of optics and seismology; interference, diffraction and polarization of sound and light waves. Examples will be directed towards geophysical applications. Prerequisite: Physics 200 or equivalent, Mathematics 300 or equivalent (concurrently). (Credit will not be given both for this course and for Physics 308.) [3-0-2\*; 3-0-2\*]
- 302. (3) General Geophysics.—Solar system; geochronology and isotope geophysics; seismology, gravity and figure of the earth; heat flow; geomagnetism and aeronomy; continental drift. Prerequisites: Geophysics 201 or Physics 200 or equivalent. Mathematics 300 or equivalent (concurrently). [3-0-2\*; 3-0-2\*]
- 400. (2) Applied Geophysics.—Instrumentation, application and limitations of the gravity, magnetic, electrical and electromagnetic methods. Integration of the corresponding measurements with geological evidence. Textbook: Dobrin, Geophysical Prospecting. Prerequisite: Physics 200 or equiva-[2-3; 0-3]
- 402. (1) Applied Geophysics Laboratory.—Any two of Geophysics 403, 404, [0-3; 0-3]405, 406 must be taken concurrently.

- **403.** (1) Geochronology.—A description of age determination techniques, and the application of these techniques to geological problems. [0-0-; 2-0]
- 404. (1) Geophysical Analysis.—The application of numerical methods of analysis to geophysical interpretation. Both time-domain and frequency domain analysis will be used. Techniques discussed will include optimum and inverse filtering, power spectral analysis and correlation methods. Examples will include synthetic seismograms, and grid spacing requirements for gravity and magnetic surveys. Prerequisites: Mathematics 410 (may be taken concurrently). Physics 300. [0-0; 2-0]
- 405. (1) Potential Field Theory.—The quantitative interpretation, by scalar potential methods, of gravity, magnetic and electric methods of exploration. The development from Maxwell's equations of the theory of electromagnetic prospecting methods. Recommended reference: Grant and West, Interpretation Theory in Applied Geophysics. Prequisites: Physics 300 (or equivalent), Mathematics 300 (or equivalent). [2-0; 0-0]
- 406. (1) Instrumentation.—Seismic detectors and needle magnetometers as examples of electromagnetic systems. Modulators using vibrating condensers and saturated magnetic cores, with special reference to the vibrating reed electrometer and the fluxgate magnetometer. Calibration techniques for these and other instruments. Prerequisites: Physics 300 (or equivalent). Mathematics 300 (or equivalent). [2-0; 0-0]
- 412. (2) Introduction to Space Plasma Physics.—Fundamentals of plasma dynamics; the solar wind and the magnetosphere; whistlers and geomagnetic micropulsations; trapped radiation; electric currents in the ionosphere; aurorae and magnetospheric substorms. Prerequisite: Physics 301 and Mathematics 300. (This course to be offered 1970/71).
- 449. (3) Directed Research and Thesis.—This course is available only to students enrolled in Honours Geophysics programmes.

### General Course

310. (3) Exploring the Universe.—A modern approach to the Earth Sciences and Astronomy without the use of advanced mathematics. This course is open only to third and fourth year students not registered in the Faculty of Science or Applied Science. [3-0; 3-0]

#### Graduate Courses

- 501. (2) Topics in Geophysics and Astronomy.—This course is required of all graduate students enrolled in the Department of Geophysics. They will choose, in consultation with their supervisors, six of the eight topics: Astronomy, Cosmogony, Aeronomy, Geomagnetism, Seismology, Isotope Geophysics, Physics of the Earth's Interior, and Tectonophysics. Each of the eight sections will occupy about three weeks of lectures. [3-0; 3-0]
- 502. (2) Principles of Earth Science.—A detailed discussion of geologic evidence bearing on graduate research in the Geophysics Department. Prerequisite: consent of the instructor.
- 511. (1-2) Seismology.—Theory of seismic waves and seismographs; focal mechanism, magnitude and statistics of earthquakes; interpretation of surface wave dispersion curves.
- 512. (1-2) Geomagnetism and Aeronomy.—Transient variations, magnetic storms and ionospheric disturbances.
- 513. (1-2) Radioactive and Isotopic Processes in Geophysics.—Modern methods of geochronology and the application of mass spectrometry to geological studies.

514. (1-2) Geophysical Analysis.—A discussion of the analysis and interpretation of geophysical phenomena; analytical treatment, numerical procedures, and application of statistical methods.

520. (1-3) Directed Studies in Geophysics and Astronomy.

521. (1) Modern Aspects of Geophysics.—A seminar course.

549. (6) M.Sc. Thesis.

599. (6) M.A.Sc. Thesis.

649. Ph.D. Thesis.

#### LIFE SCIENCES

Programmes leading to the B.Sc. degree are offered by the Departments of Biochemistry, Botany, Microbiology, Physiology, and Zoology. In addition, a cooperative programme in Biology is offered by these departments. A combined honours programme in Biology and Chemistry is also available. Biology 101 (or the equivalent\*) should be taken in the First Year and is a requirement of all programmes in Biochemistry, Biology, Botany, Microbiology, Physiology, and Zoology; and is prerequisite to all courses in Biology, Botany, Microbiology, Physiology and Zoology. Students contemplating a major or honours programme in Biology should consult with the Office of the Dean. Students planning a major or honours programme in Biochemistry, Botany, Microbiology, Physiology, or Zoology should consult with advisers in the appropriate department. By a careful selection of courses in the first three years, premedical and predental students may proceed at the end of the Third Year on an acceptable programme in the Faculty of Science should they elect to complete requirements for the B.Sc. degree. Students planning to enter the Faculty of Medicine or Dentistry after completing three years in the Faculty of Science, and who wish to complete requirements for a B.Sc. degree at the end of the first year in Medicine or Dentistry, may do so in accordance with the regulations outlined on p. T25. Courses offered by the Faculty of Medicine and approved for credit toward the B.Sc. degree are shown on pp. T87-91.

Students wishing to continue on a graduate programme in the life sciences should consult with the department or departments most appropriate to the field of specialization. In special cases inter-departmental or inter-faculty graduate programmes can be arranged.

Details concerning programmes and courses in Biology and in the Departnents of Biochemistry, Botany, Microbiology, Physiology, and Zoology are nutlined below.

A First Year university course in Biology, Botany or Zoology will be considered as equivalent.

## **Biochemistry**

The department offers opportunities for study leading to bachelor's, master's and doctoral degrees. For information on the M.Sc. and Ph.D. degree programmes, see the Graduate Studies calendar. A combined Honours B.Sc.-M.D. or B.Sc.-D.M.D. programme can be arranged for interested students with very high academic standing. The Major B.Sc. degree programme can lead to technical positions in biochemistry and provides a strong background in chemistry and physiology. The B.Sc. Honours degree programme is planned to lead into post-graduate study.

## Requirements for the B.Sc. degree:

	Mə	ijor	
First Year Biology 101 Chemistry 110 or 120 Mathematics 100 and 121 Physics 110 (120 or 130) English 100	(3) (3) (3) (3) (3)	Second Year Biology 200 Chemistry 205, 210 or 220 Chemistry 230 (or 203) Mathematics 200 Elective Microbiology 200†	$ \begin{array}{c} (1\frac{1}{2}) \\ (3) \\ (3) \\ (2) \\ (2\frac{1}{2}) \\ (3) \end{array} $
Third Year Biochemistry 410 Biochemistry 411 Chemistry 305 (or 304) Chemistry 330 Electives chosen in consultation with the Department	$ \begin{array}{c} (3) \\ (1\frac{1}{2}) \\ (3) \\ (3) \\ (3) \\ \hline (4\frac{1}{2}) \\ \hline (15) \end{array} $	Fourth Year Physiology 301/302 or Zoology 304 and electives chosen in consultation with the Department	(15)
	Hon	ours	
First Year Biology 101 Chemistry 110 or 120 Mathematics 100 and 121 Physics 110 (120 or 130) English 100	(3) (3) (3) (3) (3)	Second Year Biology 200 Chemistry 210 or 220 Chemistry 203 Mathematics 200 Microbiology 200† 3 units of Arts 1½ units of Science*	$(1\frac{1}{2})$ $(3)$ $(3)$ $(2)$ $(3)$ $(3)$ $(3)$ $(1\frac{1}{2})$
Third Year Biochemistry 410 Biochemistry 411 Chemistry 303 Chemistry 305 3 units of Arts 4½ units of Science*	(3) (1½) (2) (3) (3) (4½)	Fourth Year Biochemistry 430 Biochemistry 449 Biochemistry 500 Chemistry 403, 411 and 423 6 units of electives Plus electives to total	$ \begin{array}{c} (17) \\ \hline (17) \\ (17) \\ (3) \\ (1-6) \\ (3) \\ (6) \\ \hline (17) \end{array} $
	(17)		
†Recommended course			

<sup>†</sup>Recommended course.

# Suggested-

## \*Science electives:

Biology 330	(3)	Biochemistry 506		Microbiology 323	
Biology 334	$(1\frac{1}{2})$	Biochemistry 507	$(1\frac{1}{2})$	Microbiology 402	
Biology 340	$(1\frac{1}{2})$	Botany 435	(3)	Microbiology 405	(3)
Biology 400	$(1\frac{1}{2})$	· · · · · · · · · · · · · · · · · · ·	1	Microbiology 409	$(1\frac{1}{2})$
Biology 401	$(1^{1/2})$	Chemistry 407	(1)	Physiology 301	(3)
	121	Chemistry 413	(1)	Physiology 302	(3)
Biochemistry 500	(1-6)	Chemistry 416	(1)	Zoology 203	$(1\frac{1}{2})$
Biochemistry 502		Computer Science	•	Zoology 204	$(1\frac{1}{2})$
Biochemistry 503		200	$(1\frac{1}{2})$	Zoology 302	(3)
Biochemistry 504		Mathematics 140	(1)	Zoology 307 and	(3)
	· / -/		` . /	308	(3)
Biochemistry 505	(1/2)	Mathematics 205	(2)	300	(3)

Students planning to proceed to graduate work are advised to take German and French.

- 410. (3) Principles of Biochemistry.—A lecture course dealing with the structure, function and metabolic reactions of proteins, carbohydrates, nucleic acids, lipids, and steroids; enzymology and bioenergetics; biochemical transfer of genetic information and protein synthesis; regulatory mechanisms; control of cellular activity. Prerequisite: Chemistry 203 or 230. (Students are advised not to attempt this course unless their standing in the prerequisite is at least 60%).
- 411. (1½) Biochemistry Laboratory.—A course to demonstrate the chemical and physical properties of the fundamental components of cells, and some of the techniques by which these properties are studied.
- 430. (1) Perspectives in Biochemistry.—A seminar course on the history of biochemistry. Prerequisites: Biochemistry 400 or 410 and 411.
- 449. (3) Thesis.—A laboratory research problem under the direction of a staff member.

#### Graduate Courses

Biochemistry 410, or the equivalent, is prerequisite to all graduate courses in Biochemistry. Students are advised not to take graduate courses in Biochemistry unless they have obtained at least 65% in Biochemistry 410 or the equivalent.

- 500. (1-6) Biochemical Methods.—A study of the principles of modern advanced biochemical techniques and their application to the solution of biochemical problems. The lecture section of the course has a unit value of (1) and registration is not limited. Admission to the laboratory section of the course is by permission of the Head of the Department of Biochemistry.
- 502. (1½) The Biochemical Function of Proteins.—Modern concepts of the relationship between macromolecular structure and biochemical function. Given 1970-71 and alternate years.
- 503. (1½) Biochemistry of the Nucleic Acids.—The chemical, physical and piological properties of nucleotides and nucleic acids; the elucidation of jucleic acid structures and modern concepts of their function and replication a the cell. Given 1970-71 and alternate years.
- 504. (11/2) Biochemistry of Amino Acids and Proteins.—Metabolism of idividual amino acids and modern concepts of the biosynthetic mechanisms

leading to the formation of proteins by cellular components. Given 1970-71 and alternate years.

- 505. (11/2) Biochemistry of Carbohydrates.—The pathways, reactions, regulatory mechanisms and dynamic control of carbohydrate and energy metabolism. Given in 1969-70 and alternate years.
- 506 (1½) Biochemistry of Lipids.—Modern concepts of the metabolism and biochemical function of fats, phospholipids and cholesterol. Given 1969-70 and alternate years.
- 507. (11/2) Biochemistry of Steroids and Hormones.—Modern concepts of the metabolism and biochemical function of the sterols, bile acids, steroid hormones, catecholamines and peptide hormones. Given 1969-70 and alternate years.
- 530. (1) Seminar in Biochemistry.—Attendance is required of all graduate students in Biochemistry. Normally each will present one paper per year on a topic approved by his research advisor or committee or on the results of his research.
- 548. (1-3) Directed Studies.—In special cases, with approval of the Head of the Department, advanced courses may be arranged for graduate students in attendance.
  - 549. (6) M.Sc. Thesis.
  - 649. Ph.D. Thesis.

**Biology** 

Biology is not treated as a department but as a field of study. Programmes are sponsored and instruction is offered cooperatively by the Departments of Biochemistry, Botany, Microbiology, Physiology and Zoology in courses in the principles of Biology, Biometrics, Cell Physiology, Cytology, Ecology and Genetics. Students wishing to continue on a graduate programme in Biology should consult with the Life Science department or departments most appropriate to the field of specialization. In special cases inter-departmental graduate programmes can be arranged.

# Requirements for the B.Sc. degree:

	Ma	ajor	
First Year		Second Year	
Biology 101 Chemistry 110 (120 or 103) Mathematics 100 Mathematics 121 Physics 110 (120 or 130) English 100	(3) (3) (2) (1) (3) (3)	Biology 200 Biology 201 Chemistry 230 Electives from: Arts*† Botany 209 Botany 210 Chemistry 210 (220 or 205) Microbiology 200 (201) Zoology 203 Zoology 204	$ \begin{array}{c} (1\frac{1}{2}) \\ (1\frac{1}{2}) \\ (3) \end{array} $ (9)
	(15)	20008) 201	(15)

	M	ajor		
Third Year		Fourth Year		
Biochemistry 410	(3)	$1\frac{1}{2}$ -3 Units from: $(1\frac{1}{2}$ -3)		
Biology 330	(3)	Biology 300		
3 Units from:	(3)	Biology 301		
Biology 334	, ,	$1\frac{1}{2}$ -3 Units from: $(1\frac{1}{2}$ -3)		
Biology 340		Botany 335		
Botany 330		Zoology 425		
Chemistry 210 (220 or 205)		3 Units from: (3)		
Microbiology 307, 308		Biochemistry 430		
Physics 200 and 219		Botany 330		
Zoology 307		Microbiology 405		
Zoology 308		Physiology 421		
3 Units from:	(3)	Physiology 422		
Botany 302	` '	Physiology 423		
Botany 303		Physiology 424		
Botany 304		Physiology 425		
Botany 305		Physiology 426		
Chemistry 210 (220 or 205)		Physiology 431		
Geology 306		Physiology 432		
Physics 200 and 219		Physiology 433		
Physiology 301		Physiology 434		
Physiology 302		Zoology 307		
Zoology 301, or 305		Zoology 308		
Zoology 306		Zoology 428		
Zoology 311 and 410		6-9 units of electives to be (6-9)		
Zoology 413		chosen in consultation with		
Zoology 415		Biology advisers.		
Zoology 416				
*3 Units from Arts	(3)			
	(15)	(15)		

\*Students planning to proceed to graduate work are advised to elect at least one course in a foreign language.
†Students who do not take an Arts course as an elective in Second Year should Note that 9 units of Arts courses (including English 100) must be completed prior to graduation on a B.Sc. programme.

Honours				
First Year		Second Year		
Biology 101 Chemistry 110 (120 or 103) Mathematics 100 Mathematics 121 Physics 110 (120 or 130) English 100	(3) (3) (2) (1) (3) (3)	Biology 200 Biology 201 Chemistry 230 (or 203) Electives from: Arts Botany 209 Botany 210 Chemistry 210 (220 or 205) Microbiology 200 (201) Zoology 203 Zoology 204	(1½) (1½) (3) (9)	
	(15)		(15)	

	Hon	ours		
Third Year		Fourth Year		
Biochemistry 410	(3)	Biology 449	(3)	
Biology 330	(3) (3) (3)	$1\frac{1}{2}$ -3 Units from:	$(1\frac{1}{2}-3)$	
3 Units from:	(3)	´Biology 300	( /2 /	
Chemistry 210 (220 or 20	)5) `´	Biology 301		
Physics 200 and 219	<i>'</i>	12-131/2 Units to be che	os- (12-13½)	
3 Units from:	(3)	en in consultation with		
Biology 334		Biology advisors.		
Biology 340		0,		
Botany 330				
Microbiology 307, 308				
Zoology 307				
Zoology 308				
3 Units from:	(3)			
Botany 302				
Botany 303				
Botany 304				
Botany 305				
Geology 306				
Physiology 301				
Physiology 302				
Zoology 301 or 305				
Zoology 306				
Zoology 311 and 410				
Zoology 413				
Zoology 415				
Zoology 416				
*3 Units from Arts	(3)			
	$\overline{(18)}$		(18)	
	(10)		(10)	

\*Students planning to proceed to graduate work are advised to elect at least one course in a foreign language.

†Students who do not take an Arts course or an elective in Second Year should note that 9 units of Arts courses (including English 100) must be completed prior to graduation on a B.Sc. programme.

Combined Biology and Chemistry Honours					
First Year Biology 101 Chemistry 110 or 120 Mathematics 100 and 121 Physics 110 or 120 English 100	(3) (3) (3) (3) (3)	Second Year Chemistry 210 or 220 (205) Chemistry 203 (or 230) Mathematics 202 3 Units from: Botany 209 and 210 Botany 302, 303, 304, 305 Biology 200 and 201 Microbiology 200, 201 Zoology 203 and 204 3 units from Arts	(3) (3) (3) (3) (3)		
	(15)		(15)		

Combined	Biology ar	d Chemistry Honours	
Third Year *Chemistry 303 or 330  Chemistry 305 Chemistry 311 and 321 Biology 334 and 340 Biology 330 Electives	(3) (2) (3) (3) (4)	Fourth Year Chemistry 310 and 320 Chemistry 312 Chemistry 403 and 423 One of Chemistry 411 or 413 Chemistry 449 or Biology 449 6 Units from: Botany 302, 303, 304, 305, 330 435	(3) (2) (2) (1) (3) (6)
O.	(18)	Microbiology 307 and 308 Zoology 203 and 204 Zoology 307 and 308 Elective	(1)

<sup>\*</sup>Chemistry 303 if 203 taken in Second Year.

# Combined Biology and Forest Biology Honours Programme

A programme leading to the degree of B.Sc. with combined honours in Biology and Forest Biology has been developed for students primarily interested in research and teaching in this field and planning to proceed to graduate work. Emphasis is given to education in basic and interactional phenomena that influence the establishment and growth of trees and forests. These may include genetics, soils, weather and climate, form (dendrology, anatomy, morphology and cytology), function (physiology and biochemistry), ecology (plant and animal influences), microbiology and other foundation courses in Entomology, Pathology, Silviculture and Wood Science. Options in Forest Ecology, Forest Entomology, Forest Genetics, Forest Pathology, Forest Soils or Tree Physiology are possible within the following programme. Interested students should discuss their programmes of study with a representative of the Dean of Forestry. In the second, third and fourth years, programmes must be approved by the Deans of Science and Forestry and include at least 18 units from courses numbered 300 and higher in the Life Sciences (including Biology 449).

First Year		Second Year	
Biology 101 Chemistry 110 or 120 (or 103) Mathematics 100	(3) (3) (2)	Forestry 150 Forestry 250† Chemistry 230	(2) (1) (3) (3)
Mathematics 121 Physics 110 or 120 (or 130)	(1) (3)	3 units from Arts* Biology 334 and Forestry 352	(3)
English 100	(3)	or Biology 340 3 units from Science	(3) (3)
	(15)		(15)

<sup>†</sup>For. 250 will be replaced by For. 350 for 1968-69 only. \*Economics 200 or Geography 202 is recommended.

Third Year		Fourth Year
Forestry 270	(2)	Biology 449 (3)
Forestry 350	(2)	3 units from Arts* (3)
Soil Science 200	(2)	6 units from Science (6)
Biology 330, or Botany 330	` /	6 units free electives (6)
or Zoology 307, Zoology 308	3 (3)	
Biology 321 and 322 or	• /	$\overline{(18)}$
Botany 425	(3)	(/
3 units from Science	(3) (3)	
Forestry 351, or other		
approved course(s)	(3)	* A foreign language is suggested for
	(18)	those planning on graduate studies.

101. (3) Principles of Biology.—An introductory course emphasizing principles of wide application to all living organisms, including cell structure and function, the mechanism of inheritance, evolution, and adaptation to environment. A comparative approach to the unity and diversity of organisms will be stressed. Biology 11 is strongly recommended. An additional one hour tutorial period is required each week for those students who have not previously had Biology 11 or its equivalent in high school. Biology 100 from Grade 13 in British Columbia will not be accepted as equivalent to Biology 101; however, Botany 105 or Zoology 105 will be accepted as equivalent for prerequisite [3-3; 3-3] purposes.

Note: Students who have satisfactorily completed Biology 11 or the equivalent, may write a placement examination in general biology during the week of registration. If this examination is passed, the student will be granted exemption from Biology 101 and may subsequently be admitted to courses requiring Biology 101 as a prerequisite. Students wishing to sit for the placement examination must apply to do so not later than 22 August 1969. Applications should be addressed to: The Chairman, Biology 101, Department of Zoology, The University of British Columbia.

- 200. (1½) Cell Biology I: Structural Basis.—A study of the structure, at all levels, of the nucleus and cytoplasm of plant and animal cells, with an emphasis on diversity, rather than, as hitherto, on unity. Topics considered will include tissue culture, instruments, ultrastructure, development, nuclear events such as recombination, population studies, and the alternative hypotheses which have been advanced to explain the diversity in structure. Students are normally expected to take Biology 201 (for which Chemistry 230 is a prerequisite) as a companion course. Prerequisite: Biology 101. Mr. Fin-[3-0-0: 0-0-0] negan.
- 201. (1½) Cell Biology II: Chemical Basis.—An introduction to structural and functional aspects of cell chemistry. Topics to be discussed include biological micro- and macromolecules and their relationships, protein structure and enzyme action, energy transfer, selected metabolic sequences with some reference to control mechanisms, and the chemistry of information storage and utilization. Prerequisites: Biology 101, Biology 200, and concurrent registration in Chemistry 230. Mr. Bohm and Miss Green. (0-0-0; 3-0-0)
- 310. (1½) Human Heredity and Evolution.—A course which relates genetic and evolutionary concepts to man and to human populations. Primarily for students of third and fourth years in the Faculty of Arts. Credit will not be given for both Biology 101 and Biology 310. Mr. Person and Mr. Suzuki.

(0-0-0; 3-0-2)

315. (3) Protistology.—An introduction to the understanding of single cells as organisms, irrespective of plant or animal affinities. Special attention is given to environmental adaptations, their signficance to ecosystems, and their possible evolutionary implications. The diversity of morphological types is surveyed in view of the above considerations. Designed for second and third year students. Prerequisite: Biology 101. Mr. Francis and Mr. F. J. R. Taylor. [2-3; 2-3]

321. (1½) Principles of Ecology - I.—A study of organisms and their environment, with emphasis on plants. This course complements Biology 322 and normally should be taken in the same session. Mr. Maze. [3-0; 0-0]

322. (1½) Principles of Ecology - II.—Population and community ecology, with emphasis on animals. This course complements Biology 321 and normally should be taken in the same session. Mr. Efford. [0-0; 3-0]

330. (3) Cell Physiology.—The physico-chemical basis for cellular activity, with particular emphasis on: energy relationships, functions of cell parts, integration and internal control of cellular activities, mechanisms of influence of external factors, and cell ontogeny. The laboratory work will emphasize the techniques and apparatus used to study cell function. Primarily for students in the life sciences but open to others with permission of the instructors. Prerequisite: Chemistry 230. Mr. Phillips and Mr. Tregunna.

334. (1½) Fundamental Genetics.—An introduction to the basic principles of heredity, with emphasis on the physical and chemical structure and function of genetic material. It is recommended that students normally not register in this course prior to Third Year. Mr. Person. [3-2; 0-0]

340. (1½) Principles of Cytology.—General descriptive study of the cell and its components, with emphasis on their ultrastructures. Relation of structure to function. It is recommended that students normally not register in this course prior to Third Year. Mr. Bisalputra. [0-0; 2-4]

300. (1½) Biometrics.—Introduction to statistical procedures applied to biological research. Prerequisites: Math 100 and 121 or the equivalent. Mr. Wehrhahn. [3-0; 0-0]

301. (1½) Biomathematics.—Introduction to uses of mathematics in the biological sciences. Special emphasis on experimental design and modelling of biological processes. Prerequisite: Biology 300 or permission of the instructor. Mr. Wehrhahn and Mr. Kane. [0-0; 3-0]

448. (1-3) Directed Studies in Biology.

449. (3) Directed Biological Research.—A course designed to allow students to undertake a research project in selected fields prior to research at the graduate level. Open only to majors and honours students in biology, and with permission of the appropriate supervisor.

#### Graduate Programme

The field of biology is not treated by a single department, but instruction is offered cooperatively by the Departments of Biochemistry, Botany, Microbiology, Physiology and Zoology. Students wishing to pursue a graduate programme in biology should consult with the department or departments most appropriate to the field of specialization concerning graduate courses.

503 (1½) Principles and Techniques in Electron Microscopy I.—A lecture course on the principles of construction and operation of the microscope; the techniques used in the preparation of materials for examination. An introduction to biological applications. Mr. Acton and Mr. Bisalputra.

504. (1½) Principles and Techniques in Electron Microscopy II.—A laboratory course in the operation of the electron microscope and the biological techniques in electron microscopy. Enrollment limited. Prerequisite: Biology 503. Mr. Acton and Mr. Bisalputra.

505. (3) Comparative Biology.—A lecture and seminar course on the biochemical aspects of a wide range of organisms with particular reference to biochemical evolution, nature and control of metabolism and the biochemistry of differentiation. Prerequisites: Biochemistry 410 (or 400). Recommend Biology 330, Zoology 428, or Physiology 301 and 302. Mr. Hochachka.

506. (11/2) Principles of Radiotracer Methodology in Biological Research.— A comprehensive survey, by assigned reading, tutorials and problem-solving, of the principles of radioactivity and radiotracer methodology as applied to re-

search in the life sciences. First term.

- 507. (11/2) Biological Applications of Radiotracers.—A laboratory course including projects and some seminars designed to cover a wide range of problems concerned with techniques, experimental design and interpretation, as well as the handling and disposal of living tissues. Prerequisite: Biology 506. Second Term.
- 508. (3) Current Topics in Genetics.—Recent papers in genetics will be discussed with emphasis on topics concerning chromosomes and gene structure and function. Prerequisite: a genetics course or permission of an instructor. Mr. Clark, Mr. Person, Mr. Suzuki and Mr. Warren.
- 509. (3) Advanced Biometrics.—Topics in advanced statistical methods in relation to biological sciences. Experimental design, multivariate analysis, sampling, theory or error, maximum likelihood estimation and special topics in current literature. Mr. Larkin.

548. (1-3) Advanced Topics in Biology.

## Botany

Honours and Major programmes are available in Botany. The prescribed courses and electives are given below for each year. Department advisors should be consulted before the beginning of the Second Year to assist in the choice of both Science and non-science electives.

The Department offers opportunities for study leading to doctoral, master's and bachelor's degrees. For information on the Ph.D. and M.Sc. degree courses, see the Graduate Studies calendar.

Requirements for the B.Sc. degree:

	Ma	jor		
First Year			Second Year	
Biology 101 Physics 110 (120 or 130) Chemistry 110 (120 or 103) Mathematics 100 and 121 English 100	(3) (3) (3) (3) (3)	Biology Biology Botany Botany Chemist Elective	201 209 210 try 230 (Arts)	$ \begin{array}{c} (1\frac{1}{2})\\ (1\frac{1}{2})\\ (1\frac{1}{2})\\ (1\frac{1}{2})\\ (3)\\ (3)\\ \hline (15) \end{array} $
Third Year		ıd	Fourth Year	
Botany 3 Biology Biology Biology 10½ additional units in 12 units of elective* cou	300 or Pl 321 334 n Science,	6 of which	(3) $(1\frac{1}{2})$ $(1\frac{1}{2})$ $(1\frac{1}{2})$ must be in Botan	ny.

	Hor	nours		
First Year		l	Second Year	•
Biology 101 Physics 110 (130 or 120) Chemistry 110 (120 or 103) Mathematics 100 and 121 English 100	(3) (3) (3) (3) (3)	Biology 200 Biology 201 Botany 209 Botany 210 Chemistry 2 Elective (Au	230	$ \begin{array}{c} (1\frac{1}{2}) \\ (1\frac{1}{2}) \\ (1\frac{1}{2}) \\ (1\frac{1}{2}) \\ (3) \\ (3) \\ (3) \end{array} $
	(15)			(15)
Third Year		and	Fourth Year	(36 units)

Third Year	and	Fourth	Year	(36 units)
Botany 3	330	(3)		
Botany 4	<b>14</b> 9	(3)		
Biology 3	300	$(1\frac{1}{2})$		
or Pl.	Sc. 321	$(1\frac{1}{2})$		
Biology 3		$(1\frac{1}{2})$		
Biology 3	334	$(1\frac{1}{2})$		

13½ additional units in Science, 9 of which must be in Botany. 12 units of elective\* courses (of which 3 must be in Arts).

N.B. Those planning on teaching careers in Secondary School are advised to take courses in Zoology as their electives.\* Students planning to proceed to graduate work are advised to elect at least one course in a foreign language.

Biology 101 (or equivalent) is prerequisite to all courses in Botany, except Botany 310.

- 209. (1½) Non-Vascular Plants.—A study of fungi, algae, lichens and bryophytes, integrating form and function as they are related to exploitation of environment. Mr. Bandoni. [2-3; 0-0]
- 210. (1½) Vascular Plants.—A comparative study of pteridophytes, gymnosperms and angiosperms, integrating form, function and ecology. Mr. Maze and Mr. Schofield. (0-0; 2-3)
- 302. (3) Morphology & Taxonomy of Seed Plants.—The principles and practices of seed-plant taxonomy emphasizing the use of morphological and evolutionary features in classification and identification. Miss Beamish.

  [2-4; 2-4]
- 303. (3) Biology of Fungi.—Morphology, reproduction, and classification of fungi and slime molds. Mr. Bandoni and Mr. Hughes. [2-3; 2-3]
- 304. (3) Morphology & Taxonomy of Bryophytes and Lower Vascular Plants.—A study of the main taxa emphasizing form, structure, reproduction and phylogeny. Mr. Schofield. [2-2; 2-2]
- 305. (3) Biology of Algae.—A systematic survey of the algae, considering their morphology, physiology, and ecology. Mrs. Conway. [2-3; 2-3]
- 310. (1½) Plants and Man.—An introduction to the interactions of plants and human societies. The role of man in the origins, evolution and dispersal of food, drug and economic plants and the influences of plants on man's economic, cultural and political history will be considered. Suitable for students of third and fourth years in the Faculty of Arts. Mr. Hughes.

[2-0-3; 0-0-0]

- 330. (3) Plant Physiology. Introduction to physiological processes in plants, including photosynthesis, transpiration, absorption, enzyme and hormone action, and growth. Chemistry 230 is recommended but not required. Mr. Wort. [3-2; 3-2]
- 335. (1½) Plant Genetics.—The evolution of basic concepts in plant genetics including discussion of recent developments and methods. Prerequisite: Biology 334. Miss Cole. [0-0; 2-3]
- 402. (1½) Plant Anatomy.—Internal structure and organization of vascular plants. Mr. Maze. [2-4; 0-0]
- 420. (3) Principles of Biogeography.—Distribution of terrestrial and marine biotas in space and time; similarities and differences; theories of origins of biotas; descriptive biogeography of land and sea. Prerequisite: Biology 321 and 322 or equivalent. [2-3; 2-3]
- 425. (3) Plant Ecology.—An introduction to relationships between plants and their environment. Mr. Krajina. [2-3; 2-3]
- 435. (3) Plant Biochemistry.—A comparative survey of intermediary metabolism, including the chemistry, biosynthesis, and distribution of organic compounds in the plant kingdom. Prerequisite: Chemistry 230. Mr. Towers and Mr. Bohm. [2-3; 2-3]
- 436. (2) Fundamentals of Cytogenetics.—A detailed consideration of the nucleus and chromosomes as the physical basis for heredity. Prerequisite: Biology 334 or equivalent. Miss Cole. [2-4; 0-0]
- 440. (3) Palaeobotany and Palynology.—A study of plant macrofossils and microfossils emphasizing phylogenetic relationships of major taxa. (Given in 1970-71 and alternate years.) Mr. Rouse. [2-4; 2-4]
- 449. (3) Botanical Research.—A course designed to allow students to undertake a research project in selected fields prior to research at the graduate level. Open only to majors and honours students in botany, and with permission of the appropriate supervisor.

#### Graduate Courses

Note: Students wishing to enrol in any of the following courses should consult the instructor in charge for permission, prior to registration.

- 500. (1) Field Botany.—A course designed for students proceeding to a graduate degree in Botany. Attendance may be required at the discretion of the Department as a prerequisite to the degree. The course will last approximately one week and will be held immediately after the sessional examinations in April. A fee of \$25, payable to the departmental secretary on registration in September, is levied to help defray expenses. Field studies will focus attention on the ecology, taxonomy and life histories of representative plant groups. Written reports will be required as directed.
- 504. (3) Taxonomy of Vascular Plants.—Before registration in this course students are required to collect at least 150 species of vascular plants. Part of the laboratory mark for the course is assigned to this collection.
- 505. (2) Cytogenetics of Natural Populations.—Application of cytogenetic principles to the study of evolution and present-day relationships of vascular plants. Miss Beamish.
- 510. (3) Marine Phycology.—Collection, identification, ecology and life listories of algae; emphasis on marine benthonic forms. Prerequisite: Botany 05. (Given in 1969-70 and alternate years.) Mr. Scagel.
- 511. (3) Freshwater Phycology.—Collection, culture techniques, identificaon, ecology and life histories of the freshwater forms. (Given in 1970-71 ad alternate years.) Miss Stein.

- 512. (2) Practical Marine Phytoplankton Study.—A field project involving the collection, identification and distributional assessment of a selected group of marine phytoplankton organisms. Prerequisite: Oceanography 506. Mr. F. J. R. Taylor.
- 513. (2) Cytology of Marine Algae.—A cytomorphological study of marine algae, including a detailed discussion of nuclei and chromosomes. Miss Cole.
- 515. (3) Advanced Mycology.—Taxonomy of fungi; identification, nomenclature, classification. A collection of at least 40 mycological specimens must be made prior to the course. (Given in 1970-71 and alternate years.) Mr. Bandoni.
- 517. (3) Aquatic Mycology.—Structure, classification, culture, and physiology of freshwater, brackish water and marine fungi. Special problems on groups or individual species. (Given in 1969-70 and alternate years.) Mr. Hughes.
- 518. (3) Advanced Forest Pathology.—Lectures, laboratory periods and student seminars to cover hereditary, physiological, anatomical, and microbiological factors of trees that influence levels of resistance or susceptibility to disease. Emphasis on critical analyses of host-pathogen relationships of representative microorganisms causing different types of tree disease, including the effects from genetic variation within pathogens. (Given in 1970-71 and alternate years.)
- 520. (3) Phytogeography.—Historical and floristic plant geography. The pattern, dynamics and ecology of plant distributions. Terrestrial plants stressed. (Given in 1970-71 and alternate years.) Mr. Schofield.
- 525. (3) Advanced Plant Autecology.—(Given in 1970-71 and alternate years.) Mr. Krajina.
- 526. (3) Advanced Plant Synecology.—(Given in 1969-70 and alternate years.) Mr. Krajina.
- 528. (1½) Current Topics in Plant Biochemistry.—Discussions of recent and important papers dealing with the biosynthesis and metabolism of secondary metabolites and proteins in plants including fungi. Attention will also be given to microbial degradation of natural products. Given 1969-70 and alternate years. Mr. Bohm, Mr. I. E. P. Taylor, Mr. Towers. Fall Term.
- 529. (1½) Chemical Plant Taxonomy.—Discussion of the application of chemical and biochemical characters to problems of plant systematics. The usefulness of these characters will be examined with respect to problems at all taxonomic levels. Particular attention will be given to hybridization. Given 1969-70 and alternate years. Mr. Bohm. Spring Term.
- 530. (3) Advanced Plant Physiology I.—Studies of the processes and significance of photosynthesis, respiration, and the metabolism of carbohydrates, nitrogen and lipid compounds in plants. (Given in 1969-70 and alternate years.) Mr. Tregunna.
- 531. (3) Advanced Plant Physiology II.—Studies of water relations, min eral nutrition, translocation, growth and development in plants. (Given in 1970-71 and alternate years.) Mr. Wort.
- 540. (3) Advanced Paleontology and Palynology.—Detailed studies of plar macro- and microfossils and phylogenetical and paleoecological interpretations. (Given in 1970-71 and alternate years.) Mr. Rouse.
- **541.** (3) Structure and Development of Pteridophytes and Gymnosperm (Given in 1970-71 and alternate years.)
- 542. (3) Structure and Development of Angiosperms.—(Given in 1969-' and alternate years.)

- 543. (3) Recent Advances in the Biology of Plant Cells.—This course will emphasize the integration of biochemical and ultrastructural studies at cellular and subcellular levels. Topics will include biological membrances, mitochondria, chloroplasts, nucleocytoplasmic relations, control of cell division, differentiation development and other dynamic aspects of cells. (Given in 1969-70 and alternate years.) Mr. Bisalputra, Miss Green and Mr. Tregunna.
  - 546. (1-3) Advanced Topics in Botany. Staff.
- 547. (1) Seminar on Current Topics.—Attendance of all students proceeding to the graduate degree in Botany is required during each year of residence. Papers will be presented by students, staff and visitors.
  - 549. (3-6) Master's Thesis.
  - 649. Ph.D. Thesis.

# Microbiology

The department offers opportunities for study leading to doctoral, master's and bachelor's degrees. For information on the Ph.D. and M.Sc. degree programmes, see the Graduate Studies calendar.

# Requirements for the B.Sc. Degree:

Major				
First Year English 100 Biology 101 Mathematics 100 and 121 Physics 110 (120 or 130) Chemistry 110 (120 or 103)	(3) (3) (3) (3) (3)	Second Year Chemistry 230 Microbiology 200 (201) Science (elec.) Arts (elec.)*	(3) (3) (6) (3)	
	(15)		(15)	
Third Year Biochemistry 410 Microbiology 321 Microbiology 322 Microbiology 323 Biology 334 Elective Arts (elec.)*	(3) (1½) (1½) (1½) (3) (1½) (1½) (1½)	Fourth Year 9 units from: Microbiology 307 Microbiology 308 Microbiology 402 Microbiology 403 Microbiology 405 Microbiology 408 Microbiology 409 Microbiology 411 Microbiology 449 Electives	(9)	
	(15)		(15)	

See page T53.

	Hon	ours	
First Year English 100 Biology 101 Mathematics 100 and 121 Physics 110 (120 or 130) Chemistry 110 (120 or 1		Second Year Chemistry 230 Microbiology 200 (201) Science elective Arts (elec.)	(3) (3) (6) (3)
	(15)		(15)
Third Year Biochemistry 410 Microbiology 321 Microbiology 322 Microbiology 323 Biology 334 Science (elec.)* Arts (elec.)	(3) (1½) (1½) (3) (1½) (4½) (3)	Fourth Year Microbiology 405 Microbiology 430 Microbiology 449 6 units from: Microbiology 307 Microbiology 308 Microbiology 402 Microbiology 403 Microbiology 408 Microbiology 409 Microbiology 411 Elective	(3) (3) (3) (6)
	(18)		(18)

#### \*Recommended Science electives:

Biology 330 Biology 340	$(3)$ $(1\frac{1}{2})$	Chemistry 205 Chemistry 305	(3) (3)	Microbiology 402	(11/2)
Biology 400 Biology 401	$(1\frac{1}{2})$ $(1\frac{1}{2})$	Chemistry 409	(3)	Zoology 413 Zoology 420	(3) (3)
Botany 303 Botany 305	(3)	Microbiology 307	$(\frac{11}{2})$	Zoology 425	(3)

200. (3) Introductory Microbiology.—History of bacteriology; bacteria in nature; classification of bacterial forms; methods of culture and isolation; relation of bacteria to agriculture, industry, veterinary science, public health and sanitation. Prerequisite: Biology 101 or equivalent. It is recommended that Chemistry 230 be taken concurrently. This course is for those students intending to take an Honours' or Majors' degree in Microbiology. This course or Microbiology 201 is prerequisite to all other courses in the Department except 416. Credit will not be given for both Microbiology 200 and 201.

[3-2; 3-2]

201. (3) Principles of Microbiology.—Similar to Microbiology 200 but with a slight medical emphasis. Recommended for students of Nursing, Pharmacy and other Health Sciences. It is recommended that Chemistry 230 be taken concurrently. Credit will not be given for both Microbiology 200 and [3-2; 3-2] 201.

307. (1½) Microbiology of Food.—Microbiology of milk, milk products and other foods. An intensive study of the bacteria of significance in the food industries. Role of microorganisms in food spoilage and food preservation. Microorganisms as indices of sanitation and of the acceptability of foods.

[2-2; 0-0]

- 308. (1½) Food and Industrial Mycology.—A study of moulds and yeasts of significance in the manufacture and spoilage of food products. Testing and control. Use of moulds and yeasts in industrial fermentations such as pro-[0-0; 2-2] duction of antibiotics, alcohol, vitamins, etc.
- 321. (1½) Quantitative Microbiology.—Technical procedures and underlying principles associated with the isolation, identification and metabolism of pathogenic and saprophytic micro-organisms; microbiological assays. Biochemistry 410 and Biology 334 must precede or be taken concurrently. [2-3-1; 0-0-0]
- 322. (11/2) Soil and Aquatic Microbiology.—Basic principles and techniques used in the study of the morphology, ecology and metabolism of soil and aquatic microorganisms. The role of various microbial species in nature's economy. (This course is the same as Soil Science 311). [0-0-0; 2-3-1]
- 323. (3) Bacterial Cytology, Growth and Genetics.—Structures of procaryons. The growth and division of bacteria. Differentiation, mutations and genetic transfer in bacteria. Biochemistry 410 and Biology 334 must precede or be taken concurrently. Enrolment in this course will be limited. [2-3-1; 2-3-1]
- 402. (3) Immunology and Immunochemistry.—Composition and structure of antigens and antibodies; mechanisms of control of antibody synthesis; type reactions of antigens and antibodies; cellular and humoral immunity; allergies and anaphylaxis. This course is required prior to, or must be taken concurrently with Microbiology 403, 409 and 411. Prerequisite: Biochemistry 410.

[2-3; 0-0]

- 403. (11/2) Pathogenic Bacteria and Rickettsiae.—Discussion of the sources, modes of transmission, methods of identifying and controlling the commoner human and zoonotic pathogens. Prerequisite: Microbiology 402, which may be taken concurrently. [0-0; 2-4]
- 405. (3) Bacterial Physiology.—Cytology, growth and metabolism of bacteria; selected topics in bacterial physiology. Laboratory exercises stress instrumentation and the application of quantitative biochemical techniques to the study of microorganisms. Prerequisite: Biochemistry 410, Microbiology 321. [2-4; 2-4]
- 408. (1½) Animal Viruses.—Discussion of some animal viruses in respect o their structure, mode of replication and identification. Latent virus infecions and oncogenic viruses. Mechanisms of antiviral defenses. Prerequisites: Iicrobiology 402 and 408.
- 409. (1½) Bacterial Viruses.—A general outline of bacterial viruses with mphasis on topics of current interest, e.g. host controlled modification, RNA hages, control systems in lysogenic and lytic responses. Г0-0; 2-41
- 411. (1½) Pathogenic Fungi.—Morphology, physiology and immunology [0-0; 2-2]fungi with special emphasis on pathogenic species.
- 416. (3) Applied Microbiology.—A first course in microbiology for adnced science and egineering students interested in the use of microorganns in applied research and industry. Basic principles of microbial growth d metabolism; technology of large-scale cultivation and examples of instrial processes; review of microbiol research procedures. Permission of the

head of the department required. (Credit will not be given for both Microbiology 416 and 200 (201)). [2-0-1]

- 430. (3) Seminar in Bacteriological Literature.—Reviews and critical discussions of selected topics. Compulsory for Honours students.
- 449. (3) Research Problem.—In the Final Year of Honours, an investigation approved by Head of Department. The results are presented in a graduating essay, to be reviewed by oral examination.

#### **Graduate Courses**

- 502. (1½) Advanced Immunochemistry.—Lectures on biophysical aspects of protein chemistry and on advanced immunochemical methods. Prerequisite: Chemistry 305.
- 503. (1½) Bacterial Cytology and Genetics.—Morphology and functional significance of bacterial cell components. The role of nuclear material in determining inheritable characteristics of bacteria, viruses and fungi. Spontaneous and induced mutations. Transfer of genetic information by processes of transformation, transduction and recombination.
- 505. (1½) Molecular Microbiology.—The cellular processes involved in microbial growth. Transport processes, energy yielding mechanisms, bacterial protein synthesizing systems, control mechanisms. Offered in 1970-71 and alternate years.
- 506. (3) Microbiological Research Procedures I.—The application of current techniques to the isolation of proteins, criteria of purity and amino acid analysis. Advanced immunochemical methods. This course, or Microbiology 507, must be taken by all first year graduate students in Microbiology if in the opinion of the Department they have not had an adequate introduction to the techniques used in research in the Department of Microbiology. Given in 1970-71 and alternate years. To be taken only with the consent of the head of the Department.
- 507. (3) Microbiological Research Procedures II.—The isolation and identification of intermediates and end-products of various metabolic reactions; the use of radioactive isotopes, bacterial mutants, respirometry. This course, or Microbiology 506, must be taken by all first year graduate students in Microbiology who, in the opinion of the Department, have not had an adequate introduction to the techniques used in research in the Department of Microbiology. Given in 1969-70 and alternate years. To be taken only with permission of the head of the Department.
- 509. (3) Viral Ecology.—Range of viruses infectious for man and domestic animals, natural vectors and reservoirs, methods of spread, laboratory diagnostic procedures, histological virology, insect viruses, plant viruses. Prerequisite Permission of the Head of the Department.
  - 530. (3) Seminar in Microbiology.
  - 548. (3) Directed Studies on an approved problem.
  - 549. (6) Master's Thesis.
  - 649. Ph.D. Thesis.

# Physiology

The department offers opportunities for study leading to doctoral, master and bachelor's degrees (Honours only). For information on the Ph.D. ar M.Sc. degree programmes, see the Faculty of Graduate Studies calendar. Further information on other courses within the department, consult the Faulty of Medicine calendar.

Biology 101, Chemistry 120; 203 or 230; Mathematics 100 and 121 and Physics 110, 120 or 103 or the equivalent are prerequisite to all courses in Physiology.

Biochemistry 410 and Physiology 301, 302, or the equivalents, or consent of the department are prerequisite to all courses in Physiology numbered 421 or higher.

# Requirements for the B.Sc. degree:

Hon	ours	
(3) (3) (3) (3) (3)	Second Year Chemistry 205 (220 or 210) Chemistry 230 (or 203) Mathematics 202 Arts elective Optional additional electives from: Biology 200, 334, 340 Microbiology 200 (or 201 Physics 200 and 219 Zoology 202	(3) (3) (3) (3) (6)
(15)		(18)
	Fourth Year	
(3) (1½) (3) (3)	2 courses from Physiology 421-426 1 course from Physiology 431-434 Physiology 440 Physiology 449 2 Electives	(3) (1½) (1½) (3) (6) (15)
	(3) (3) (3) (3) (3) (3) (15) (4 <sup>1</sup> / <sub>2</sub> ) (3) (1 <sup>1</sup> / <sub>2</sub> ) (3)	(3) Chemistry 205 (220 or 210) (3) Chemistry 230 (or 203) (3) Mathematics 202 (3) Arts elective (3) Optional additional electives from:     Biology 200, 334, 340     Microbiology 200 (or 201     Physics 200 and 219     Zoology 202  (15)  Fourth Year  (4½) 2 courses from     Physiology 421-426 1 course from     Physiology 431-434     Physiology 440     Physiology 449 2 Electives

## Combined Honours B.Sc.-M.D. or D.M.D.

First and Second Year a	s above		
Third Year		Fourth Year	
Biochemistry 400 Biology 330 Physiology 301 Physiology 302 Arts or Science Electives	$ \begin{array}{c} (5) \\ (3) \\ (3) \\ (1\frac{1}{2}) \\ (5\frac{1}{2}) \end{array} $	Anatomy 400 Anatomy 401 1 course from Physiology 421-424, and 431-434 Physiology 440 Physiology 449 Science Elective	$ \begin{array}{c} (3) \\ (3) \\ (1\frac{1}{2}) \\ (1\frac{1}{2}) \\ (3) \\ (3) \end{array} $
	(18)		(15)

ist of electives acceptable for the Honours Programme in Physiology: Biology 334, 340 (Fundamental Genetics, Principles of Cytology) Biology 400, 401 (Biometrics I and II)

Computer Science 210 (or 200 and 201) (Introduction to Computers. Automatic Programming)

Microbiology 200 (or 201) (Introductory Microbiology)

Microbiology 402 (Immunology)

Microbiology 405 (Bacterial Physiology)

Physics 200 (Electricity and Kinetic Theory)

Physics 219 (Laboratory in Electricity and General Physics)

Zoology 301 (Invertebrates)

Zoology 302 (Microanatomy)

\*Zoology 428 (Comparative Physiology)

\*Elective normally taken.

- 301. (3) Human Physiology.—A lecture course on body function with particular reference to man. Normally taken concurrently with Physiology 302. Open to Honours students and others with high academic standing. Credit will normally be given for others with high academic standing. Credit will normally be given for only one of the following: Physiology 301 and 302; Zoology 303 or Zoology 304. Prerequisites: Biology 101 and Chemistry 203 or 230. [3-0: 3**-**0]
- 302. (1½) Human Physiology Laboratory.—A laboratory course designed to illustrate physiological principles and to provide training in physiological techniques. Must be taken in conjunction with Physiology 301. Enrollment limited and subject to consent of the department. [0-3; 0-3]

Physiology 301 or Zoology 304, and Biochemistry 410, or the equivalents, are prerequisites for all courses numbered 421-426.

- 421. (1½) Advanced Topics in Renal and Respiratory Physiology.—A lecture and seminar course in which certain aspects of these fields will be considered in detail. (1970-71 and alternate years). [3-0; 0-0]
- 422. (1½) Advanced Topics in Cardiovascular Physiology.—A lecture and seminar course. (1969-70 and alternate years). [0-0; 3-0]
- 423. (1½) Advanced Topics in Gastrointestinal Physiology.—A lecture and seminar course with special emphasis on the control of digestion and motility. (1968-69 and alternate years). [0-0; 3-0]
- 424. (11/2) Advanced Topics in Endocrinology.—A lecture and seminar course with special emphasis on the analysis of homeostatic control systems. (1969-70 and alternate years). [3-0; 0-0]
- 425. (1½) Elements of Neurophysiology.—An introduction to the functions of the nervous system. Anatomy 425 must be taken concurrently.

426. (1½) Advanced Topics in Neurophysiology.—Advanced studies of functions of the central nervous system, with special emphasis on mechanisms of synaptic transmission and information processing. Physiology 425 and Anatomy 425 are additional prerequisites for this course. (1969-70 and alternate years).

Physiology 302 or the equivalent, and the consent of the Department are required for the following laboratory courses in which enrollment will be limited.

- 431. (1½) Advanced laboratory in Renal and Respiratory Physiology.-Given only in conjunction with Physiology 421. (1970-71 and alternat years). [0-6; 0-0]
- 432. (1½) Advanced laboratory in Cardiovascular Physiology.—Given onl in conjunction with Physiology 422. (1969-70 and alternate years). [0-0; 0-6

- 433. (1½) Advanced laboratory in Gastrointestinal Physiology.—Given only in conjunction with Physiology 423. (1970-71 and alternate years). [0-0; 0-6]
- 434. (11/2) Advanced laboratory in Endocrinology.—Given only in conjunction with Physiology 424. (1969-70 and alternate years). [0-6; 0-0]
- 440. (1½) Seminar.—Open to Honours students in physiology and gradu-[2-0; 2-0] ate students.
  - 448. (1-3) Directed Studies in Physiology.
- 449. (3) Graduating Essay.—Prior to graduation, students in the Honours course will be required to carry out an investigation approved by the Head of the Department and to submit a satisfactory graduating essay based on this work.

#### Graduate Courses

Physiology 301, 302, Biochemistry 410, or the equivalent, or consent of the Department, are prerequisite to all graduate courses.

- 510. (3) Neurophysiology.—A study of the functions of the central nervous system, with special emphasis on mechanisms of synaptic transmission and of information processing. Anatomy 510 must be taken concurrently.
- 511. (1-3) Seminar in Mammalian Physiology.—Seminar in selected topics in mammalian physiology.
  - 549. (6) M.Sc. Thesis.
  - 649. Ph.D. Thesis.

# Zoology

The department offers programmes leading to bachelor's, master's and doctoral degrees. For information on the Ph.D. and M.Sc. degree programmes, see the Graduate Studies calendar.

# Requirements for the B.Sc. Degree:

# First-Year Major and Honours

The programme is identical with the first year Biology programme (page T51).

	Major						
Second Yea Arts option Biology 200 Biology 201 Zoology 203 Zoology 204 Chemistry 230 Option	(3) (1½) (1½) (1½) (1½) (1½) (1½) (3) (3)	Third 'Arts option Biology 334 Biology 322 Zoology 301 or Zoology plus Zool. Elective Zoology 302 Zoology 302	$ \begin{array}{c} (3) \\ (1\frac{1}{2}) \\ (1\frac{1}{2}) \end{array} $ $ (3) \\ (3) \\ (3) \\ (1\frac{1}{2}) \end{array} $ $ (1\frac{1}{2}) \\ (1\frac{1}{2}) $	Fourth Year Biology 300 (1½) As advised, but to include 6 units of Science of which 3 must be Zoology*			
	(15)	Zoology 308	$\frac{(1\frac{1}{2})}{(15)}$	(15)			

## Honours

Second Year	r	Third Year	1	Fourth Ye	ar
Arts option Biology 200 Biology 201 Zoology 203 Zoology 204 Chemistry 230 Option	$ \begin{array}{c} (3) \\ (1\frac{1}{2}) \\ (1\frac{1}{2}) \\ (1\frac{1}{2}) \\ (1\frac{1}{2}) \\ (3) \\ (3) \end{array} $	Arts option Biology 300 Biology 324 Biology 322 Zoology 301 or Zoology 305 plus Zoology Elective Zoology 302 Zoology 307 Zoology 308 Option	$ \begin{array}{c} (3) \\ (1\frac{1}{2}) \\ (1\frac{1}{2}) \\ (1\frac{1}{2}) \\ (3) \\ (1\frac{1}{2}) \\ (3) \\ (1\frac{1}{2}) \\ (3) \\ (1\frac{1}{2}) \\ (1\frac{1}{2}) \\ (3) \\ (1\frac{1}{2}) \\ (3) \\ (4) \\ (4) \\ (4) \\ (5) \\ (4) \\ (5) \\ (5) \\ (5) \\ (6) \\ (6) \\ (6) \\ (7) \\ (7) \\ (8) \\ (8) \\ (8) \\ (9$	Biology 300 Zoology 448 Zoology 449 plus 12 units of Science of which 6 must Zoology*	(1½) (3) (3) (3) be (12)
	(15)		(18)		(18)

<sup>\*</sup>Note: For purposes of these regulations, the following courses are acceptable zoology credits in the major and honours programmes: Biology 334 (Genetics); Biology 321/322 (Ecology); Biology 330 (Cell Physiology) Biology 300/301 (Statistics).

T2-3: 0-01

Note: During a reorganization of the Zoology programme, there will be, for a time, courses with similar content but different numbers. Credit will not be given for both members of the following pairs: Zoology 202 and 203; 202 and 306; 301 and 305; 302 and 204; 304 and 307; 304 and 308; 422 and 323; Zoology 302 and Biology 200.

203. (1½) Comparative Animal Morphology.—A comparative study of animal morphology, with particular reference to the vertebrates; a study of the evolution of organ systems, with dissection of representative forms. Mr.

Scudder.

**204.** ( $1\frac{1}{2}$ ) Development Biology.—Animal development and its underlying casual principles; introductory embryology and histology. Mr. Kasinsky. [0-0; 2-3]

301. (3) Invertebrate Zoology.—Morphology; taxonomy; life histories of invertebrates with special reference to marine forms. Prerequisite: Zoology 202 or permission of instructor. Mr. Dehnel.

302. (3) Microanatomy.—Morphological and physio-chemical organization of the cell, description of the fundamental tissues; introductory embryology

with an emphasis on causal principles of development. Mr. Finnegan.

303. (3) Vertebrate Physiology.—Organ physiology for students not taking the Major or Honours B.Sc. programme. Prerequisite: First year Chemistry and Biology 101 or the equivalent of one lecture per week and 3 hours laboratory per week for one semester devoted to the functional anatomy of vertebrate animals. Mr. Perks. Students will get credit for one only of Zoology [2-2; 2-2] 303 and 307/308.

305. (1½) Invertebrate Zoology.—An introduction to the invertebrate phyla. [2-3; 0-0]

306.  $(1\frac{1}{2})$  Vertebrate Zoology.—The origins and classification of the evolution of organ systems in terms of adaptation to the environment. Prerequisite: Zoology 203. Mr. Fisher. (To be offered 1970-71).  $[0.\overline{0}; 2.3]$ 

- 307. (1½) Physiology.—Lectures on animal physiology. Restricted to students who have successfully completed the second year requirements of a major or honours programme in Life Sciences. Mr. Perks. Students will get credit for one only of Zoology 303, 307 and 308. [2-0; 2-0]
- 308. (1½) Physiology Laboratory A.—Experiments in organismic physio-[0-4; 0-4]
- 311. (1½) Introduction to Entomology.—A survey of the structure, classication and biology of insects, with an introduction to spiders, mites and ticks. [2-3; 0-0] Ir. Scudder.

323. (1½) Introduction to Comparative Ethology.—An introduction to the tudy of animal behaviour with special emphasis on social behaviour. Preequisite: Zoology 203 or consent of Instructor. Mr. Liley. [0-0; 3-0]

- 400. (3) Principles and History of Biology.—Lectures and seminars on e scientific revolutions of the seventeenth and eighteenth centuries, and on the problem of discovery in science. No prerequisites other than clear standing [3-0; 3-0] second year; Biology 101 is not required. Mr. Chitty.
- 401. (3) Experimental Ecology.—Theoretical and experimental analysis the basic principles in population dynamics, behavioural ecology and mmunity structure and discussions of recent advances. Prerequisite: Consent [2-4; 2-4] the instructor. Mr. Harger.
- 402. (1½) Evolution.—A critical appraisal of the evidence for evolution; a asideration of the basic principles of natural selection and the nature and gin of species and higher categories. Prerequisites: Third Year major or nours, or permission of the Instructor. Mr. Scudder. [0-0; 3-0]

- 410. (1½) Entomology.—A detailed consideration of selected aspects of entomology, functional morphology, taxonomy, biology and physiology of insects. Prerequisite: Zoology 311. Mr. Scudder [0-0; 2-3]
- 413. (3) Introductory Parasitology.—Classification, morphology, life histories of animal parasites affecting domestic and wild animals and man. Mr. Adams. [2-3; 2-3]
- 414. (1½) Marine Invertebrate Zoology.—General problems in ecology, morphology and physiology of marine invertebrates. Prerequisites: Zoology 301 or 305 or equivalent. (1970-71 and alternate years.) Mr. Dehnel.

[2-3; 0-0] 415. (3) Biology of Fishes.—Classification, identification, life histories and

ecology of fishes, with an introduction to the study of their marine and freshwater environments. Mr. McPhail. [2-3; 2-3]

- 416. (3) Terrestrial Vertebrate Zoology.—The forms, function and evolution of terrestrial vertebrates, as related to their distribution and abundance. The laboratory includes classification, life histories, and ecology of terrestrial vertebrates with particular attention to British Columbia. Prerequisite: Zoology 202 or 203. Miss Taylor. [2-3; 2-3]
- 417. (3) Morphogenesis.—The causal factors and mechanisms involved in the development of animals. Prerequisite: Zoology 302. Mr. Finnegan (in charge), Mr. Action, Mrs. Auersperg, Mr. Ford, Mr. Francis. [3-0; 3-0]
- 418. (1½) Experimental Cytology.—The study of living animal cells. Topics will include culture in vivo and in vitro, fluorescent tracers, phase contrast microscopy and time lapse cine-micrography. Prerequisite: Zoology 302 or Biology 200 plus Zoology 204. Mr. Acton. [2-3; 0-0]
- 419. (1½) Histochemistry.—The theory and practice of histological and histochemical methods. Reference will be made to techniques suitable for use with phase contrast, fluorescence, electron and light microscopes. Mr. Ford. [0-0; 1-4]
- 420. (1½) Biology of the Protozoa.—Morphology, taxonomy, physiology and ecology of free-living protozoa. Prerequisite: Second year major or honours in Life Sciences. Mr. Francis. [0-0; 2-4]
- 421. (3) Principles of Applied Ecology.—Principles of animal and community ecology applicable to the management of animal resources; application of statistical and computer techniques for measuring, analyzing, modelling, and simulating resource systems; problems of multiple resource use. Prerequisite: Permission of the Instructor. Mr. Bendell and Ecology staff.
- [2-2; 2-2] 423. (3) Comparative Ethology.—A detailed study of selected topics in ethology; laboratory sessions and the development of an individual problem. Consent of instructor. Mr. Liley [1-2-3; 1-2-3]
- 424. (1½) Comparative Histology and Histophysiology.—Fundamental tissues; selected experiments on environmental and pathological effects on tissue and organ architecture. (To be offered 1970-71). [0-0; 1-4]
- 425. (3) Advanced Problems in Genetics.—A study of advanced problems and concepts in chromosome mechanics, radiation, molecular, microbial, human, developmental and population genetics. Prerequisites: Biology 334 or a course of similar content. Mr. Suzuki and Mr. Stich. [3-3; 3-3]
- 428. (1½) Comparative Physiology.—Organ functions in various phyla with interpretations in terms of ecology and phylogeny. Mr. Randall.
- 429. (1½) Physiology Laboratory B.—Experiments in general and cellular physiology. [2-0; 2-0]

448. (1-3) Directed Studies in Zoology.—Students should consult departmental advisers and must obtain written permission from the Head of the

Department before registration.

449. (3) Zoology Tutorial.—Scientific methods of inquiry, organization of research material, use of literature, rules of nomenclature, preparation of manuscripts and illustrative materials, microscopy. Directed investigation of a descriptive problem requiring a written scientific report of the findings. (For Honours students only, written permission of the Head of the Department.)

Note: The following are also accepted as credit in Zoology: Biology 334 (Genetics), Biology 321/322 (Ecology), Biology 330 (Cell Physiology), Bio-

logy 300/301 (Statistics).

#### For Graduate Students

Facilities are available for advanced study and research in the following areas: Biological Oceanography, Comparative Physiology, Developmental and Cell Biology, Entomology, Ethology, Genetics, Ichthyology and Limnology, Parasitology, Population and Community Ecology, Vertebrate and Invertebrate Zoology and Zoogeography. Attention is also directed to the following applied fields of Zoology and students should consult the appropriate adviser for approval of programmes in these areas.

## Entomology

A student may enter the field of entomology through zoology, forestry or agriculture. Facilities include an insectary, a museum collection and an excellent library. Mr. Scudder.

#### Fisheries

Students desiring training in various fields related to fisheries may obtain instruction by a judicious selection of courses offered in various departments of the University. Courses in oceanography form an important part of the graduate work in fisheries biology. The Institute of Fisheries houses an excellent museum and offers facilities for both marine and freshwater fisheries research. Mr. Larkin.

## Wildlife Management

Courses of study permitting a student to enter this field of applied zoology can be obtained either through the B.Sc. degree, the B.S.A. degree or the B.S.F. degree. In each instance the Master's degree is essential and students should not attempt to enter the field unless they can meet the academic requirements for it. Facilities for field studies include the Thacker Research Area at Hope, B.C., with 280 acres of varied terrain, Mr. Cowan, Mr. Bendell.

#### Graduate Courses

A selected number of graduate courses is offered annually. In general, Zoology 500, 502, and 505 are offered every year; 503, 510, 512, 516, 519, 522, 31 will be offered in 1969-70 and alternate years; 507, 508, 509, 511, 515, 17, 520, 525, 526, 530, 532 will be offered in 1970-71 and alternate years; thers as required.

- 500. Special Advanced Courses.—Special advanced courses correlated with ne work for the thesis may be arranged for a graduate student upon the oproval in writing of the Head of the Department. The credit will not be ore than 3 units in any one such course.
- 502. (3) Advanced Ecology.—Current problems in population and comunity ecology. Seminars and directed readings. Prerequisite: Permission of structors. Mr. Bendell, Mr. Chitty, Mr. Efford, Mr. Harger, Mr. Holling. r. Larkin.

- 503. (3) Comparative Physiology.—Selected topics in animal physiology. Permission of instructors. 1969-70 and alternate years. Mr. Dehnel, Mr. Phillips, Mr. Randall.
- 504. (1½) Ethology Seminar.—Current problems in animal behaviour. Prerequisites: Consent of the Instructor. Mr. Liley.
- 505. (3) Cell Biology.—Problems and recent advances in the study of mechanisms underlying the structure, function and differentiation of cells. Consent of Instructor required for registration. Mr. Finnegan (in charge), Mr. Acton, Mrs. Auersperg and Mr. Ford.
- 506. (1) Marine Field Course.—A two-week intensive course designed for candidates for the Ph.D. degree The course will commence immediately following sessional examinations in April. Special attention will be given the marine forms, invertebrates and fishes. Emphasis will be placed upon anatomy, taxonomy, life histories and ecology of benthic and planktonic organisms. (1970-71 and alternate years.)
- 507. (2) Zoogeography.—Factors of distribution. Faunal histories. Faunistical and description zoogeography, distribution of biotic communities. (1970-71 and alternate years.)
- 508. (2) Endocrinology.—Lectures and directed studies of the endocrinology of vertebrates. Registration by permission of instructor. (1970-71 and alternate years.) Mr. Perks.
- 509. (1½) Population Genetics.—An introduction to the genetics of animal populations (1970-71 and alternate years.) Mr. Wehrhahn.
- 510. (1½) Developmental Genetics.—Recent advances in the study of mechanisms of the genetic control of development. (1969-70 and alternate years.) Mr. Stich.
- 511. (2) Advanced Marine Zooplankton.—Special advanced studies in systematics and ecology of Zooplankton intended for graduate students proceeding in biological oceanography. Prerequisites: Zoology 301 or equivalent, and Oceanography 400. (1970-71 and alternate years.) Mr. Bary.
- 512. (2) Marine Invertebrate Zoology.—Life histories, ecology and systematics of marine invertebrates. (1969-70 and alternate years.) Mr. Dehnel.
- 515. (3) Comparative Invertebrate Embryology.—A study of morphogenesis and developmental physiology of representatives of the invertebrates with laboratory concentration on the local marine forms. Prerequisite: Zoology 301 or equivalent. (1970-71 and alternate years.) Mr. Finnegan.
- 516. (3) Advanced Entomology.—Lectures and directed studies of advanced entomological problems. (1969-70 and alternate years.) Mr. Scudder.
- 517. (3) Principles and Problems of Applied Entomology.—The biological background of research and control of injurious insects; the problems and principles of quantitative evaluation, experimentation and manipulation of insects and their populations in relation to variability, structure, physiology, life cycles and behaviour. (1970-71 and alternate years.) Mr. Graham.
- 519. (3) Parasitology.—Seminar discussions of selected topics. Basic problems of parasitism, trends in current research. Laboratory procedures in parasitology; individual projects. Prerequisite: Zoology 413. (1969-70 and alternate years.) Mr. Adams.
- 520. (3) Limnology.—Physical, chemical and biological factors of lakes and streams in relation to productivity. Prerequisites: Zoology 301, 415. (1970-71 and alternate years.) Mr. Northcote.
- 521. (3) Fisheries Biology and Management.—Description of world fisheries and discussion of population problems pertinent to commercial and

game fishes with review of techniques of management of fish stocks. Pre-

requisite: Zoology 415. Mr. Wilimovsky.

522. (2) Limnology Seminar.—Recent advances in limnology. Prerequisite: Zoology 520, or by permission. (1969-70 and alternate years.) Mr. Northcote. 525. (1½) Problems in Systematics and Evolution.—Seminar discussions of

525. (1½) Problems in Systematics and Evolution.—Seminar discussions of selected topics. (1970-71 and alternate years.) Mr. Acton, Mr. Liley, Mr. Mc-Phail, Mr. Scudder.

526. (1) Marine Zoogeography.—A discussion of the factors affecting the distribution of marine organisms and the nature of the various marine

zoogeographic regions. (1970-71 and alternate years.) Mr. Lewis.

527. (3) Theoretical Population Dynamics.—Discussion of dynamics of exploited fish populations and related theoretical population biology. Emphasis will be placed on mathematical models and their application to popu-

lation problems. Mr. Larkin and Mr. Wilimovsky.

528. (3) Ichthyology A.—A comprehensive survey of the morphology, phylogeny, palaeontology, life histories and literature of primitive fishes, including Cyclostomes, Elasmobranchs, and the soft-rayed Teleosts. Lectures, seminars and laboratory dissection. Prerequisite: Permission of the Instructor. Mr. Wilimovsky.

529. (3) Ichthyology B.—A survey similar in treatment to Zoology 528 but covering primarily the Perciform fishes. Prerequisite: Permission of the

Instructor. Mr. Wilimovsky.

Note: Zoology 528 and 529 may be taken in the reverse order.

530. (2) Vertebrate Reproduction.—Reproductive biology of mammals and other vertebrates. Comparison of factors influencing reproductive mechanisms and performance in various vertebrate groups. (1969-70 and alternate years). Miss Taylor and Mr. Fisher.

531. (2) Ornithology.—Phylogeny, morphology and biology of birds; factors affecting their abundance and distribution. (1969-70 and alternate years.)

Mr. Drent.

532. (2) Mammalogy.—Phylogeny, morphology, and biology of mammals: factors affecting their abundance and distribution. (1970-71 and alternate years.) Mr. Fisher.

533. (2) Problems in Wildlife Management. Mr. Cowan.

549. (6) M.Sc. Thesis.

649. Ph.D. Thesis.

#### Mathematics

The department offers opportunities for study leading to doctor's, master's nd bachelor's degrees. For information on the Ph.D., M.A., and M.Sc. degree ourses, see the Graduate Studies calendar. For information on the B.A. degree ourse, see the Faculty of Arts calendar.

# 'equirements for the B.Sc. degree:

Students entering the Major or Honours programme should obtain a copy the new undergraduate structure of Mathematics courses.

1) General Requirements: See p. T24.

1) Language requirement (for all students taking a major in mathematics, or single honours in mathematics, or honours in mathematics combined with another subject): At least one year at the university level of either French, German or Russian. However a student who has completed French or German at the Grade 12 level in British Columbia Schools is considered to have met the language requirement stated above. For students who plan graduate work in Mathematics further work in a language, either French, German or Russian is strongly recommended.

Major				
First Year English 100 Mathematics 100, 120*, 121 Chemistry 103, 110, or 120 Physics 110, 120 or 130 Elective	(3) (4) (3) (3) (3) (3) (16)	Third and Fourth Years Mathematics 300 Four courses from Mathematics 301 Mathematics 302 Mathematics 305 Mathematics 306 Mathematics 307 Mathematics 308 Mathematics 410 Mathematics 411 Mathematics 412 Mathematics 419	(3) (12)	
Second Year Mathematics 200 Mathematics 202 Electives	(3) (3) (9) (15)	or certain honours courses with the consent of the department Electives	$\frac{(15)}{(30)}$	

<sup>\*</sup>Mathematics 120 need not be taken in the first year.

Honours				
First Year English 100 Mathematics 100, 120*, 121 Chemistry 103 or 110 or 120 Physics 110 or 120 Elective	(3) (4) (3) (3) (3) (3) (16)	Fourth Year Option I: Mathematics 400 Mathematics 401 Mathematics 404 One of Mathematics 402, 403 405, 406, 407, 409, 413, 414, 415, 418 Electives	(3) (3) (3) (3) (3)	
Second Year Mathematics 220 Mathematics 221 Electives**	(3) (3) (11) (17)	Option II: Mathematics 402	(3)	
Third Year Mathematics 320 Mathematics 321 Mathematics 322 Electives	(3) (3) (3) (9) (18)	Mathematics 404 Mathematics 406 One of Mathematics 400, 401, 403, 405, 407, 409, 413, 414, 415, 418 Electives	(3) (3)	

<sup>\*</sup>Mathematics 120 need not be taken in the first year.

\*\*Recommended that Physics 210 or 220 be taken by students selecting Option II in the fourth year.

Combined Honours in Mathematics and Physics			
First Year		Third Year	
English 100	(3)	Mathematics 320	(3)
Mathematics 100, 120*, 121	(4)	Mathematics 321	(3)
Chemistry 120 (preferably)	(4) (3)	Mathematics 322	(3)
103 or 110		Physics 301	(2)
Physics 120 (preferably)	(3)	Physics 302	(1)
or 110		Physics 306	(2) (2)
Arts elective	(3)	Physics 308	(2)
		Physics 309 or 310	(1)
	(16)		
		1	(17)
Second Year		Fourth Year	
Mathematics 220	(3)	Two of Mathematics 400, 401,	(6)
Mathematics 221	(3)	402, 403, 404, 405, 406, 407,	. ,
Physics 204	(3)	409, 413, 414, 415, 418	
Physics 209	(1)	Physics 402	(2)
Physics 210 or 220	(2)	Physics 403	(3)
Chemistry 200** or 210**	(3)	Physics 406	(1)
Arts elective	(3) (3)	Elective	(3)
	(10)		(15)
	(18)		(15)

<sup>\*</sup>Mathematics 120 need not be taken in the First Year.

## Combined Honours in Mathematics and Another Subject

First three years: as for single honours.

Fourth Year: 9 units of Honours Mathematics courses numbered 400 or higher.

# Primarily for First Year Students

- 100. (2) Calculus I.—Ideas, techniques and applications of differentiation and integration. Prerequisite: Mathematics 12 (Secondary School Programme, British Columbia) or the equivalent. [2-1; 2-1]
- 121. (1) Introduction to Vectors and Matrices.—Systems of linear equaions, vectors, matrices, determinants, linear dependence. Prerequisite: Mathmatics 12 (Secondary School Programme, British Columbia) or the equival-[2-0; 0-0] or [0-0; 2-0] nt.

Mathematics 100 and 121 are prerequisite to Mathematics 151, 155, 156, 200, 22, 240. Mathematics 100 and 121 are required courses for all students in le Faculty of Science and for all students intending to take Engineering, rchitecture, Economics.

120. (1) Introduction to Analysis I.—Discussion of induction, greatest wer bound, least upper bound, sequence, limit, continuity and proofs of eorems. Prerequisite: Mathematics 100 which may be taken concurrently nen Mathematics 120 is taken in the Spring term. A student must have athematics 100, 121 and 120 or the equivalent to take a major or honours ogramme in Mathematics. [2-0; 0-0] or [0-0; 2-0]

<sup>\*\*</sup>Recommended, but another 3-unit course may be substituted with the approval of the Physics Department.

- 130. (3) Finite Combinatorial Mathematics.—Permutations, combinations, the binomial theorem, probability, properties of numbers and geometric configurations. Prerequisite: Mathematics 11 (Secondary School Programme, British Columbia) or the equivalent. This course will not be accepted as a prerequisite to Mathematics 151, 155, 156, 200, 202, 220, 221, 240. [3-0; 3-0]
- 140. (1) Introduction to Linear Programming.—Linear programming problems, dual problems, the simplex algorithm, solution of the primal and dual problems, some special linear programming problems such as transportation and network flows. Prerequisite: Mathematics 121. [2-0; 0-0] or [0-0; 2-0]

# Primarily for Second Year Students

- 200. (3) Algebra and Geometry.—Introduction to matrices, linear equations, linear transformations of the plane, determinants, vectors, complex numbers, elementary theory of equations, mathematical induction. Prerequisite: Mathematics 120. (1968-69 session or earlier). [3-0; 3-0]
- 202. (3) Calculus.—Integration with applications, vector analysis, introduction to functions of several variables. Prerequisites: Mathematics 120 (1968-69 session or earlier.) [3-0; 3-0]
- 204. (3) Principles of Mathematics.—This course outlines some of the basic concepts of number theory, modern algebra, geometry and topology. It is intended for students in the Faculty of Arts. Not for credit in the Faculty of Science. Prerequisite: Consent of the Department. [3-0; 3-0]
- 205. (3) Elementary Statistics.—Descriptive statistics, introduction to probability and sampling, estimation theory, tests of hypotheses, correlation, simple analysis of variance. Not for credit in the Faculty of Commerce. Prerequisite: Mathematics 110 or 120 (1968-69 session or earlier). Enrolment will be limited to 60 students. [3-0; 3-0]
- 220. (3) Differential and Integral Calculus.—Basic ideas of analysis, integration, the mean value theorem, Taylor's theorem, partial derivatives, multiple integrals. Prerequisite: At least Second Class standing in Mathematics 120 (1968-69 session or earlier) and full standing in the preceding year.

  [3-0; 3-0]
- 221. (3) Algebra and Geometry.—Mathematical induction, complex numbers, polynomials, introduction to vectors and matrices, linear equations, determinants, solid geometry. Prerequisite: At least Second Class standing in Mathematics 120 (1968-69 session or earlier) and full standing in the preceding year. [3-0; 3-0]
- 240. (3) Calculus for Social Science Students.—The definite integral, exponential functions, linear differential equations, vectors and matrices, convex polyhedral sets and extreme points, partial derivatives. Prerequisite: Mathematics 120 (1968-69 session or earlier.) Not for credit in the Faculty of Science.

  [3-0; 3-0]

Credit may be obtained for only one of Mathematics 202, 220, 240, and for only one of 200, 221.

# Primarily for Third and Fourth Year Major and General Course Students

- 300. (3) Calculus II.—Infinite series, partial differentiation, multiple integration, line and surface integrals, vector fields, introduction to differential equations. Prerequisite: Mathematics 202 or 220. [3-0; 3-0]
- 301. (3) Life Contingencies.—Theory of compound interest, introduction to life contingencies. Prerequisite: Mathematics 300 or 320, 321 or 323 (which may be taken concurrently) or the consent of the Department. (May not be offered 1970-71). [3-0; 3-0]

- 302. (3) Introduction to Numerical Analysis.—Interpolation, numerical differentiation and integration, least squares approximation, solution of nonlinear equations, generation of random numbers and simulation, principles of programming and problem planning. Prerequisite: Mathematics 300, 321 or 323 (which may be taken concurrently); Computer Science 201 or 210 is recommended. [2-2; 2-2]
- 305. (3) Statistics.—Distribution theory, testing of statistical hypotheses, point and set estimation, parametric and nonparametric problems, elements of decision theory, analysis of variance. Prerequisite: Mathematics 300, 321 or 323 (which may be taken concurrently). [3-0; 3-0]

306. (3) Topics in Geometry.—A study of various geometries with some attention to the foundations of the subject. Prerequisite: Mathematics 200.

[3-0; 3-0]

- 307. (3) Linear Algebra.—Vector spaces, linear mappings, linear equalities and matrices, linear inequalities and convex sets, inner products and norms, quadratic forms. Prerequisite: Mathematics 200. [3-0; **3**-0
- 308. (3) Topics in Algebra.—Elementary set theory, introduction to groups and rings, congruences and the number systems. Prerequisite: Mathematics 200. [3-0; 3-0]
- 410. (3) Differential Equations.—An introductory course with applications to geometry, mechanics, physics, and chemistry. Prerequisite: Mathematics 300. [3-0; 3-0]
- 411. (3) Complex Variables.—Elementary functions, conformal mapping, integration, Taylor and Laurent series, residues, singularities, meromorphic functions, analytic continuation, elliptic functions. Prerequisite: Mathematics **3**00. [3-0; 3**-**0]
- 412. (3) Fundamentals of Analysis.—Set theory up to the Cantor-Bernstein equivalence theorem. Real numbers. Continuous-function theorems. Mean-value theorem. Brouwer fixed-point theorem. Poincaré's theorem on vector fields on the surface of a sphere. Prerequisite: Mathematics 300.

419. (3) Design of Experiments.—Design of experiments, the general linear hypothesis, regression theory, construction and analysis of experimental designs, classificatory problems. Prerequisites: Mathematics 300 and 305. [3-2; 3-2]

### For Third and Fourth Year Honours Students

At least Second Class standing in each of Mathematics 220 and 221 is prerequisite to Mathematics 320, 321, 322.

- 320. (3) Elementary Real-Variable Theory.—Elementary topology of nspace. Continuity and compactness. Sequences and series of functions; Fourier series. Theorems of Weierstrass, Ascoli, Picard. Problems sets will be assigned periodicaly throughout the year and marks obtained will be con-[2-1; 2-1] sidered in determining standing.
- 321. (3) Advanced Calculus.—Derivatives and integrals in n-space, Stokes' [3-0; 3-0]theorem, differential forms, manifolds.
  - 322. (3) Vector Spaces and the Theory of Matrices. **[3-0: 3-0]**
- 323. (3) Advanced Calculus for Science Students.—Functions of several variables; infinite series; elementary differential equations. Credit may be obtained for only one of Mathematics 321, 323. Prerequisite: Mathematics 220 and 221. [3-0; 3-0]

For Honours students in Mathematics or in Mathematics combined with nother subject, at least Second Class standing in each of Mathematics 320,

- 321, and 322 is prerequisite to each of the following courses. Other students may be admitted only with the consent of the Department.
  - 400. (3) Algebra I.—The theory of groups, rings, and fields. [3-0; 3-0]
- 401. (3) Analysis.—Metric spaces (including such examples as  $l^p$ , C(X), Hilbert space); Lebesgue integration; differentiation; Lp-spaces. [3-0; 3-0]
- 402. (3) Differential Equations.—Theory of ordinary differential equations and systems; introduction to partial differential equations and boundary [3-0; 3-0] value problems.
- 403. (3) Modern Geometry.—Application of analysis and algebra to topics in modern geometry. (May not be given in 1969-70) [3-0; **3-**0]
- 404. (3) Functions of a Complex Variable.—An introduction to the subject with applications. [3-0; 3-0]
- 405. (3) Mathematical Statistics.—Derivation of sampling distributions, principles of statistical inference and estimation, parametric and nonparametric problems, introduction to regression and the analysis of variance, applications to problems in the sciences.
- 406. (3) Numerical Analysis I.—Interpolation and elementary approximation theory; numerical solution of differential equations; solution of systems of linear algebraic equations; matrix inversion; calculation of eigenvalues and eigenvectors. [3-0; 3-0]
- 407. (3) Theory of Numbers.—Elementary theory; prime-number theory; elementary Diophantine equations; additive number theory; analytic number theory. (May not be given in 1969-70.) [**3-0**; **3**-0]
- 409. (3) Topology.—Elementary properties of topological spaces; introduction to homology theory. (May not be given in 1969-70.) [3-0; 3-0]
- 413. (3) Calculus of Variations.—Variation of functionals and Euler's equations, canonical variables and transformations, applications to mechanical systems, second variation of a functional, field associated with a functional; extension to several variables, optimal regulation, maximum principle. Prerequisites: Mathematics 321 or 323, 322. (May not be given in 1969-70.) [3-0; 3-0]
- 414. (3) Nonlinear Differential Equations I.—Quasilinear differential equations; topology of the phase plane; general theory of stability of motion according to Lyapunov. (May not be given in 1969-70.) [3-0; 3-0]
- 415. (3) Dynamical Systems I.—Differential equations of dynamics; transformation theory; gyroscopic systems; motion of a rigid body about a fixed point; the problem of Kovalevskaya; self-excited rigid body. (May not be given in 1969-70.) [3-0: 3-0]
- 418. (3) Probability.—Introduction to and application of stochastic processes. Random walks, branching processes, recurrent events, Markov chains, birth and death processes, queuing theory, applications to biology, physics, and economics. Prerequisites: Mathematics 321 or 323, 322. [3-0; 3-0]
- 423. (3) Applied Analysis.—Laplace's, wave, diffusion equations; conformal mapping; transform techniques; asymptotic methods. Physical applications will be stressed. Prerequisite: Mathematics 323. [3-0; 3-0]

#### Graduate Courses

Students interested in graduate courses should consult the Department.

- 501. (3) Measure Theory and Integration.
- 502. (3) Point Set Topology. 503. (3) Differential Geometry.
- 504. (3) Algebraic Geometry.

- 505. (3) Ordinary Differential Equations.
- 506. (3) Partial Differential Equations.
- 507. (3) Number Theory.
- 508. (3) Theory of Rings. 509. (3) Algebra II.
- 510. (3) Homological Algebra.
- 511. (3) Algebraic Topology.
- 512. (3) Theory of Groups. 513. (3) Topological Groups.
- 514. (3) Nonlinear Differential Equations II.
- 515. (3) Integral Equations.
- 516. (3) Harmonic Analysis. 517. (3) Complex Analysis.
- 518. (3) Probability.
- 519. (3) Statistics.
- 520. (3) Numerical Analysis II.
- 521. (3) Functional Analysis. 522. (3) Geometric Topology.
- 523. (3) Theory of Games and Programming.
- 524. (3) Operational Calculus.525. (3) Fluid Mechanics.
- 526. (3) Dynamical Systems II. 527. (3) Theory of Elasticity.

- 531. (1-3) Theory of Elasticity.
  530. (1-3) Topics in Algebra.
  531. (1-3) Topics in Analysis.
  532. (1-3) Topics in Topology.
  533. (1-3) Topics in Geometry.
  534. (1-3) Topics in Applied Mathematics.
  535. (1-3) Topics in Differential Equations.
  536. (1-3) Topics in Numerical Analysis.
- 536. (1-3) Topics in Probability and Statistics.
  537. (1-3) Topics in Probability and Statistics.
  538. (1-3) Topics in the Foundations of Mathematics.
  539. (1-3) Topics in Functional Analysis.
  549. (3-6) Thesis for Master's Degree.

- 649. Ph.D. Thesis.

# **Physics**

The department offers opportunities for study leading to bachelor's, master's and doctoral degrees. For information on the M.Sc., M.A.Sc. and Ph.D. degree programmes and courses, see the Graduate Studies calendar.

Requirements for the B.Sc. degree:

(a) General requirements: See pp. T22 and T23. Note that students in all S.Sc. programmes must obtain credit for English 100 plus six further units of Non-Science Elective (N.S.E.) courses offered by the Faculty of Arts. In view their specialized programmes, students intending to take either Single or **Combined** Honours in Physics should satisfy all N.S.E. requirements before entering the Third Year.

(b) Before registering for each of the Second, Third and Fourth years, very student who intends to commence or continue either the Physics Major, any Honours Programme in Physics must obtain formal Programme Apwoval from a Physics Departmental Advisor and file a copy thereof in the fice at Hebb 11. This may be sought as soon as the student has received ts previous year's Statement of Marks (which should be presented). General ourse students are invited to consult a Departmental Advisor concerning ppropriate courses.

First Year — All Physics Programmes					
Physics 120* (preferably), or 110† Mathematics 100(2) and 121(1) Chemistry 120, 110, or 103 English 100 Non-Science Elective‡	(3) (3) (3) (3) (3)				
Total Units	$\overline{(15)}$				

<sup>\*</sup>Prerequisite: Both Physics 12 (or 92) (Secondary School Programme, British Columbia), and approval by a Physics Departmental Advisor.

‡Students intending to qualify for admission to Combined Honours in Physics and Geophysics take Geology 105 in their First Year, and may postpone their Non-Science Electives until the Second Year.

The Physics Major			
First Year		Second Year	
Physics 120 (preferably), or		Physics 200	(2)
Mathematics 100(2) and 121	(1) (3)	Physics 219	(1)
Chemistry 120, 110 or 103	(3)	Mathematics 200	(3)
English 100	(3)	Mathematics 202	(3)
Non-Science Elective	(3)	Science Elective*	(3)
		Elective	(3)
Total Units	(15)	Total Units	(15)
Third Year		Fourth Year	
Physics 300	(2)	Physics 400	(3)
Physics 308	(2)	Physics 413	(3)
Physics 316	(3)	One 3-unit course in Math	
Physics 318	(1)	or Computer Science	
Physics 319	(1)	numbered above 300	(3)
Mathematics 300	(3)	Electives‡	(6)
Elective†	(3)	'	( )
Total Units	(15)	Total Units	(15)

<sup>\*</sup>Recommended: One of: Chemistry 205, 210, 220, 230; Astronomy 200; Geology 105; Computer Science 210; Biology 101.

<sup>†</sup>Students lacking Physics 11 (or 91) must enroll in Section 4.

<sup>†</sup>If additional Physics courses are to be elected in Third Year, Physics 312 (2 units) and/or Physics 441 (1 unit) are recommended.

<sup>‡</sup>If additional Physics courses are to be elected in Fourth year, Physics 312 (2 units), 411 (2 units) and 409 (3 units) or 419 (2 units) are recommended. Physics 441 (1 unit) is available. Exceptional students may also be admitted to Physics 306 (2 units); Physics 402 (2 units), 405 (1 unit); 406 (1 unit); 408 (1 unit).

	Honours	n Physics	
For Students presenting Physics 12 (or 92):		For Students not presenting Physics 12 (or 92):	
First Year		First Year	
Physics 120 Mathematics 100(2) and 1 Chemistry 120, 110 or 103 English 100 Non-Science Elective	(3) (21(1) (3) (3) (3) (3)	Physics 110 Mathematics 100(2) and 1: Chemistry 120, 110 or 103 English 100 Non-Science Elective	(3) 21(1) (3) (3) (3) (3)
Total Units	(15)	Total Units	(15)
Second Year†		Second Year†	
Admission Requirements: A clear pass from First Year, with at least Second Class standing in Physics 120, Mathematics and Chemistry.		Admission Requirements: A clear pass from First Year (or B.C. Grade 13), with at least Second Class standing in Physics, Mathematics and Chemistry.	
Physics 204 Physics 209 Physics 220 Mathematics 220 Mathematics 221 Science Elective* Non-Science Elective	(3) (1) (2) (3) (3) (3) (3)	Physics 204 Physics 209 Physics 210 Mathematics 220 Mathematics 221 Science Elective* Non-Science Elective	(3) (1) (2) (3) (3) (3) (3)
Total Units	(18)	Total Units	(18)

\*Recommended: One of: Chemistry 205, 210, 220, 230; Astronomy 200; Computer Science 210; Geology 105.
†See p. T23: An average standing of at least 65% must be obtained in each year to remain in the Honours Programme.

Third Year		Fourth Year	
Physics 301 Physics 302 Physics 306 Physics 308 Physics 309 Physics 310 Mathematics 322 Mathematics 323 Elective* Total Units	(2) (1) (2) (2) (1) (1) (3) (3) (0-3) (15-18)	Physics 401 Physics 402 Physics 403 Physics 406 Physics 406 Physics 408(1) or 405 (1) Physics 409 Mathematics 423 Elective*  Total Units	(2) (2) (3) (1) (1) (3) (0-3) (15-18)

<sup>\*</sup>A total of 3 elective units must be taken in the combined Third and Fourth years. These 3 units may be divided in any way between the Third and Fourth years.

# Combined Honours in Physics and Mathematics

First Year As for Honours Physics (15), plus Mathematics 120(1) (may be taken in the first or second year.)		Second Year As for Honours Physics (18).	
Third Year		Fourth Year	
Physics 301	(2)	Physics 402	(2)*
Physics 302	(1)	Physics 403	(2) <b>*</b> (3)
Physics 306	(2)	Physics 406	(1)
Physics 308	(2)	Two of Mathematics 400, 401,	
Physics 309 or 310 (1)		402, 403, 404, 405, 406, 407,	
Mathematics 320 (3)		409, 413, 414, 415, 418	(6)
Mathematics 321 (3)		Elective	(3)†

Mathematics 321 (3)
Mathematics 322 (3)

Total Units (17)

Total Units (15)\*†
\*Unit value of Physics 402 will increase to 3 units commencing 197071, and total units then required will be 16.
†Total of 66 units required for

# Combined Honours in Physics and Geophysics

graduation.

First 3	Year
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As for Honours Physics (15) but recommending Geology 105 as elective.

#### Second Year

As for Honours Physics (18), but replacing "Science Elective" by a second Non-Science Elective.

live.	second Non-Science Elective.		
Third Year		Fourth Year	
Physics 301 Physics 302 Physics 308 (2) and Physics 310 (1), or Geophysics 301 (3) Physics 309 Physics 413 Geophysics 302 Mathematics 323 Total Units	(2) (1) (3) (1) (3) (3) (3) (16)	Physics 409 or Geophysics 449 At least six units from Physics 401 (2); 402 or 452 (3); 457 (2) or and either 408 (1) or 405 (1) At least two units from physics 404 (1), 405 406 (1), Astronomy 4 Mathematics 423 Electives* Total Units	(3) (2) 406 (1) (6-7) Geo- (1),
		*To give at least 66 to graduation.	otal units for

Combined Honours in Physics and Astronomy

Gomenium	LACATOURD IN	x 11 y 01 00 011 011 011 011 011 011 011	
First Year As for Honours Physics	(15)	Second Year As for Honours Physics	(18)
Third Year		Fourth Year	
Physics 301 Physics 302 Physics 306 Physics 308 Physics 309 Physics 310 Astronomy 320 Mathematics 323	(2) (1) (2) (2) (1) (1) (3) (3)	Physics 401 Physics 402 Physics 403 Astronomy 421 Five units from: Astron. 321 331 (1); 449 (1-3); Physi 409 (3); 449 (1-3) Mathematics 423	(2) (2) (3) (3) (3) (2); cs (5) (3)
Total Units	(15)	Total Units	(18)

# Combined Honours in Physics and Chemistry

First Year		Second Year	
As for Honours Physics, but includ-		Physics 204	(3)
ing Chemistry 120 or 110 (15).		Physics 209	(1)
		Physics 220 (or 210)	(2)
		Chemistry 203	(3) (3) (3) (3)
Third Year		Chemistry 220 (or 210)	(3)
Physics 301	(2)	Mathematics 220 (or 202)	(3)
Physics 308	(2)	Non-Science Elective	(3)
Physics 309	(1)	- 177 to	(10)
Physics 310	(1)	Total Units	(18)
Chemistry 304	(2)		
Chemistry 310 (2)		Fourth Year	
Chemistry 312	(2)	Physics 402 (or 452) (2	e) or (3)
Chemistry 320	(1)	Physics (per	, - ( )
Chemistry 324	(1)		or (4)
Mathematics 323 (or 300)	(3)	Chemistry 401	(1)
		Chemistry 404	(1)
Total Units	(17)	Chemistry 407	(1)
•		Chemistry 427	(1)
		Chemistry (per consultation	n) (2)
		Mathematics 410	(1) (1) (2) (3)
		Total Units	(16)

# Combined Honours in Physics and a Subject Other Than Mathematics, Geophysics, Astronomy, or Chemistry

First Year	I	Second Year	
As for Honours Physics (1	15).	Physics 204	(3)
Third Year Physics 301 Physics 306 Physics 308 Physics 309 Physics 310 Mathematics 323 (or 300)	(2) (2) (2) (1) (1) (3)	Physics 209 Physics 220 (or 210) Mathematics 220 (or 202) Other Dept.* Non-Science Elective Total Units*	$ \begin{array}{c} (1) \\ (2) \\ (3) \\ (3-6) \\ (3) \\ \hline (15-18) \end{array} $
Other Department*	(4-7)	Fourth Year	
Total Units*	(15-18)	Physics 402 (or 452) (2 Physics (per consultation) Mathematics 410 Other Department*	(3) or (3) (4) (3) (6-8)
		Total Units*	(15-18)

<sup>\*</sup>To be decided in consultation with other Department concerned; total of 66 units required for graduation with Honours.

# Primarily for First Year Students

Mathematics 100 and 121, and a First Year course in Physics (with laboratory) are prerequisite to all Second and higher Year courses in Physics. Credit will be given for only one of Physics 110, 120, 130, former 101, 103, B.C. Grade 13 Physics or an equivalent course which included a Physics laboratory at another institution. Registered students, requesting University of B.C. credit for a content-equivalent Physics course from another institution which did not include the laboratory, may remedy the deficiency by specially enrolling (at Hebb 11) for and passing the laboratory portion of Physics 110.

Physics 120, and a clear First Year pass with either overall Second Class standing or at least Second Class standing in Physics 120, Mathematics 100 and 121, and Chemistry 120, 110 or 103, is the prerequisite for admission to the Second Year Pre-Honours Programmes in Physics. However, students lacking the B.C. Secondary School Physics 12 (or 92) and/or academic standing prerequisite for Physics 120 may substitute Physics 110 provided all other minimum requirements are met.

Physics 110 (or 120) is the normal prerequisite for admission to the Physics Major Programme or for entrance into the Faculty of Applied Science. Physics 110 will also be accepted as a prerequisite for admission to the Second year Pre-Honours Programmes involving Physics provided the student achieves a clear First Year pass with either overall Second Class standing or at least Second Class standing in Physics 110, Mathematics 100 and 121, and Chemistry (120, 110 or 103).

Physics 130 is intended mainly for students not planning to specialize in physical science or engineering. Students from Faculties other than Science, planning to take Physics 130 as their only physics course, are advised to defer it to their second or higher year at the University. Physics 130 may be accepted for entrance into second year physics courses in the Faculty of Science or into the Faculty of Applied Science in the case of a student who has achieved First (or high Second) class standing in both Physics 130 and Mathematics 100 and 121, and whose overall academic record is deemed satisfactory by a Physics Departmental Advisor.

- 110. (3) Mechanics, Electricity and Atomic Structure.—Particle kinematics and dynamics; rigid body dynamics; work and energy concepts; general wave motion, sound and light; electricity and magnetism; atomic spectra; waves and elementary particles; laboratory work emphasizing physical techniques of obtaining, treating and interpreting data as applied to mechanics, heat, electricity, optics, and radioactivity. Mathematics 100 and 121 must precede or be taken concurrently with this course. [3-3\*-2\*; 3-3\*-2\*]
- 120. (3) Matter and Mechanics.—The structure and properties of matter; photons, waves, spectra; electrons, atoms; Newtonian mechanics of particles and rigid bodies; laboratory investigations emphasizing the use of electrical instruments (Geiger counter, cathode ray oscilloscope, microwave apparatus, tc.). Prerequisites: Physics 12 (or 92) plus permission of the Physics Departmental Advisor. Mathematics 100 and 121 must precede or be taken concurrently with this course.

  [2-3-1; 2-3-1]
  - 130. (3) Elements of Physics.—From Newton's mechanics to particle physs, a description of ideas, principles and their applications. [3-3\*-0; 3-3\*-0]

# Primarily for Second Year Students

Either Physics 204 plus 220 or 210, or Physics 200 (or Geophysics 201), is prerequisite for higher year courses in Physics. If credit is obtained for Physics 200 (or Geophysics 201) no additional credit may be obtained for Physics 204, and conversely. The same rule applies with respect to Physics 209 and Physics 219, and with respect to Physics 210 and Physics 220.

# (a) For Pre-Honours in the Physical Sciences

Physics 204, Physics 209 and either Physics 220 or Physics 210 are intended for prospective Honours students in the physical sciences. Students desiring to register in one or more of these courses must obtain formal approval from a Physics Department Advisor before registration. Students intending to proceed toward any Physics Honours programme take Physics 204 and Physics 209, plus Physics 220 (if they hold credit for Physics 120) or Physics 210 (if they hold credit for Physics 110 or an accepted alternative). The academic requirements for permission to register for any of Physics 204, 209, 210 or 220 are the same as those for entrance to any Physics Pre-Honours Programme, as detailed above under "Primarily for First Year Students".

- 204. (3) Electricity and Heat.—Elements of D.C. and A.C. circuits. Kirchhoff's Laws. Capacitance, inductance, C-R, L-R, L-C-R circuits. Representation of sinusoidal quantities by vectors and complex numbers. Heat, gas laws, elements of thermodynamics, kinetic theory. [3-0-1; 3-0-1]
- **209.** (1) Intermediate Experimental Physics.—Experiments on properties of matter, heat, and A.C. and D.C. circuits. To be taken concurrently with or following Physics 204. [0-3-0; 0-3-0]
- 210. (2) Mechanics and Special Relativity.—Classical mechanics in inertial frames of reference. Non-inertial frames. Relativistic kinematics and dynamics of particles. Prerequisites: Physics 110; Mathematics 220 and 221 (may be taken concurrently). [2-0-1; 2-0-1]
- **220. (2) Mechanics and Special Relativity.**—(Intended in place of Physics 210 for students who have taken Physics 120.) Classical mechanics in inertial frames will be replaced by selected special topics. Prerequisites: Physics 120; Mathematics 220 and 221 (may be taken concurrently). [2-0-0; 2-0-0]

# (b) For Physics Majors and Students not Specializing in Physics

Physics 200 and Physics 219 are intended for all students proceeding to the Physics Major Programme, and for students not intending to specialize in Physics. Mathematics 100 and 121, and normally one of Physics 120, 110, former 101 or Grade 13 Physics 101 (including laboratory), are prerequisite. Students offering high standing in Physics 130 or a First Year Physics course (with laboratory) equivalent to Physics 110 from another institution, are admitted if their overall academic record is acceptable.

- 200. (2) Electricity and Kinetic Theory.—Elements of D.C. and A.C. circuits, resistance, capacitance, inductance, steady state and transient responses, vector and complex number representation of sinusoidal quantities; kinetic theory of gases. Prerequisites: Physics 110 or equivalent, or permission of the Physics Department; Mathematics 202 (may be taken concurrently).
- 219. (1) Laboratory in Electricity and General Physics.—Required of all Physics Major students, and particularly useful for students of Chemistry and experimental Life Sciences. To be taken concurrently with or following Physics 200 (or Geophysics 201).

  [0-3-0]

# Primarily for Third and Fourth Year Honours Students

- 301. (2) Electricity and Magnetism.—Experimental basis and mathematical formulation of the laws of Coulomb, Ampere and Faraday and of the concepts of electric and magnetic fields leading up to Maxwell's equations. Prerequisite: Physics 204 and 209. [2-0-0: 2-0-0]
- 302. (1) Probability and Statistics.—An introductory course with applications to physical problems and measurements. [2-0-0; 0-0-0]
- 306. (2) Theoretical Mechanics.—Analytical mechanics of particles and rigid bodies. Lagrange and Hamilton equations, Hamilton-Jacobi theory. [2-0-0; 2-0-0]
- 308. (2) Optics and Spectroscopy.—Geometrical and physical optics; interference, diffraction, polarization, spetroscopy and the vector model. [2-0-0; 2-0-0]
- 309. (1) Honours Electrical Laboratory.—Selected experiments in electricity, magnetism and electronics for Honours students. To be taken concurrently with or following Physics 301. [0-3-1\*; 0-3-1\*]
- 310. (1) Honours Optics Laboratory.—Selected experiments in optics for Honours students. To be taken concurrently with or following Physics 308 (Honours Section). [0-3-0; 0-3-0]
- 349. (1-3) Directed Studies.—With approval of the Head of the Physics Department, studies under the direction of a staff member may be arranged.
- 401. (2) Electromagnetic Theory.—Maxwell's theory with applications to optics and microwaves. [2-0-0; 2-0-0]
- 402. (2) Introductory Quantum Mechanics.—An introduction to quantum mechanics with applications to atomic, solid state, and nuclear physics. [2-0-1; 2-0-1]
- 403. (3) Thermodynamics and Statistical Mechanics.—Laws of thermodynamics and statistical mechanics; applications to modern physics. Prerequisite: Physics 306 (may be taken concurrently). [3-0-0; 3-0-0]
- 405. (1) Elasticity.—Introductory theory of elasticity with some applications. Prerequisite: Physics 406. 10-0-0: 2-0-01
- 406. (1) Continuum Mechanics.—Introduction to the mechanics of deformable bodies; equations of motion; stress and strain tensors. [2-0-0; 0-0-0]
- **408.** (1) Fluid Flow.—Non-viscous and viscous fluids, laminar and turbu-Lent flow, non-linear effects. Prerequisite: Physics 406. 10-0-0; 2-0-01
- 409. (3) Experimental Physics.—Advanced experiments in electricity, elecconics, atomic and nuclear physics. Textbooks: Hoag, Electron and Nuclear physics; Strong, Procedures in Experimental Physics; Yarwood, High Vacuum echnique. [0-6-0; 0-6-0]

# Primarily for Third and Fourth Year Major Students

Credit will be given for only one member of each following parallel pair of Majors (Honours) courses: 300 (301); 315 or 413 (403); 316 (210 or 220); 318 (310); 319 (309); 400 (307); 419 (409).

- **300. (2)** Electricity and Magnetism.—Fundamentals of electromagnetism. Prerequisites: One of Physics 200 (or Geophysics 201), Physics 204, 210, or 220, plus Physics 209 or 219; Mathematics 202 or 220. [2-0-0; 2-0-0]
- 308. (2) Optics and Spectroscopy.—Geometrical and physical optics; optical instruments, interference, diffraction, polarization, spectroscopy and the vector model. [2-0-0; 2-0-0]
- 312. (2) Introduction to Mathematical Physics.—Application of differential equations and vector analysis to topics from free and forced vibrations, wave motion, potential theory, heat conduction. Prerequisite: One of Physics 200, 210, 220 or Geophysics 201. [2-0-0; 2-0-0]
- 316. (3) Particle Mechanics.—Vector methods; Galilean invariance; non-relativistic dynamics; conservation of energy and momentum; harmonic motion; inverse square law forces; speed of light; Lorentz transformation; relativistic dynamics; particles of modern physics.

  [3-0-0; 3-0-0]
- 318. (1) Optics Laboratory.—Selected experiments in optics. To be taken concurrently with or following Physics 308. [0-3-0; 0-3-0]
- 319. (1) Electrical Laboratory.—Selected experiments in electricity, magnetism and electronics. To be taken concurrently with or following Physics 300. [0-3-0; 0-3-0]
- 400. (3) Atomic and Nuclear Physics.—The major phenomena in the fields of atomic and nuclear physics. Prerequisite: Physics 300 or 301.

  [3-0-0; 3-0-0]
- 411. (2) Electromagnetism.—Potential theory, Maxwell's equations and electromagnetic waves. Prerequisite: Physics 300 or 301. [2-0-0; 2-0-0]
- 413. (3) Thermodynamics and Statistical Theory of Matter.—Laws of thermodynamics and an introduction to statistical mechanics. Prerequisite: Physics 200 or 204, or Geophysics 201. [3-0-0; 3-0-0]
- 419. (2) Experimental Atomic Physics.—Experimental investigations in the fields of atomic and nuclear physics forming a course supplementary to Physics 400 which should precede or be taken concurrently with this course. This course is available for credit in the Faculty of Education. [0-8\*-0; 0-8\*-0]
- 429. (3) Experimental Atomic Physics. Experimental investigations in atomic and nuclear physics together with lectures providing mathematical background. Prerequisite: Physics 300. Physics 400 should precede or be taken concurrently with this course. Available for credit in the Faculty of Education. Credit will not be given for both Physics 419 and 429. (Offered in some Summer Sessions only.)
- **430. (3)** Recent Developments in Physics.—This course is available for credit only in the Faculty of Education. It consists of lectures and demonstrations and is intended to review the latest developments in physics. (Offered in some Summer Sessions only.)

  [3-0-0]

441. (1) Introductory Meteorology.—Instruments. Observations and their presentation. Synoptic patterns. Basic dynamics and thermodynamics of the atmosphere. Water vapour and cloud formation. Radiation. Prerequisites: One of Physics 156, 200, 204, Geophysics 201, or equivalent; Mathematics 202 or equivalent. [2-0-0; 0-0-0]

# Primarily for Pre-Architectural and General Course Students

326. (3) Optics, Vibrations and Acoustics.—An intermediate course offered primarily for pre-architecture students. Illumination, photometry, geometrical and physical optics, radiation and color phenomena; elasticity; mechanical vibrations, waves, acoustics, elementary heat transfer. Not available for credit to students in Physics Majors or Honours Programmes. (Credit may be obtained for only one of Physics 326 or 308.) Prerequisites: Physics 110 or equivalent and Mathematics 202 or 220. [3-3\*-0; 3-3\*-0]

# Graduate Courses

- 501. (2) Elementary Quantum Mechanics. Non-relativistic quantum mechanics with application to atomic problems. Prerequisite: one of Physics 400, 402, 452 or equivalent.
- 502. (2) Waves.—Wave propagation in one, two, and three dimensions with consideration of reflection, refraction, diffraction, dispersion, surface coupling, waveguide phenomena and propagation of waves in inhomogeneous and dissipative media. Principal emphasis will be on electromagnetic and acoustic waves.
- **503.** (1) Electromagnetic Theory.—A deductive presentation of the classical theory of electrons and its relation to the macroscopic electromagnetic theory. Prerequisite: Physics 401, 404, or 411.
- 505. (2) Nuclei and Particles.—General properties of the nucleus, two-body problem at low energies, nuclear forces, nuclear models, nuclear reactions, interaction of nuclei with electromagnetic radiation, beta-decay. Properties of elementary particles, classification of interactions, intermediate and high energy reactions.
- 506. (2) Quantum Theory of Solids.—An elementary treatment of the theory of the structure and properties of solids: energy band method, lattice vibrations, phonon and electron transport, dielectric and magnetic properties, imperfections.
- 507. (2) Plasma Physics.—Equilibrium theory of ionized gases, kinetic theory, transport coefficients. Motion of individual charges, cyclotron radiation. Waves, Landau damping. Derivation of magnetohydrodynamic equations.
- 509. (1) Theory of Measurements. Probability, statistical distributions, significance tests, least squares, experimental design, numerical techniques.
- 510. (1) Stochastic Processes in Physics.—Statistical and thermodynamic fluctuations in electromagnetic, mechanical and thermal systems. Fundamental limits of observation and measurement in classical and quantum systems.
- 511. (1) Advanced Magnetism.—Spin hamiltonian, theory of ferro- and antiferromagnetism, nuclear magnetic resonance, relaxation in spin systems. Prerequisites: Physics 501 and 506.
- 512. (1) Spectroscopy.—Energy states of atoms and diatomic molecules. Textbooks: Herzberg, Atomic Spectra and Atomic Structure; Herzberg, Molecular Spectra and Molecular Structure. Prerequisite: Physics 501.

- 513. (1) Crystal Structure and X-rays.—Fundamentals of crystallography, production and properties of X-rays, structure analysis by X-rays and electron diffraction.
- 514. (1) Special Relativity Theory.—Relativistic kinematics, dynamics, connection with electromagnetic theory. Prerequisite: Physics 401, 404 or 411.
- 515. (1) Physical Electronics.—Electronic processes in vacuo and in solids with particular reference to electron beams and semiconductors and the physical aspects of the devices derived therefrom.
- 516. (2) Statistical Mechanics.—Ensemble theory (classical and quantum mechanical). Fluctuations. Response to external perturbations. Non-equilibrium statistical mechanics. Prerequisite: Physics 403, 413, 415 or 455.
- 517. (1) Introduction to Low Temperature Physics.—Description of cryogenic techniques insofar as these differ from normal techniques. Phenomenological aspects of low temperature physics.
- 518. (1) Low Temperature Physics.—Theoretical aspects of selected topics of interest in low temperature physics. Students enrolling in this course are expected to have a working knowledge of quantum mechanics.
- 519. (1) Molecular Spectroscopy.—Theory of Raman effect and infra-red absorption. Vibrational spectra of polyatomic molecules. Chemical applications.
- 520. (2) Advanced Spectroscopy.—Selected topics; determination of nuclear properties, microwave spectra. Textbooks: Condon and Shortley, The Theory of Atomic Spectra; Herzberg, Infra Red and Raman Spectra.
- 521. (2) Group Theory Methods in Quantum Mechanics.—Selected topics from atomic, molecular, solid state, nuclear and elementary particle physics treated by group theory methods. Prerequisite: Physics 501.
- 522. (2) Nuclear Physics.—Selected topics in low and intermediate energy nuclear physics. Prerequisites: Physics 501 and 505. Offered in alternate years beginning in 1968.
- 523. (1) Advanced Electronics.—Advanced treatment of problems in noise, non-linear circuit theory and information theory.
- 524. (1) Waves and Antennas.—Energy and power flow, wave impedance concept, reflection and refraction; properties of media, dispersion, propagation along the ground and via the ionosphere; antenna radiation, electromagnetic screening; plasma waves.
- 525. (1) Advanced Topics In Solid State Physics.—Theory of the structure and properties of solids, with emphasis on electronic phenomena.
- 526. (1) Quantum Theory of Radiation.—Calculation of cross-sections for absorption, emission and scattering of photons, creation and annihilation of positrons. Theory of radiation damping. Prerequisites: Physics 501, 503 and 514.
- 527. (1) Theoretical Nuclear Physics.—Selected topics from current nuclear theory. Prerequisites: Physics 501 and 505.
- 528. (2) Elementary Particle Physics.—Selected topics in high energy physics. Prerequisites: Physics 501 and 505. Offered in alternate years beginning in 1969.
- 529. (2) Advanced Quantum Mechanics.—Selected topics in relativistic quantum mechanics, quantum field theory, and theories of elementary particles. Prerequisites: Physics 501 and 514.

- 530. (1) General Relativity Theory.—Primarily for students interested in theoretical physics. Prerequisites: Physics 503 and 514.
- 531. (1) Advanced Plasma Physics.—Selected topics from current research in plasma physics—seminar course.
- 532. (2) Plasma Dynamics.—The magnetohydrodynamic formulation of plasma dynamics including the effects of diffusion, viscosity, thermal conduction and ionization phenomena on plasma motion.
- 534. (1) Radiological Physics I.—A systematic study of the principles involved in radio-therapy and of the techniques required for the application of these principles.
- 535. (1) Radiological Physics II.—A continuation of Physics 534, including an extension of the topics discussed in that course.
- 537. (1) Advanced Dynamic Oceanography.—A more intensive study of the dynamics of ocean currents. Reference: Stommel, *The Gulf Stream*. Prerequisite: Oceanography 401.
- 538. (1) Fluid Mechanics.—The flow of real and ideal fluids, emphasizing the influence of turbulence and the application to ocean currents.
- 539. (2) Waves and Tides.—Surface and internal waves, tides of the oceans, tidal currents.
- **540.** (2) Turbulence.—A discussion of turbulent fluid motion, presenting both the empirical aspects and the development of statistical theories, including the spectrum of turbulence and similarity and equilibrium hypotheses. Textbook: Hinze, *Turbulence*. (Offered in 1968-69 and alternate years.)
- 541. (1) Dynamic Meteorology. Development of basic equations of motion and their application to the atmosphere. A knowledge of vector calculus is assumed.
- 544. (1) Magnetic Resonance Seminar.—Selected topics in the recent developments of the theory and applications of magnetic resonance.
- 545. (1) Theoretical Physics Seminar. Selected topics from current literature.
  - 549. (6) Master's Thesis.
- 555. (1-3) Directed Studies in Physics.—With approval of the Head of the Department, advanced studies under the direction of a staff member may be arranged in special cases.
- 570. (1) Radio Astronomy.—Emission, propagation and detection of radio noise from the solar system, galaxy and extragalactic radio sources. This course complements E.E. 593 which deals with instrumentation for radio astronomy.
- **571.** (1) Cosmic Physics.—Reviews of radio, infra-red, optical, ultra-violet, X-ray, gamma ray and particle astronomy. Studies of interstellar matter. Developments in theories of gravitation and cosmology.
  - 649. Ph.D. Thesis.

# FIRST YEAR ELECTIVES IN THE FACULTY OF ARTS

### Asian Studies

100. (6) Basic Chinese.—An introduction to the grammar and syntax of spoken and written Chinese. [6-2; 6-2]

100. (6) Basic Japanese.—An outline of the grammar and syntax of the spoken language together with an introduction to the Japanese script.

[6-2; 6-2]

### **Economics**

100. (3) Introduction to Economic History and Development.—An introduction to economic development emphasizing problems in the emergence and growth of industrial economies. [3-0; 3-0]

# Fine Arts

125. (3) History of Art.—The history of architecture, sculpture and painting of the Western World from Ancient Egypt and Mesopotamia to the present. [3-0; 3-0]

### French

- 110. (3) First-Year French.—Prerequisite: French 11 (91). [3-1; 3-1]
- 120. (3) Contemporary French: Language and Literature.—Prerequisite: French 12 (92). [3-1; 3-1]

# Geography

101. (3) Introduction to Physical Geography.—Weather and climate; origin and distribution of landforms with particular reference to North America; map-projections. [3-2; 3-2]

### German

- 100. (3) First-Year German.—Introduction to the language. [3-1; 3-1]110. (3) First-Year German.—Review of grammar; extensive reading. Pre-
- requisite: German 20 or German 91. [4-0; 4-0]
- 120. (3) First-Year German.—Garmmar, composition, extensive reading. Prerequisite: German 92 or First Class in German 91. [4-0; 4-0]

### Greek

100. (3) Beginners' Greek.—The elements of Attic Greek. [4-0; 4-0]

# History

100-199. (1½-3) Problems in History.—Several courses will be given each year. They will include specific topics and periods as well as comparative studies. A list of the courses to be given in the coming year is available from the office of the Department of History. One 3-unit course or two 1½-unit courses selected from this group is prerequisite for the Major or Honours programme in History. (This course is open to first- and second-year students only.)

[2-1; 2-1]

### Italian

100. (3) First-Year Italian.—Grammar, reading conversation. [3-1; 3-1]

### Latin

- 100. (3) First Year Latin.—For students with no previous knowledge of Latin. [4-0; 4-0]
  - 110. (3) Intermediate Latin.—Prerequisite: Latin 20. [4-0; 4-0]
- 120. (3) Latin Language and Literature, I.—Prerequisite: Latin 12 (92). Reading of an anthology of Latin prose and poetry; prose composition.

  [3-0; 3-0]

### Music

100. (3) Theory of Music I.—Melodic, harmonic, contrapuntal, rhythmic and formal elements in music. [3-2; 3-2]

107. (3) Composition I.—An introduction to musical composition.
[3-0; 3-0]

120. (3) History of Music I.—The development of music from Greece to cira 1600. [3-0; 3-0]

Philosophy

100. (3) Introduction to Philosophy.—Some influential philosophical writing and doctrines, as an introduction to the problems and methods of Philosophy.

[3-0; 3-2]

### Polish

110. (3) Basic Polish.—An introductory course.

[3-1; 3-1]

# Psychology

100. (3) Introductory Psychology.—A survey of the areas and methods of psychology with emphasis upon the basic processes in animal and human behaviour: Topics covered include learning, sensation, perception, biological bases of behaviour, personality and social psychology. [3-0; 3-0]

# Russian

100. (3) Basic Russian.—Grammar, reading, oral practice. Special sections are provided for science students. [3-1; 3-1]

110. (4½) Basic Intensive Russian.—Aural comprehension, oral practice, grammar. Emphasis on learning to understand the spoken language and to express oneself in it. [6-2; 6-2]

# Spanish

100. (3) First-Year Spanish.—Grammar, composition, translation, oral practice. [3-1; 3-1]

# Theatre

120. (3) Introduction to Theatre.—Theory and practice of the theatrical arts; the development of Western theatre; reading of representative plays.

[3-0; 3-0]

### COURSES FROM FACULTIES OTHER THAN ARTS AND SCIENCE

Students transferring from another faculty to the Faculty of Science may obtain credit for any of the following courses with the approval of the Dean. In exceptional circumstances, students in the Faculty of Science may include some of these courses in their programmes, with the approval of the Dean and the Department in which the course is offered.

Note: A student may not receive credit toward the B.Sc. degree for more than 15 units for courses from the following: Anatomy 400 (not more than 3 units), 401, 425; Biochemistry 400; Microbiology 425; Pharmacology 425; Physiology 400, 425.

# Agricultural Mechanics

- 300.  $(1\frac{1}{2})$  Power Systems in Agriculture and Food Processing.
- 301. (1½) Thermal Systems in Agriculture and Food Processing.
- 401. (3) Food Mechanics.

### Anatomy

(See also Faculty of Medicine calendar)

390. (3) Basic Human Anatomy.

400. (6) Human Anatomy. (Credit will not be given for both Anatomy on and Anatomy 400.)

401. (3) Microscopic Human Anatomy. (Credit will not be given for both Anatomy 401 and Zoology 302.)

425.  $(1-1\frac{1}{2})$  Neuroanatomy.

# Applied Science

(See also Faculty of Applied Science calendar)

- 270. (2) Strength of Materials.
- 278. (2) Materials Science.

# Architecture

(See also School of Architecture calendar)

- 305. (3) Architectural History. (Credit will not be given for both Architecture 305 and Fine Arts 125.)
  - 405. (3) Architectural History. (Not open to pre-Architecture students.)
  - 424. (11/2) History of Urban Form.
  - 425. (1½) History of Urban Planning.

# **Biochemistry**

(See also Faculty of Medicine calendar)

**400**. **(5) General Biochemistry**. (Credit will not be given for Biochemistry 400 if credit has already been given for Biochemistry 410 and 411.)

# Chemistry

(See also Faculty of Applied Science calendar)

- 156. (3) Physical Chemistry. (Credit will be allowed for only one Chemistry 156, 304 or 305.)
  - 352. (2) Modern Analytical Methods.

# Civil Engineering

(See also Faculty of Applied Science calendar)

- 250. (2) Plane Surveying.
- 360. (3) Fluid Mechanics I.
- 367. (2) Soil Mechanics I.
- 451. (1½) Control Surveys I.
- 452. (1½) Control Surveys II.
- 453.  $(1\frac{1}{2})$  Photogrammetry.
- 472.  $(1\frac{1}{2})$  Soil Mechanics II.
- 476. ( $\frac{1}{2}$ ) Legal Aspects of Engineering.

### Commerce

459. (3) Introduction to Accounting.

### Computer Science

(See also Faculty of Applied Science Calendar.)

- 251. (1) Introduction to Computers and Programming.
- 350. (1) Programming of Numerical Algorithms.

# **Electrical Engineering**

(See also Faculty of Applied Science calendar)

- 253. (3) Introduction to Solid State Electronics.
- 351. (3) Circuits and Devices.
- 355. (3) Signals and Systems.
- 357. (3) Electronic Devices.
- 451. (3) Electrical Circuits and Apparatus.
- 465. (3) Applied Electronics.
- 467. (2) Control Systems.
- 469. (2) Microwave Engineering.
- 475. (2) Electronic Systems.

# Forestry

(See also Faculty of Forestry calendar)

- 150. (1½) Dendrology.
- **250**. (1½) Forest Ecology.
- 270. (2) Wood Anatomy.
- **278.** (2) Wood Physics.
- 350. (2) Silviculture.
- 351. (4) Forest Protection.
- 352. (1½) Forest Genetics. (Credit will not be given for both Forestry 352 and Biology 334.)
- 410 (11/2) Principles of Forest Entomology.
- 418. (11/2) Methods in Forest Pathology.
- 466. (1½) Advanced Biometrics.

# Geology

(See also Faculty of Applied Science calendar)

150. (3) Earth Science for Engineers.

### Mathematics

(See also Faculty of Applied Science calendar)

- 155. (3) Calculus.
- **156.**  $(1\frac{1}{2})$  Vector Calculus.
- 250. (3) Vector Analysis and Differential Equations.
- (2) Elementary Statistics.
- 50. (3) Applied Calculus and Differential Equations.
- 57. (1) Industrial Statistics and Linear Programming.
- 60. (2) Real Variable.
- 62. (2) Linear Algebra.
- 64. (2) Complex Variable.

- 450. (3) Analysis.
- 452. (3) Theory and Application of Differential Equations.

# Mechanical Engineering

(See also Faculty of Applied Science calendar)

- 491. (2) Industrial Management.
- 492. (1) Engineering Economics.

# Metallurgy

(See also Faculty of Applied Science calendar)

- 350. (1) Metallurgical Thermodynamics I.
- 351. (1) Laboratory Methods.
- 374. (3) Physical Metallurgy I.
- 450. (2) Metallurgical Thermodynamics II.
- 462. (2) Thermodynamics of Metal Systems.
- 470. (2) Structure of Metals II.
- 472. (3) Physical Metallurgy II.

†Credit will not be given for both Metallurgy 470 and 472

# Microbiology

(See also Faculty of Medicine calendar)

425. (3) Medical Microbiology. (Credit will not be given for both Microbiology 425 and Microbiology 403.)

# Mineral Engineering

(See also Faculty of Applied Science calendar)

- 350.  $(1\frac{1}{2})$  Mineral Exploration.
- 351. (1½) Introduction to Valuation.
- 457. (3) Introduction to Rock Mechanics.

# Oceanography

(See also Faculty of Graduate Studies calendar)

- 400. (1) Introduction to Synoptic Oceanography.
- 401. (1) Introduction to Dynamic Oceanography.
- 402. (1) Introduction to Chemical Oceanography.
- 403. (1) Introduction to Biological Oceanography.
- 404. (1) Introduction to Geological Oceanography.

### Pharmacology

(See also Faculty of Medicine calendar)

- 410. (1½) Biological Effects of Chemicals and Drugs.
- 425. (41/2) Medical Pharmacology.

# **Physics**

(See also Faculty of Applied Science calendar)

- 155. (3) Mechanics.
- 156. (3) Heat, Light and Sound.
- 250. (3) Electricity and Magnetism.
- 251. (3) Electric and Magnetic Fields.
- 351. (2) Electricity and Magnetism.
- 352. (2) Introduction to Mathematical Physics.
- **358.** (3) Cryogenics.
- 398. Essay.
- 452. (3) Atomic and Nuclear Physics.
- 455. (3) Thermodynamics and Statistical Mechanics.
- 456. (2) Classical Mechanics.
- 457. (2) Continuum Mechanics.
- 459. (3) Experimental Physics.
- 480. (1) Seminar

# Physiology

(See also Faculty of Medicine calendar)

- **400. (6)** Human Physiology. (Credit will not be given for Physiology 400 f credit has already been given for Physiology 301 and 302. Only 3 units of redit will be given for Physiology 400 if credit has already been given for **Zoology** 303 or **Zoology** 304.)
  - 425. (11/2) Elements of Neurophysiology.

### Plant Science

(See also Faculty of Agriculture calendar)

- 321. (1½) Biometrics.
- 322.  $(1\frac{1}{2})$  Design of Experiments.

### Poultry Science

**406.** (1½) Product Technology.

### Soil Science

(See also Faculty of Agriculture calendar)

- **200.**  $(1\frac{1}{2})$  An introduction to the Study of Soils.
- 203. (2) General Forest Soils.
- 311. (1½) Soil and Aquatic Microbiology.
- 314. (11/2) Soil and Water Conservation.
- 404. (1½) Chemical Properties of Soils.
- 416. (1½) Soil, Classification, Cartography and Use.

V020,10

# AWARDS AND FINANCIAL ASSISTANCE

THE UNIVERSITY OF BRITISH COLUMBIA

ANCOUVER 8 • BRITISH COLUMBIA CANADA

# MEDALS, FELLOWSHIPS, SCHOLARSHIPS, PRIZES, BURSARIES, AND LOANS

### GENERAL REGULATIONS

- 1. All awards of medals, scholarships, fellowships, prizes, and bursaries are made on the recommendation of the Joint Faculty Committee on Prizes, Scholarships, and Bursaries (University Scholarship Committee), unless otherwise provided for by special resolution of Senate. Awards, when announced by the University, are final.
- 2. Medals, scholarships, fellowships, prizes, bursaries, and loans are open to winter session students only, unless otherwise stated, and marks obtained in summer session courses are not taken into account in awarding them.
- 3. If the award of a medal, scholarship, fellowship, or prize is based on an examination, no award will normally be made to a candidate who obtains less than 75 per cent of the possible marks.
- 4. To be eligible for a general proficiency scholarship a student must take the full year's course, which must include the required courses for the year in which he is registered. Where credit has already been obtained in a required subject, however, another course may be substituted, with permission of the faculty concerned. The standing of students taking more than the required number of units will be determined on the basis of the required number of units to be chosen in a manner most advantageous to the students.
- 5. Except in cases approved by Senate, no student may enjoy the proceeds of more than one scholarship in the same academic year, and the scholarships thus relinquished will be awarded to the candidates next in order of merit.
- 6. A winner, if he so desires, may retain the honour of winning an award but resign the monetary value. Any funds thus made available will be used for additional awards or loan funds.
- Scholarships, fellowships, and bursaries under the jurisdiction of the University are payable in two instalments, one at the beginning of each term. Payments will be made only to those who continue their studies to the satisfaction of the faculty concerned and the Committee, and may be withheld for unsatisfactory attendance, conduct, or progress. A scholarship may be reserved for one year, provided the student shows satisfactory reasons for post-poning attendance. Postponement of University Entrance and Senior Matriculation scholarships will be granted on medical grounds only. Application for postponement must be made to the Dean of Inter-Faculty and Student Affairs.
- 8. In awarding bursaries consideration will be given to the financial need of applicants.
- 9. If invested funds do not provide the necessary revenue for any endowed scholarship, fellowship, prize or bursary, payment of the award will be reduced or withheld.
- The University does not guarantee the payment of any prizes, bursaries, scholarships, or fellowships other than those from the funds of the University. With respect to prizes, bursaries, scholarships, or fellowships based upon the gifts of individuals or associations other than the University, no award will be made unless the funds required have been actually received from the Private donor or donors.
- 11. The Senate of the University of British Columbia reserves the right to change the terms governing an award, so that they may better meet new con-

ditions, may more fully carry out the intentions of the donor or maintain the usefulness of the benefaction. The right so reserved shall be exercised by a resolution of the Senate duly confirmed by the Board of Governors, provided always that a year's notice shall be given in Senate of any proposed change and that the donor or his representatives, if living, shall be consulted about the proposed change.

# FOR HEADS OF THE GRADUATING CLASSES

The Governor-General's Gold Medal—A gold medal, presented by His Excellency the Governor-General of Canada, will be awarded to the student whose record, in the opinion of the Faculties, is the most outstanding in the graduating classes in Arts and Science (B.A. and B.Sc. programmes).

The Wilfrid Sadler Memorial Gold Medal—A gold medal, given by Sigma Tau Upsilon Honorary Agricultural Fraternity in memory of Professor Wilfrid Sadler, Professor and Head of the Department of Dairying, 1918-33, will be awarded to the student standing at the head of the graduating class for the B.S.A. degree.

The Association of Professional Engineers Gold Medal—A gold medal, given by the Association of Professional Engineers of the Province of British Columbia, will be awarded to the student in the graduating year of Applied Science (B.A.Sc. course) whose record, in the opinion of the Faculty, is the most outstanding.

The Kiwanis Club Gold Medal and Prize—A gold medal and a cash prize of \$100, given by the Kiwanis Club of Vancouver, B.C., will be awarded to the student standing at the head of the graduating class for the B.Com. degree.

The University Medal for Arts and Science—This medal will be awarded to a student in the graduating class for the degree of B.A. or B.Sc. This medal will be awarded to the student obtaining highest standing in the degree category which does not include the winner of the Governor-General's Medal.

The Law Society Gold Medal and Prize—A gold medal, presented by the Law Society of British Columbia, will be awarded to the student obtaining the highest aggregate marks in the Final Year in the Faculty of Law. This award will be accompanied by a cash grant equivalent to the individual's Call and Admission Fee.

The Hamber Gold Medal and Prize—A gold medal and a cash prize of \$250, presented by the late Honourable Eric W. Hamber, C.M.G., B.A., LL.D., Chancellor of this University from 1944 to 1951 and Chancellor Emeritus from 1951 to 1960, will be awarded annually to the student graduating in the Faculty of Medicine with the most outstanding record throughout the medical course. The winner of this medal and prize is not precluded from being considered for the Hamber Scholarship.

The Horner Gold Medal for Pharmacy—This medal, known as the "Horner Gold Medal", is awarded annually by Frank W. Horner Limited of Montreal, to the head of the graduating class, Faculty of Pharmacy.

The Helen L. Balfour Prize—A prize of \$250, made possible by a bequest from the late Helen L. Balfour, will be awarded annually to the student obtaining highest standing in the Final Year for the degree of B.S.N.

The Canadian Institute of Forestry Medal—A gold medal, the gift of the Canadian Institute of Forestry, will be awarded to the student in the graduating class in Forestry (B.S.F. or B.A.Sc. course) who, in the opinion of the Faculty of Forestry, has made the best all-round record in professional forestry in all years at University, and who has demonstrated a high quality of character, leadership, sportsmanship, and scholarship.

The H. R. MacMillan Prize in Forestry—A prize of \$100, the gift of H. R. MacMillan, Esq., C.B.E., D.Sc., LL.D., will be awarded to the student standing at the head of the graduating class for the degree of B.S.F.

Dr. Maxwell A Cameron Memorial Medals and Prizes-A silver medal and a prize of \$100 is awarded annually by the BCTF to the student in each of the three public universities completing the final year of the B.Ed. degree in secondary school teaching, who achieves the highest standing in general proficiency and whose achievement includes first class standing in practice teaching. A similar award is made on the same terms to the leading student in the final year of the B.Ed. course in elementary school teaching. These awards commemorate the distinguished life and work of Dr. Maxwell A Cameron (1907-1951), first director of the School of Education at UBC and author of the Cameron Report on Education.

The College of Dental Surgeons of British Columbia Gold Medal—A gold medal, presented by the College of Dental Surgeons of British Columbia, will be awarded to the student graduating in the Faculty of Dentistry with the most outstanding record in the four-year course.

The Royal Architectural Institute of Canada Medal—This medal is available to a student in the graduating class for the degree of Bachelor of Architecture. The award will be made only to a student who, in the opinion of the School, has attained a high proficiency in the course and shows those qualities of character and ability which promise outstanding achievement in the profession. In the determination of standing for this award, the work taken in the final two years will be considered. The award will not necessarily be made every year.

The Ruth Cameron Medal for Librarianship—This medal, honouring the memory of Miss Ruth E. Cameron, for many years Chief Librarian of the City of New Westminster, is offered annually by the Board of the New Westminster Public Library. It will be awarded to the student whose record in the course for the degree of B.L.S. is, in the opinion of the School of Librarianship, most outstanding.

The Canadian Association for Health, Physical Education and Recreation Medal—This gold medal, gift of the Vancouver and District Branch, Canadian Association for Health, Physical Education, and Recreation, will be awarded to the Head of the Graduating Class for the degree of Bachelor of Physical Education.

# AWARDS FOR GRADUATE STUDY AND RESEARCH

Graduate students proceeding to Librarianship, Social Work or Teacher Training should consult pages 62, 79 and 43 respectively.

In most cases, winners of graduate fellowships and scholarships are selected by the University Scholarship Committee from among those nominated directly by departments, schools, and faculties. Unless the calendar description of an award specifies another procedure, a student who wishes to be considered for a graduate fellowship or scholarship should consult the head of the department concerned with his major field of study.

In general awards are open only to students taking a full programme of study at this University in the winter session. Departments should be consulted before February 15.

Attention is directed to awards made by other institutions, pages U140-162. For most of these awards, special applications must be submitted.

The Alan Boag Scholarship—As on page 17.

The Alcan Fellowship—This fellowship, the gift of Alcan Research and Development Limited, Montreal, is offered annually to students admitted for postgraduate studies leading to a Master's or Doctor's degree in the mathematical and physical sciences, pure and applied. Preference will be given to candidates pursuing studies in the field of physical metallurgy. The tenure will be for one year with a stipend of \$2,000 plus tuition fees. During tenure the holder of the fellowship shall not have teaching duties in excess of three hours per week.

The Anne Wesbrook Scholarship—This scholarship of \$350, given by the Faculty Women's Club of the University of B.C., is open to a woman student of the graduating class of this University who is proceeding in the following year to graduate study in this or any other approved university.

The B.C. Forest Products Fellowship in Forest Genetics—This research fellowship, the gift of British Columbia Forest Products Limited, provides \$5000 annually for support of research studies in forest genetics in the Faculty of Forestry at the University of British Columbia. Up to \$3200 will be provided to the fellow, the balance to be used for equipment, materials and supplies essential to the research. The fellowship will be awarded to a candidate recommended by the Faculty of Forestry and approved by the University Scholarship Committee.

The Brissenden Scholarship—As on page 31.

British Columbia Hydro and Power Authority Graduate Scholarships—Three scholarships of \$750 each—two in the pure or applied sciences, and one in law, business administration, the social sciences, or the humanities—are offered by British Columbia Hydro and Power Authority for graduate study at this University. Selection will be made by the Scholarship Committee in consultation with the appropriate departments.

The British Columbia Loggers' Association Forest Protection Scholarship—As on page 55.

The British Columbia Sugar Refining Company Limited Scholarships—Scholarships to the total of \$3500, the gift of the British Columbia Sugar Refining Company Limited, are available annually for students in Agriculture, Chemistry, Mechanical and Chemical Engineering, and Home Economics. Winners of these awards will be selected from recommendations submitted by the departments concerned. Selection will be made on the basis of scholastic standing and promise of ability in research. At the discretion of the Scholarship Committee awards may be made to undergraduates in the upper two years of undergraduate work.

The British Columbia Teachers' Federation Postgraduate Scholarships for Teachers—See page 144.

The British Columbia Telephone Company Graduate Scholarships—Four scholarships of equal value, to the total of \$2500, the gift of the British Columbia Telephone Company, are available for graduates. Of these awards, one will be available in Community and Regional Planning, one in Commerce and Business Administration, and two in Electrical Engineering. Awards will be made on the basis of scholastic standing and promise of ability in research

to students undertaking an approved programme of graduate study and research at the University of British Columbia.

The Burroughs Wellcome Fellowship in Anaesthesiology and Applied Pharmacology—This fellowship of \$1000, the gift of Burroughs Wellcome & Co. (Canada) Ltd., is available for postgraduate study and research in anaesthesiology. The award will be made on the recommendation of the Faculty of Medicine.

The Canadian Foundation for the Advancement of Pharmacy Graduate Study Fellowship—One grant is available each year in the University of British Columbia in the amount of \$500 and will be awarded on the basis of competition among graduates in the Faculty of Pharmacy pursuing graduate studies in pharmacy at U.B.C. Further information may be obtained from the Dean of the Faculty of Pharmacy.

CBC Prizes in Television and Radio Writing—As on page 19.

Chevron Standard Limited Graduate Fellowship—Chevron Standard Limited offers annually five graduate fellowships which are tenable in selected Canadian universities to students proceeding to a graduate degree in one of the fields of Geology, Geophysics, or Petroleum Engineering. The fellowships are tenable for one year in the amount of \$1,000 each, plus a grant of \$500 to the university department concerned. The awards are primarily intended to assist male Canadian students showing an interest in earth science related to oil exploration and to students who are interested in petroleum development and production. They will be awarded on the basis of scholastic ability, field of interest, the recommendation of the Department in which the student plans to conduct his graduate work, plus the concurrent recommendation of the Head of the Department in which the student conducted his undergraduate studies. Application forms which list the universities in which the fellowships are tenable may be obtained from the Dean of Inter-Faculty and Students Affairs, the Departmental Head, or by writing directly to the Company. They should be prepared in duplicate, one copy to be forwarded to the Head of the Department in which the candidate is applying for admission. and the other to the Secretary, Aids to Education Committee, the Chevron Standard Company, 400 - 5th Avenue, S.W., Calgary 1, Alberta, prior to March 31st of the year in which the graduate program is to be undertaken.

The Class of Agriculture '21 Graduate Scholarship-On the occasion of the thirty-fifth anniversary of graduation, the Class of Agriculture '21 established a scholarship for graduate study and research in agriculture leading to a higher degree. In awarding this scholarship consideration will be given academic standing, character, and promise of ability in investigation and research.

Crown Zellerbach Canada Foundation Graduate Scholarship in Economics and Political Science—A scholarship of \$500, the gift of Crown Zellerbach Canada Foundation, will be awarded to a graduate student who is beginning or continuing studies, at this University, towards a Master's degree in the field of Economics or Political Science or a combination of these fields. Should no graduate in these fields qualify, the scholarship will be awarded to a graduate in some other field. In awarding this scholarship consideration will be given to academic standing, personal qualities, and research ability.

The Don Buckland Memorial Scholarship in Forest Pathology—As a memprial to Dr. Donald C. Buckland and in tribute to his distinguished career, his many friends have established a fund, from which the annual income of

\$150 will be awarded annually as a scholarship for study in forest pathology at this University. Preference will be given to a graduate forester who has demonstrated research ability and whose studies will be materially furthered by financial support.

The Dr. and Mrs. J. E. Kania Scholarship—As on page 49.

The Dr. A. W. D. (Bill) Knox Memorial Award—This fund was established by friends in memory of Dr. Bill Knox, a young B.C. surgeon tragically deceased on the threshold of his career. Awards will be made to assist worthy candidates in post-graduate surgical study.

The Dr. F. J. Nicholson Scholarships—Out of the proceeds of a fund donated by the late Dr. Francis John Nicholson, the following scholarships will be awarded annually for the purpose of enabling students to do graduate study in the University of British Columbia or in any other approved university: (1) One scholarship of the value of \$500 for graduate work in Chemistry. Applicants must be Honours graduates in Chemistry of the Faculties of Arts or Science, with the degree of B.A., B.Sc., M.A., or M.Sc., or graduates in Chemical Engineering of the Faculty of Applied Science, with the degree of B.A.Sc. or M.A.Sc. (2) One scholarship of the value of \$500 for graduate work in Geology. Applicants must be graduates of the Faculty of Applied Science in Geological or Mining Engineering, with the degree of B.A.Sc. or M.A.Sc. (3) An additional scholarship of \$500 as described in (1) or (2). Recipients must be qualified to undertake graduate and research work in respect of scholarship, ability, character, and health. These scholarships will be granted with due consideration for the financial status of the candidate. The spirit of the endowment is to aid those to whom financial help is necessary or of material assistance. Winners must be graduates of the University of British Columbia, have British citizenship, and be not more than 30 years of age on the last day of the final examinations. Preference will be given in making awards to native-born British Columbians.

The Edith Ashton Memorial Scholarship—A scholarship of \$250, given by Mrs. Daniel M. Armstead in memory of Edith Ashton, will be offered in the Department of Biology and Botany. This scholarship will be awarded to an outstanding graduate student whose topic of research is in the field of marine and freshwater botany or some field approved by the Head of the Department.

The Ernestine A. M. E. Kania Scholarship—As on page 20.

The Finning Tractor & Equipment Co. Ltd. Graduate Scholarship-A scholarship of \$600, the gift of Finning Tractor & Equipment Co., Ltd., will be available to a graduate student specializing in marketing in the M.B.A. program at the University of British Columbia. It will be awarded by the Joint Faculty Committee on Prizes, Scholarships and Bursaries to a student who, because of his academic record, is worthy and deserving of assistance.

The Fisheries Association of B.C. Scholarships—As on page 77.

The Frank F. Wesbrook Fellowships—As a memorial to the late Dr. F. F. Wesbrook, first President of the University of British Columbia, six fellowships are offered annually to students proceeding to graduate study and research at the University in microbiology or bacteriology. The gift of Dr. H. R. MacMillan, these fellowships are open to Canadian citizens who are beginning and continuing studies toward the Ph.D. degree. Each fellowship has the value of \$3200 and is renewable for attendance at this University for two further years. A candidate must be a Canadian citizen, have an undergraduate average of at least 75% with first class grades in at least half his subjects, have a potential for research and investigation, and indicate, by his record, promise of success in advanced levels of study. In accepting the award, a candidate must agree to remain in Canada for a reasonable period following completion of his Ph.D. programme, if he is offered a suitable position.

The Frederick and Agnes Eatock Memorial Fund-The annual income on this fund, a bequest from the late Agnes Eatock, provides a graduate scholarship for students proceeding to a degree in Nursing at this University in the Faculty of Graduate Studies. If, in any year, no suitable candidate or candidates are available, the income will be used to provide bursaries for deserving students proceeding to the degree of B.S.N.

The Frederick Armand McDiarmid Scholarship—This scholarship, a memorial to Frederick Armand McDiarmid, has been provided by Neil H. McDiarmid. It will be awarded to a student, graduate or undergraduate, with preference to those in Mining. Selection will be based on academic standing, practical ability and experience, and promise in research.

The General Accountants' Scholarship—In order to stimulate scholarship and research in the general area of business administration and, particularly, in the field of accountancy, the General Accountants' Association has announced its intention of making an annual gift of \$1500 for the purpose of an award to a student proceeding to, or engaged in, graduate studies. Normally, such studies are expected to be undertaken at the Faculty of Commerce and Business Administration but exceptions may be made to accommodate the special needs of graduate students. The award will be made at the discretion of the Dean of the Faculty of Commerce and Business Administration to a candidate whose academic record, ability, and other qualifications, indicate a capacity for distinguished work at the graduate level.

The Ghent Davis Memorial Scholarship-As on page 36.

The Giant Yellowknife Mines Scholarship—This scholarship of \$2000, the rift of Giant Yellowknife Mines Limited, is offered to students pursuing graduate studies at this University in mineral engineering and undertaking work in a field specifically relating to the mining industry. An additional sum of \$500 will be made available to the Department to cover auxiliary costs and expenses. The award will be made by the University on the recommendation of the Department of Mineral Engineering.

The H. C. LePatourel Fellowship in Hospital Pharmacy—This fellowship of \$500, provided annually from the estate of the late H. C. LePatourel, is open to graduates of the Faculty of Pharmacy who intend to further their practical training through one year of hospital pharmacy interneship. The award will be made by the Faculty, after consultation with the hospital concerned, to a student who not only has a good academic record but who has shown interest and promise in the field of hospital pharmacy.

The H. R. MacMillan Family Fellowships—Through the generosity of H. R. MacMillan, C.B.E., D.Sc., LL.D., forty-five fellowships, each in the amount of \$3200 per annum (with an additional amount of \$500 for the University), are offered to outstanding students admitted as candidates for the Ph.D. degree and proceeding with full-time studies at the University it B.C. To be eligible a candidate must be a Canadian citizen, have an underpraduate average of at least 75% with first class grades in at least half his subects, have a potential for research and investigation and indicate, by his record, fromise of success in advanced levels of study. A candidate accepting an award must agree to remain in Canada for a reasonable period following completion his Ph.D. programme, if he is offered a satisfactory position. Subject

to satisfactory progress, a fellow may have his award renewed for two further years or until he has received his degree, whichever is the shorter period. Winners will be selected by the Scholarship Committee from among those nominated for graduate fellowships by faculties and departments.

The J. A. Beckow Graduate Scholarship—This scholarship of \$500, the gift of J. A. Beckow Limited, will be awarded to a graduate student who is continuing studies at the University towards a Master's Degree in the field of Science or Mechanical Engineering. If, in the opinion of the University Scholarship Committee there is no qualified student, the said sum will be used for students completing the Third Year of Mechanical Engineering and proceeding to Fourth Year.

The John and Annie Southcott Memorial Scholarship—A scholarship of \$100, provided annually from the estate of the late Mrs. Thomas H. Kirk, will be awarded to that student who, possessing exceptional aptitude for research, either intends to pursue, or is already pursuing some approved investigation in the field of British Columbia history. The scholarship will normally be awarded to a Fourth Year student or to a graduate proceeding to a higher degree, but may be awarded to a student of the Third Year.

J. Walter Thompson Company Limited Fellowships—These fellowships, the gift of the J. Walter Thompson Company Limited, are offered annually to students admitted for post-graduate studies leading to the Master of Business Administration degree. The intention of the donor is to contribute to the development of managerial resources in Canada and particularly in the field of marketing. The term will be for one year with a stipend of \$1,500 and the basis of the award will be scholastic standing. Where a fellowship is granted to a student in the first year, he will be eligible for renewal of the fellowship in the second year of his programme.

The Kaiser Coal Ltd. Fellowship—A grant of \$5,000 per annum for three years from Kaiser Coal Ltd. provides a fellowship and supporting financial assistance in the Faculty of Forestry for research on the reclamation of strip mine lands. The value of the annual fellowship is \$3,600.

Killam Scholarships—These scholarships are provided annually from "The Isaak Walton Killam Memorial Fund for Advanced Studies", established through a bequest from the late Dorothy J. Killam. Available in general for any field of study or research (other than the "arts" as presently defined in the Canada Council Act and not limited to the "humanities and social sciences" defined in that Act), these scholarships will be awarded, insofar as possible, for work either leading or subsequent to a doctorate or for work of similar standing. The basis of award will be special distinction of intellect, with due regard for sound character and personal qualities. They are open to suitable candidates from any country, but those who are not Canadian Citizens may use their awards only for study and research in Canada. Killam Scholarships will be granted initially for two years, but are subject to review and may be terminated at the end of the first year, or where circumstances warrant, they may be extended for a further period.

The Killam Scholarships offered through "The Isaak Walton Killam Memorial Fund for Advanced Studies" at the University of British Columbia are as follows:

(a) Killam Senior Fellowships—These awards, approximately three in number (including new awards and renewals), are open to members of faculty of the University who have outstanding records of achievement and wish to devote full time to research, and study in their field for a period of

time. The amount of each award will be equivalent to salary and benefits. Awards may also be made to distinguished members of other institutions who wish to pursue study and research for one or two years or more at the University of B.C.

- (b) Killam Postdoctoral Fellowships—These awards, approximately ten in number (including new awards and renewals), and each in the range of up to \$7500, are open to (i) students who have recently obtained a doctorate at the University of B.C., have shown superior ability in research, and wish to pursue further study and research at the University of B.C. or elsewhere; and (ii) students who have recently obtained a doctorate at another University, have shown superior ability in research, and wish to pursue further study and research at the University of B.C. Consideration will also be given to candidates who, although they do not possess a doctorate, are deemed by virtue of their achievements and ability to have similar qualifications.
- (c) Killam Predoctoral Scholarships-These awards, approximately ten in number (including new awards and renewals), and each in a range of up to \$4000, are open to outstanding graduates of any institution for full time study and research leading to a doctorate at the University of B.C. Up to four of these fellowships, renewable for two further years, will be reserved each year for an area or areas of study designated by the University. The fellowships not awarded in the designated areas will be open to candidates in any field of study in which a doctorate is offered at the University.

Awards are administered by the Scholarship Committee of the University in accordance with the regulations of the Trust and the University Senate.

The Lefevre Gold Medal and Scholarship—Out of funds provided by the late Mrs. Lefevre in memory of her husband, Dr. J. M. Lefevre, a gold medal and scholarship will be awarded annually to the student standing highest in general proficiency and research ability in one of the following courses: (a) Honours in Chemistry in the Faculty of Arts or Science; (b) Chemical Engineering in the Faculty of Applied Science. The award will be based upon the work of the last two years in these courses. The value of the scholarship is approximately \$200. The winning of this scholarship will not preclude the holder from enjoying the proceeds of a further award.

The Leonard S. Klinck Fellowships—In honour of Dr. Leonard S. Klinck, President Emeritus of the University of British Columbia, six fellowships are offered annually to students proceeding to graduate studies and research at the University in a field of agriculture. The gift of Dr. H. R. MacMillan, these fellowships are open to Canadian citizens who are beginning and continuing studies toward the Ph.D. degree. Each fellowship has the value of \$3200 and is renewable for attendance at this University for two further years. A candidate must be a Canadian citizen, have an undergraduate average of at least 75% with first class grades in at least half his subjects, have a potential for research and investigation, and indicate, by his record, promise of success in advanced levels of study. In accepting the award, a candidate must agree to remain in Canada for a reasonable period following completion of his Ph.D. programme, if he is offered a suitable position.

The Law Society of British Columbia Fellowship—A fellowship up to \$3000, provided by the Law Society of British Columbia, is offered in competition to graduates or graduating students of the Faculty of Law, University of B.C., or of other Canadian Law Schools, who are proceeding to a full programme of graduate studies in a field of law at a recognized institution. The fellowship will not necessarily be offered every year, and when offered will be awarded only if there is a highly qualified applicant. Applications will be considered only from applicants who, on completion of their graduate programme, plan to pursue a career in law teaching, and who have outstanding academic and other qualifications. Each applicant must apply by letter, which must be received by the Dean of Inter-Faculty and Student Affairs, University of B.C., not later than March 15th. The letter must contain the essential details of the applicant's academic career to date, his proposed plans for graduate study, and the assurance of his willingness to join the Faculty of Law, University of B.C., if he is offered a position. Supporting documents, which the applicant must arrange to be forwarded, should include an official transcript of his academic record, and three confidential letters of recommendation from the dean and instructors of the Law School from which he has graduated or will graduate.

The Mabel Johnston Scholarship in Nursing—This scholarship, established through a bequest from Mabel Johnston, a graduate of Nursing '28, is offered to a student proceeding to the Master's degree in Nursing. The award will be made on the recommendation of the School of Nursing.

The Morris Belkin Prize—As on page 34.

The McLean Fraser Memorial Fellowships—Three fellowships of \$750 each, established as a memorial to Dr. McLean Fraser by a bequest from Clara A. Fraser, are offered to graduates of the University of British Columbia with high academic standing and demonstrated outstanding research ability in Zoology during their undergraduate years. They will be awarded for postgraduate study and research leading to a postgraduate degree in Zoology at this University or at a university or research foundation approved by the University of British Columbia.

The MacMillan Bloedel Fellowship in Forest Mensuration—This fellowship, the gift of MacMillan Bloedel Limited, provides \$5,000 annually for support of graduate studies in forest mensuration in the Faculty of Forestry at the University of British Columbia. A portion will be provided to the fellow, the balance to be used for equipment, materials and supplies essential to his research. The fellowship will be awarded to a candidate recommended by the Faculty of Forestry and approved by the University Scholarship Committee.

The MacMillan Bloedel Limited Scholarship—For research in wood chemistry, or on a subject with application to the pulp and paper industry, MacMillan Bloedel Limited offers annually a scholarship of \$1500, open to Honours graduates in Chemistry in the Faculty of Arts or Science, or graduates in Chemical Engineering in the Faculty of Applied Science. The topic of research will be chosen after consultation with the Department of Chemistry or Chemical Engineering of the University and MacMillan Bloedel Limited. Recipients must be qualified to undertake graduate and research work in respect of scholarship, research ability, personality, and health. Furthermore, if special aptitude is shown in carrying out this work, an equal amount may be offered for further graduate study and research in wood chemistry or a subject with application to the pulp and paper industry, in this or any other approved university.

The Macmillan Company of Canada Prizes in Creative Writing—As on page 23.

The Native Daughters of British Columbia Scholarship—A scholarship of \$200 is given by the Native Daughters of British Columbia to a Canadian-

born graduate student for research work in the early history of British Columbia, such work to be carried on in the Provincial Archives in Victoria, B.C.

The Norman MacKenzie Fellowships—In honour of Dr. N. A. M. MacKenzie, President Emeritus of the University of British Columbia, six fellowships are offered annually to students proceeding to graduate studies and research at this University. The gift of H. R. MacMillan, these fellowships are open to Canadian citizens who are beginning and continuing studies (i) toward the Ph.D. degree in the field of international relations, or (ii) toward the Ph.D. degree in the field of history, political science, or economics concerned with Canadian affairs, or (iii) toward a higher degree in the field of international law. Each fellowship has the value of \$3200 and is renewable for attendance at this University for two further years. A candidate must be a Canadian citizen, have an undergraduate average of at least 75% with first class grades in at least half his subjects, or, in the case of a graduate in Law, he must rank in the top ten percent of his class and have first or high second class standing in each subject. He must also have indicated a potential for research and investigation and promise of success in advanced levels of study. In accepting the award, a candidate must agree to remain in Canada for a reasonable period following completion of his Ph.D. programme, if he is offered a suitable position.

Northern Electric Graduate Research Fellowship—A fellowship of \$1500, the gift of Northern Electric Company Limited, Montreal, is available for graduate study at the University of British Columbia in the fields of Electrical Engineering, Engineering Physics, Physics, Physical Chemistry, Metallurgy and Applied Mathematics and preferably where thesis work can be expected to have implications for the communications industry. The accepted candidate must be a Canadian citizen or landed immigrant and a graduate of a recognized university.

Oppenheimer Bros. & Company Centennial Scholarship—As on page 39.

The Pacific Pine Co. Ltd. Scholarship in Forestry—A scholarship of \$300, gift of Pacific Pine Co. Ltd., New Westminster, is available for a student engaging in graduate study and research in Forestry at the University of British Columbia. It will be awarded on the recommendation of the Faculty of Forestry to a student who has a good scholastic record, and has shown special interest in and aptitude for the field of forest products. In making the award, consideration will be given to promise of ability in investigational and research work.

The Panco Poultry Research Awards—As on page 29.

The Pfizer Fellowship in Hospital Pharmacy—Through the generosity of Pfizer Co. Ltd., a fellowship of \$500 is open annually to graduating students in the Faculty of Pharmacy. This award will enable the winner to further his practical experience through one year of hospital pharmacy interneship. In the selection of the winner, consideration will be given to academic record and to interest in, and aptitude for, hospital pharmacy. Final selection will be made by the Faculty in consultation with the hospital concerned.

The Poulenc Fellowship in Applied Physiology—This fellowship of \$500, established by Poulenc Limited, Montreal, is offered to individuals interested in anaesthesiology and related fields in medicine who will engage in postgraduate training in physiology. The award will be made on the recommendation of the Faculty of Medicine.

The Queen Elizabeth Scholarships (University of British Columbia)— These scholarships, to the total of \$50,000, were donated by H. R. MacMillan, Esq., C.B.E., D.Sc., LL.D., in July, 1959, to commemorate the visit of Her Majesty Queen Elizabeth to British Columbia and to the University. The gift provides five graduate scholarships of \$1000 each, to be awarded annually for ten years, commencing in May, 1960. The awards will be made to students with high standing beginning or continuing graduate studies at the University of British Columbia.

The Richard Claxton Palmer Scholarship—This scholarship of \$400 is endowed by colleagues and other friends of the late Richard Claxton Palmer, B.S.A., M.S.A., D.Sc., Superintendent of the Experimental Station at Summerland and one time member of the Senate of this University, as a memorial to his private friendships, his public service, and his contributions in the field of science. It is offered to a graduate of the Faculty of Agriculture of the University of British Columbia who is proceeding to graduate study in this or any other approved university. Applicants should show evidence of scholarship and of ability to carry on investigation or research. In making the award, preference will be shown to a candidate engaged in continuing studies in horticulture or related fields of agriculture.

The Shane Fellowship—This fellowship of \$6000 annually is a gift of the Grand Chapter of British Columbia, Order of the Eastern Star. It is for postgraduate study and research in cancer. The fellowship is tenable at the British Columbia Cancer Institute in cooperation with the clinical departments of the Faculty of Medicine, and a candidate will be selected by a committee appointed by the Dean of the Faculty of Medicine and the Director of the British Columbia Cancer Institute.

The Sherritt Gordon Graduate Scholarship in Mineral Engineering—A scholarship of \$1000, gift of Sherritt Gordon Mines Limited, is offered annually to a student proceeding to a graduate degree in Mineral Engineering at the University of British Columbia. It will be awarded on the recommendation of the Head of the Department.

The Standard Oil (Indiana) Foundation Inc. Fellowship—A fellowship of \$2400 over 12 months plus tuition fees is offered to a student of high academic merit for graduate study and research in Engineering, Geology or Geophysics at the University of British Columbia. Preference will be given to an applicant whose project is in the field of the Petroleum Industry. Selection of the winner is made by the University.

The Standard Oil Company of British Columbia Limited Fellowship—For research the Standard Oil Company of British Columbia Limited offers a fellowship of \$1500 open to Honours graduates in Chemistry in the Faculty of Science or to graduates in Engineering in the Faculty of Applied Science. The topic of research is to be chosen after consultation with the Department of Chemistry, or the appropriate department in Engineering of the University, and Standard of B.C. Recipients must be qualified to undertake graduate and research work in respect of scholarship, research ability, personality, and health.

The T. Halpert-Scanderbeg Memorial Scholarship-As on page 35.

The Tina and Morris Wagner Foundation Fellowships.—These fellowships, established through a bequest from Mr. and Mrs. Morris Wagner, are offered to graduate students in the field of the humanities.

United Fishermen and Allied Workers' Union Scholarship in Fisheries—This scholarship of \$200, the gift of the United Fishermen and Allied Workers' Union, will be awarded annually to a student who is beginning or continuing postgraduate studies and research in the field of fisheries. The award will be made to a student who not only has a good academic

record, but has shown interest and promise in the field. In making the award consideration will be given to the financial circumstances of those who are eligible.

University Graduate Fellowships—A number of fellowships in the range \$2000-\$3000 are offered to graduates with first class records proceeding to the Ph.D. or Ed.D. degree, and in the range \$1200-\$2000 to outstanding graduates proceeding to a master's degree. Inquiries should be addressed to the head of the department concerned, by whom candidates must be nominated.

The Vancouver B'nai B'rith Hillel Foundation Scholarships—Vancouver B'nai B'rith Hillel Foundation will award two scholarships of the value of \$125 each in the winter session. The terms of the awards are as follows: these scholarships will be awarded to outstanding graduates of any of the four faculties—Arts, Science, Agriculture, and Applied Science. The winners shall indicate satisfactory plans for graduate study at the University of British Columbia or at any other university approved by the Joint Faculty Committee on Prizes, Scholarships, and Bursaries. Only one scholarship shall be available in any one faculty in one year.

The VanDusen Graduate Fellowships in Forestry—Two fellowships of \$3000 each, the gift of the W. J. VanDusen Forestry Fund, a fund of Vancouver Foundation, are open to students proceeding to advanced work in forestry leading to a higher degree. They are tenable for one year at the University of British Columbia, but may be renewed. If they are renewed for one or more years, the Dean of Forestry and the supervisor of studies may authorize the holders to pursue their studies further at another university or in another country. A candidate must be qualified to undertake graduate work in respect of scholarship, research, ability, character, health, and indicate special interest in problems of forestry in British Columbia. The field of research and the thesis will be arranged after consultation between the donor or his representative and the Dean of Forestry. Awards are normally announced by April 15th for the following session.

The Vancouver Women's Canadian Club Scholarship in Canadian History—As on page 35.

The Vancouver Sun Graduate Scholarship for Journalism—A scholarship of \$2500, the gift of The Vancouver Sun, is offered to graduating students or graduates of the University of British Columbia who, in the fall, intend to proceed to a full year's programme of study in an approved school or faculty of journalism, and who are planning a career in journalism in the newspaper field. The award will be made to a student who, in terms of ability and aptitude, experience, academic record, and proposed plans, is considered by the committee of selection to be best qualified. If, in the opinion of the Committee, no applicant is sufficiently outstanding, the award will be withheld. Each applicant must apply by letter, addressed to the Dean of Inter-Faculty and Student Affairs, University of B.C., Vancouver 8, B.C. In this letter he must (i) state his experience (if any) and interest in the newspaper field, outline his specific plans for the year of study and his future plans for a career in newspaper work; (ii) list the names and addresses of three references who are willing to write on his behalf. The letter of application must reach the University not later than March 15th. Evidence of acceptance by an approved school or faculty of journalism should also be supplied. If this acceptance has not been received by March 15th, the candidate should nevertheless submit his application by this date and file the letter of acceptance as soon as possible.

The Warner-Lambert Research Fellowship in Pharmacy-A fellowship of

\$1200, the gift of Warner-Lambert of Canada Limited, is offered annually for graduate study and research in the field of pharmacy. The winner will be selected by the Faculty of Pharmacy, with preference being given to graduates in Pharmacy of Canadian universities, and must enroll as a candidate for the degree of Master of Science in Pharmacy at this University. An additional \$300 will be paid to the Faculty toward the cost of materials and equipment required in the research undertaken.

The William Rea Scholarship in Television—A scholarship of \$1000 is offered annually by William Rea, Jr., vice-president of CHEK-TV Ltd., in honour of his father, a pioneer Edmonton educator. The scholarship is open to a University of British Columbia graduate or graduating student of either sex, who shows the greatest aptitude in terms of scholarship and extracurricular activity for a career in television through drama, music, writing, photography, engineering or business. The student may attend any recognized graduate school which will further his training in this area, and the scholarship may be renewed for one or more years in appropriate circumstances. Any graduate or graduating student interested should apply to the Dean of Inter-Faculty and Student Affairs by March 15th, and should request three or more instructors familiar with his work to supply confidential statements indicating his merits and their estimate of his ability to pursue work in one of the areas of television as outlined above. Definite details should be given as to the field of study in which the candidate desires to work.

Xerox of Canada Limited Centennial Fellowship—This fellowship, gift of Xerox of Canada Limited, is offered in the Faculty of Commerce and Business Administration for graduate study in the general area of business administration. The amount of the fellowship is \$5700, to be divided into stipend, tuition and supporting costs at the discretion of the University and the Faculty.

# Residence Fellowships

Dons and Resident Fellows will be appointed annually to positions at the Men's and Women's Residences (permanent) and at Fort Camp. While some of the Donships may be given to junior members of Faculty, students enrolled in the Faculty of Graduate Studies or taking professional training on the campus are eligible for appointment. Older undergraduates, particularly if they have had experience in dealing with young people, may also be considered. Resident Fellows will be appointed from among students in their senior year or in graduate courses.

Requests for application forms should be made to the office of the Director of Residences. Application should be made before May 1.

### SCHOLARSHIPS FOR UNDERGRADUATES

- 1. Scholarships and prizes are listed in the following order: General, Agricultural Sciences, Architecture, Arts, Commerce and Business Administration, Dentistry and Dental Hygiene, Education and Teacher Training, Engineering, Forestry, Home Economics, Law, Librarianship, Medicine, Music, Nursing, Pharmaceutical Sciences, Physical Education and Recreation, Rehabilitation Medicine, Science, Social Work, High School Graduation and Grade XIII, Extension and Miscellaneous, and Summer Session.
- 2. Awards listed under Arts or Science include not only those open to students taking courses leading to a B.A. or B.Sc. degree, but also those open to students taking preparatory courses for entrance to Architecture. Commerce, Dentistry and Dental Hygiene, Engineering, Forestry, Law, Li-

brarianship, Medicine, Nursing, Pharmaceutical Sciences, and Rehabilitation Medicine.

- 3. Attention of all students is drawn to the Government of B.C. and general awards described on page 17, to the Rhodes Scholarship, and other awards listed on pages 140-165. Attention of students in the graduating years is called to the awards listed on pages 140-152.
- 4. Most undergraduate scholarships and prizes are awarded automatically on the basis of merit or on nomination by departments, schools and faculties, and applications from students are not required. Students should apply only for those awards where the calendar description indicates that applications are necessaru.
- 5. Scholarships are normally tenable only at this University and in the regular winter session. Winners are required to continue in a full year's programme.

### GENERAL

Government of British Columbia Scholarships-These awards are available to students of the Province of British Columbia who are beginning or continuing a programme of undergraduate studies at the University of British Columbia. Students taking the one-year teacher training course for graduates, the course in Librarianship, and the course in Social Work are also eligible. Awards are not available for graduate study or for students registered as qualifying or unclassified. Candidates for awards applicable to the session 1968-69 were considered on the basis of standing received in the final examinations (excluding supplementals) in a full programme for the session 1967-68. Candidates in the University of British Columbia were required to take the final written examinations conducted by the University in April; those in Grade XII or XIII were required to write the scholarship examinations conducted in June by the Department of Education, B.C. Candidates were considered only if they fulfilled requirements of being domiciled in British Columbia, to the satisfaction of the Government Awards Committee. Eligible applicants who obtained First Class standing (an overall average of at least 80%) received a grant of three quarters of the tuition fee. Awards, amounting to one-half or one-third the tuition fee, were also made to the top Second Class students. All candidates were required to submit applications on special forms. Fuller and more precise details concerning these awards will be available in a special circular issued by the Department of Education, B.C. Students at the University of B.C. should consult the Dean of Inter-Faculty and Student Affairs. Secondary school students must apply through their schools before June 1st; University students must apply through the University before July 1st.

The Adelphian Scholarships—A scholarship or scholarships to the total of approximately \$1000, provided by a gift from an American donor, are offered to students from other countries beginning or continuing their studies as graduates or undergraduates at the University of British Columbia. The winners will be selected on the basis of academic standing, promise of success in their proposed programme of studies, and need for financial assistance. In particular they will be selected for studies which will be of benefit to their own countries in fields such as agriculture, forestry, medicine, dentistry, nursing and teaching.

The Alan Boag Scholarship—A scholarship of \$250, the gift of the trustees of a fund established by the late Alan Boag, is available for a student who in taking his major work in Commerce, History, Economics, International Studies, Law, Political Science, or Sociology and is proceeding to a further year of study at the University of British Columbia. This scholarship, which is open to graduates, or to undergraduates who have completed at least two years at the University, will be awarded for the best essay or report on some aspect of socialism. In making the award special consideration will be given for originality in analysis and treatment. The award will be made on the recommendation of Professor Walter D. Young, Department of Political Science. If no essay reaches the required standard, the award will be withheld. Students intending to compete for this scholarship must obtain the approval of their essay subject from Professor Young. Essays must be submitted not later than March 31st.

The Amy Woodland Scholarships—One or more scholarships of at least \$100 each have been provided by a bequest from the late Archibald Raworth. They will be awarded annually to students who are academically worthy and deserving and who are beginning or continuing studies at the University of B.C. Insofar as is practicable, the awards will be made to students who have for at least two years during school studies, attended the Amy Woodland School or the Central School at Cranbrook, B.C. Consideration will be given by the University to students recommended by the Board of School Trustees of School District No. 2, Cranbrook, B.C. Eligible students should apply by May 15th.

The Archibald Raworth Scholarships—One or more scholarships of at least \$100 each have been provided by a bequest from the late Archibald Raworth. The scholarships will be awarded annually to academically worthy and deserving students beginning or continuing studies at the University of B.C. Insofar as is practicable, the awards will be made to students who have for at least two year of school studies, attended a school in Cranbrook, B.C. Consideration will be given to candidates recommended by the Board of School Trustees of School District No. 2, Cranbrook, B.C. Eligible students should apply by May 15th.

The British Columbia Hotels Association Scholarships—Six scholarships of \$250 each, the gift of the British Columbia Hotels Association, are offered to students who are residents of British Columbia and who are beginning or continuing studies in the Second, Third, or higher Year of University work. Selection of the winners will be made by the University on the basis of scholastic standing, personal qualities, and interest and participation in student and community affairs. In making the awards financial circumstances of the candidates may also be considered.

The Canadian Armed Forces University Training Scholarships—Three scholarships of \$250 each, established by the trustees of the Combined Services Trust Fund, are offered to students undertaking officer training in the Canadian Armed Forces. To be eligible for the awards candidates must have completed at least the first phase of their practical summer training and be proceeding with their university studies. Winners will be selected by the Scholarship Committee of the University in consultation with the University Liaison Officer, on the basis of academic proficiency and on qualities of leadership as exhibited in the service training programme. The financial circumstances of candidates may, however, also be considered. If no candidate is considered to be sufficiently well qualified the awards may be withheld.

The Canadian Association of Geographers' Book Prize—An award will be granted annually to the graduating student who has specialized in geography and who has demonstrated the greatest proficiency in this subject.

CBC Prize in Playwriting and Documentary Writing-A prize of \$100, donated by the Canadian Broadcasting Corporation, is offered in competition to winter or summer students in any faculty, graduate or undergraduate, who are attending the University and have registered for a full programme of studies leading to a degree. The prize will be offered to a student who has shown unusual promise as a playwright or documentary writer (film, television, radio, or stage). At the discretion of the judges, the prize money may be divided between two applicants, or withheld if no application of sufficient merit is received. If the work is accepted by the C.B.C. for broadcast, an additional \$400 will be paid the recipient. Submissions must be original and must be designed to fill a half-hour programme or longer. The winning of the prize does not in any way obligate either the recipient or Corporation with respect to performance or production of the script. Submissions should be sent to the Chairman of the Creative Writing Department, Buchanan Building, no later than August 31st in any given year.

Cominco Scholarships—To assist in ensuring a continuing supply of qualified graduates in fields vital to industry in Canada, Cominco Ltd. has established a program of twenty-four two-year undergraduate scholarships at specified Universities. Four of these scholarships of \$800 per year, are available at the University of British Columbia. They are open to students who, in the fall, will enter the penultimate undergraduate year of a course leading to a degree in Honours Geology, Geological Engineering, Mining, Mineral Engineering, Metallurgy, Metallurgical Engineering, Chemical Engineering, Mechanical Engineering, Honours Chemistry, Soil Science, Agronomy. Students must apply to the University of B.C. by April 15th on forms obtainable from the Dean of Inter-Faculty and Student Affairs, University of B.C., Vancouver 8, B.C. Renewals for the second year will be subject to attainment of academic standards satisfactory to the Scholarship Committee of the University.

C. W. Deans Memorial Scholarship—A scholarship of \$100, established by the Women's Auxiliary to the Canadian Paraplegic Association, B.C. Division, is offered annually to paraplegic students, or sons and daughters of paraplegics. This scholarship will be available to a student beginning or continuing studies in one of the Universities in British Columbia. Preference will be given to a student beginning or continuing his studies in Engineering. The award will be made to a student with a good academic record.

The Daniel M. Young Memorial Scholarship—In memory of Daniel M. Young (B.A., 1952), who tragically lost his life in December, 1967, the Friends of the University of British Columbia Incorporated, in co-operation with his wife, have established a scholarship of \$500 to be awarded in the fall of 1969. This scholarship will be awarded to a student whose home is in the United States and who is beginning or continuing studies at the University of B.C. The award will be made on the basis of personal qualities and academic standing.

The D. F. MacKenzie Scholarship-A bequest from the late Donald Fraser MacKenzie provides scholarships to the total value of \$1000 annually. Under the terms of the bequest the University annually makes awards to one or two students proceeding to the Final Year of Arts, Science, or Medicine, the awards to be based upon academic standing and individual need, with preference in favour of deserving students proceeding to a career in theology or Medicine.

The Dilworth Prize in English—A book prize, to the value of approximately \$50, established by the late Dr. Ira Dilworth and augmented in honour of his memory by friends, will be awarded annually to the student who obtains the highest standing in Second Year English (English 200).

Dr. MacKenzie American Alumni Scholarships and Bursaries—Ten scholarships and/or bursaries of \$500 each, gift of the Friends of the University of B.C. Inc., are available for the academic year 1969-70 to students who are residents of the United States and who are beginning or continuing studies at the University. Selections will be made on the basis of personal qualities, academic standing and promise. Preference will be given to candidates who are sons or daughters of U.B.C. Alumni. Application on the appropriate scholarship application form must be submitted to Dean Walter H. Gage, University of British Columbia, Vancouver 8, B.C., not later than May 31st.

Dr. Yun-I Ssu Memorial Prize—A prize of \$50, provided by the income from the Dr. Yun-I Ssu Memorial Fund established by friends of the late Dr. Yun-I Ssu (Ph.D. in Metallurgy, University of B.C., 1960), will be awarded to the overseas student of Chinese ancestry with the highest scholastic standing in a year preceding his or her final year in attendance.

The Ernestine A. M. E. Kania Memorial Scholarship—This scholarship of \$200, donated by Dr. and Mrs. J. E. Kania as a memorial to Dr. Kania's mother, Mrs. Ernestine A. M. E. Kania, is open to graduates or undergraduates for study and investigation in the field of geochemistry. The award will be made to a student with good academic standing and promise of ability in research. Selection of the winner will be made by the Scholarship Committee on the recommendation of Dr. H. V. Warren.

The E. V. Young Memorial Prize—This prize honours the memory of E. V. Young, who was highly esteemed for his contributions to radio and theatre in the fields of music and drama and is affectionately remembered by members of the University Musical Society in the years 1932-1954, not only for his professional skill, but also for his untiring efforts and his kindly and friendly encouragement. Donated by Dr. Maurice D. Young, this prize of \$50 will be awarded to an undergraduate who is taking his major work in Theatre at this University, who has good standing and has maintained an active interest in music or drama on the Campus. If, in any year, no student is sufficiently well qualified, the award will be withheld.

The Fern Cochrane James Scholarship—This scholarship of \$120, in memory of Fern Cochrane James, will be awarded annually to the woman student obtaining the highest standing in the First Year course in English.

The Frank de Bruyn Memorial Prize—As a memorial to their son, Frank de Bruyn, a prize of \$150 is offered annually by his parents. This prize will be awarded to the most promising undergraduate student in 17th-century English literary studies, as at present covered by the courses English 370 and 375.

The Gilbert Tucker Memorial Prize—An annual prize of \$25 is offered by Dr. and Mrs. Sydney M. Friedman in memory of Gilbert Tucker (1898-1955), who served this University as scholar, historian and teacher. It will be awarded to the leading student in the field of the French in North America enrolled in History 531, 532, or 533.

The Gordon H. Woodward Memorial Scholarship—This scholarship has been established by friends in memory of Gordon H. Woodward who, during the two decades before his death in 1966, contributed fiction to the best periodicals in Canada, England, Australia and the United States, and whose dedication to writing as an art is well-known here and abroad. In the amount of \$50 annually it will be awarded by the Department of Creative Writing to a student with a good academic record who has shown ability and promise in the writing of fiction.

The Guenther Felix Sanders Scholarships—These scholarships, provided by

the income on a bequest from the late Guenther Felix Sanders, are available to students at the University of British Columbia, who are honouring or majoring in Mathematics or Applied Science and who are also the sons or daughters of members of the Knights of Pythias residing in British Columbia. Students must apply by May 15th on the appropriate scholarship form obtainable from the Dean of Inter-Faculty and Student Affairs, University of British Columbia. Basis of selection will be academic standing, but financial need may be a factor. Awards will be made on the recommendation of the University, in consultation with the Royal Lodge No. 6, Knights of Pythias, to the Trustees, whose approval is necessary and who are empowered to determine from time to time the amounts and conditions of these awards.

The Helen Badenoch Scholarships—A bequest from Ida Helen Badenoch provides annually two scholarships of \$300 each, one for the most proficient student in a field of public health, and the other for the most proficient student

in a field of journalism or in a field related to journalism.

The H. R. MacMillan Scholarship—In honour of the outstanding contribution made to the Bank by H. R. MacMillan, Esq., C.B.E., D.Sc., LL.D., formerly a Vice-President and Director, Canadian Imperial Bank of Commerce has established a scholarship to enable employees to attend the University of British Columbia. The applicant must have a minimum of two years' service with the Bank and meet the admission requirements of the University, which will select the winner. Subject to satisfactory standing, the winner will receive annual scholarship aid to enable his or her completion of a degree program.

The Hugo E. Meilicke Memorial Fund—This fund was established by the late Hugo E. Meilicke who, for many years, gave distinguished service to the community through his business associations and through active participation in organizations such as the Kiwanis Club, the Salvation Army, the Vancouver Foundation, the Crippled Children's Hospital, the Vancouver Art Gallery, and the Vancouver Symphony Society. The annual income provides scholarships in various fields, such as agriculture, political science, commerce, fine arts, and music. The awards will be made on the recommendation of the Joint Faculty Committee on Prizes, Scholarships, and Bursaries.

The Imperial Order Daughters of the Empire Scott Memorial Scholarship This scholarship of \$100, derived from an endowment founded by the Imperial Order Daughters of the Empire of the City of Vancouver, in memory of Captain Robert Falcon Scott, R.N., the Antarctic explorer, who sacrificed his life in the cause of science, will be awarded to a Third or Fourth Year student who combines high standing in Biology 334 with promise of service in the Commonwealth.

The International House Prize—A book prize will be awarded annually to the student of International House, University of British Columbia, who has made the greatest contribution to the aims and purposes of International House. Criteria in the selection will include initiative and ability in promoting activities, leadership, and academic qualifications.

The International Longshoremen's and Warehousemen's Union Undergraduate Scholarships—Three scholarships of \$250 each are offered to members, and sons and daughters of members, in good standing, of the Intermational Longshoremen's and Warehousemen's Union. They are open to students in attendance at the University of B.C., the University of Victoria, or Simon Fraser University who will continue in a full programme of studies in the next session in an undergraduate faculty. These scholarships will normally be awarded to the candidates with highest standing as determined by the results of the Final Sessional Examinations conducted in

April by the named universities. Candidates must notify the Dean of Inter-Faculty and Student Affairs, University of B.C., by May 1st of their intention of competing. The donors reserve the right to withhold awards if the academic standing of candidates is not sufficiently high or to re-award scholarships if winners receive other scholarships of substantial value. (See also page 26, Thomas P. Mayes Scholarship.)

International Nickel Scholarship-The International Nickel Company of Canada, Limited annually provides one scholarship to students entering the University of British Columbia for studies in Engineering, Geology, Geophysics, Mathematics, Physics or Chemistry, with preference being given to Mining or Metallurgical Engineering (when applicable). Awards are renewable for three additional academic years or until graduation, whichever is the shorter period, provided satisfactory standing is maintained. Valued at \$1,200 annually, each scholarship provides for tuition and fees, a \$300 living allowance, and a grant of up to \$500 to the University as a cost-of-education supplement.

The Jean Craig Smith Scholarship—The Jean Craig Smith Scholarship of \$500, provided by the income on a bequest from the late Jean McIntosh Smith, is awarded annually to a student in attendance at the University of British Columbia in any year and faculty. Selection of the winner will be made on the basis of academic ability, character and personal qualities, participation in community and student affairs, and evidence of leadership.

I. K. Campbell & Associates Limited Scholarship—A scholarship of \$350, the gift of J. K. Campbell & Associates Limited (Edmonton, Calgary, and New Westminster) will be awarded to a student with an outstanding academic record who is continuing his studies in the following session.

The Joseph A. Crumb Book Prize—A book prize, established by the students and friends of Professor Joseph A. Crumb, will be awarded annually to the student submitting the graduating essay judged to be the best in the field of money and banking and related fields.

The Joseph David Hall Memorial Scholarship—As a memorial to Joseph David Hall, a scholarship has been established by his parents, Mr. and Mrs. Joseph C. Hall. In accepting this award, the University pays tribute to a brilliant student, whose scholarship, sportsmanship, personal qualities, and courage in adversity won the admiration of all who knew him. In the amount of \$500, it will be awarded annually to a student beginning or continuing studies in a full course leading to a degree in any field. First preference will be given to a candidate nominated by the B.C. Division of the Canadian Paraplegic Association, but should no suitable nomination be received it will be awarded to a student with an outstanding academic record.

I. W. Gehrke Memorial Scholarship—This scholarship of \$100 will be awarded to a deserving undergraduate at the University of British Columbia.

The Kapoor Singh Scholarships-Through the generosity of the Kapoor Singh Siddoo Foundation, the amount of \$500 is offered annually for scholarships of \$250 each, for two students in attendance at this University. Of these scholarships, one will be available to an East Indian student, either from India or living in Canada, or to a Canadian of East Indian origin, and the other to the student body at large. The awards will be made to worthy students who (a) are deserving of assistance; (b) have high academic standing (with First Class Honours); and (c) have good character. If, in any year, no East Indian student can qualify, the scholarship money, or the residue thereof, will be placed in a trust fund and will be granted in the succeeding year or years to one or more East Indian students in the amount of \$250 or more.

The Karen Elaine King Memorial Scholarship-This scholarship is given by Mr. and Mrs. F. E. King of Calgary in memory of their daughter, Karen Elaine, who attended this University in the session 1959-60. In the amount of \$350, it will be awarded to a student who is outstanding with respect to personal qualities and academic record, and who is worthy and deserving of financial assistance. This scholarship is open to students who have completed the First Year of studies in a full programme leading to a degree and are continuing in the next higher year.

The Kinu Uchida Memorial Scholarship-As a memorial to Mrs. Kinu Uchida, who arrived in Canada in 1889 at the age of seventeen and who died in 1967 at the age of ninety-five, this scholarship has been established and endowed by her son, Dr. M. Uchida. At present in the amount of \$250 annually, it will be awarded to a student with outstanding ability in any year and faculty, subject only to the stipulation that the student selected each

year to receive the award shall be of Japanese ancestry.

The Macmillan Company of Canada Prizes in Creative Writing-Two prizes of \$100 each, the gift of the Macmillan Company of Canada, Publishers, will be awarded for the best original short story and the best original poem, respectively, written by an undergraduate or graduate student while enrolled in the University. The awards will be made on the recommendation of the Head of the Creative Writing Department, in consultation with the Committee on Prizes and Scholarships, Entries must be submitted to the Head by April 1st.

The Mary Stewart MacInnes Memorial Scholarship—A scholarship of \$350. established by W. H. MacInnes, Esq., of Vancouver, in memory of his mother, Mary Stewart MacInnes (1841-1936), is offered annually to a student in the Faculty of Arts, Applied Science, Agriculture, Forestry, or Science, who is completing the third of the first three years of University work. In choosing the winner, consideration will be given, not only to scholastic standing but also to achievement in the field of student government and in athletics, and either to participation in military or other training or service units on the campus or to special interest in German studies.

The Mrs. H. R. MacMillan Scholarship and Bursary Fund—The annual income from a bequest by Mrs. H. R. MacMillan provides scholarships and bursaries to enable deserving women students with good academic standing to begin or continue attendance at the University of B.C. In making awards the Scholarship Committee of the University will give special preference to those whose circumstances make it necessary to be self-supporting.

The Nancy Ryckman Scholarship—Out of the proceeds of a fund bequeathed to the University by the late Nancy E. Ryckman, a scholarship of \$400 will be awarded annually to a student beginning or continuing a course of study at the University. This scholarship will be available only to students who have completed Senior Matriculation and who attended school in East Kootenay, British Columbia, for three years, of which two years must have been immediately prior to entrance to the University. It is the expressed wish of the donor that the scholarship be awarded to young men or women who require aid in obtaining a university education and that, in making the award, consideration be given to character and intellectual promise. Applications, on forms available at the office of the Dean of Inter-Faculty and Student Affairs, must be received not later than May 31st.

The Rayonier Canada (B.C.) Limited Special Scholarship—A scholarship of \$500, the gift of Rayonier Canada Limited, is offered annually to sons and daughters of employees of the Company in attendance at the University. The award will normally be made to the student obtaining the highest standing in the First Year of University work and proceeding to further undergraduate study. If, in the opinior of the University, however, no student in the First Year obtains sufficiently high standing, the scholarship will be similarly offered to an eligible student in the Second, Third, Fourth and higher years, in that order. Candidates who are eligible for this award should submit their names and details of family service with the Company to the Dean of Inter-Faculty and Student Affairs not later than April 30th.

The Retail Food and Drug Clerks Union, Local 1518, Scholarships—The Retail Food and Drug Clerks Union, Local 1518, offers three scholarships of \$350 each to students beginning or continuing studies in a full academic programme of studies at the University of B.C., University of Victoria, or Simon Fraser University. The awards will be made to the applicants with the highest standing in the final examinations. Students entering from Grades XII or XIII must write a full set of examinations conducted in June by the Department of Education. To be eligible a candidate must be a member, or the son, daughter, or legal ward of a member of the Union in good standing. Those who wish to be considered must give full details of their own or their parents membership in the Union. Applications must be made on the appropriate Application Form for Scholarship, which may be obtained from, and must be returned to, the Dean of Inter-Faculty and Student Affairs, University of B.C. The last day for receiving applications is June 1st. Two awards are available for students entering university and one for students continuing their university studies.

The Robert Lorne Stanfield Book Prize in Political Science—A book prize of the value of \$65 annually will be awarded on the recommendation of the Department of Political Science to a student with an outstanding record in this field of study. This award was provided by individual donors on the occasion of Mr. Stanfield's first official visit to British Columbia as Leader of the Opposition.

Ruth E. Cameron Memorial Scholarship—A scholarship of \$250, the gift of the University Women's Club of New Westminster, will be awarded annually to a woman student for undergraduate or graduate studies at the University of B.C. in Vancouver. In making the award, consideration will be given to the motivation, scholastic standing, and the financial circumstances of the applicants, and to their interest and participation in school or community affairs. Applicants from secondary school must write the Government Scholarship Examinations conducted in June. The academic standing of candidates for this award will be based on the written examinations at University or, in the case of secondary school students, on the Government Scholarship Examinations conducted in June.

The Scandinavian Businessmen's Club Scholarship—The Scandinavian Businessmen's Club offers a scholarship of \$250 to a student of Scandinavian (Danish, Icelandic, Finnish, Norwegian or Swedish) parentage on the paternal side, continuing studies at this University in any recognized courses leading to a degree. The winner will be selected by the University on the basis of academic standing and with some consideration of the need for financial assistance.

The Sherwood Lett Memorial Scholarship—To honour the memory of the late Chief Justice Sherwood Lett, C.B.E., D.S.O., M.C., E.D., Q.C., B.A., LL.D., an annual scholarship, at present in the amount of \$1500, has been endowed by alumni, faculty and staff, students, colleagues, and friends. Open to students, both men and women, in attendance at this University, this scholarship pays tribute to an outstanding graduate who rendered distinguished service to the University, to his profession and, both in war and peace, to his country.

It will be awarded annually to the candidate who most fully displays the all round qualities exemplified by the late Sherwood Lett. The selection will be made, by a special committee, from candidates nominated by faculties and designated student organizations. In assessing the merits of candidates, this committee will be concerned with qualifications such as those for which Sherwood Lett was distinguished—high scholastic and literary attainments, physical vigour (through active interest in sports), moral force of character, and ability to serve, work with, and lead others. Full details are given in a brochure which may be obtained from the Dean of Inter-Faculty and Student Affairs.

The Sons of Norway Scholarships—The British Columbia Sons of Norway offer three scholarships of \$300 each to students attending a University in British Columbia and proceeding to the second final or the final year of a full programme leading to a degree. To be eligible a candidate must be (a) a member of a British Columbia Sons of Norway Lodge, or (b) the son or daughter of a member of such a Lodge. Application must be by letter, addressed to the Sons of Norway Scholarship Committee, c/o Dean Walter H. Gage, University of B.C., Vancouver 8, B.C. The letter of application must (1) indicate the applicant's eligibility with respect to (a) or (b) above, together with a receipt from the secretary of the Lodge concerned; (2) give details of the applicant's course of study, reasons for applying, and future plans for a career; (3) be accompanied by official transcripts of the applicant's high school and University records. The applicant must also arrange for one or more confidential testimonials to be forwarded, preferably from faculty members acquainted with the applicant's character and personal qualities, interests, and ability as a student. Applications must be submitted by August 1st. Successful applicants will be chosen by a special Committee.

The T. E. and M. E. Ladner Memorial Scholarship-An annual scholarship of \$550, derived from a capital sum as a permanent memorial endowment, and given by Dr. Leon J. Ladner, O.C., and family in memory of his parents, Thomas Ellis and Minnie E. Ladner, is offered to a student whose home is in Delta Municipality of the Lower Fraser Valley. To be eligible for this scholarship an applicant must have high scholastic standing. In making the award, however, consideration will be given to character and financial need. The scholarship is open to students who are eligible for entrance to and will attend the University or are in any year of any faculty. If, in any year, no applicant can meet the scholastic requirements of the University, the award may be withheld. In such case, two awards will be made in a subsequent year. Applications, on forms available at the office of the Dean of Inter-Faculty and Student Affairs, must be received not later than May 15th.

The Thea Koerner Memorial Scholarship—A scholarship of approximately \$500, established by her friends in memory of Thea Koerner and in recognition of her most generous encouragement of the arts at the University and in British Columbia, will be awarded annually, upon the joint recommendation of the Departments of Fine Arts, Music and Theatre, to a full-time student regularly enrolled in one of these Departments and proceeding to a degree, whose past performance and future promise qualify him as the most suitable recipient of the award.

Theta Chapter of Phrateres Scholarship—A scholarship of \$75, established by Theta Chapter of Phrateres, will be awarded to a member of the organization who has attained good academic standing and who, by her active participation and qualities of leadership, has made an outstanding contribution to Phrateres. Candidates will be nominated by a nominating committee of Phrateres. The winner will be selected by the University on

the basis of April marks. The award will be presented at the Pledging Ceremony held in October or November. The winner will not be precluded from holding other awards.

The Thomas and Evelyn Hebb Memorial Scholarship—In recognition of the part played in the development of this University by Professor Thomas Carlyle Hebb, until his death, and by his wife, Evelyn Hebb, herself a distinguished scholar, and in commemoration of their interest in the progress of students, their son and daughters have endowed a scholarship of the value of \$450 per annum, open to students of any faculty who are specializing in Physics. The award will be made, on the recommendation of the Department of Physics, to a student in the upper undergraduate years or in the graduate school who has an outstanding academic record, desires to proceed with further work at this University, and shows promise of continuing ability in his chosen field. If the award is made at the undergraduate level, it may be divided between two candidates of equal merit.

The Thomas P. Mayes Scholarship—In memory of Thomas P. Mayes, who until his death in 1968, served as secretary of the Union, the International Longshoremen's and Warehousemen's Union offers an undergraduate scholarship of \$250 to members, and sons and daughters of members, in good standing. The terms and conditions of award are the same as for the three International Longshoremen's and Warehousemen's Union Undergraduate Scholarships, described on page 21.

The Thorleif Larsen Memorial Scholarship—This scholarship of \$100, established in honour of Professor Thorleif Larsen, a member of the English Department of the University of British Columbia from 1919 to 1958, will be awarded annually to the leading student in English 200.

UBC Alumni Association National Scholarships—The Alumni Association of the University of B.C. offers four scholarships of \$1000 each (payable \$500 a year for two years), one in each of the regions Maritimes, Quebec, Ontario, Prairies. These scholarships are open in competition to Canadian citizens who are entering the University of B.C. for the first of their two final years leading to an undergraduate degree, and whose previous University studies up to this level have been taken at a recognized University or College in one of these regions. Applicants will be considered on the basis of high academic standing, outstanding achievement in extra-curricular activities, and personal qualities. Further information may be obtained from the UBC Alumni Association, University of B.C.

U.B.C. Branch No. 72 of the Canadian Legion, B.E.S.L., Scholarship Fund—This fund was established in September, 1951, by the University of British Columbia Branch No. 72 of the Canadian Legion of the British Empire Service League, in recognition and appreciation of the University's contribution to the education and rehabilitation of veterans of World War II. By agreement between the University and West Point Grey Branch No. 142 (which undertook to act for Branch No. 72 when it disbanded), the University makes an annual grant, administered by the Joint Faculty Committee on Prizes, Scholarships, and Bursaries, to provide scholarships, prizes, bursaries, and loans for former members of the armed forces or their dependents. Special preference is given to the children of those killed or wounded in action, and to service disability pensioners generally. In the event of there being no applicants with the above qualifications, awards may be made to members of the student body at large.

The United Nations Prize—A prize of \$50, made possible by a gift of \$1000 from the late Annie Bruce Jamieson, B.A., LL.D., is offered annually

to the student on the campus who, during the session, makes the most significant contribution toward furthering an understanding of the aims and objects of the United Nations. If, in any year, no student qualifies, the award may be withheld.

The University Essay Prize—A book prize of the value of \$25 will be awarded to a student in the final undergraduate year for the best essay presented in any of the courses regularly given by the Department of English.

University Great War Scholarships—Two scholarships of \$200 each may be awarded, on the basis of the work of the First Year in Arts, Science or Agriculture, to ex-servicemen, their dependents, and the children of deceased ex-servicemen, proceeding to a higher year in any faculty.

The Vancouver Natural History Society Prize—A prize in the form of a book to the value of \$50, the gift of the Vancouver Natural History Society, is offered to the best student in Fourth Year Botany.

The Vancouver Estonian Society Scholarship—A scholarship of \$100, established by the Vancouver Estonian Society to commemorate the Canadian Centennial Year and the Fiftieth Anniversary of the Republic of Estonia, will be awarded to a student beginning or continuing a course of study at the University of British Columbia. To be eligible a candidate must be a member, or the son or daughter of a member, of the Vancouver Estonian Society. Application must be made to Dean Walter H. Gage, University of British Columbia, Vancouver 8, B.C. and must be received not later than June 30th. Applicants entering from secondary schools should apply on the "General Application for University Entrance Scholarship Form" and others on the "Undergraduate Scholarship Application Form", both of which may be obtained from Dean Gage's office. Applicants will be considered on the basis of academic standing, personal qualities, and need for financial assistance.

The Vancouver Police Force Scholarships—As on page 95.

The Walter C. Koerner Scholarships—Ten scholarships of \$250 each, the gift of Walter C. Koerner, Esq., C.C., LL.D., will be awarded annually to students selected by the Scholarship Committee of the University. The basis for awarding these scholarships will be outstanding academic merit.

The Walter H. Gage Scholarship—This scholarship of \$500 was established in 1968 by the Board of Governors. The award will be made each year for ten years, beginning in 1969, to a student with a first class academic record and outstanding qualities of character.

The W. H. MacInnes Scholarship in Greek—This scholarship, in the amount of \$300, the gift of Mr. W. H. MacInnes of Vancouver, will be awarded annually to the outstanding student completing Greek 200 who is continuing undergraduate studies in a programme including an advanced course or courses in Greek.

The William Eugene MacInnes Memorial Scholarship—A scholarship of \$350, established by Mr. and Mrs. W. H. MacInnes of Vancouver, in memory of their son, William Eugene MacInnes (1912-1934), a graduate of this University in a combined course of Arts and Science and Mining Engineering, is available annually for a student in Arts, Science or Applied Science who is completing the third of the first three years of University work. In choosing the winner, consideration will be given, not only to scholastic standing, but also to achievement in student government and in athletics, and to participation in military or other training or service units on the campus.

In Agricultural Sciences

The Agricultural Pesticide Society Prize—A cash prize of \$25 will be

awarded by the Agricultural Pesticide Society to the undergraduate student in the Faculty of Agricultural Sciences presenting the best research project in the Plant Protection Option.

The A. J. Mann Scholarship in Horticulture—This scholarship of \$100, established by Mrs. A. J. Mann to honour the memory of her husband, a research scientist in horticulture, is offered annually to students continuing their studies at the University of British Columbia in the field of horticulture. It is open to any student entering this field, but first preference is given to students who are graduates of Summerland Secondary School. Although the scholarship is available to students proceeding to a higher year, preference will be given to a student entering the First Year. The award will be made on the recommendation of the Faculty of Agricultural Sciences.

The British Columbia Fruit Growers' Association Golden Jubilee (1939) Scholarship—This scholarship, of the annual value of \$250, donated by the British Columbia Fruit Growers' Association, will be awarded to a student taking the horticultural options of the Third Year. To qualify for this scholarship candidates must obtain scholarship standing, not only in horticultural subjects, but also in the work of the year, and must be proceeding to the horticultural course of the Fourth Year—the year in which the scholarship shall be enjoyed.

The Butler Brothers Scholarship in Agricultural Engineering or Mechanics as on page 48.

The David Thom Scholarship—A scholarship in Agricultural Sciences of \$150 will be awarded to a student proceeding to a higher year in that Faculty, the award to be based on the work of the Second Year.

The David A. McKee Scholarship—A scholarship of the annual value of \$240, established by a bequest from the late Dr. D. A. McKee, will be the award to be based on the work of the Second Year.

The Dean B. A. Eagles Book Prizes—These prizes are awarded annually for outstanding achievement in the essay and other requirements, and for leadership, in the course Agriculture 300 (Field Trip).

The Dean Blythe Eagles Medal—This medal, in honour of Blythe A. Eagles, was established by former students in June, 1967, on the occasion of his retirement as Dean of the Faculty of Agriculture. It serves to pay tribute to his outstanding personal qualities and, especially, to express the gratitude of those whom he helped, in their scientific careers, through his advice, direction, and inspiration. It will be awarded annually to a student in the graduating year in Agricultural Sciences who, in the opinion of the staff, has best been able to combine good academic standing with outstanding contributions in student or community affairs.

The Dr. D. A. McKee Memorial Prize—A cash prize of \$50 established from the income of a trust fund donated by the late Mrs. D. A. McKee in memory of her husband, will be awarded annually to the student with the highest standing in the Third Year of Agricultural Sciences, who is proceeding to the Fourth Year.

The Dr. G. F. R. Barton Memorial Scholarship—In recognition of the private friendships, public service, and contributions of Dr. G. F. R. Barton in the field of veterinary science, this scholarship-bursary of \$100 was established and endowed in July, 1958, as a memorial by his friends in the Chilliwack area. It will be awarded annually to a British Columbia student who has good standing in the First Year of the pre-Veterinary course at the University and is proceeding to the next year. In making the award, considera-

tion will be given to the financial circumstances of eligible candidates. Applications must be submitted by April 30th.

The Gillmor and Roderick Morrison Memorial Scholarship—This scholarship, of annual value of \$100, was established and endowed by Mr. and Mrs. A. B. Morrison as a memorial to their sons, Gillmor Innis Morrison and Roderick Norman Morrison, who attended the University during the session 1929-30. This scholarship will be awarded annually to a student in the Faculty of Agricultural Sciences who has shown proficiency in the Third Year in the field of genetics and is continuing his studies in the Final Year.

General Foods, Limited, Food Science Scholarship-A scholarship of \$500 a year for two years is offered to an undergraduate student entering the Third Year. It will be awarded to a student in the field of food science who has good academic standing.

Hoffmann-La Roche Prize in Animal Nutrition-A prize, the gift of Hoffmann-La Roche Limited, Montreal, will be awarded for the best graduating essay or Master's thesis in the field of Animal Nutrition. The award will be made on the recommendation of the Dean of Agricultural Sciences.

The Nabob Scholarships in Food Technology—Two scholarships of \$500 each are given annually by Nabob Foods Division of Kelly, Douglas & Co. Limited, Vancouver, to students in the Faculty of Agricultural Sciences. One of these scholarships will be open to students entering the Third or the Fourth Year of the course in Food Technology and the other will be open to students completing the Fourth Year of the course in Food Technology and proceeding to the Fifth Year. To be eligible for these scholarships the recipients must have high standing and indicate special interest in this highly important field. They will be selected on the basis of scholarship, research ability and personal qualities. If no student qualifies for one of these awards they may both be given to students in the same year of the course. During the summers between successive years of their undergraduate course the winners will be given the opportunity of employment with the Company, which offers the possibility of an attractive career on graduation. Students interested in being considered for these awards should consult the Dean of Inter-Faculty and Student Affairs not later than March 1st. Dependents or relatives of employees of the Company are specially invited to apply.

The Panco Poultry Research Awards-Through the generosity of Panco Poultry Ltd., research awards to the total of \$500 are offered annually to graduates or undergraduates in poultry science for research and investigation in the fields of poultry nutrition, physiology, genetics and products technology. The awards will be made by the Scholarship Committee on the recommendation of the Chairman of the Division of Poultry Science.

The Stanford and Iris Wainwright Memorial Scholarship—This scholarship, endowed by Iris Violet Wainwright in memory of her husband, Stanford Wainwright, serves to recognize his general interest in the field of agriculture and his special interest in the breeding of Jersey cattle. In the amount of approximately \$150 annually, it will be awarded to a student in the Third or a higher year of Agriculture who has good academic standing and is pursuing studies or research in the selection or breeding of dairy cattle.

University Scholarship in Agriculture—A scholarship in Agricultural Sciences of \$200 will be awarded to a student proceeding to a higher year, the award to be based on the work of the First Year.

Western Vinegars Centennial Scholarship (donated by Canada Vinegars Limited)—This scholarship of \$250 is offered annually in competition to undergraduates who have completed the first two years of the course leading to the degree of Bachelor of Science in Agricultural Sciences and are continuing in the Third Year of the programme in this Faculty. It is open to students who, after graduation, propose to engage in careers related to production agriculture. In selecting the winner, the Faculty of Agricultural Sciences will consider the candidates' academic standing, interest in a career in agriculture, character, and qualities of citizenship.

#### In Architecture

The Architectural Institute of British Columbia Scholarship—A scholarship of \$250, the gift of the Architectural Institute of British Columbia, will be available to a student entering First Year Architecture. The award will be made to the student entering with the highest marks as determined by the average on the written examinations of Arts and Science at the University of British Columbia. To students of the Institute other assistance may be available from the Institute to assist them to attend the First Year in Architecture at the University of British Columbia.

The Architectural Institute of British Columbia Prizes—Prizes to the total of \$200, given annually by the Architectural Institute of British Columbia, are available for leading students in any year of Architecture. These prizes, which consist of books and an award of merit, will be awarded to the student in any year showing outstanding ability in architectural design and obtaining high academic standing. If, in any year, no student obtains a sufficiently high standing, the awards may be withheld.

The Bapco Scholarship in Architecture—A scholarship of \$500, the gift of Bapco Paint Ltd., with British Columbia offices in Victoria and Vancouver, is offered to students of architecture at this University. This award is offered to students who are entering the final undergraduate year of the course leading to the degree of B.Arch. The scholarship will be awarded to the student with the most outstanding over-all record in the previous year. The winner is not permitted to hold other scholarships.

The Canadian Pittsburgh Industries Scholarship—A scholarship to the value of \$250 will be awarded annually by Canadian Pittsburgh Industries Ltd., to a student in the Second Year of Architecture. The award will be made to the student submitting the best solution of an architectural problem proposed by the Staff of the School of Architecture in conjunction with the Company. The award will be made on the recommendation of the School.

The McCarter, Nairne & Partners Scholarship—A scholarship of \$400, provided by a gift from McCarter, Nairne & Partners, Architects, will be awarded annually to the student in Second Year Architecture obtaining the highest standing.

Northwest Plaster Bureau Scholarship—A scholarship of \$250 is offered by the Northwest Plaster Bureau to the student, entering the Final Year, who is considered by the faculty of the School of Architecture to be outstanding in his or her progress towards the profession of Architecture and devotion to good practices in building design and construction, and who indicates that he or she proposes to continue in the profession of Architecture after graduation.

Pan-Abode Scholarship in Architecture—A scholarship of \$500, the gift of Pan-Abode Buildings Ltd., is offered annually to a student entering Final Year of the course leading to a degree of B.Arch., who received one of the highest aggregate standings in the previous years of the course and shows outstanding promise in his future professional career.

#### In Arts

The Ahepa Prize—A prize of \$100, gift of Gladstone Chapter No. C. J. 6, Order of Ahepa (Anglo Hellenic Educational Progressive Association), will be awarded annually to the student in the Third or Fourth Year with the most outstanding record in Greek.

The Alan Boag Scholarship—As on page 17.

The Alice H. Shelton Scholarship—A scholarship of approximately \$100, made possible by a bequest from the late Alice H. Shelton, will be awarded annually to an undergraduate student for proficiency in the field of German studies.

The Beverley Cayley Scholarship—A scholarship of \$100, in memory of Beverley Cayley, Arts '18, given under the terms of the will of his mother, the late Mrs. H. S. Cayley, will be awarded to the male student standing highest in English 100 in the First Year of the Faculty of Arts or Science.

The Brissenden Scholarship—A scholarship of \$350, given by P. R. Brissenden, Esq., Q.C., is offered in alternate years to a student of the University of British Columbia, graduate or undergraduate, who has shown promise as a creative writer and who is returning to the University. The next award will be made on the basis of work taken in the session 1969-70.

The British Columbia 1958 Centennial Scholarship—This endowed scholarship is offered annually to students who are residents of British Columbia and are continuing undergraduate studies in the field of the humanities or social sciences. In the amount of \$500 annually, it will be awarded to a student entering the Third Year with an outstanding academic record. In the selection of the winner, the general interest and participation of candidates in University and community affairs may be a factor.

The British Columbia Psychological Association Gold Medal in Psychology—This gold medal, gift of the British Columbia Psychological Association, is offered for outstanding achievement in the study of psychology. It will be awarded on the recommendation of the Department of Psychology to a student in the graduating class.

British Columbia Hydro and Power Authority Undergraduate Scholarship in the Social Sciences and Humanities—A scholarship of \$250 is offered by British Columbia Hydro and Power Authority to students in the Third Year of the Faculty of Arts. Selection of the winner will be made by the Scholarship Committee, from students in the field of the social sciences and humanities.

The Canadian Forest Products Ltd. Scholarships in Arts—Two scholarships of \$200 each, the gift of Canadian Forest Products Ltd., are offered to students in the Faculty of Arts who are proceeding to the Final Year. Awards will be made on the basis of proficiency.

Chris Lin Memorial Scholarship—This scholarship is dedicated to the memory of Christopher Lin, who died tragically on August 31, 1966. Chris, the son of Professor Paul Lin, was born in the United States, and was brought up in China. He was a second-year student at U.B.C. at the time of his death. His death represented to his parents more than the loss of their son. Had Christopher lived, he would have become, in the words of his father, "a living denial of the cultural cold war". This scholarship of \$500 will be awarded annually to an undergraduate student who, like Christopher, would contribute to the promotion of better understanding between China and the West. The recipient will be a student committed to the study of Chinese who has satisfactorily demonstrated a proficiency equivalent to one year of the language, and whose area of concentration is Chinese studies. Application

forms may be obtained from the Dean of Inter-Faculty and Student Affairs, and must be submitted not later than July 1st.

The Daniel Buchanan Scholarship in Mathematics—As on page 77.

The Dante Alighieri Society of Vancouver Prizes in Italian—This prize of \$100, the gift of the Dante Alighieri Society of Vancouver, is awarded to a student of Italian recommended by the Department of Hispanic and Italian Studies.

The David and Blanche Gwynne-Vaughan Memorial Scholarship—A scholarship of \$100, given by Mrs. S. J. Bateman of Chilliwack as a memorial to her parents, David Edward and Eva Blanche Gwynne-Vaughan, will be awarded annually to a promising and deserving student who is continuing studies in Second or Third Year at this University and who proposes, either before or after graduation, to proceed to work in theology at the Anglican Theological College of British Columbia. In awarding this scholarship, consideration will be given not only to academic achievement, but also to personal qualities and character. Application by letter must be submitted by May 1st.

The David Bolocan and Jean Bolocan Memorial Prize—A prize of \$25, given by Mr. J. L. Bolocan, Edmonton, Alberta, in memory of his wife Jean and son David, will be awarded to the student in the Final Year of the Faculty of Arts who is regarded by the Department of Philosophy and Psychology as the outstanding student in these departments in the graduating year.

The Department of Asian Studies Scholarship—A scholarship of \$300 is offered to honours undergraduates or to graduate students specializing in Asian Studies. It will be awarded on the recommendation of the Head of the Department to a student whose academic record and achievement show promise of a successful career in the Asian Studies field.

The Dorothy Somerset Scholarship—In honour of Dorothy Somerset, B.A., LL.D., founder and first Head of the Department of Theatre at the University of British Columbia, a scholarship has been established by her friends and associates. This scholarship gives recognition to her devoted service and outstanding contributions to the life and quality of amateur and professional theatre in Vancouver, in British Columbia, and in Canada. It will be awarded annually to a student at the graduate level in the Department of Theatre at the University.

The Dr. Isabel MacInnes Prize—In honour of Dr. Isabel MacInnes and in recognition of her qualities as a teacher and of her services to the University, a prize of \$100 is offered to a student in German 200, 210, 223, or 230. The award will be made on the basis of standing and progress in the course.

The Dr. William Rose Award-This prize of \$150, gift of the Canadian Polish Congress, British Columbia Branch, will be awarded to two students in the First Year, each to receive a gift of \$75, when both have an outstanding record of achievement in Polish. When only one student qualifies the student is to receive the full sum of \$150.

The English Honours Medal—This medal will be awarded annually at the Spring Congregation to the outstanding graduate of the year in English Honours. The decision as to whom the medal shall be given will be made by the members of the English Honours Committee, who shall reach their decision on the basis of the student's overall record in his senior years of study. Students in combined and double honours, as well as in single honours, will be eligible. The basic reasons for the establishment of the award are to grant particular recognition to exceptional achievements in the field of English studies at the undergraduate level and to encourage continuing studies in the humanities.

English Honours Prize—Through the generosity of Dr. and Mrs. Wallace Wilson, an annual prize of \$300 will be awarded to the winner of the English Honours Medal in that year.

The Fred A. Krügel Memorial Prize—This prize will be awarded by the Department of German for outstanding work in the field of German Romantic Literature.

The German Government Book Prizes—These book prizes, the gift of the Federal Republic of Germany through the Consulate in Vancouver, are available for students in the upper years showing proficiency in German.

The Honours Economics Scholarship—This scholarship of \$300, the gift of Management Science, Vancouver, will be awarded to the student in the Third Year of Arts who, in the opinion of the Department, is the most outstanding in the Honours Economics Programme and is proceeding to the Final Year in that programme.

The Italian Scholarship—This scholarship of \$180 will be awarded annually to an undergraduate of outstanding ability specializing in Italian.

The Jacob Kaliski Memorial Award-This prize of \$150, gift of the Canadian Polish Congress, British Columbia Branch, will be awarded in June, 1969 to two students in the Second Year, each to receive a gift of \$75, when both have an outstanding record of achievement in Polish. When only one student qualifies the student is to receive the full sum of \$150.

The Joseph Grebski Memorial Award—This prize of \$150, gift of the Canadian Polish Congress, British Columbia Branch, will be awarded in June, 1970 to two students in the Third Year, each to receive a gift of \$75, when both have an outstanding record of achievement in Polish. When only one student qualifies the student is to receive the full sum of \$150.

The J. H. Stewart Reid Medal in Honours History—In memory of J. H. Stewart Reid, B.A., M.A. (Brit. Col.), Ph.D (Toronto), LL.D. (Manitoba), and in tribute to his fine personal qualities, his academic excellence, especially in the field of history, and his services as Executive Secretary of the Canadian Association of University Teachers, Ottawa, this gold medal is offered annually by his sister, Colina Stewart Reid. It will be awarded to the student graduating with the most outstanding record in honours history.

The John and Annie Southcott Memorial Scholarship—As on page 10.

The KVOS-TV Scholarships—A scholarship or scholarships to the total of \$200, the gift of KVOS-TV (B.C.) Ltd., are offered in the Faculty of Arts. These scholarships will be awarded to students in the field of the humanities or the social sciences, with preference begin given to those who have a special interest in journalism, communication, or related areas of study.

The Mabelle Andison Scholarship Fund—As a memorial to Mrs. J. G. Andison and as a tribute to her fine personal qualities and her outstanding service to the Community, this fund has been established by her friends. It will be used to provide awards, from time to time, for students in the field of French Language and Literature who have high scholastic standing or who show promise and are deserving of financial assistance.

The McGill Graduates' Scholarship—A scholarship of \$140, founded by the McGill Graduates' Society of British Columbia, will be awarded to the student standing highest in English and French of the Second Year in Arts and proceeding to a higher year.

The Morris Belkin Prize—A cash prize of \$500, the gift of Morris Belkin,

Esq., is available for students specializing in psychology and registered in graduate studies or the senior undergraduate year. It will be awarded for the best essay submitted in courses given by the Department on an approved subject in the field of Freudian Psychology. Further details may be obtained from members of the Department, on whose recommendation the award will be made. If no essay reaches a sufficiently high standard, the award may be withheld.

Polish Credit Union Award—A prize of \$150, gift of the Polish Credit Union, will be awarded in June, 1969 to a student with an outstanding record in the field of Polish studies. It will be awarded on the recommendation of the Department of Slavonic Studies.

The Prizes of the Ambassador of Switzerland—These book prizes will be awarded in the session 1969-70 to an outstanding student of French Language and Literature and to a student with high standing in German.

The Rosemary Elizabeth Gordon Memorial Fellowship—This fellowship, a memorial to Rosemary Elizabeth Gordon, will be awarded to a student who has completed at least the first year of the Arts I programme (or its successor programme), and is continuing studies in the University in a higher undergraduate year. In the amount of \$500, the award will be determined by the participating faculty of the New Arts I programme. Rosemary Gordon saw with clarity and distress the personal, social and political problems which beset the community, and devoted herself with vigor, tenderness and wisdom to their solution. For these reasons, the student selected should display a special concern for these problems and a special commitment to work for their solution. The faculty will judge between candidates meeting these qualifications at their own discretion.

Royal Institution Scholarship in Arts—A scholarship of \$200 will be awarded to the student taking first place in the examinations of First Year Arts and proceeding to a higher year in any faculty.

Scholarship in Economic Geography (donated by the Canadian Transport Co. Ltd.—This scholarship of \$100 is available for Third Year students in Arts who are taking Honours or majors in Geography, or for Third Year students in Commerce (Foreign Trade option) with elective subjects in Geography. The award will be made to a student who has obtained high standing in Geography 102 (Economic Geography) in his Second Year, and has the highest aggregate standing in the Third Year of Arts or of Commerce in six units chosen from Upper Year Geography courses.

The Shaw Memorial Scholarship—This scholarship of \$140, founded by friends of the late James Curtis Shaw, Principal of Vancouver College, and afterwards of McGill University College, Vancouver, will be awarded upon the results of the examinations of the Second Year in Arts to the undergraduate student standing highest in any two of three courses, English 200, Latin 200 or 210 or 220, Greek 100 or Greek 200, and proceeding to a higher year.

Thte Stephen and Katherine Kirstiuk Scholarship—In honour of Stephen and Katherine Kirstiuk, and to mark their fiftieth wedding anniversary, a scholarship has been established and endowed by their family and friends. This scholarship, at present in the amount of \$100, will be awarded annually to a student who has an outstanding interest and academic record in Slavonic Studies. If, in the future, courses in Ukrainian history and language become available, the award will be made to a student of Slavonics who has shown interest, ability, and proficiency in these special areas.

The Terminal City Club Memorial Scholarship—This scholarship of \$100, founded by the members of the Terminal City Club as a memorial to those members of the Club who lost their lives in the Great War, will be awarded to the student standing highest in English 200 and Economics 100 or 200 or 202 in the Second Year in Arts, and proceeding to a higher year.

The T. Halpert-Scanderbeg Memorial Scholarship—As a memorial to Tadeusz Halpert-Scanderbeg, long-time professor of Polish language and literature at the University of B.C., this scholarship of \$200 is offered for graduate work at this University in the field of Polish studies. It will be awarded from time to time to a deserving student on the recommendation of the Department of Slavonic Studies. Should there be no graduate candidate, the scholarship may be awarded to the most deserving student of Polish language or literature who will proceed to third or fourth year courses in this field.

The Theodore Boggs Prize in Economics—This prize of \$100, the gift of Andrew V. Gray, and named in honour of the first Head of the Department of Economics, is offered to the student in the Second Year of Arts who, in the opinion of the Department, is the most outstanding in Economics.

University Scholarship in Arts—Scholarships of \$200 each will be awarded to the student obtaining highest standing in the Third Year, the student obtaining highest standing in the Second Year, and the student obtaining second highest standing in the First Year.

The Vancouver Women's Canadian Club Scholarship in Canadian History—A scholarship of \$100, the proceeds of a fund created by the Vancouver Women's Canadian Club, will be awarded to the undergraduate obtaining first place in Canadian History (History 202, 326, 329).

The Wallace and Ethel Wilson Scholarship—An annual scholarship of \$1200, established through the generosity of Dr. and Mrs. Wallace Wilson, will be awarded to a student of high academic standing and with promise of distinction, nominated by the Department of English and entering the final year of the Honours English programme.

# In Commerce and Business Administration

The B.C. Association of Real Estate Boards Mary Simpson Scholarship—A scholarship of \$250 annually, the gift of the Realtor Division of the Real Estate Institute of British Columbia, is offered to an undergraduate or graduate student in Commerce and Business Administration who is taking the Real Estate programme, has high academic standing and is deserving of assistance to further his education. The award will be made on the recommendation of the Faculty.

British Columbia Hydro and Power Authority Undergraduate Scholarships in Commerce and Business Administration—Two scholarships of \$250 each are offered by British Columbia Hydro and Power Authority to students in Commerce and Business Administration. One scholarship is open to students who, in the fall, will proceed to the Final Year, and the other to those who will proceed to the Third Year. Selection of winners will be made by the Scholarship Committee in consultation with the Faculty.

The Canadian Forest Products Ltd. Scholarships in Commerce—Four scholarships, each of the value of \$250, are offered by Canadian Forest Products to students in Commerce and Business Administration. Two of these awards are open to students entering the penultimate year and two are open to students entering the final year. Awards will be made on the basis of ability and academic standing.

Chadwick, Potts and Company Scholarship—A scholarship of \$100, the gift

of Chadwick, Potts and Company Chartered Accountants, will be awarded annually to a student with high standing in the Faculty of Commerce and Business Administration who is proceeding to a further year of study in the Faculty and who has a particular interest in Accounting. In making the award, consideration will be given to ability, character and general academic record of the student.

The Clarkson, Gordon & Co. Research Assistant Award—An award of \$250 is offered annually by Clarkson, Gordon & Co., Chartered Accountants, to a student entering the Fourth Year of the accounting option. The award will be made on the recommendation of the Faculty of Commerce and Business Administration, consideration being given to character, industry, and the general academic record of the student. During the tenure of this award, the student will be required to render assistance to members of the accounting staff on research being carried on by them.

The Clarkson Prize in Accounting—A prize of \$100, the gift of Clarkson, Gordon & Co., Chartered Accountants, will be awarded annually to the student in the accounting option who obtains the highest mark in Commerce 252 (Intermediate Accounting). To be eligible for this award, the student must also obtain above average standing in his other courses.

Clarkson, Gordon and Co. Service Award—The service award will be given to a student in Third Year Commerce who is proceeding to the Fourth Year and who intends on graduation to enter articles with a firm of Chartered Accountants. The student's tuition will be paid in his final year of Commerce and ordinarily he will be given employment with Clarkson, Gordon and Co. for the summer. The award will be made to a student whose academic ability and record are, in the opinion of the Faculty, those needed by a successful chartered accountant.

Coote, Roxburgh and Kuys Realty Limited Prize—A prize of \$100, the gift of Coote, Roxburgh and Kuys Realty Limited, will be awarded to the student with the highest standing in the course Commerce 309 (Urban Land Investments).

The Elmer Johnston Memorial Scholarship-A scholarship of \$250, donated by the Automotive Transport Association of B.C., will be awarded annually to the student in Commerce who obtains the highest standing in the course on transportation practices and policies (Commerce 341) and is proceeding to the course in Motor Highway Transport Problems (Commerce 446).

The Finning Tractor & Equipment Co. Ltd. Scholarships—As on page 50.

The Ghent Davis Memorial Scholarship—A scholarship in the amount of \$750, gift of Mrs. Frances Davis in memory of her husband Ghent Davis, is offered to an undergraduate or graduate student in Commerce and Business Administration. The award will be made to a student who, though not necessarily among the leaders of his class, is in the opinion of the Faculty deserving of financial assistance. At the discretion of the Faculty the sum may be divided between two students.

Gill Interprovincial Lines Limited Scholarship—A scholarship of \$250, gift of Gill Interprovincial Lines Ltd., is offered annually to students in Commerce and Business Administration. This scholarship is open to students who are completing the Third Year and are proceeding to the Final Year, who have outstanding academic records, and are specializing in finance, or economics and political science. The winner will be selected by the Faculty on the basis of academic standing, rersonal qualities and promise. During the Final Year the recipient will be required to undertake study, investigation or research in an area related to the field of highway transportation.

The Graduating Class of 1958 Memorial Shields—As a memorial to two of their classmates, the members of the Graduating Class of 1958 have donated the Matthew H. Henderson Memorial Shield and the Dorothy Anne Dilworth Memorial Shield; the first to be awarded annually to the outstanding man student, and the second to the outstanding woman student, in the graduating class. The awards will be made by the Faculty on the basis of academic standing, personal qualities, and contributions to the Commerce Undergraduate Society and other campus activities.

Granville Mayall Memorial Scholarship—This scholarship of \$250 has been established by the friends of the late Granville Mayall with the assistance of the Automotive Transport Association of B.C. The scholarship is offered annually to graduate or undergraduate students in Commerce and Business Administration. It is awarded on the basis of academic standing, personal qualities and interest in the field of transportation. It is expected that the student will undertake a paper in the area of transportation.

Greater Vancouver Real Estate Board Scholarship—A scholarship of \$500, gift of the Greater Vancouver Real Estate Board, is offered to a Third Year student in Commerce and Business Administration who is taking the option in Real Estate, has high standing, and is deserving of assistance to further his education in the profession of real estate.

H. A. Roberts Scholarship—A scholarship of \$200, gift of H. A. Roberts Ltd., is offered to a student in Commerce and Business Administration who is taking the Real Estate programme, has high academic standing, and is deserving of assistance to further his education. The award is to be made on the recommendation of the Faculty.

The Harold A. Jones Memorial Scholarship (donated by Vancouver Tug Boat Co. Ltd.)—As a memorial to Harold A. Jones, President of Vancouver Tug Boat Co. Ltd. from 1924 to 1956, this scholarship of \$750 is offered annually in the Faculty of Commerce and Business Administration. It serves not only to pay tribute to his contribution to the Company, but also to give recognition to his interest and participation, both public and personal, in all matters pertaining to coast-wise shipping, in the Board of Trade, the Vancouver Tourist Association, the Royal Vancouver Yacht Club, the Seattle Yacht Club, and the Pacific International Yachting Association. This scholarship will be awarded to an outstanding student entering the Final Year and majoring in the field of transportation.

The Hudson's Bay Company Service Awards—One or two service awards, offered annually by the Hudson's Bay Company (Vancouver), are open to students intending a career in the department-store field. They are open, in competition, to students completing Second Year Commerce or, in appropriate options, Second Year Arts or Science, and proceeding to a higher year. To be eligible for these awards, applicants must qualify in respect of academic standing, ability, aptitude and personality, and consider possible employment with the Company on graduation. By the terms of awards, winners will be even their tuition fees for each of the Third and Fourth Years and guaraneed employment with the Company in the summer periods, the Christmas acations, and at other times, such as Saturdays. Subject to satisfactory performance, they will, on graduation, be given an opportunity for an ecutive career with the Company. Further information may be obtained om the offices of the Dean of Inter-Faculty and Student Affairs. Inquiry hould be made not later than January 15th.

The J. Ewart Collins Memorial Scholarship—This scholarship of \$250 has been established as a memorial to the late J. Ewart Collins, C.A., by the firm of Collins & Collins, Chartered Accountants, of which he was senior partner. The award, which is available annually to a student in Third Year Commerce, will be made to the student who obtains the highest standing in Commerce 353 (Advanced Accounting) and registers in the Fourth Year for Commerce 455 (Auditing).

The Kiwanis Club Scholarship—A scholarship of \$250, the gift of the Kiwanis Club of Vancouver, B.C., will be awarded to the student obtaining highest standing in the Third Year of Commerce and proceeding to the Final Year of that course. The winning of the award does not preclude the holder from enjoying the proceeds of other awards.

The Laurentide Financial Corporation Ltd. Scholarship—This scholarship of \$250, the gift of Laurentide Financial Corporation Ltd., will be awarded annually, on the recommendation of the Faculty, to a student in Commerce or Education. The award will be made to a student with high standing who has shown an aptitude for work in the field of business, and in particular for the field of consumer finance.

Life Underwriters Association of Vancouver Scholarship—A scholarship of \$275, the gift of the Life Underwriters Association of Vancouver, is open to students who are completing the Third Year in the Faculty of Commerce and Business Administration, are taking the course in life insurance offered in that year, and are proceeding to the Final Year. The selection of the winner will be made by the Faculty on the basis of academic standing, personal qualities, and character. At the discretion of the Faculty, the financial circumstances of those eligible may be a factor in the selection.

The Marsh and McLennan Limited Scholarship in Commerce—As a mark of Canada's Centennial Year, Marsh and McLennan Limited have established university scholarships in several areas throughout Canada. One of these scholarships, an annual award of \$500, is offered to students at the University of British Columbia who are registered in the Faculty of Commerce and Business Administration. It will be awarded annually to a student with outstanding academic qualifications who is proceeding to the final year of studies leading to the B.Com. degree.

The Morrow Scholarship in Commerce—In honour of Professor Ellis Henry Morrow, from 1938 to 1950, Head of the Department of Commerce, and in recognition of his service to the University and the community, a fund of \$2000 has been established by the generosity of Walter and Leon Koerner. The annual proceeds of this fund, at present approximately \$100, will be given as a scholarship to the outstanding student enrolled in Commerce 281.

The N. Leo Klein Memorial Scholarship—A scholarship of \$200 in memory of N. Leo Klein, and given by the late I. J. Klein, Vancouver, B.C., will be awarded to the student obtaining first place in the examinations of the Second Year of the course in Commerce and proceeding to the next year in that course.

The North Fraser Harbour Commissioners Scholarship—This scholarship of \$750, the gift of the North Fraser Harbour Commissioners, is offered annually to students in Commerce. It will be awarded for study and research or investigation in the field of transportation related to the operations of the Commissioners.

Okanagan-Mainline Real Estate Board Scholarship—Three scholarships (one of \$500 and two of \$250 each), the gift of the Okanagan-Mainline Real

Estate Board, are offered annually to students in Commerce and Business Administration who are taking one or more courses in Estate Management, have high academic standing, and are deserving of assistance to further their education. At the discretion of the Faculty the scholarship of \$500 may be divided into awards of \$250 each.

The Oppenheimer Bros. & Company Centennial Scholarship—Oppenheimer Bros. & Company (Food Brokers), Vancouver, in memory of Milton B. Oppenheimer, established a scholarship in 1958 to mark the Centennial of the Company, which was founded in Victoria and Yale, British Columbia, in 1858. In the amount of \$500 annually, this scholarship is offered in competition to students in the Faculty of Commerce and Business Administration who are continuing their studies in the Final Year of the course leading to the degree of B.Com., in the field of marketing, or to graduates in Commerce pursuing study and research toward a higher degree in this field. The winner will be selected on the basis of academic standing, aptitude and promise in the field of marketing, and personal qualities and character. Special consideration will be given to applicants interested in the marketing of food.

The Peat, Marwick, Mitchell & Co. Scholarship—A scholarship of \$300, the gift of Peat, Marwick, Mitchell & Co., will be awarded to a student with high standing in the Second Year in Commerce who is proceeding to the Third Year. In making the award, consideration will be given to ability, character and the general academic record of the student.

The Peat, Marwick, Mitchell & Co. Service Award—A service award will be offered annually by the firm of Peat, Marwick, Mitchell & Co., Chartered Accountants, to students intending to enter the profession of public accounting. It will be open, in competition, to students completing Third Year Commerce and proceeding to Fourth Year. To be eligible for this award applicants must qualify in respect of academic standing, ability, aptitude and personality, and consider possible employment with the firm on graduation. By the terms of the award, the winner will be granted his tuition fees for his Fourth Year, and guaranteed employment with the firm during the summer period.

Pemberton Securities Limited Scholarship—A scholarship of \$250, the gift of Pemberton Securities Limited, is offered annually to students in Commerce and Business Administration. This scholarship is open to students who have completed Third Year and are proceeding in the Final Year, or who are in graduate studies. The award will be made on the basis of high academic standing, character and ability, and interest in the field of investment theory. Selection of the winner will be made by the Faculty, with preference to a student who is a resident of British Columbia or who intends upon graduation to reside in British Columbia.

The Price Waterhouse & Co. Scholarship—A scholarship of \$300, the gift of Price Waterhouse & Co., will be awarded to a student in the accounting option in Commerce who is at the end of his Third Year, who is proceeding to his Final Year, and who plans to enter articles with a practising firm of chartered accountants. The award will be made to a student with high standing in the Third Year examinations whose academic record, ability, and other qualifications are considered to be outstanding.

Riddell, Stead, Graham & Hutchison Service Award—This service award will be given to a student in Third Year Commerce who is proceeding to the Fourth Year and who intends on graduation to enter articles with a practising firm of chartered accountants. The student will ordinarily be given employment with Riddell, Stead, Graham & Hutchison for the summer and, in addition, a contribution of \$500 towards his tuition fees will be paid in his Final Year Commerce. The award will be made to the student whose personality, ability, academic record and other characteristics are, in the opinion of the Faculty, those needed by a successful chartered accountant.

The Robert Keith Porter Scholarship—A scholarship in the amount of approximately \$170, the gift of Mrs. Agnes Graham Turnbull in honour of her son-in-law, Robert Keith Porter, will be awarded annually to a high ranking student in the Faculty of Commerce and Business Administration proceeding to the degree of B.Com.

The Sales and Marketing Executives of Vancouver Scholarship—A scholarship of \$200, the gift of the Sales and Marketing Executives of Vancouver, is available annually for a student in the Fourth Year of the marketing option. The award will be made on the recommendation of the Faculty, consideration being given to character, industry and the general academic record of the student. During the tenure of this scholarship, the student will be required to undertake, along with his courses, certain training duties in the Faculty related to the field of marketing. Due consideration will be given to the financial need of the student selected.

The Sales and Marketing Executives of Vancouver Ben Benwell Scholarship—A scholarship of \$200, the gift of the Sales and Marketing Executives of Vancouver, is available annually to a student in Third Year of the marketing option. The award will be made on the recommendation of the Faculty, consideration being given to character, industry and general academic record of the student. Due consideration will also be given to the financial need of the student selected.

The Society of Industrial Accountants of British Columbia Scholarship—A scholarship of \$100, gift of the Society of Industrial Accountants of British Columbia, is offered to a Third Year student in Commerce and Business Administration who obtains the highest standing in Commerce 354 (Cost Accounting) and who has maintained a high over-all academic record.

Thorne, Gunn, Helliwell and Christenson Scholarship—A scholarship of \$200, the gift of Thorne, Gunn, Helliwell and Christenson, Chartered Accountants, will be awarded annually to a student with high standing in the Faculty of Commerce and Business Administration who is proceeding to a further year of study in the Faculty and who has a particular interest in Accounting. In making the award, consideration will be given to ability, character and general academic record of the student.

The Thorne, Gunn, Helliwell & Christenson Service Award—This service award will be given to a student in Third Year Commerce who is proceeding to his final year and who anticipates upon graduation entering articles leading to a career in chartered accountancy. Summer employment between the student's Third and Fourth Years will be provided by Thorne, Gunn, Helliwell & Christenson and tuition fees will be paid for the student's Fourth Year. The award will be made to a student whose personality, ability and aptitude are, in the opinion of the University, those needed by a successful chartered accountant. Applications are required not later than March 15th.

The Vancouver Junior Chamber of Commerce Scholarship—A scholarship of \$300, the gift of the Vancouver Junior Chamber of Commerce, is offered to students entering Second Year of the Faculty of Commerce and Business Administration. It will be awarded to the student with high scholastic standing who exemplifies through his character qualities of leadership and independent judgment. If no student is considered sufficiently well qualified with respect to these qualities the award may be withheld. The winning of this

award will not preclude the holder from enjoying the proceeds of other awards.

The Vancouver Stock Exchange Scholarship—This scholarship of \$250, the gift of the Vancouver Stock Exchange, is available annually for a student in the finance option in the course leading to the degree of B.Com. It will be awarded on the recommendation of the Faculty to a Third Year student proceeding to the Final Year.

The Victoria Real Estate Board Scholarship—A scholarship of \$250, a gift of the Victoria Real Estate Board, is offered to an undergraduate or graduate student in Commerce and Business Administration who is taking the Estate Management programme, has high academic standing and is deserving of assistance to further his education. The award will be made on the recommendation of the Faculty.

Westminster County Real Estate Board Scholarship—A scholarship of \$500 annually, the gift of the Westminster County Real Estate Board, is offered to a student in Commerce and Business Administration who is taking the Real Estate programme, has high academic standing and is deserving of assistance to further his education. At the discretion of the Faculty the award may be divided into two scholarships of \$250 each.

The William M. Mercer Memorial Scholarship (donated by William M. Mercer Limited)—As a memorial to its founder, William Manson Mercer (B.Com., U.B.C. 1943), and as part of its Centennial project, William M. Mercer Limited has established a scholarship of annual value of \$500. This scholarship will be awarded in the Faculty of Commerce and Business Administration to an outstanding student who (a) is entering the final year, has a good background in courses in economics and mathematics, and whose graduating essay will be in a field related to employee benefit plans or actuarial science, or (b) is entering the penultimate year, has shown aptitude in economics and mathematics, and intends to write his graduating essay in the final year on a subject related to employee benefit plans or actuarial science. Special preference will be given to students who, after graduation, propose to enter the field of employee benefit plans or actuarial science, particularly those who have sat for actuarial exams to Fellowship in the Canadian Institute of Actuaries. A student who receives the award in Third Year will not be precluded from receiving it again in the Final Year.

The Winspear, Higgins, Stevenson and Doane Scholarship in Accounting—A scholarship of \$300, the gift of Winspear, Higgins, Stevenson and Doane, Chartered Accountants, is offered annually to students in the accounting option who are proceeding to the degree of B.Com. This scholarship will be awarded in May to a student who, in the fall, will enter the Third Year. The award will be made on the recommendation of the Faculty to a student of outstanding merit.

The Woodward Scholarships (donated through the Men's Canadian Club of Vancouver)—Two scholarships, established by the late Honourable W. C. Woodward will be available as follows:

- 1. The sum of \$125 will be awarded to the student in Second Year Commerce who obtains highest standing in Commerce 261 and is proceeding to the Third Year.
  - 2. The sum of \$125 will be awarded to the student in Third Year Commerce who obtains highest standing in Commerce 362 and is proceeding to the Fourth Year.

To be eligible for either of these awards, the student must also obtain high standing in his other courses.

### In Dentistry and Dental Hygiene

American College of Dentists Scholarship—This scholarship of \$100, gift of the American College of Dentists (Washington - British Columbia Section), is offered to students completing the Second year of Dentistry. It will be awarded by the Faculty of Dentistry, in consultation with the Scholarship Committee of the University, on the basis of character and academic record during the first two years of Dentistry.

The British Columbia Dental Supply Co. Limited Scholarship—A scholarship of \$200, the gift of The British Columbia Dental Supply Co. Limited, is open to students proceeding to dentistry. It will be awarded to the student in attendance at the University who has completed the pre-dental requirements, has been accepted by an approved school or college of dentistry, and in the opinion of the Scholarship Committee, is best qualified in terms of academic standing, personal qualities, and promise in dentistry. Applications must be submitted not later than April 30th.

The C. V. Mosby Scholarship Book Award—Five prizes, each consisting of the choice of a book up to the value of \$30, are offered annually by the C.V. Mosby Company of St. Louis, Missouri, to dental student who show excellence or promise in their studies as determined by the Faculty.

The College of Dental Surgeons of B.C. Scholarship—This scholarship of \$100, gift of the College of Dental Surgeons of British Columbia, will be awarded annually to the student who obtains the best academic record in First Year and who is proceeding to the Second Year in the Faculty. Selection will be made by the Faculty of Dentistry, in consultation with the Scholarship Committee of the University.

The International College of Dentists Scholarship—This scholarship of \$100, gift of the International College of Dentists (Canadian Section), is offered to students completing the Third Year of Dentistry. It will be awarded by the Faculty of Dentistry, in consultation with the Scholarship Committee of the University, on the basis of character, participation in extra-curricular activities, and academic record in the Third Year.

The Margaret Merrell Memorial Scholarship—As a memorial to Margaret Merrell, and in tribute to the affectionate esteem in which she was held by all who knew her, this scholarship has been established by her husband, Dr. J. H. Merrell. In the amount of \$100 annually, it will be awarded by the University to a student in the Dental Hygiene programme. In selecting this winner consideration will be given to academic standing, personal qualities, character, and need.

The Max M. Waterman Prize—This prize of \$25, established by Dr. M. J. Waterman in honour of his father, is to be awarded annually to the Second Year student who demonstrates the best performance in Dental Morphology (Oral Biology 410 and 420).

The Robert D. Sheret Memorial Scholarship (B.C. Dental Association)—As a memorial to Robert D. Sheret and to mark the esteem and affection in which he was held, the B.C. Dental Association offers annually a scholarship of \$250. This scholarship is open to residents of British Columbia who are enrolled in the Faculty of Dentistry at the University of British Columbia. It will be awarded to the student who, in the opinion of the Scholarship Committee, has the most outstanding academic record.

Vancouver B'nai B'rith Hillel Foundation Scholarship—A scholarship of \$300, established by the Vancouver B'nai B'rith Hillel Foundation, is offered annually to a student entering the Faculty of Dentistry at the University of B.C. This scholarship will be awarded on the recommendation of the Faculty

to the student whose qualifications and promise in the field of Dentistry are the most outstanding.

## In Education and Teacher Training

The British Columbia Parent-Teacher Federation Scholarship—The sum of \$200 will be awarded to a student, showing ability and need, who intends to qualify as a home economics teacher either through the School of Home Economics and the Faculty of Education, or through the Faculty of Education. This scholarship will be awarded preferably for the Final Year. Applications are required by May 15th.

The British Columbia Teachers' Federation Scholarships for Student Teachers—See page 153.

The British Columbia Teachers' Federation Undergraduate Scholarships for Teachers—See page 153.

The Dr. Evlyn Fenwick Farris Scholarship in Education—A scholarship of \$400, the gift of the University Women's Club of Vancouver, is offered annually to women students at this University in the full winter session who are graduates of other Faculties entering the professional year in Education, or undergraduate students entering the Final Year of a Bachelor of Education programme. This scholarship will be awarded to the applicant who, in the opinion of the Faculty of Education, is best qualified in terms of her personal qualities and academic record. Applications must be submitted by May 15th.

The Dr. H. B. King Memorial Scholarship in Education—This scholarship of \$300 has been established by the B.C. Association of District Superintendents and Inspectors of Schools as a memorial to Dr. H. B. King, who from 1939 to 1945 was Chief Inspector of Schools for British Columbia. For many years prior to 1939, Dr. King also served the Province of British Coumbia with distinction and devotion as a teacher and principal, and as technical adviser with the Department of Education. This scholarship will be awarded to a student who is proceeding to a degree or certificate in the teaching field and is taking a full course in the Second Year at any recognized Faculty of Education in a B.C. University. The award will be made on the basis of academic standing, personal qualities, interest and participation in school and community affairs, aptitude for teaching, and other factors. Applications, on forms obtainable from Walter H. Gage, the Dean of Inter-Faculty and Student Affairs, must be submitted to the University not later than May 15th.

The Edna Baxter Memorial Fund—An annual prize, established as a memorial to Edna Baxter by her friends and colleagues, serves as a tribute to her devoted work as a teacher. This prize will be awarded to a full-time undergraduate in the Faculty of Education who achieves distinction in English 311 (Children's Literature).

The Ernest A. Munro Memorial Scholarship—This scholarship in memory of Ernest A. Munro, offered by his wife, Nancy Munro, and his sister, Constance Munro, gives recognition to his distinguished services as a principal and teacher in the Vancouver schools, including King Edward, Prince of Wales, Britannia and Magee. In the amount of \$150, it will be awarded in the session 1969-70 to an outstanding student who needs financial assistance and who is proceeding to teacher training.

The Jeanette Dewitt-Huberman Memorial Prize—This prize of \$25, to honour of the memory of Jeanette Dewitt-Huberman, is offered to students preparing for a career in teaching exceptional groups or individuals such as the mentally retarded, the emotionally disturbed, or the specially gifted. It will

be awarded to a student who not only has a good academic record but who also has the qualities of vitality and sincerity, and an understanding of differing points of view arising from factors such as national origin or religious faith.

The Jessie L. McLenaghan Scholarship—As on page 58.

The Kay Norgan Scholarships in Education—From a fund established by Kay Norgan, scholarships of \$500 each are offered annually to students in the Faculty of Education who are preparing to teach in an elementary or secondary school and are residents of British Columbia. These scholarships will be awarded by the University Scholarship Committee to students who not only have outstanding academic records combined with need for financial assistance, but who also show promise of success in a teaching career. In the session 1969-70, three scholarships will be available.

The Marion Langridge Scholarship Fund—This scholarship of \$400, the gift of the Vancouver Secondary Women Teachers, is offered to a woman student who is entering her Final Year of a degree course and who proposes to take, in the session 1970-71, the one-year Teacher Training Course for graduates leading to a Secondary Teaching Certificate at the university to prepare for teaching at the secondary level or to a woman student entering her Fourth Year of the five-year Bachelor of Education programme for secondary teaching. The award will be made on the basis of academic ability, interest in and aptitude for teaching, and qualities of leadership. Applications on special forms must be submitted to the Dean of Inter-Faculty and Student Affairs not later than May 15th.

The Mathilde MacInnes Memorial Scholarship—As a memorial to his wife, Mathilde MacInnes, and in recognition of her interest in young people, this scholarship of \$300 annually has been established by Mr. W. H. MacInnes in the field of Education. It will be awarded to the student who obtains the highest standing in the First Year of the course leading to the B.Ed. degree (elementary teaching field) and is proceeding to the Second Year of that course.

The Saul Grand Scholarship—This scholarship of \$100, established as a memorial to Saul Grand by the Vancouver Section of the National Council of Jewish Women of Canada, will be awarded to a student in First Year Education proceeding to a degree or certificate in the teaching field. To be eligible for this award a student must not only have high academic standing, but also possess those qualities of character and personality which are necessary for success in teaching elementary and secondary school children. Applications must be submitted by May 15th.

The Smith, Davidson & Lecky Ltd. Scholarship in Education.—A scholarship of \$500, the gift of Smith, Davidson & Lecky Ltd., is offered annually to students proceeding to secondary teaching in the Province of British Columbia. This scholarship is open in competition to applicants entering the Final Year of the programme leading to the B.Ed. degree (secondary) or the one-year Teacher Training Programme for Graduates. Applicants will be considered on the basis of their overall academic standing and achievement in their major areas of specialization, on their promise of success in teaching, personal qualities, and character, and on their need for financial assistance. Applicants must submit their applications not later than May 15th.

The Stella Shopland Memorial Fund—An annual prize of \$75, established as a memorial to Stella Shopland by her friends and associates, serves to mark the esteem and affection in which she was held by her colleagues and

students. In tribute to her special interest in children's literature, this prize will be awarded to a full-time undergraduate in the Faculty of Education who achieves distinction in English 311 (Children's Literature).

The Vancouver Elementary School Teachers' Association Scholarships-Eight scholarships of \$150 each, the gift of the Vancouver Elementary School Teachers' Association, are offered to students who are residents of Vancouver, have attended a Vancouver elementary school, and are proceeding to a degree or certificate in teaching. Winners are selected on the basis of academic achievement. The awards offered are:

- (a) The Elizabeth Dobbins Memorial Scholarship—Open to students entering the First Year of the Faculty of Education.
- (b) The Owen J. Thomas Memorial Scholarship-Open to students entering the First Year of the Faculty of Education.
- (c) The Elsie Roy Recognition Award—Open to students entering the First Year of the Faculty of Education.
- (d) The A. E. Henderson Memorial Scholarship—Open to students entering the First Year of the Faculty of Education.
- (e) Other Awards (Four)—One scholarship to be awarded to each of the top students proceeding from the First, Second, Third and Fourth Years respectively to the next higher year of teacher training.

Students who wish to be considered for these scholarships should submit application forms, obtainable from the Dean of Inter-Faculty and Student Affairs, not later than May 15th.

The Vancouver Secondary School Teachers' Association Scholarship— This scholarship, the gift of the Vancouver Secondary School Teachers' Association, is available to students entering the Teacher Training Course The award offered is:

The Owen J. Thomas Scholarship in Teacher Training—A scholarship of \$300 as a tribute to Owen J. Thomas, who from 1911 to 1956 gave devoted service and inspirational leadership to the teachers of this Province.

In making this award, consideration will be given to academic standing, personal qualities, and interest in teaching as a career. Financial circumstances may also be a factor. Candidates may apply or be nominated by members of the teaching profession or University staff. Application forms, which may be obtained from the office of the Dean of Inter-Faculty Affairs, must be submitted to the University by May 15th.

The West Vancouver Teachers' Association Scholarship—The West Vancouver Teachers' Association offers annually a scholarship of \$300 to graduates of West Vancouver Secondary Schools who have successfully completed the first two years in the Faculty of Education (Elementary or Secondary programme) and who plan to continue their studies in this Faculty through one or more additional winter sessions. The winning candidate will be selected on the basis of high academic standing in the final examinations of the Second Year and promise in practice teaching. Students who wish to be considered for this scholarship must, when the Second Year results are known, apply in writing to the Dean of Inter-Faculty and Student Affairs. The scholarship will be presented upon proof of registration in any subsequent regular winter session, provided that such registration takes place within five years of the naming of the successful candidate. Selection will be made by the Chairman of the Scholarship Committee and the Dean of Education in consultation with the W.V.T.A. Scholarship Committee.

### In Engineering

The Alcan Scholarships—Two scholarships are offered annually by the Aluminum Company of Canada, Limited, to undergraduates in Honours Courses in the Faculties of Applied Science (Engineering) and Science, or to those in other faculties specializing in subjects related to the industrial field of the Company. Each scholarship has the value of \$500 and is supplemented by a general grant of \$300 to the University. The winners will be selected by the University on the basis of academic standing, character and ability. Because it is the desire of the Company to assist worthy and deserving students, financial circumstances will also be a factor. The awards are normally available to Third and Fourth Year students. At the discretion of the University, however, they may be awarded to students in the junior years.

The Amalgamated Construction Association of B.C. Graduation Prize—A prize of \$50, gift of the Amalgamated Construction Association of B.C., will be awarded to a student graduating in Engineering. Selection will be made by the Chairman of the Scholarship Committee in consultation with the Faculty of Applied Science.

The Amalgamated Construction Association of B.C. Scholarships—Scholarships to the total of \$950, gift of the Amalgamated Construction Association of B.C., are open annually to students proceeding from Second and Third Year to the next year in Civil Engineering. Of these awards, two scholarships of \$250 each will be awarded to students entering the Final Year and two scholarships, one of \$250 and the other of \$200, to students entering the Third Year. Selection of the winners will be made on the basis of academic standing, particularly in subjects basic to heavy construction and highway engineering, and upon ability, experience, and interest in these fields. Special consideration will be given to those students whose summer essays are on topics related to heavy construction or highway engineering. Students interested in being considered for these awards should consult the Dean of Inter-Faculty and Student Affairs before April 30th. (Terms subject to revision.)

The American Institute of Chemical Engineers Award—This award, donated by the American Institute of Chemical Engineers, is given in the Third Year to the Chemical Engineering student, who, during the First and Second Years of Engineering, has received the highest scholastic rating in his courses. The award consists of a student A.I.Ch.E. membership pin and certificate, and a two-year subscription to one of the Institute publications.

American Society for Metals, B.C. Chapter, Scholarship—A scholarship of \$400, gift of the B.C. Chapter of the American Society for Metals, is offered to students entering the Third Year in Metallurgy. The award will be made, on the recommendation of the Department, to a student of high academic standing who shows ability and promise in the field of metallurgy. Applications required by April 30th.

The American Society of Heating, Refrigerating, and Air-Conditioning Engineers Scholarship (sponsored by the B.C. Chapter)—A scholarship given by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, and sponsored by their B.C. Chapter, is offered annually to a Third Year student in Mechanical Engineering who is proceeding to the Fourth Year. In May 1967, the award was in the amount of \$250. The scholarship will be awarded, on the basis of merit and need, on the recommendation of the Head of the Department, to a student who has clearly demonstrated a special interest in the heating, ventilating, air-conditioning and/or refrigeration industry.

The Anna Margaret Armstrong Memorial Graduation Prize in Metallurgy—This prize, established by friends and associates to honour the memory of Anna Margaret Armstrong, not only pays tribute to her sterling qualities of character and devoted service through teaching and research in the field of metallurgy, but also marks the affection and esteem in which she was held by friends and colleagues. In the amount of \$300, it will be awarded annually to the student in the graduating class in metallurgy who, in the opinion of his classmates and members of the Department, has made the most outstanding overall contribution to his class and to his chosen profession.

The Annie M. Mack Scholarship—A bequest from the late Annie M. Mack, Vancouver, provides annually a scholarship of approximately \$250. This scholarship will be awarded to a worthy and deserving student in engineering.

The Asarco Scholarship—As on page 76.

The Association of Professional Engineers' Prizes—Six book prizes, each of the value of \$50, are offered by the Association of Professional Engineers of the Province in competition to those students in the Third Year of the Faculty of Applied Science who are enrolled as engineering pupils in the Association. These prizes are awarded for the best summer essay in each of any six branches of engineering to be selected by the Faculty. The successful essays may be made available by the Faculty to the Council and members of the Association.

The Austin C. Taylor Memorial Scholarship—A scholarship of \$250, established by the late Austin C. Taylor in memory of his associates, William W. Boultbee and Richard Bosustow, will be awarded annually to a student completing the Third Year in Mining or Metallurgical Engineering and proceeding to the Fourth Year in either of these fields. The winner of this scholarship will be chosen on the basis of ability and general proficiency in the courses in Mining and Metallurgy.

Bethlehem Copper Corporation Ltd. Scholarship—A scholarship of \$500, gift of Bethlehem Copper Corporation Ltd., is offered to students in Second Year Engineering who are proceeding to a degree in mineral engineering. It will be awarded to a student with good academic standing and with interest and aptitude for a career in mineral engineering.

The B'nai B'rith Chapter No. 77 Scholarship—A scholarship of \$50, given by the Women's Chapter No. 77 of the B'nai B'rith, will be awarded to the student in the Third Year of Applied Science standing highest in the class of Chemical Engineering or Chemistry and proceeding to the Fourth Year.

The British Columbia Forest Products Limited Scholarships in Engineering—British Columbia Forest Products Limited offers six scholarships of \$1000 each (payable \$500 a year for two years) to students proceeding from Second to Third Year. They are open to students whose homes are in (1) the area comprised of School Districts 42 (Maple Ridge), 43 (Coquitlam), 75 (Mission); (2) the area comprised of School Districts 61 (Greater Victoria), 62 (Sooke), 63 (Saanich); or (3) the area comprised of School Districts 65 (Cowichan), 66 (Lake Cowichan), 67 (Ladysmith). Two scholarships in the fields of mechanical, chemical, and electrical engineering, are offered in each of the areas (1), (2), (3). If possible, the two scholarships awarded in each area will be in different fields. If no candidate in one of these areas qualifies, the award will be available to a candidate in the other areas, or, failing suitable candidates in these areas, to students in chemical or mechanical engineering in the Greater Vancouver area. The awards will be made on the basis of academic ability and overall personal qualities. Students who

wish to be considered for these awards should consult the Dean of Inter-Faculty and Student Affairs by March 15th.

British Columbia Hydro and Power Authority Undergraduate Scholarships in Engineering—Twelve scholarships of \$250 each are offered by British Columbia Hydro and Power Authority to students in the various branches of engineering. Six of the scholarships will be available to students who, in the fall, will proceed to the Final Year, and six to those who will proceed to the Third Year. Selection of winners will be made by the Scholarship Committee, in consultation with departments.

The Butler Brothers Scholarship in Agricultural Engineering or Mechanics—This scholarship of \$300, the gift of Butler Brothers Equipment Ltd., Victoria, Surrey and Chilliwack, will be awarded to a student who is continuing his education in agricultural engineering or mechanics. Candidates will be considered on the basis of academic standing, financial need and their interest in the application of engineering principles in the agricultural industry. The award will be made at the close of the session on the recommendation of Departments concerned.

The Canadian Forest Products Ltd. Scholarships in Engineering—Two Scholarships, one of \$250 and the other of \$200, the gift of Canadian Forest Products Ltd., are offered to students in the Second or Third Year of Chemical, Civil, or Mechanical Engineering who are proceeding to the next higher year. They will be awarded on the basis of proficiency, with preference being given to students with special interest in areas related to the forest industry.

The Canadian Institute of Mining and Metallurgy B. C. Section Prizes—Three book prizes to the value of approximately \$50 each, the gift of the B.C. Section of The Canadian Institute of Mining and Metallurgy, are offered annually to students registered in the Third Year of Applied Science and enrolled in Geology, Mining, or Metallurgy. These prizes, one in each of the above fields, will be awarded to members of the G. M. Dawson Club for the best essays written during the summer between the Second and Third Years.

The Chemical Institute of Canada Book Prize—As on page 76.

Chevron Standard Limited Undergraduate Scholarships—As on page 76.

The Corporation of B.C. Land Surveyors Scholarship—This scholarship of \$300 is offered to the student entering the second term of the graduate diploma course in surveying who was the top ranking student in the first term of the course. If no student obtains sufficiently high standing the award will not be made.

The Corporation of B.C. Land Surveyors Essay Prize—This prize of \$50 is offered for the best essay describing a survey project, submitted at the end of the summer by an undergraduate in any faculty who has been a member of a survey crew. The essay must demonstrate a good command of the English language and be in a form suitable for a technical report. If no essay is of sufficiently high quality the award will not be made. For further information students should consult Professor H. R. Bell or Professor S. N. deJong, Department of Civil Engineering, University of B.C.

Cyanamid of Canada Limited Scholarship—A scholarship of the value of \$900, gift of Cyanamid of Canada Limited (Montreal) is offered to undergraduate students in Chemical Engineering. It will be awarded on the basis of promise and high scholastic standing.

The Don Carpenter I.E.E.E. Scholarship—This scholarship is provided by a bequest from Clara Laverne Carpenter to honour her husband, Don Car-

penter, and to mark his connection with the Institute of Electronics and Electrical Engineers, especially as one of the original members of the old I.R.E. group in Vancouver. One or two awards to the total of \$1,000 will be available annually to students in Electrical Engineering who have good academic standing and propose to specialize in electronics.

Dow Chemical of Canada Limited Scholarship in Chemical Engineering—A scholarship of \$500, gift of Dow Chemical of Canada Limited, will be available annually to a student entering the Final Year of Chemical Engineering. It will be awarded to a student who has a sincere interest in the chemical industry, has demonstrated leadership in extra-curricular activities, and is academically well qualified. Consideration will also be given to personal qualities and character. Winners of this award may not hold other scholarships. Additional to the scholarship, a grant of \$250 will also be made by the Company to the Department of Chemical Engineering to help defray the costs of equipment, supplies, and administration.

The Dr. and Mrs. J. E. Kania Scholarship—This scholarship of \$200, the gift of Dr. and Mrs. J. E. Kania, will be awarded to a graduate or undergraduate for study and investigation of the problem of fish and power. The winner will be selected by the Scholarship Committee, in consultation with the Head of the Department of Civil Engineering, on the basis of academic standing, promise of ability in research, and interest in the field in which the scholarship is offered.

The Dunsmuir Scholarship—A scholarship of \$250, founded by the Hon. James Dunsmuir, will be awarded to the undergraduate student standing highest in the Mining Engineering course of the Third Year in Applied Science, and proceeding to the Fourth Year.

Eldorado Nuclear Limited Scholarship—A scholarship of \$500, gift of Eldorado Nuclear Limited, is offered to students proceeding to a degree in mineral engineering. It will be awarded to a student with good academic standing and with interest and aptitude for a career in mineral engineering.

The Engineering Institute of Canada Prize—The Engineering Institute of Canada offers an annual prize of \$50, donated by the Life Members of the Institute, to each of the twenty degree granting Canadian Universities, of which the University of British Columbia is one. The prize will be awarded to a Student Member of the Institute in the year prior to Graduating Year on the basis of the marks made in his academic work in that year and his activities in the EIC student engineering organization or in the local branch of a recognized engineering society.

Engineering Institute of Canada (Vancouver Branch) Prize—A prize of \$100 will be awarded to a student proceeding to Third Year Engineering. It will be awarded on the basis of overall standing in the Second Year to a member of the E.I.C. Student Chapter who has not received other scholarships or prizes. The award will be made in the fall, on the recommendation of the Dean.

Engineering Institute of Canada (Vancouver Branch) Walter Moberly Memorial Prize—A book prize of the value of \$50, given by the Vancouver Branch of the Engineering Institute of Canada, will be awarded to a student in the Faculty of Applied Science. This prize is given in memory of the late Walter Moberly, pioneer engineer, explorer, and discoverer of the Yellowhead Pass through the Rocky Mountains, whose work in railway location so greatly influenced the development of the Province of British Columbia. The award will be made in the fall, on the recommendation of the Dean, to a student registered in Second Year who has not received

another prize or scholarship and who is a member of the E.I.C. Student Chapter. The basis of award will be overall standing in the First Year.

The Finning Tractor & Equipment Co. Ltd. Scholarships-Six scholarships of \$400 each, the gift of the Finning Tractor & Equipment Co. Ltd., are offered to Third or Fourth Year students. Of these scholarships, one will be awarded in each of Commerce, Forestry, Civil Engineering, Mining and Metallurgy, Forestry Engineering, and Mechanical Engineering. At least one of the awards will be given each year to an out-of-town student. In making the awards, consideration will be given not only to the ability, both academic and practical, but also to the financial circumstances of applicants. The awards will be made by the Scholarship Committee in consultation with the departments concerned.

The G. M. Dawson Scholarship—A scholarship of \$50 will be awarded to the undergraduate student standing highest in the Geological Engineering course, in geological subjects, in the Third Year of the Faculty of Applied Science, and proceeding to the Fourth Year.

Golder, Brawner and Associates Scholarship—A scholarship of \$100, gift of Golder, Brawner and Associates, Vancouver, will be awarded to the undergraduate in Civil Engineering with the highest standing in the subject of soil mechanics, who is continuing in the next year of his course. The award will be made on the recommendation of the Department of Civil Engineering.

The Harold Puxton Memorial Scholarship (Society of Automotive Engineers, B.C. Section)—This scholarship is offered by the Society of Automotive Engineers, British Columbia Section, in memory of the late Harold Puxton. It will be awarded to a student who is an active member of the student branch of the Society on the campus. Candidates will be considered on the basis of academic standing, interest and ability in the field of automotives, and financial need. The award will be made at the close of the session on the recommendation of Departments concerned.

The Hoffars Ltd. Scholarship in Machine Design and Applied Mechanics -This scholarship, to the value of \$300, the gift of Hoffars Ltd., will be awarded to a student with an outstanding record in Third Year Mechanical Engineering who is proceeding to the Final Year of the course leading to the degree of Bachelor of Applied Science. The award will be made to the student with the highest aggregate standing in courses in the area of machine design and applied mechanics.

The Ingledow Scholarships in Engineering—Two scholarships of \$150 each, the gift of Dr. T. Ingledow, P.Eng., are offered annually to students in the B.A.Sc. course. One of these scholarships will be awarded in the spring to a student completing the Second Year and the other in the fall to a student entering the First Year. They will be awarded to students of outstanding merit and promise. The winner of the Second Year scholarship must be an engineering pupil of the Association of Professional Engineers of British Columbia, and the winner of the First Year scholarship will be required to enroll before receiving the award.

Kennecott Copper Corporation Scholarship in Mining—This scholarship of \$1000, gift of Kennecott Copper Corporation, New York, will be awarded to a student entering the Third or Fourth Year of the course leading to the degree of B.A.Sc. in Mining Engineering. Selection will be based on (1) proficiency in studies; (2) enthusiasm, leadership, co-operativeness, initiative, and ambition; (3) good health and sturdy constitution; (4) financial need. Proficiency in studies is given prime importance and other factors are considered in the order listed. Intending applicants should consult the Dean of Inter-Faculty and Student Affairs before January 31st.

Lafarge Scholarship in Civil Engineering—A scholarship of \$500, the gift of Lafarge Cement of North America Ltd., is offered to students entering the Senior Year of Civil Engineering. The winner will be selected on the basis of proficiency in studies, character, and personal qualities, with preference beng given to those with outstanding records in structural design, concrete design, or foundation courses.

The Lambert Scholarship—A scholarship of \$400, the gift of Brigadier Noel D. Lambert, will be awarded annually to the student obtaining highest standing in the Third Year of Civil Engineering and proceeding to the Fourth Year of that course.

Lefevre Gold Medal and Scholarship-As on page 11.

The Letson Memorial Prize—This prize, the gift of Letson and Burpee Limited and consisting of books to the value of approximately \$25 and a cash award of \$100, will be awarded to the head of the graduating class in Mechanical Engineering.

The Lorne Manning Hill Memorial Scholarship—This annual scholarship of \$500, established by Mr. and Mrs. Henry L. Hill in memory of their son, Lorne Manning Hill, will be awarded to an undergraduate proceeding to the degree of B.A.Sc. in Mineral Engineering. Selection will be based on (1) proficiency in studies, (2) enthusiasm, initiative and leadership, (3) health, and (4) financial need, the factors being given in order of importance. First preference will be given to students entering the Second Year. Should no candidate in the Second Year be suitably qualified. First Year students who are clearly proceeding to a degree in Mineral Engineering will be considered. If, in any year, no award is made, two awards may be made in a subsequent year. Selection will be made by the Joint Faculty Committee on Prizes, Scholarships and Bursaries on the recommendation of the members of the Department of Mineral Engineering.

The Margaret Armstrong Scholarships—As a memorial to Anna Margaret Armstrong, these scholarships have been established to pay tribute to her devoted service through teaching and research for many years in the Department of Metallurgy, and to mark the affectionate esteem in which she was held by her colleagues and students. Two scholarships of \$500 each are offered annually to women students entering the penultimate year of an undergraduate degree programme in any branch of engineering, in honours chemistry, or in honours physics. They will be awarded primarily on the basis of academic standing.

The Mastodon-Highland Bell Mines Ltd. Scholarship—A scholarship of \$500, gift of Mastodon-Highland Bell Mines Ltd., is offered to students in Second Year Engineering who are proceeding to a degree in mineral engineering. It will be awarded to a student with good academic standing and with interest and aptitude for a career in mineral engineering.

Merrill Prindle Book Prize in Engineering—This prize, consisting of books to the value of \$50, the gift of a graduate of the University of B.C. to honour his parents and to recognize their contribution to his education, is offered annually to a student graduating in Engineering. It will be awarded on the basis of good academic standing, personal qualities, and character, combined with contributions through active participation in the Engineering Undergraduate Society. The books constituting the prize will be selected in consultation with the Dean of Engineering, from the fields of the liberal arts, humanities, and social sciences.

The Monsanto Canada Limited Scholarship in Chemical Engineering—A scholarship of \$750, gift of Monsanto Canada Limited, will be awarded annually to a student in Chemical Engineering who has completed the Third Year and is proceeding to the Final Undergraduate Year. The award will be made on the recommendation of the Head of the Department.

The Morgan Warren Scholarship—This scholarship, established and maintained as a memorial to Morgan Warren by his friends and colleagues, will be awarded annually to a student in Mechanical Engineering who has a special interest in the fields of heating, ventilation, and air-conditioning. It will be awarded on the recommendation of the Department to a student of good academic record and promise who is worthy and deserving of assistance. This scholarship, in the amount of \$100, will be supplemented by a loan of \$150, repayable after graduation.

The MacKenzie Swan Memorial Scholarship—A scholarship of the annual value of \$1000, given by Colonel W. G. Swan in memory of the late Catherine MacKenzie Swan who passed away December, 1961, and of their son, William MacKenzie Swan, an outstanding all-round undergraduate student and popular athlete, who died July 28th, 1937, as a result of injuries received in a fall from the Pattullo Bridge at New Westminster, on which he was engaged as Assistant Engineer, will be awarded to a student or students registered in the Second, Third or Fourth Year of the Faculty of Applied Science and requiring financial assistance to enable him or them to continue studies at the University. In making the award, consideration will be given to the academic record of the applicant and to his participation in undergraduate affairs.

MacMillan Bloedel Limited Scholarship for Mechanical or Chemical Engineering—One scholarship of \$500, the gift of MacMillan Bloedel Limited, is offered to students who will be entering the field of Mechanical or Chemical Engineering the following session. Awards will be made on the basis of academic standing, personal qualities and interest in the field. Students who wish to be considered for these scholarships should apply to the Dean of Inter-Faculty and Student Affairs by March 15th.

Northern Commercial Company Limited Scholarship—This scholarship of \$500, the gift of Northern Commercial Company Limited, Seattle, is available for students in Engineering. The award will be made to a student with high scholastic standing. In the selection of the winner, consideration will also be given to personal qualities and character, and to demonstrated aptitude in both practical and theoretical aspects of engineering. Preference and special consideration will be given to students from the Yukon Territory.

The Northwest Survey Corporation Scholarship—A scholarship of \$100, gift of the Northwest Survey Corporation, is offered annually to a student in Civil Engineering in the Faculty of Applied Science. It will be awarded to a student on completion of his Third Year, who is proceeding to the Final Year of Civil Engineering. The award will be made on the basis of his academic standing in general and his demonstrated interest in surveying, mapping and photogrammetry in particular. The recipient will be selected by the Department of Civil Engineering.

Ocean Cement Limited Civil Engineering Scholarship—A scholarship of \$250, donated annually by Ocean Cement Limited, is offered to students in Engineering. It will be awarded to a student who is completing Second or Third Year and is continuing in Civil Engineering at this University. The award will be made to a student who has an outstanding academic record and who, in the opinion of the Faculty, shows unusual promise and ability. The

winner must be enrolled as an engineering pupil with the Association of Professional Engineers of British Columbia.

Paper Industry Management Association Scholarship—A scholarship in the amount of \$500 (U.S.) for one academic year is offered by Paper Industry Management Association, Pacific Coast Division, to undergraduates majoring in chemical, civil, electrical, industrial or mechanical engineering. To qualify an applicant must have a good scholastic record and be in need of financial assistance to pursue his university studies. Preferably, candidates should be in the earlier part of their university programme. They must have an interest in a career in the pulp and paper industry and be willing to accept summer employment in a northwest pulp or paper mill. Although PIMA does not guarantee summer employment, it will assist in finding it. Interested students should consult the Dean of Inter-Faculty and Student Affairs before January 31st.

The Placer Development Limited Scholarships-Placer Development Limited offers several scholarships annually in each of the Second, Third and Fourth Years of Mineral Engineering. Subject to possible flexibility in individual cases permitted by the Company on the written recommendations from the Chairman of the University Scholarship Committee, the awards are as follows: (a) Three scholarships of \$500 each are available in the fall to students entering Second Year Engineering and proceeding to a degree in Mineral Engineering. The scholarships will be awarded to students who meet the academic requirements set by the University; preference will be given to students who accept employment with the Company during the summer period and who have good records of summer employment. (b) Three scholarships of \$750 each are available in the fall to the winners in (a), provided they maintain satisfactory academic standing and continue in the Third Year; preference will be given to those who accept summer employment with the Company and maintain satisfactory employment records. (c) Three scholarships of \$1000 each are offered to the winners in (a), (b) under the same conditions with respect to academic standing and employment, provided they continue in the Fourth Year. The winners of all scholarships will be selected by a committee of three, including a representative of the Company.

The Rayonier Canada (B.C.) Limited Scholarship in Chemical Engineering-Two scholarships of \$500 each, offered annually by Rayonier Canada Limited, are available to students in Third Year Chemical Engineering who are proceeding to the Final Year. The awards will be made to students whose academic and practical work of the year is, in the opinion of the Faculty, the most outstanding. Other factors being equal, however, preference will be given to the son or daughter of an employee of the Company.

The Rayonier Canada (B.C.) Limited Scholarship in Mechanical Engineering—This scholarship of \$500, offered annually by Rayonier Canada Limited, is available to students in Third Year Mechanical Engineering who are proceeding to Final Year. The award will be made to the student whose record in the academic and practical work of the year is, in the opinion of the Faculty, the most outstanding. Other factors being equal, however, preference will be given to the son or daughter of an employee of the Company.

The Read Jones Christoffersen Limited Scholarship in Civil Engineering— A scholarship of \$200, the gift of the firm of Read Jones Christoffersen Limited, Civil and Structural Engineers, Vancouver, is offered annually to students proceeding from the Third Year to the Fourth Year in Civil Engineering. The

award will be made to a student who has a good academic record and who, by his laboratory work, projects, summer and other experience, has demonstrated his promise and ability in both the academic and practical aspects of engineering. In selecting the winner, consideration will also be given to the financial circumstances of those who are eligible.

Royal Institution Scholarship in Applied Science—A scholarship of \$200 will be awarded for general proficiency in the work of the First Year to a student who is proceeding to the Second Year.

The R. Randolph Bruce Scholarship—Out of the proceeds of a fund bequeathed to the University of British Columbia by the late Honourable R. Randolph Bruce in memory of his term as Official Visitor, a scholarship of \$270 will be offered annually to the undergraduate student standing highest in the Metallurgical Engineering course in the Third Year in Applied Science and proceeding to the Fourth Year.

The Sherritt Gordon Mines Limited Mineral Engineering Scholarship— This scholarship, the gift of Sherritt Gordon Mines Limited, is offered annually to undergraduates in mineral engineering with satisfactory academic standing who are entering the Second or Third Year. If the winner is entering the Second Year he will receive \$700 in the Second Year, \$700 in the Third Year, and \$600 in the Fourth Year; but if he is entering the Third Year he will receive \$1000 in each of the Third and Fourth Years. A renewal is subject to maintenance of satisfactory academic standing. The award is tenable only at the University of British Columbia and cannot be held with other major scholarships. A candidate should apply for this scholarship through the Department of Mineral Engineering before the close of the second term. Applicants will receive consideration for summer employment at Sherritt Gordon Mines Ltd., Lynn Lake, Manitoba. The applicant's performance on the job will be taken into consideration in awarding the scholarship. The winner will be recommended for the award by the Department of Mineral Engineering in consultation with the Company.

The Society of Chemical Industry Merit Awards—As on page 79.

S. P. Slinn Scholarship in Engineering-A scholarship of \$100, the gift of S. P. Slinn Ltd., Consulting Engineers, will be awarded to a student in Engineering who is worthy and deserving of financial aid.

The Standard Oil Company of California Scholarship in Chemical Engineering—This scholarship of \$750, gift of Standard Oil Company of California, is offered to undergraduates in any year of Chemical Engineering. Selection of the winner will be made on the recommendation of the Department.

The Stephen Kenneth Nelson Memorial Scholarship—This scholarship was established by friends and classmates of Stephen Kenneth Nelson, who graduated in Geological Engineering from the University in May, 1963, and tragically lost his life while engaged in survey work in August of the same year. It serves to pay tribute, not only to his fine academic record, but also to his outstanding personal qualities. This scholarship will be awarded on the recommendation of the Department to a member of the Dawson Club entering the Final Year of Mining Engineering, Geological Engineering or Geology, whose overall qualifications are considered to be the most outstanding.

TPL Industries Ltd. Prizes—Prizes of the value of \$100, \$60, and \$30, together with three merit awards of \$20 each, given by TPL Industries Ltd., will be awarded to the students enrolled in the course of Engineering Law (C.E. 476) of the Fourth Year of Civil Engineering in the Faculty of Applied Science who submit specifications, judged to be the best, of a structure of modern engineered timber construction requiring preservative treatments. The awards will be made upon the recommendation of the donors in collaboration with the instructor in charge of the course.

University Scholarship in Applied Science—A scholarship of \$200 will be awarded to the student who obtains the highest marks in the Second Year in Engineering and who is proceeding to the Third Year.

The Western Canada Steel Limited Scholarship in Metallurgy—A scholarship of \$1000, the gift of Western Canada Steel Limited, is offered annually to a student who has completed the Second Year in Applied Science and is proceeding to Metallurgical Engineering at this University. The winner of this scholarship will receive \$500 during each of the Third and Fourth Years, payment in the Fourth Year being dependent upon satisfactory standing in the previous years. Selection will be based on: (1) proficiency in studies; (2) interest in and aptitude for work in metallurgy; and (3) character and qualities of leadership. If no suitable candidate applies, the award will be withheld and two scholarships will be available in the following year. Intending applicants should consult the Dean of Inter-Faculty and Student Affairs before April 30th.

The William McMahan Scholarship—A scholarship of approximately \$600, established and endowed by William McMahan, Esq., Vancouver, is offered annually to students entering their Second, Third, or Final Year in chemical, civil, electrical, or mechanical engineering, or in forestry or forest engineering. This scholarship is open to sons and daughters of employees of the Logging Divisions, the Pulp Division, or the Head Office Division of Canadian Forest Products Ltd., or, failing a suitable candidate from these divisions, to sons and daughters of employees in other divisions of the Company. If, in the judgment of the University, there are two students deserving of the award, it will be divided between them. If no such candidate is available, or, in the opinion of the University, no candidate has a sufficiently good academic record to merit the award, the University may grant the scholarship to a worthy and deserving student in Engineering or Forestry from the student body at large. Candidates in the preferred categories should submit their names and details of family service with the Company to the Dean of Inter-Faculty and Student Affairs by March 15th.

# In Forestry

The Association of British Columbia Foresters Prizes—Three prizes of the value of \$25, \$50, and \$125 are offered by the Association of British Columbia Foresters in the name of the late Dr. George S. Allen, past president, past Dean of Forestry, distinguished forest scientist and noted forester, for competition by students in the Faculty of Forestry. A prize of \$25 is awarded for the best summer essay (Forestry 298) in Second Year Forestry, and one of \$50 for the best summer essay (Forestry 398) in Third Year Forestry. A prize of \$125 is awarded for the best B.S.F. Thesis (Forestry 498). The successful essays and thesis may be made available by the Faculty to the Council and Members of the Association.

The British Columbia Loggers' Association Forest Protection Scholarship—The B.C.L.A. Forest Protection Scholarship amounting to \$300 per annum was established by the British Columbia Loggers' Association to encourage graduates and undergraduates in the work of forest protection. This scholarship is available to Forestry students registered in the Second or a higher year at the University of British Columbia. The award will be made on the recommendation of the Faculty of Forestry. Applications, on forms available, at the office of the Dean of Inter-Faculty and Student Affairs, should be received by March 15th, but in the event that the award is not made in the spring,

further applications will be invited in the fall. In making the award, special desire and aptitude for research in forest protection will be governing factors. Due weight will also be given to scholastic standing and physical fitness. In November, 1966, the Association amalgamated with other forest industry associations on the Coast and is now known as the B.C. Loggers' Division of the Council of the Forest Industries of B.C.

The Canadian Forest Products Ltd. Prizes in Forestry—Two prizes of \$100 each, the gift of Canadian Forest Products Ltd., will be awarded to students graduating in Forestry with the degree of B.S.F., in the Harvesting Option. The awards will be made on the basis of proficiency in the work of the final two years. In the event that candidates in the Fourth Year do not qualify, the prizes may be awarded to students in the Second or Third Years in these fields who have obtained high standing in the final examinations.

The Canadian Forest Products Ltd. Scholarships in Forestry — Two scholarships of \$250 each, the gift of Canadian Forest Products Ltd., will be awarded to the students attaining highest standing in the Third Year of the Harvesting Option of the B.S.F. course and proceeding to the Fourth Year. In the event that students entering the Fourth Year do not qualify, the scholarships may be awarded on the basis of proficiency to students in these courses proceeding to the Second or Third Year.

The Canadian Forestry Association (B.C. Branch) Scholarship—As on page 81.

Commonwealth Forestry Bureau Book Prize—This prize, gift of the Commonwealth Forestry Bureau, Oxford, and consisting of a year's issue of Forestry Abstracts, is awarded to the outstanding student in the graduating class.

The David Bell Little Memorial Scholarship—A scholarship of \$100, established as a memorial to David Bell Little, B.S.F. (1958), by his friends and family, is offered to Second Year students in the Faculty of Forestry who are proceeding to the Third Year. It will be awarded to the student who, in the opinion of the Faculty, is most outstanding in those qualities of character and leadership, promise and interest in forestry, and scholarship for which David Little was distinguished in his undergraduate and graduate studies at this University.

The Dr. G. S. Allen Scholarship in Forest Genetics—A scholarship of \$100 has been donated by the Alumni and Faculty of Sopron Division, Faculty of Forestry, in memory of the late Dean G. S. Allen, for his magnanimous help during the years when the Hungarian Forestry School was in operation on the U.B.C. campus. The scholarship will be awarded annually to the undergraduate forestry student obtaining highest standing in Forest Genetics.

The Finning Tractor & Equipment Ltd. Scholarships-As on page 50.

Forestry Summer Camp Scholarship—A scholarship of \$75, donated by F. Malcolm Knapp, Professor Emeritus of Forestry, will be awarded to the Third Year student obtaining the highest marks at the Forestry Summer Camp. To be eligible the student must have been an active participant during ninety per cent of the camp period. Leadership and participation will be considered in making the award.

The Galt Elkington Memorial Scholarship—A scholarship of \$450 has been endowed by Dr. and Mrs. Eric H. W. Elkington of Victoria in memory of their son, Galt Elkington, B.Sc., B.A. (McGill), a graduate student at the University of B.C. who lost his life by drowning in August, 1955, while employed with the B. C. Forest Service. In recognition of his special interest in forestry, this scholarship will be awarded annually to a student in the

Faculty of Forestry who is completing the Third and proceeding to the Final Year. In making the award, consideration will be given, not only to academic standing, but also to personal qualities, character, and interest and promise in the field of Forestry.

The H. R. MacMillan Scholarships in Forestry—Through the generosity of H. R. MacMillan, Esq., C.B.E., D.Sc., LL.D., four scholarships to the total of \$600 will be available for students in Forestry. These awards are as follows:

- (a) a scholarship of \$200 for the student with the highest standing in Second Year Forestry;
- (b) a scholarship of \$100 for the student in Second Year Forestry with the next highest standing;
- (c) a scholarship of \$200 for the student with the highest standing in First Year Forestry;
- (d) a scholarship of \$100 for the student in First Year Forestry with the next highest standing.

These awards are available only for those who continue their course in Forestry in the following session.

The H. R. MacMillan Prize in Forest Harvesting—A prize of \$100, the gift of H. R. MacMillan, Esq., C.B.E., D.Sc., LL.D., will be awarded to the student graduating with highest standing in the Forest Harvesting option.

The John E. Bier Memorial Prize in Forest Pathology—As a memorial to Dr. John E. Bier, who served with distinction as Professor in Biology and Botany, and in Forestry, his colleagues and friends have established a prize. This prize will be awarded annually to the most outstanding student in the forest pathology portion of Forestry 351.

The Kapoor Singh Scholarship in Forestry—Through the generosity of Mr. Kapoor Singh Siddoo, a scholarship of \$250 is offered annually to students in Forestry. The award will be made to a worthy student, deserving of assistance, with high academic standing (First Class).

MacMillan Bloedel Limited Scholarships for Forestry—As on page 78.

Prince George Forestry Scholarship—A scholarship of \$200, donated by the Industrial Forestry Service Ltd., is offered annually to a graduate of a Prince George High School or College who has at least second class standing in Grade XIII or First Year Forestry. It will be awarded by the University of B.C. Scholarship Committee on the recommendation of a special committee chosen from Industrial Forestry Service Ltd., the B.C. Forest Service in Prince George, and a local Prince George industrial concern. Applications should be submitted to the University of British Columbia by May 31st. If no student qualifies the amount of the scholarship will be contributed to the Prince George Forestry Loan Fund and will be available for loan without interest to any student in forestry.

The Rayonier Canada (B.C.) Limited Scholarship in Forestry—Two scholarships of \$500 each, the gift of Rayonier Canada Limited, are offered annually to students in the Third Year of the B.S.F. course who are proceeding to the Final Year. The awards will be made to the students whose records in the Third and lower years of Forestry are, in the opinion of the Faculty, the most outstanding. Other factors being equal, however, preference will be given to the son or daughter of an employee of the Company.

Ted Johnson Scholarship in Forestry—In memory of Edward (Ted) William Johnson, who lost his life in September, 1964, prior to continuing his studies in Fourth Year Forestry, his classmates and friends have established a scholar-

ship. This scholarship, in the amount of \$50, will be awarded to the student in the Wildlife Option in Forestry, who is an active member of the Forest Club, and who obtains the highest average and is entering the Fourth Year of Forestry. A minimum standing of Second Class is required.

The Truck Loggers Association Scholarships—As on page 92.

The William McMahan Scholarships—As on page 55.

### In Home Economics

The Agnes Merle Turnbull Scholarship—A scholarship in the amount of approximately \$170, endowed by Mrs. Agnes Graham Turnbull in honour of her daughter, Agnes Merle Turnbull Porter, is offered annually to the highest ranking student in First Year Home Economics who is proceeding to the Second Year.

The B.C.D.A. Scholarship in Dietetics—A scholarship of \$100, the gift of the British Columbia Dietetic Association, will be awarded annually to a student in the graduating year who has taken a dietetic major. The award will be made to a student who has high academic standing, and has shown potentialities for success in her chosen field. Those eligible shall be proceeding to a dietetic interneship in Canada and shall indicate intention of continued practice in the field of dietetics.

The British Columbia Parent-Teacher Federation Scholarship—As on page 43.

The Clothing and Textiles Scholarship—This scholarship of \$100, gift of a graduate of the School of Home Economics of this University, is offered annually to students entering the Final Year of the Programme leading to the B.H.E. degree. It will be awarded to the student selected by the School who has excelled in the fields of clothing and textiles and who, preferably, has taken or will take a course or courses in Marketing, such as Commerce 261.

The Dr. Alice Ravenhill Memorial Scholarship—This scholarship of \$200, established from the bequest of the late Dr. Alice Ravenhill, will be awarded to the student obtaining highest standing in the Second Year of the Home Economics Course and proceeding to the next year.

The Jessie L. McLenaghen Scholarship—This scholarship has been established as a tribute to the late Dr. Jessie L. McLenaghen, Provincial Director of Home Economics from 1926 to 1946, in recognition of her leadership in the development of Home Economics in this Province. Dr. McLenaghen received an Honorary doctoral degree from the University of British Columbia on the twenty-first anniversary of the establishment of the School of Home Economics. An award of \$200 will be made to a graduate of the School of Home Economics who will be entering the fifth year program in education in order to prepare herself as a teacher of Home Economics. This award will be made in September.

The Lillian Mae Westcott Prize—This prize will be awarded annually to the senior student in Home Economics who has been outstanding in the areas of clothing and textiles throughout her course.

The Mary Graham Holland Scholarship for Home Economics—A scholarship of \$700, endowed from a bequest made by the late Mrs. Mary Graham Holland, will be awarded annually to a woman student who has completed her Third Year and is entering upon the Fourth or Fifth Year of study at this University in the School of Home Economics or in any other school or faculty in which instruction in home economics is offered. This scholar-

ship will be given to the student considered by the School of Home Economics to be the most deserving of the award.

The Russell Food Equipment Limited Scholarship—A scholarship of \$350, the gift of Russell Food Equipment Limited, will be awarded annually to a high ranking student taking a dietetic major and entering the Fourth Year in the School of Home Economics. The award will be made to a student who has maintained high academic standing in the three previous years, has demonstrated personal qualities appropriate for a professional dietitian, has spent at least one University summer vacation in the dietary or food service department of an approved institution, and will complete professional preparation through interneship. The selection of the winner will be made by the School.

The Singer Company of Canada Ltd. Prize—A portable electric Singer Sewing Machine, the gift of the Singer Company of Canada Ltd., will be awarded to a high ranking student in the graduating class in Home Economics who has shown originality and skill in the field of clothing and who intends to enter the field of teaching. The prize will be awarded on the recommendation of the School of Home Economics.

The Vancouver and District Home Economics Association Scholarship-As on page 93.

The Vancouver Women's Canadian Club Scholarship in Home Economics —A scholarship of \$100, the proceeds of a fund created by the Vancouver Women's Canadian Club, will be awarded for general proficiency in the work of the Third Year of the Home Economics course to a student proceeding to the Fourth Year of that course.

### In Law

The Allan S. Gregory Memorial Prize—Prizes totalling \$200, the gift of Ladner, Downs, Ladner, Locke, Clark and Lenox, will be awarded annually to the two students in Third Year Law, who, in the opinion of the Faculty, have displayed greatest merit in Moot Court work. A first prize of \$125 will be paid to the most outstanding student and a second prize of \$75 will be paid to the other student.

The Armstrong, Brawner and Speton Scholarship—This scholarship of \$300, gift of Armstrong, Brawner and Speton, Barristers and Solicitors, will be awarded to a deserving Second Year Law student who, in the opinion of the Selection Committee of the Faculty of Law, has shown good scholastic ability and proven character, responsibility and initiative, and who is not the recipient of any other legal scholarship.

The Boughton, Street & Company Prize in Law—A prize of \$150, gift of Boughton, Street & Company, Barristers and Solicitors, Vancouver, B.C., is offered annually in the Faculty of Law. It will be awarded to a student in the Faculty with a good academic record and with proficiency in a field or fields of legal studies.

Campney, Owen & Murphy Scholarship-A scholarship of \$300, gift of Campney, Owen & Murphy, Barristers and Solicitors, Vancouver, B.C., is offered annually in the Faculty of Law. It will be awarded to a student in Second Year for excellence in legal studies and superior academic accomplishment.

The Canada Law Book Limited Prizes—A book prize to the value of \$50, the gift of the Canada Law Book Limited, is available annually for students in each year of the Law course. The awards will be made to students obtaining high marks in one or more courses.

The Canada Permanent Mortgage Corporation Prize—A prize of \$50, the gift of the Canada Permanent Mortgage Corporation, will be awarded annually to the student in the Third Year of Law obtaining the highest standing in the course on Mortgages.

Canada Permanent Trust Company Prize in Trusts—A prize of \$100, the gift of Canada Permanent Trust Company, will be awarded to the student in the Third Year of Law obtaining the highest standing in the

course on Trusts.

The Carswell Company Limited Prizes—The Carswell Company Limited, Law Publishers, Toronto, offers annually three book prizes of the value of \$35 each. Of these prizes, one will be awarded in each year of the Law course to the student obtaining highest standing in that year.

C.H.A.P. Copy Ltd. Scholarship—A scholarship of \$100, gift of C.H.A.P. Copy Ltd., is offered annually in the Faculty of Law. It will be awarded on the recommendation of the Selection Committee of the Faculty to a worthy student who has a good academic record and is deserving of financial assist-

ance.

The Class of Law '53 Scholarship Fund—A scholarship of \$200, gift of the Class of Law '53, will be awarded to a student in Law. The winner will be selected on the basis of scholastic achievement combined with need for financial assistance. Contributions from members of the Class are used to provide the annual scholarship and to establish a fund for maintaining

the scholarship in the future.

The David Neil Hossie, Q.C., Scholarship in Corporation Law—This scholarship of \$150, given by his wife and family in memory of David Neil Hossie, D.S.O., Q.C., B.A. (Sask.), Rhodes Scholar, B.A., M.A. (Oxford), serves to pay tribute to his fine personal qualities, his distinguished military record in the First World War, and his outstanding record in the legal profession. To commemorate his special professional interests, this scholarship will be awarded, on the recommendation of the Faculty of Law, to a student attaining high proficiency in the field of Corporation Law.

The Diana and P.AE Irving Scholarship Trust Fund—From this fund, bequeathed by the late Diana Ogilvy Irving, two scholarships of \$1000 each, will be awarded annually to students entering the First Year of Law. The scholarships will be awarded by the Joint Committee on Prizes, Scholarships and Bursaries, designated as the Trustees, to deserving students of promise and distinction, who without financial assistance would have difficulty in pursuing their studies. Preference is given to native born British Columbians. Provided the winner maintains good academic standing and is in need of assistance, his award may be renewed in each of the Second and Third Years.

The Faculty of Law Legal Writing Prize—A prize of \$100 provided by the Faculty of Law is awarded annually for the best piece of legal writing done by a law student. The work submitted may be on any subject relating to law and may be done independently or to fulfil a course requirement. All contributions will be made available to the editors of the Law Review. Further details of the competition will be announced at the beginning of the session.

The Farris, Farris, Vaughan, Wills & Murphy Scholarship—A scholarship of \$200, gift of Farris, Farris, Taggart, Wills & Murphy, Barristers and Solicitors, Vancouver, B.C., will be offered in the Faculty of Law. It will be awarded to a studeent with an outstanding academic record.

The Griffiths, McLelland & Co. Prize in Torts—This prize of \$100, the gift of Griffiths, McLelland & Co., Barristers and Solicitors, is offered annually to the student in Law obtaining the highest standing in the law of torts.

The Harold and Anne Joseph Prize in Law—This prize of \$25, gift of Harold R. Joseph, LL.B., is open to first year students in Law. It will be awarded after the mid-term examinations to a student selected by the Faculty of Law on the basis of character and on enthusiasm for, and promise of success in, the practice of law, and who is not the recipient of other scholarship awards.

The Harper, Gilmour, Grey & Co. Scholarship—This scholarship of \$100, the gift of Harper, Gilmour, Grey & Co., Barristers and Solicitors, Vancouver, B.C., will be awarded annually for proficiency in the First Year of Law.

The H. Carl Goldenberg Book Prize—This book prize, the gift of H. Carl Goldenberg, Esq., S.M., O.B.E., Q.C., LL.D., Montreal, Que., will be awarded annually to a deserving student in the Faculty of Law.

The Hon. R. L. Maitland Memorial Scholarship—A scholarship of \$280, initiated by the Primrose Conservative Club of Vancouver on behalf of friends of the late Hon. R. L. Maitland, K.C., will be awarded to the student who attains the highest standing in the Second Year of the Law course and is proceeding to the Third Year of that course.

The Insurance Company of North America Prize in Insurance Law—H. C. Mills Memorial Award—A prize of \$200, gift of the Insurance Company of North America, is offered annually in the Faculty of Law. It will be awarded to the student obtaining the highest standing in the final examinations in the subject of Insurance Law. In the event of a tie, the award will be divided.

Judge Schultz Prize in Criminal Law—A prize of \$100, the gift of His Honour Judge William A. Schultz, a Judge of the County Court of Vancouver, will be awarded to the student in the Second Year of Law who obtains highest standing, as determined by the final examinations, in the subject of Criminal Law.

The Ladner Prizes in Law—Prizes to the total of \$100, the gift of Leon J. Ladner, Esq., Q.C., LL.D. will be awarded annually to students in the Faculty of Law. The awards will be made on the recommendation of the Faculty to students who have obtained high standing either in special fields or in the whole year's work.

The MacIntyre Memorial Fund—To honour the memory of Malcolm M. MacIntyre, Professor in the Faculty of Law at this University from 1948 to 1964, and to pay tribute to his outstanding abilities as a teacher, his kindness and generosity to students, and his exceptional courage and devotion to duty, members of the legal profession, colleagues, and students have established a fund providing an award, at present in the amount of approximately \$100, to be presented annually to a promising student proceeding to Second or Third Year Law. The award will be made to a student who, though not necessarily among the leaders of his class, is in the opinion of the selection committee deserving of financial assistance.

The Norman MacKenzie Prize in Public International Law—In honour of Dr. Norman MacKenzie a prize of \$125, established and endowed by an anonymous donor, is offered annually to the student in Law obtaining the highest standing in Public International Law.

The Panvini Scholarship Fund in Law—The income on a bequest from the late Frank Panvini provides scholarships and bursaries annually for students in the Faculty of Law. Awards will be made, by the Joint Faculty Committee of the University and the Dean of the Faculty of Law, to students with outstanding academic records, or with high scholastic standing combined with need for financial assistance.

Patrons of the Law Review Prize—A prize of \$100, the gift of the Patrons of the University of British Columbia Law Review, will be awarded annually to a student in the Faculty of Law of the University of British Columbia. To be eligible the candidate must display the following qualities: (a) He must have obtained a satisfactory academic standing at the University of British Columbia. (b) If he is a student in the first or second year of law, he must give assurance that, if selected, he will continue in the next regular session in a full programme of studies in the Faculty of Law at the University of British Columbia. (c) If a student is in the third year of a Bachelor of Laws programme, he must give assurance that, if selected, he will continue in the next regular session in a full programme of graduate legal studies at a university. (d) He must be in financial need. Preference will be given to students who, in addition to meeting the above requirements, have been active in the affairs of the Law Students Association, the University of British Columbia Law Review, or other student activities in connection with the Faculty of Law. The winner of the prize will be selected by the Scholarship Committee of the University of British Columbia on the recommendation of the Faculty of Law. To be eligible for consideration students must apply for the Law Review prize to the Faculty of Law on or before February 1st. The application should be accompanied by a statement by the candidate of the reasons why he should receive the scholarship.

The Robie L. Reid Scholarship—This scholarship, gift of Sutton, Braidwood, Morris, Hall & Sutton, Barristers and Solicitors, Vancouver, B.C., is in honour of the memory of Robie L. Reid, K.C., who served with W. A. Sutton, Q.C., and other predecessors of the present firm and won distinction for his scholarly interest in Canadian literature and history. In the amount of \$200, it will be awarded annually to an outstanding student in the Faculty of Law.

The Russell & DuMoulin Scholarship—A scholarship of \$400, the gift of Russell & DuMoulin, Barristers and Solicitors, Vancouver, B.C., will be awarded annually to an undergraduate in Law. The winner will be selected on the basis of hard work and achievement coupled with need for financial assistance.

Special Book Prize—A book prize of the value of \$25, the gift of an anonymous donor, will be awarded in May to a student in the Second Year who obtains high scholastic standing and is not the recipient of another scholarship or prize.

The Superior Courts Judges' Scholarship—A scholarship of \$300, provided by Members of the Court of Appeal and the Supreme Court of British Columbia, is offered annually in the Faculty of Law. It will be awarded on the basis of proficiency to a student who has completed the First or Second Year with high standing and is proceeding to the next higher year. At the discretion of the Faculty the sum may be divided to provide two scholarships of \$150 each.

The Thomas Francis Hurley Prize—A prize of \$150, gift of Isaac Shulman, Esq., in memory of Thomas Francis Hurley, is offered annually in the Faculty of Law. It will be awarded on the recommendation of the Faculty to the student obtaining the highest mark in the Criminology Seminar offered in the Third Year.

# In Librarianship

Alcuin Society Prize—This prize, and a copy of one of its publications, are offered annually by the Alcuin Society to the student in the School of

Librarianship attaining the highest standing in the course "History of the Book". The award will be made on the recommendation of the School.

The Gladys Ledingham Award—A cash award of \$75, gift of the Victoria and District Parent-Teacher Council, is offered to students who have graduated from the University of Victoria, the University of British Columbia, or Simon Fraser University. It will be awarded to a student selected by the School of Librarianship, University of B.C., who has been accepted for the Bachelor of Library Science degree. The winner will be selected by the School of Librarianship on the basis of need and scholastic ability. Application should be made on the University Bursary Form by July 15th.

The H. W. Wilson Scholarships—One or more scholarships, given by the H. W. Wilson Foundation, Inc., New York, are available for students intending to adopt librarianship as a profession. The winners will be selected by the School on the basis of academic record, ability, financial need, and promise of success in the field of librarianship. Application forms may be obtained from the School of Librarianship, The University of British Columbia, Vancouver 8. B.C.

The Marian Harlow Prize in Librarianship—A cash prize of approximately \$25 will be awarded to a student in the graduating class of the School of Librarianship. The prize will not necessarily be awarded annually. It will be given to that student who has demonstrated leadership and academic or research ability in studies relating to special librarianship.

#### In Medicine

The Arthur Crease Award—This prize of \$300, the gift of the Section of Psychiatry of the British Columbia Medical Association, is offered to the student in the graduating class of the Faculty of Medicine who presents the best graduating thesis or essay on a psychiatric subject.

The B.C. Federation of Women Doctors Scholarship in Medicine—A scholarship of \$200, the gift of the B.C. Federation of Women Doctors, is offered annually in the Faculty of Medicine to a woman student who has completed at least one year of the medical course. It will be awarded to a student who has high standing, and shows promise of success in the medical profession. The winner will be selected by the Faculty of Medicine in consultation with the University Scholarship Committee.

B.C. Oto-Ophthalmological Society Prize—A prize of \$125, gift of the B.C. Oto-ophthalmological Society, is offered annually to the final year student who, during his academic year, has attained the best aggregate standing in the Department of Ophthalmology. Another prize of \$125 is offered annually by the Society to the final year student who, during his academic years, has attained the best aggregate standing in Otolaryngology.

The Bristol Laboratories Medical Prize—This prize, donated by Bristol Laboratories of Canada Limited, consists of medical texts and/or books, the contents of which deal at least in part with the disciplines of Therapeutics and Pharmacology. Selection of the books, to the value of \$125, will be made by members of the clinical Faculty. This prize will be awarded annually to a student in the third year class in the Faculty of Medicine who has exhibited superior general scholastic ability throughout the first two years of the medical course.

British Pacific Life Insurance Company Scholarships in Medicine—Two scholarships of \$125 each, the gift of the British Pacific Life Insurance Company of Vancouver, are offered annually to students in Medicine proceeding from the Third to the Final Year. They will be awarded, on the recommendation of the Faculty, to students who have a better than average academic record, have shown promise and ability in the medical field, and who require financial assistance.

The Charles Leonard Gorvich Memorial Scholarship—To honour the memory of Charles Leonard Gorvich, Fairview Branch No. 178 of the Royal Canadian Legion offers annually a scholarship of \$100. This scholarship will be awarded on the basis of academic merit to an outstanding student who has completed pre-medical requirements and is continuing studies in First Year Medicine.

CIBA Company Limited Medical Prize—This prize, gift of CIBA Company Limited (Dorval, Quebec), consists of six volumes of medical illustrations on the nervous system, reproduction system, digestive system, and endocrine systems. It is awarded annually on the recommendation of the Faculty of Medicine.

The CIBA Prize in Psychiatry—A prize of \$100, the gift of CIBA Company Limited, Montreal, is offered annually to students in the Final Year of the course leading to the degree of M.D. It will be awarded to the student who is considered to be the most outstanding in the subject of psychiatry. The award will be made on the recommendation of the Department.

The College of Physicians & Surgeons Medical Entrance Scholarship—A scholarship of \$750 a year for two years, the gift of the College of Physicians & Surgeons of British Columbia, is offered annually in competition to students entering First Year Medicine, University of B.C. It will be awarded by the Faculty of Medicine to a student with outstanding academic and other qualifications. Renewal of the award for the Second Year will be subject to maintenance by the winner of good standing during the First Year.

Crown Zellerbach Canada Foundation Scholarship in Medicine—A scholarship of \$600, the gift of Crown Zellerbach Canada Foundation, will be awarded annually to a student who has completed at least the first two years in Medicine and is proceeding to his Third or Fourth Year. Selection of the winner will be made by the Faculty on the basis of academic record, character and personality, and promise in his chosen field.

The C. V. Mosby Company Scholarship Book Award—Five prizes, each consisting of the choice of a book up to the value of \$30, are offered annually by The C. V. Mosby Company, Toronto, Ontario, to medical students showing excellence or promise in a field or fields of their studies. Names of winners will be announced at the end of the session.

The Dean M. M. Weaver Medal—A silver medal, awarded initially by the late Dean M.M. Weaver on the occasion of the graduation of the first class in Medicine and made possible by him through a permanent endowment, will be awarded annually to a student in the graduating class whose record and progress throughout the four years have been outstanding.

The Dr. A. B. Schinbein Memorial Scholarship—This scholarship of \$250 was established by Mrs. A. B. Schinbein and Dr. John E. Schinbein in memory of Austin Birrel Schinbein, O.B.E., M.B., F.A.C.S., F.R.C.S. (Canada), who was for many years Chief Surgeon at Shaughnessy Hospital and Consulting Surgeon at Vancouver General Hospital. Dr. Schinbein was outstanding in his profession and, as a member of Senate and the Board of Governors of this University, took an active part in the establishment of the Faculty of Medicine. This scholarship is awarded annually to the medical student of the Fourth Year obtaining the highest standing in the subject of surgery.

The Dr. A. E. Trites Memorial Prize-From a fund, established by friends

and colleagues of Dr. A. E. Trites to honour his memory, a prize of \$150 is offered annually to the student in the Third Year with highest standing in Obstetrics and Gynaecology. The award will be made on the recommendation of the Department.

The Dr. A. M. Agnew Memorial Scholarship-To honour the memory of Dr. Alec M. Agnew, first Head of the Department of Obstetrics and Gynaecology, this scholarship of the annual value of \$200 has been established by his friends, colleagues, and family. It will be awarded to the student in the Final Year who is most proficient in Obstetrics and

Gynaecology.

The Dr. Frank Porter Patterson Memorial Scholarship—This scholarship of \$150 has been established by the Primrose Club of Vancouver in memory of the late Dr. Frank Porter Patterson, Chief of Orthopaedic Surgery at the Vancouver General Hospital and one-time member of the Board of Governors of the University of British Columbia. It will be awarded to a student graduating from the Faculty of Medicine who, in the Fourth Year, has meritoriously pursued the course in surgery and displayed a special interest in orthopaedic surgery, and is proceeding to his interneship.

Dr. Ernest Roland Myers Scholarship Fund-This fund, a bequest from the late Dr. E. R. Myers, provides annual scholarships for promising and deserving students who are pursuing studies in the Faculty of Medicine and who merit financial assistance. The awards will be determined at the discretion of the Joint Faculty Committee on Prizes, Scholarships and Bursaries.

The Dr. H. A. Henderson Memorial Medal—A silver medal, the gift of friends and colleagues in memory of Dr. H. A. Henderson, will be awarded to the student recommended by the Department who has demonstrated proficiency and promise in Obstetrics and Gynaecology in the Third Year.

The Dr. H. L. W. Turnbull Memorial Scholarship—In memory of Dr. H. L. W. Turnbull (1880-1950) and in testimony of his marked devotion to the study and practice of medicine as a measure of help to men and women, this scholarship has been founded by his family. The scholarship has a value of \$500 and will be awarded annually to the student in the Faculty of Medicine who completes the Second Year with the highest aggregate standing in the pre-clinical subjects and is proceeding to a

The Dr. J. H. MacDermot Award—In honour of Dr. Jack MacDermot, who for many years gave devoted service to the development of medical journalism in British Columbia, the British Columbia Medical Association in 1967 established an annual award of \$100. This award will be made to the Faculty of Medicine Undergraduate Journal to provide prizes for articles or, in some

similar manner, to encourage improved standards in medical writing.

The Dr. Lachlan Neil MacKechnie Memorial Entrance Scholarship—As a memorial to Dr. L. N. MacKechnie (1863-1926), a modest, highly esteemed and self-effacing man, who first practised his profession in Victoria and Vancouver as early as 1893, and as a tribute to his devotion in public and private life, a scholarship has been established by his widow, Mrs. L. N. MacKechnie, and family. This award in the amount of \$500 is offered annually to students entering First Year Medicine, University of British Columbia, with consideration not only of academic standing, but also of character, financial circumstances and the promise of success in a medical career.

The Dr. Lavell H. Leeson Memorial Scholarship—As a memorial to Dr. Lavell H. Leeson, and as a tribute, both to his devotion to the study and Practice of medicine and also to his public and private friendships, a scholarship has been established in the Faculty of Medicine by his family, colleagues and friends. This scholarship, in the annual amount of \$100, will be awarded by the Faculty to a student with high academic standing who shows promise in his chosen profession.

The Dr. Peter H. Spohn Memorial Prize—As a memorial to Dr. Peter Howard Spohn, F.R.C.P. (C), who lost his life in a drowning accident in 1960, and as a tribute to the high esteem in which he was held, his many friends and colleagues have endowed a prize in the field of paediatrics. A former student of the University of British Columbia, a graduate in Medicine of Toronto and, at the time of his death, Associate Clinical Professor of Paediatrics in the Faculty of Medicine at this University and Chief of the Paediatric Service at St. Paul's Hospital, Dr. Spohn had won the respect and admiration of those in his profession, not only for his enthusiastic leadership, but also for his energetic interest in the special field of adolescent medicine. The prize, in the amount of \$150, will be awarded annually to a student in the graduating class who is outstanding in paediatrics.

The Dr. Wallace Wilson Leadership Award—An award to the value of \$100, given in appropriate form such as books, has been established and endowed by Dr. Wallace Wilson. It is offered annually to a graduate of the Faculty of Medicine of the University of British Columbia who, in the ten years following graduation, has demonstrated high ethical standards and outstanding leadership to the profession. In making this award factors such as professional community leadership, teaching, research, and personal participation in postgraduate education will be considered. The selection of the winner will be made by the Dean of the Faculty of Medicine and the Medical Alumni.

The Dr. Walter Stewart Baird Memorial Gold Medal—This medal, the gift of Mrs. W. S. Baird and Mrs. W. C. Gibson, will be awarded annually for the best student essay on a topic related to the history of Medicine, the winner to be selected by the Head of the Department of the History of the Health Sciences.

The Dr. W. A. Whitelaw Scholarship—As a memorial to Dr. W. A. Whitelaw his family has endowed a scholarship of \$250 which is offered to a student in the Final Year of Medicine who has good scholastic standing and needs financial assistance.

Dr. W. T. Kergin Memorial Scholarship—As a memorial to Dr. William Thomas Kergin and as a tribute to his fine personal qualities and outstanding public service in the practice of his profession, this scholarship of \$250 has been established in the Faculty of Medicine. It will be awarded to an undergraduate with a good academic record who is worthy and deserving of financial support. In making the award, preference will be given to students from Northern British Columbia or the Upper Coastal areas.

The Elizabeth K. Craig Memorial Scholarship—A scholarship of \$300 established as a memorial to Mrs. Charles E. Craig (B.A., U.B.C., 1942) by her husband, sisters, and brother, is offered to a graduate or undergraduate student who has a good academic record and shows ability and promise for research in medical fields. The award will be made to a student undertaking directed research in the summer period or in the winter session in the area of cancer or in some other area where medical investigation is important to human welfare.

The G. F. Amyot and S. Stewart Murray Prizes—Two cash prizes of \$100 each have been provided by a fund established and maintained by donations from the Health Officers of British Columbia to honour these two public health physicians who contributed greatly to the development of public health services in British Columbia and assisted in the establishment of the

Department of Health Care and Epidemiology, Faculty of Medicine. The prizes will be given to students, who have demonstrated leadership and academic or research ability, selected by the Department after consultation with the Health Officers' Council of British Columbia. The S. Stewart Murray Prize will be awarded for meritorious scholarship in the field of public health, preventive medicine or epidemiology; the G. F. Amyot Prize will be awarded for meritorious scholarship in the field of health care research and adminitrative medicine.

The Hamber Scholarships in Medicine—Three scholarships of \$750 each, the gift of the late Honourable Eric W. Hamber, C.M.G., B.A., LL.D., Chancellor of this University from 1944 to 1951 and Chancellor Emeritus from 1951 to 1960, are offered annually to students in the Faculty of Medicine. One of these scholarships will be awarded to the top ranking student in the Final Year who is proceeding to an interneship. The other two will be awarded to top ranking students proceeding to the Final Year.

The Hamish Heney McIntosh Memorial Prize—This prize, the gift of William George McIntosh, Vancouver, in memory of his brother, Dr. Hamish Heney McIntosh, will be awarded to the student in the Final Year of Medicine who, in the opinion of the Faculty, is best qualified in every respect to practice his profession. The prize consists of specially bound volumes of Cushing's "Life of Sir William Osler".

The Hoffmann-La Roche Limited Scholarship—This scholarship of \$200, the gift of Hoffmann-La Roche Limited, Montreal, will be awarded to an outstanding student for proficiency in pharmacology.

The Horner Prize and Gold Medal—This medal, known as the "Horner Gold Medal", and a cash prize of \$100, is awarded annually by Frank W. Horner Limited of Montreal, to the Fourth Year student with the highest aggregate standing in the four-year course in Medicine.

The H. Rocke Robertson Prize in Surgery—In recognition of the contribution made to the Faculty and to the Department of Surgery by Dr. Rocke Robertson, as first Professor and Head of Surgery, this prize is awarded annually to the Third Year student showing outstanding ability in the field of surgical studies.

The Ingram & Bell Limited Prize—A prize donated by Ingram & Bell Limited, Vancouver, will be awarded to a student in the graduating class of the Faculty of Medicine. This prize will be awarded to the student who, in the opinion of the Faculty, has the best overall qualifications in terms of standing, interest and participation in student affairs, character, and promise.

Irving Clinic Medical Entrance Scholarship—An award of \$500, consisting of a scholarship of \$250 and a bursary-loan of \$250, is offered annually by Irving Clinic, Kamloops, to a student entering First Year Medicine. It will be awarded to a student in Kamloops School District No. 24 who has resided in that area for five years. The winner will be selected on the basis of academic standing, promise of success in medical studies, and need for financial assistance by the Medical Screening Committee of the University of B.C., in consultation with the Irving Clinic. The bursary-loan portion of the award is to be repaid by the recipient one year after he has completed his medical training (including interneship). If, in any year, there is no qualified candidate, the amount of the scholarship will be placed in the Irving Clinic Scholarship Fund and may be used, with the consent of the donors, to provide additional awards in a future year to assist previous winners in higher years of their medical course, or for similar purposes.

The Dr. Jack Margulius Memorial Prize-To honour the memory of Dr.

Jack Margulius who, between the years 1937 to 1965, served with distinction and devotion as a specialist in the field of internal medicine, this prize has been established by his son-in-law and daughter, Dr. and Mrs. S. Morton Schloss. A graduate of the University of Manitoba in 1937, Dr. Margulius practiced in New Westminster until 1941. He then entered the Royal Canadian Army Medical Corps, and served overseas as Second-in-Command with Number Six General Hospital. In 1946 he resumed his practice in New Westminster. For eight years he was Chief of Medicine at Royal Columbian Hospital, and between 1948 and 1954, headed the Department of Cardiology which he himself had organized. Later he became Medical Advisor to the Director of the Department, and, at the time of his death, he was Chief of Staff at St. Mary's Hospital. In the amount of \$100, this prize will be awarded annually to a student in the Third or Fourth Year who has an outstanding record in internal medicine.

The Janet Hatfield Medical Scholarship—A scholarship of the annual value of \$200, the gift of Miss Janet Hatfield of Vancouver, is available for a student in the Faculty of Medicine. It will be awarded on the recommendation of the Joint Faculty Committee on Prizes, Scholarships, and Bursaries to a student who has a good academic record, has shown promise and ability in the medical field, and is worthy of financial assistance.

The Jean Guskin Memorial Scholarship-This scholarship, in memory of Jean Guskin, pays tribute to her outstanding qualities of character and honours her unselfish devotion to her family, friends and associates. Established by her husband and the firm of Aljean of Canada Limited, in the amount of \$1000, it is awarded annually to a graduate or undergraduate in Medicine whose academic record and personal attributes indicate promise of achievement in the treatment or investigation of human diseases, especially cancer. The winner will be selected by the Faculty.

The Joseph L. Jackson Prize in Anatomy—A prize consisting of a copy of the Pernkopf Atlas of Topographical Anatomy will be awarded to a student in First Year with high standing in Anatomy. The prize is awarded in honour of Dr. Joseph L. Jackson, long-time Professor of Anatomy at the University of Saskatchewan, by a former student.

The J. R. Neilson Memorial Book Prize—This award, in the amount of \$50, for the course Surgery 450, has been established by a friend of the late Dr. Neilson to commemorate his services to the Faculty of Medicine in its formative stages and particularly in the field of paediatric surgery.

Lange Medical Publications Award—Twenty books will be awarded annually by Lange Medical Publications. A choice of four books will be awarded to each of the two graduating students selected for excellence in their studies. A choice of any two publications will also be given to two outstanding students from each of the First, Second and Third Years of the medical course. Names of the winners will be announced at the end of the session.

Lederle Medical Student Research Fellowships-These awards, provided by Lederle Research Division, American Cyanamid Company, enable selected students to devote their summers to research in the pre-clinical departments Selection is made by the Faculty.

The Louis Lipsey Toohill Scholarships—From a fund established by a bequest from the late Louis Lipsey Toohill, four scholarships of \$500 each are available annually for students in the Faculty of Medicine. In accordance with the terms of the bequest the Joint Faculty Committee on Prizes, Scholarships, and Bursaries gives preference to students requiring financial assistance and showing aptitude for study related to research in cancer, arthritis and rheumatism.

Max and Susie Dodek Medical Scholarship—A scholarship of \$100, gift of Max and Susie Dodek, is offered annually in the Faculty of Medicine to students proceeding to the degree of M.D. It will be awarded annually, on the recommendation of the Faculty, to a student who has completed at least one year and who has an outstanding record of achievement.

Mead Johnson of Canada Ltd. Prize in Paediatrics—A prize of \$100, the gift of Mead Johnson of Canada Ltd., is offered annually in the Faculty of Medicine. It will be awarded to the student in the Fourth Year obtaining highest standing in Paediatrics.

The Metropolitan Bio-Medical Laboratories Ltd. Prize in Clinical Pathology—This prize is awarded to a student with an excellent record in clinical pathology in Second Year.

The M. M. Weaver Prizes in the History of Medicine—A prize or prizes to the total of approximately \$75, endowed by the late Dr. M. M. Weaver, first Dean of Medicine at this University, will be awarded annually to the student or students in the Faculty of Medicine who submit the best essays on topics in the history of medicine. It is the expressed desire of the donor that the prizes be used by the winners for the purchase of books, selected in consultation with the instructors of the course.

The M.S.A. Medical Entrance Scholarships—Two scholarships, each of \$750 a year for two years, are awarded annually to students beginning studies in the Faculty of Medicine toward the M.D. degree. The awards will be made, on the recommendation of the Dean of Medicine and the Medical Screening Committee, to two students selected on the basis of outstanding academic achievement, promise, and personal qualities. Renewal of the scholarship in the Second Year will be subject to maintenance of satisfactory standing and progress.

The Myron M. Weaver Memorial Scholarship—The Medical Board of the Vancouver General Hospital has established an annual scholarship of the value of \$200 as a tribute to the services, leadership and inspiration given by the late Dr. M. M. Weaver as first Dean of Medicine of this University. This scholarship, which serves as a recognition of Dr. Weaver's special interest in the values which the humanities and the arts can contribute to medical training and the practice of medicine, will be awarded to the student in the Second, Third, or Fourth Year of the course who in the opinion of the Faculty of Medicine has best exemplified these values and contributed to their realization within the Faculty.

The Okanagan Medical Entrance Scholarships—Scholarships of \$500 a year for two years, the gift of the medical staffs in the Okanagan Valley, are offered annually to students entering First Year Medicine, University of B.C. The winner will be selected by the Faculty of Medicine on the basis of academic distinction and promise of success in a medical career. The financial circumstances of those considered may be a factor in the selection. Renewal of the award for the second year will be subject to maintenance by the winner of good standing during the First Year. It is the hope of the donors and the University that the recipient of these awards will, if circumstances permit, contribute to the maintenance and perpetuation of this fund when they have completed their training.

The Osler Society of Vancouver Scholarship—This scholarship of \$200, the gift of the Osler Society of Vancouver, will be awarded annually to the student or students who are proceeding to the Fourth Year and who, in the opinion of the Faculty, have the most outstanding records in the study of Internal Medicine.

The Richard and Mary Legh Trophy—This trophy is awarded annually to the undergraduate class in medicine considered by the Faculty to have made the best all-round contribution during the academic year. The trophy remains in the permanent possession of the Faculty.

The Richard Owen Memorial Prize—As a memorial to Richard Owen, a member of the Class of 1962 who, in the summer of 1960, lost his life in an accident, a fund has been established by his friends in the Faculty of Medicine to provide a prize. This prize will be awarded annually to a student with outstanding personal qualities who has achieved high rank in the first two years of the medical course.

The Samuel and Rebecca Nemetz Memorial Scholarship—This scholarship of \$200, the gift of the Hon. Mr. Justice N. T. Nemetz and Mrs. Nemetz, in memory of his parents, Samuel and Rebecca Nemetz, will be awarded in 1970 and alternate years in the Faculty of Medicine to a student in the graduating class who, in his Final Year, has shown special aptitude for medical research.

The Signus Club of Vancouver Prize—A prize of \$100, donated by the Signus Club of Vancouver in honour of its founder, Mrs. William McDougall Holland, is offered annually in the Faculty of Medicine. It will be awarded to the graduating student who, in the opinion of the Faculty, has submitted the best graduation thesis on a subject in the field of nervous diseases, with preference to the field of cerebral palsy.

The Vancouver Medical Association Medical Entrance Scholarship—A scholarship of \$750, to be known as the John Mawer Pearson Scholarship, provided by the Vancouver Medical Association, will be awarded annually to a promising student entering First Year Medicine who is worthy and deserving of assistance. The financial circumstances of those considered will be a factor in the selection. The award will be made on the recommendation of the Dean and the Screening Committee of the Faculty of Medicine.

The Vancouver Women's Canadian Club Scholarship in Medicine—This scholarship of \$100, endowed by the Vancouver Women's Canadian Club, has been established as a memorial to the Honourable Tilly Jean Rolston, Minister of Education for the Province of British Columbia from August 1, 1952 to October 12, 1953, and first woman cabinet minister with portfolio in Canada. In establishing this award, the Vancouver Women's Canadian Club pays tribute to her fine personal qualities, her distinguished public service, and her outstanding contributions in education and other fields. This scholarship is offered annually to a student in the Faculty of Medicine who not only attains high standing but who also shows promise of ability in research.

The Vera and Dudley Myers Prize—This prize of \$500, in memory of Vera and Dudley Myers, will be awarded annually to the postgraduate resident in his second year of psychiatric training under the University Program whose ability, promise and record in the field of Psychiatry is considered by the Faculty of Medicine to be the most outstanding.

The V.G.H. Department of Psychiatry Attending Staff Prize—This prize of \$75, given annually by the Attending Staff of the Department of Psychiatry of the Vancouver General Hospital, will be awarded to the student who is generally the most proficient during his Third Year. The award will be based on examination results and on clinical ability judged on performance during the academic year.

The W. S. Berryman Memorial Scholarship Fund—This fund, established in memory of her husband by the late Mrs. Berryman, provides an annual scholarship of approximately \$250 for a worthy and promising medical student

or students needing financial assistance. It will be awarded by the Joint Faculty Committee on Prizes, Scholarships and Bursaries from among the applicants who submit applications for bursaries.

#### In Music

The Eileen R. Gilley Soroptimist Award in Music—A scholarship of \$100, the gift of the Soroptimist Club of New Westminster, will be offered in the session 1969-70. It is open to students entering Music for the first time and majoring in Piano.

The Friends of Chamber Music Scholarship—A scholarship of \$100, gift of the Friends of Chamber Music, is offered to a student proceeding to a degree in Music. The award will be made to a promising student who shows special interest in the field of Chamber Music.

The Friends of Victoria Nagler Scholarship—A scholarship of \$100, established by the friends of Victoria Nagler, is available annually to students who are proceeding to the degree of B.Mus. at this University and who have completed at least one year of the prescribed programme. The award will be made on the recommendation of the Head of the Department to a worthy and deserving student selected on the basis of ability, proficiency, and promise.

The Henry Ohlman Scholarship-This scholarship of \$100, the gift of Mr. Henry Ohlman, is offered to a student in any year of the course leading to the degree of B.Mus. It will be awarded to the student whose major instrument is the clarinet and who, in the opinion of the Faculty, has the best overall record in the total programme of the year.

The Janine Elizabeth d'Estrubé Scholarship—This scholarship, established by Dr. and Mrs. P. F. d'Estrubé, is dedicated to the memory of their young daughter Janine Elizabeth in recognition of her particular sensitivity to, and love for, music. It will be awarded annually by the Department of Music to a student of woodwind instruments, preferably the clarinet. The selection will be based on performing ability, scholarship, financial need, and promise of success.

The Maurice Taylor Scholarship in Music—This scholarship of \$450, established by a bequest from Elizabeth Brydone Taylor and initiated by her husband, the late Maurice Taylor, will be awarded annually to a student specializing or majoring in music at this University. The award will be made to a student with high standing who shows continuing promise of ability and interest in the field of music.

Prize for Musicology-A \$25 prize will be awarded to a student in his Third or Fourth Year of the Bachelor of Music programme who has shown an interest in and aptitude for research in Musicology. If in any one year there is no suitable candidate, the prize will not be awarded.

Radio Station CHQM Scholarships in Music—Two scholarships of \$500 each, one for a woman and the other for a man, are offered by Radio Station CHOM, Vancouver, to students proceeding from the Third Year to the Final Year. The winners will be selected on the basis of outstanding scholarship in the field of music and promise of success in this field.

The Thea Koerner Memorial Scholarship—As on page 25.

The Vancouver Symphony Society Scholarship in Music—A scholarship of \$200, the gift of the Vancouver Symphony Society, will be awarded in the session of 1969-70 to a student in the degree programme in Music for proficiency on a string instrument. The winner will be selected by the Department.

# In Nursing

Crown Zellerbach Canada Foundation Scholarship in Nursing—A scholarship of \$500, the gift of Crown Zellerbach Canada Foundation, will be awarded to a student who is entering the Final Year of the degree course in Nursing. Selection of the winner will be made on the recommendation of the School of Nursing. In selecting the winner consideration will be given to the records of candidates in both the academic and practical programmes, and to their promise in the profession of nursing.

The Hamber Scholarship in Nursing—A scholarship of \$300, the gift of the late Honourable Eric W. Hamber, C.M.G., B.A., LL.D., Chancellor of this University from 1944 to 1951 and Chancellor Emeritus from 1951 to 1960, is available annually to students entering the Final Year of the degree course in Nursing. This scholarship will be awarded to a top-ranking student who has an outstanding record in both the academic and practical programmes.

The Mary Graham Holland Scholarship in Nursing—A scholarship of approximately \$750, endowed from a bequest made by the late Mrs. Mary Graham Holland, will be awarded annually to a woman undergraduate entering upon her Final Year in the School of Nursing at this University. The scholarship will be given to the student considered by the School to be the most deserving of the award.

The Nettie Neudorf Memorial Scholarship in Nursing—As a memorial to Nettie Neudorf, B.S.N. (Brit. Col.), R.N., this scholarship of \$500 is offered to students proceeding to the Fourth Year of the degree programme in Nursing. This scholarship will be awarded, on the recommendation of the School, for excellence in the subject of obstetric nursing combined with outstanding personal qualities and promise. Preference will be given to a student needing financial assistance.

The Pearl MacKenzie Scheel Scholarship in Nursing—A scholarship of approximately \$250, established and endowed by a bequest from the late Pearl MacKenzie Scheel, is awarded annually to students in Second Year Nursing. It will be awarded on the recommendation of the School to a student with high standing.

The Provincial Health Branch Scholarship—The Health Branch of the Province of British Columbia offers the sum of \$100 to be given as a scholarship in Nursing. This scholarship will be awarded in September to a student proceeding to the Final Year of the degree programme who, on completion of the course, will seek employment as a public health nurse.

The University of B.C. Nursing Division Alumni Association Award—A scholarship of \$200, gift of the Nursing Division of the University of British Columbia Alumni Association, will be awarded annually to one or more students in the School of Nursing. In selecting the winners, consideration will be given to academic standing, ability, promise, and financial circumstances.

University Scholarship in Nursing and Health—A scholarship of \$200 will be awarded for general proficiency in previous work of university grade (which must include a minimum of two years' work in the Province of British Columbia), to a student proceeding to the Second Year of the course in Nursing who has successfully completed all First Year requirements and has demonstrated the potentialities of a good nurse.

The Vancouver Women's Canadian Club Scholarship in School of Nursing—A scholarship of \$100, the proceeds of a fund created by the Vancouver Women's Canadian Club, will be awarded to the student who attains the

highest standing in all previous work and is entering the Final Year of her course in the School of Nursing.

### In Pharmaceutical Sciences

The Bristol Award—This award, given by Bristol Laboratories of Canada and consisting Drs. L. S. Goodman and Alfred Gilman's manual the Pharmaceutical Basis of Therapeutics, will be awarded to an outstanding student of the graduating class in Pharmaceutical Sciences.

The British Columbia Pharmaceutical Society Scholarship—This scholarship of \$200 will be awarded to a student in the Faculty of Pharmaceutical Sciences who is proceeding to the Final Year. The award will be made to a student who, in the opinion of the Faculty, shows a major interest and promise of combining a successful career in the practice of pharmacy with active participation in community and professional affairs.

The Burroughs Wellcome Scholarship—A scholarship of \$250, the gift of Burroughs Wellcome & Co. (Canada) Ltd., will be awarded annually to a student in the Faculty of Pharmaceutical Sciences who, in the opinion of the Dean of the Faculty, shows outstanding ability and is worthy of financial assistance.

The Canadian Foundation for the Advancement of Pharmacy Scholarships —Scholarships of \$100 each, the gift of the Canadian Foundation for the Advancement of Pharmacy, are available for students in Pharmaceutical Sciences. The number of scholarships depends upon the registration. Although awards will be made primarily on merit, financial need will be considered.

The Centennial Pharmacy Scholarship—This scholarship, given jointly by the Canadian Pharmaceutical Association and the Pharmaceutical Association of the Province of British Columbia and with travel expenses provided by Mr. L. C. Elliott, enables a third year student to join with students from other Faculties of Pharmacy in Canada in attending the Annual Meeting of the Canadian Pharmaceutical Association and in visiting the Food and Drug Directorate and other governmental, industrial and academic institutions of interest to pharmacy in Eastern Canada. The winner of this scholarship also receives a cash award of \$200.

The Charles E. Frosst Scholarship—This scholarship of \$250, is offered by Charles E. Frosst and Co. of Montreal for annual award to a student of special promise and ability in the Faculty of Pharmaceutical Sciences. Students entering the Final Year of the degree course are eligible to compete and the award is made on the basis of scholarship, leadership, and financial need.

The Cunningham Prize in Pharmacy—A cash prize of \$100, the gift of the late George T. Cunningham, will be awarded to the student in Pharmaceutical Sciences whose scholastic record in all years of the course has been the most outstanding.

The Cunningham Scholarship in Pharmacy—A general proficiency scholarship of \$250, the gift of the late George T. Cunningham, will be awarded annually to the student obtaining highest standing in the Second Year of Pharmaceutical Sciences and proceeding to the Third Year of the course.

The Dean E. L. Woods Memorial Prize (donated by the Pharmaceutical Association of the Province of British Columbia)—A cash prize of \$50, the tift of the Pharmaceutical Association of the Province of British Columbia, will be awarded annually to a student completing the Final Year. The award will be made on the recommendation of the Dean of the Faculty to the tudent whose record during the entire course, in both the practical and theoretical parts of the pharmaceutical subjects, is considered to be the most cutstanding.

The Edith and Jacob Buckshon Memorial Prize—A prize of \$100, given by Buckshon's Pharmacy in memory of Edith and Jacob Buckshon, is open to students in the Faculty of Pharmaceutical Sciences. It will be awarded to the student in the Final Year with the highest marks in the laboratory course in compounding and dispensing.

The George E. K. MacDonald Memorial Prize in Pharmacy—A book prize, given by the family in honour of Mr. George E. K. MacDonald, for many years a well-known pharmacist of Cranbrook, B.C., will be awarded to a student completing the Third Year. This award will be made on the basis of academic record, interest in the affairs of the Pharmacy Undergraduate Society and the Pharmacy Association and participation in extracurricular activities.

The Merck Sharp & Dohme Awards—Through the generosity of Merck Sharp & Dohme of Canada Limited, Montreal, two awards, each consisting of the Merck Index, the Merck Manual, and \$25, are available annually for students in Pharmaceutical Sciences. The awards will be made to the two students obtaining the highest standing in Pharmaceutical Chemistry.

National Drug and Chemical Company of Canada Ltd., B.C. Drugs Division Scholarship—A scholarship of \$200, the gift of National Drug and Chemical Company of Canada Ltd., B.C. Drugs Division, will be awarded annually to the student who obtains highest standing in the examinations of First Year Pharmacy and is proceeding to the Second Year.

The Parke, Davis & Company Ltd. Awards—Through the generosity of Parke, Davis & Company Ltd., several awards, each consisting of a copy of the illustrated history of pharmacy entitled "Great Moments in Pharmacy", will be made available annually to outstanding students in the Faculty of Pharmaceutical Sciences.

The Pharmaceutical Association of the Province of British Columbia Scholarship—A scholarship of \$250, the gift of the Pharmaceutical Association of the Province of British Columbia, will be awarded annually to the student obtaining the highest standing in the examinations of Third Year Pharmacy and who is proceeding to the Fourth Year.

The Pharmaceutical Association of the Province of British Columbia Entrance Scholarship—A scholarship of \$100, the gift of the Pharmaceutical Association of the Province of British Columbia, will be awarded to a student entering First Year Pharmaceutical Sciences. The award will be made to the student with the highest entrance qualifications, as determined by his standing in the examinations of Senior Matriculation or First Year Arts or Science.

The Poulenc Gold Medal—A gold medal, presented by Poulenc Limited, Montreal, will be awarded annually to the student graduating in Pharmaceutical Sciences with the highest standing in the Pharmacology course.

The Poulenc Scholarship in Pharmacy—A scholarship of \$250, the gift of Poulenc Limited, Montreal, will be awarded annually to the student who has the most outstanding record in the biological sciences courses of the First and Second Years and who is proceeding to the Final Year in Pharmaceutical Sciences.

The Upjohn Company of Canada Scholarship—This scholarship of \$200, presented by the Upjohn Company of Canada, will be awarded annually for general proficiency in the First Year of the Pharmaceutical Sciences course.

The W. Elgin Turnbull Memorial Scholarship—By a gift of his family, a scholarship in Pharmacy has been established in memory of W. Elgin Turnbull (1912-1941,) who was a member of the pharmaceutical profession in

British Columbia. This scholarship to the value of \$140 will be awarded annually on the basis of general proficiency, particularly in the practical aspects of pharmaceutical subjects of the Second Year. Preference will be given to a student showing aptitude in pharmaceutical economics and, in particular, merchandising.

# In Physical Education and Recreation

The Alice Bishopric Memorial Book Prize—A book prize of \$25, in memory of Mrs. Alice Bishopric, is awarded annually to the student in the Third Year of the B.P.E. degree course with the highest First Class standing in the biological sciences.

The Fruehauf Trailer Company Scholarships—A scholarship or scholarships to the total of \$400, the gift of Fruehauf Trailer Company of Canada Limited, Dixie, Ontario, may be offered in the School of Physical Education and Recreation. The awards will be made to one or more students, on the basis of good scholarship and demonstration of all-round leadership qualities, who show special interest in health, particularly in the preventive field, and who have need for assistance.

Gymnastic Book Prize—A book prize of \$25, donated by the British Columbia Gymnastic Association, is awarded annually to a student in the First or Second Year of B.P.E. degree programme with general academic proficiency and high standing in gymnastics.

The J. J. McRae Memorial Book Prize—A book prize of \$25, in memory of J. J. McRae, will be awarded annually to a student in the B.P.E. degree programme with general academic proficiency who has made a contribution to youth work. Special consideration will be given to a student who has worked with the blind or other handicapped groups.

The Leonard Osborne Memorial Book Prize—A book prize of \$25, in memory of J. Leonard Osborne, will be awarded annually to a student in the B.P.E. degree programme with general academic proficiency, and high standing in basketball or soccer courses.

The Lieutenant James Douglas Hamilton Book Prize—A book prize, in memory of Lieutenant James Douglas Hamilton, a graduate in Physical Education and a former member of the C.O.T.C. of this University, who, on April 13, 1952, was killed in action in Korea, is offered by the Physical Education Alumni and Undergraduate Societies. The award is open to Third Year students in Physical Education showing academic and physical proficiency in the course.

The Mary Isdale Memorial Scholarship—The Mary Isdale Memorial Scholarship is offered annually to a student who achieves high academic standing in the Third Year of the Bachelor of Education or Bachelor of Physical Education and Recreation Program. Consideration will be given to eligible students who, over a period of years, have demonstrated particular interest in highland dancing, Scottish country dancing, or piping, either through University participation or outside the University.

### In Rehabilitation Medicine

The Helen Grimmer Scholarship in Physiotherapy—A scholarship of \$125, the gift of the Business and Professional Women's Club of New Westminster, is offered annually to women students beginning or continuing studies in Physiotherapy in the School of Rehabilitation Medicine at the University of B.C. The scholarship will be awarded to a student with a good academic record and with promise in the field. Financial circumstances may also be a factor in the award. Special preference will be given to students residing in New Westminster.

### In Science

The Alcan Scholarships—As on page 46.

The Andrew H. Hutchinson Scholarship in Biology and Botany—A scholarship of \$240 per annum was endowed (through the University Development Fund) by Alumni, the Vancouver Rotary Club and friends of Dr. Andrew H. Hutchinson, upon the occasion of his retirement as Head of the Department of Biology and Botany (1916-1954), in recognition of his years of devoted service to his students, to his Department and to the University. The award will be made in the fall to a promising student who has entered the Third Year (or, exceptionally, the Fourth Year) with First Class standing in biological subjects and is registered for Honours or major studies in the Department of Botany.

The Armstead Prize in Biology and Botany—A prize of \$100, the gift of Mrs. Daniel M. Armstead, will be awarded to a graduating student in an Honours Course of the Department of Biology and Botany. The winner will be recommended on the basis of scholastic achievement and promise of ability in research.

The ASARCO Scholarship—This scholarship of \$500, gift of the American Smelting and Refining Company, is offered to a student in the Third or Fourth year of Honours Geology or Geological Engineering. The applicant, who must be a male citizen of the United States or Canada, will be selected by the Department on the basis of scholastic standing and leadership in his chosen field. He must be in good health and without physical disability and be in the top 35% of his class scholastically. An additional grant of \$500 is made to the University to the Department of Geology for its teaching programme.

The Canadian Forest Products Ltd. Scholarships in the Combined Biology and Forest Biology Honours Programme—Two scholarships, one of \$250 and the other of \$200, the gift of Canadian Forest Products Ltd., are offered to students proceeding to the Third or Fourth Year of the B.Sc. programme in Honours Biology and Forest Biology. The awards will be made on the basis of ability and academic standing.

Canadian Society of Exploration Geophysicists Scholarship—The Canadian Society of Exploration Geophysicists Scholarship of \$350 in Geophysics or a related field is offered annually to a male student entering the Third or Fourth Year of a four year course in the sciences, physics, or engineering, or to a student continuing postgraduate studies in Geophysics or a related field after attaining a Bachelor's degree.

The Chemical Institute of Canada Prizes—Two prizes of the value of \$25 each, and each accompanied by a silver medal, the gift of The Chemical Institute of Canada, are offered to students entering the Final Year. Of these prizes, one will be awarded to the student obtaining highest standing in Chemistry in the Third Year of the Faculty of Science and the other to the student obtaining highest standing in the Third Year of Chemical Engineering.

Chevron Standard Limited Undergraduate Scholarships—Two scholarships of \$500 each, the gift of Chevron Standard Limited are available annually to outstanding students at the University of British Columbia proceeding to the year designated. The awards will be made, one in each of the following fields: (1) Honours Geophysics-Physics, Honours Geophysics-Geology, Engineering Physics (Geophysics Option), Geological Engineering (Option II-Geophysics), Geophysics-Geology (Major Programme) (tenable in the penultimate or final year); (2) Geology, Geological Engineering (Options I, II, III), Geology and Physics (tenable in the final year). In making the awards consideration

will be given to scholarship, character, personality and potential ability for leadership. These awards are intended to encourage an interest in oil exploration and production and, where possible, students showing an interest in these fields will be given special consideration. Applications must be submitted by

April 30th.

The Daniel Buchanan Scholarship in Mathematics—As a memorial to Daniel Buchanan, Dean of the Faculty of Arts and Science (1928-1948), and Head of the Department of Mathematics (1920-1948), and in recognition of his teaching and research in Mathematics, Alumni and friends (through the Alumni-U.B.C. Fund), together with members of the Department of Mathematics, have established a scholarship fund. From this fund a scholarship of \$180 is offered annually to the student who gains the highest standing in the Third Year of an Honours Course in Mathematics and proceeds to the Final Year in that course.

The David E. Little Memorial Scholarship—This scholarship of \$100, a memorial to David Edmund Little, B.Sc., M.A., whose graduate work in Physics was taken at the University of British Columbia, is offered annually by his wife. It will be awarded to a student graduating in Physics. The award will be made to a student on the basis of academic proficiency and promise in research.

The Dr. John Allardyce Memorial Scholarship—This scholarship honours the memory of Professor William John Allardyce, B.A., M.A. (U.B.C.), Ph.D. (McGill), one of the pioneer members of the University who was a student during the period 1914 to 1919, interrupted by service during the First World War, and a member of the Staff from 1919 to 1931 and from 1938 to 1964. Established by his wife and family, this award pays tribute to his outstanding service through teaching and research and to his fine personal qualities which endeared him to his students and colleagues. In the amount of \$100 annually, this scholarship will be awarded to a student for excellence in cell physiology or plant physiology. The award will be made on the recommendation of the Department of Botany.

The Edgar C. Black Memorial Prize in Honours Physiology—This prize of \$50 in memory of Dr. Edgar C. Black, first member of the Department of Physiology at this University, has been provided by contributions from his friends and colleagues. It will be awarded annually to the outstanding student in the graduating class in Honours Physiology.

The Fisheries Association of B.C. Scholarships—Four scholarships of \$300 each, or three awards of \$400 each, the gift of the Fisheries Association of B.C., are offered to students in the field of fisheries. Normally these awards will be available to undergraduates proceeding from the Second to the Third Year and to students proceeding from the Third to the Fourth Year. They may be given, however, to students beginning or continuing graduate study at this University. Awards will be made on the basis of interest, promise, and ability in the field of fisheries; character and personal qualities; and academic standing. To be eligible a candidate must be intending to pursue a career in some area of fisheries. Winners will be selected by a committee consisting of the Head of the Department of Zoology, the Director of the Institute of Fisheries and the Chairman of the Scholarship Committee in consultation with a committee of the Association.

The Joel Harold Marcoe Memorial Scholarship—As a memorial to Joel Harold Marcoe, who attended the University from 1961 to 1963, this scholarship has been established by his brothers, Dr. K. D. Marcoe of Vancouver and Dr. M. Marcoe of Houston, Texas. In the amount of \$100, it will be awarded annually by the University to a student who has completed the

First Year of Science and is proceeding to the Second Year of a B.Sc. programme. The award will be made to a deserving student with high academic standing.

The John E. Bier Memorial Prize in Forest Pathology—As on page 57.

The Joseph P. Ruffel Scholarship in Science—A scholarship of at least \$600, established and endowed by Joseph P. Ruffel, Parksville, is offered annually to a male student beginning or continuing undergraduate or graduate studies at the University of British Columbia in a field of pure or applied science. It will be awarded to a student who has an outstanding academic record and who shows promise of success in his chosen field.

The Kit Malkin Scholarship—This scholarship honours the memory of Christopher (Kit) Malkin, who, after a distinguished undergraduate career, graduated from the University of B.C. with First Class Honours in Zoology. In the amount of \$500, it will be awarded annually to a student with an outstanding record in the biological sciences who is deserving of financial assistance. To mark Kit's special interest, both as an undergraduate at the University of B.C. and as a graduate student at Stanford, where he tragically lost his life, preference will be given to a candidate continuing studies or research in marine biology.

Lefevre Gold Medal and Scholarship—As on page 11.

The Loraine Schwartz Prize in Statistics and Probability—In memory of Dr. Loraine Schwartz, Assistant Professor in the Department of Mathematics, 1960-65, this prize has been established by her friends and colleagues. It will be awarded annually for distinction in the fields of statistics and probability to an undergraduate or graduate on the recommendation of the Department.

The Margaret Armstrong Scholarhips-As on page 51.

MacMillan Bloedel Limited Scholarships for Forestry—Two scholarships of \$500 each, the gift of MacMillan Bloedel Limited, are offered to students in Arts or Science who are preparing to enter Forestry in the following session. Awards will be made on the basis of academic standing, personal qualities and interest in the field. Preference will be given to candidates whose homes are in or near Alberni, Campbell River, Chemainus, Duncan, Kelsey Bay, Ladysmith, Nanaimo, Parksville-Qualicum, Port Hardy, Powell River, Squamish, or Port Alberni. Students who wish to be considered for these scholarships should apply to the Dean of Inter-Faculty and Student Affairs by March 15th.

The Mallinckrodt Chemical Works Limited Prize—A cash prize of \$50, the gift of Mallinckrodt Chemical Works Limited, will be awarded annually to the student in the Third Year who, in the opinion of the Department of Chemistry, is most outstanding with respect to achievement and promise in the fields of inorganic and analytical chemistry.

The Prince George Scholarship-As on page 57.

The R. M. Thompson Memorial Scholarship—A scholarship from the proceeds of a fund established in memory of the late Robert Mitchell Thompson, professor of Geology at the University of British Columbia, will be awarded to an undergraduate pursuing a geological programme in the Faculty of Science or Applied Science. The award, valued at approximately \$250, will be made on the basis of academic ability, personal qualities and participation in such student activities as those of the G. M. Dawson Club. The recipient will be chosen by the Department of Geology. If, in the opinion of the Department, no appropriate candidate is available, the scholarship will not be awarded.

The Society of Chemical Industry Merit Awards—Two merit awards, each consisting of an inscribed gold key and a year's subscription to the publication entitled "Chemistry and Industry" are offered annually by the Society of Chemical Industry, Canadian Section, to members of the graduating classes. They will be given, one in Honours Chemistry (or Honours Chemistry and Physics) and the other in Chemical Engineering, to the students achieving highest standing in these fields in the Final Year.

The Stephen Kenneth Nelson Memorial Scholarship-As on page 54.

The Truck Loggers' Association Scholarships—As on page 92.

University Scholarship in Science—A scholarship of \$200 will be awarded to each of the students obtaining highest standing in the First, Second, and Third Year respectively.

The W. H. MacInnes Scholarship in Physics and Mathematics—A scholarship of \$350, the gift of Mr. W. H. MacInnes of Vancouver, is offered annually to the student obtaining highest standing in the Second Year and proceeding to the Combined Honours Course in Physics and Mathematics.

### In Social Work

The British Columbia Association of Social Workers Prize—The British Columbia Association of Social Workers offers annually a prize of \$100 to the student in First Year Social Work who is regarded by the Faculty as the best all-round member of the class.

Child Welfare Scholarship Fund—A fund known as the Child Welfare Scholarship Fund, consisting of voluntary contributions from Parent-Teacher Associations, has been established through the British Columbia Parent-Teacher Federation. Monies collected are presented annually to the University of B.C. for distribution by the Dean of Inter-Faculty Affairs in consultation with the Director of the School of Social Work. Awards are made preferably to students proceeding to the Master's degree in Social Work and who, upon graduation, plan to serve in Public Welfare in British Columbia. One of the factors in making awards is the need for financial assistance.

Greater Vancouver Branch, British Columbia Association of Social Workers, Prize—A book prize to the value of \$50, the gift of the Greater Vancouver Branch, British Columbia Association of Social Workers, will be awarded annually to a student taking a Master's degree in Social Work. The award will be made on the basis not only of academic standing, but also on all-round professional activity and promise. Selection of the winner will be made on the recommendation of the School.

The Catholic Family and Children's Service Scholarship in Social Work-To commemorate its Fiftieth Anniversary, celebrated on August 25th, 1955, the Children's Aid Society of the Catholic Archdiocese of Vancouver has established an annual scholarship of \$400. This scholarship is available to a Roman Catholic student entering the First Year of Social Work at this University. In making the award, consideration will be given to academic standing, ability, personal qualities, and promise. The award will be made by the Joint Faculty Committee on Prizes, Scholarships, and Bursaries, in consultation with the School of Social Work. Any student who wishes to be considered for the award may apply by letter addressed to the Director of the School of Social Work, University of British Columbia, Vancouver 8, Canada. This letter should be submitted at the time application is made for admission to Social Work.

Neil Douglas McKay Scholarship-Established by Ruby McKay and friends, this fund provides an annual scholarship of \$1500 for a student who, through the First Year, has demonstrated skill in work with children and their families, and who is entering Second Year. Preference will be given to a student whose stated purpose is to practice in the field of public welfare.

The Laura Holland Scholarship—The friends and associates of Laura Holland, desiring to recognize her distinguished service in the field of Social Work to British Columbia and to Canada in general, have, through a special committee, endowed a scholarship. This scholarship of \$380 will be awarded annually to the student in Social Work who is entering the Second Year and whose record in the First Year is the most outstanding. Students proceeding directly from the First Year to the Second Year or returning from a period of employment after the First Year are eligible for consideration.

The Zella Collins Scholarship Fund—This scholarship of the annual value of \$100, established by a bequest from Laura Holland in honour of Zella Collins, will be awarded annually to a student or students beginning or continuing studies in the School of Social Work at this University. The award will be made on the recommendation of the School, to those who are deemed worthy and deserving.

# High School Graduation and Grade XIII Scholarships

The A. J. Mouncey Memorial Scholarship—To honour the memory of Ada J. Mouncey, founder and for many years Director of Shurpass Pacific College (now Columbia Junior College) and to pay tribute to her generosity and devotion in helping others, this scholarship has been established by her colleagues, students, and friends. It will be awarded annually to a student of the College who is proceeding in the fall to a full programme of Second Year studies at the University of British Columbia. The award will be made to a student selected on the basis of high academic standing and outstanding personal qualities. Candidates will be recommended by the College to the University.

The Alan W. Neill Memorial Scholarship—To honour the memory of Alan W. Neill, who represented with distinction the constituency of Comox-Alberni in the Parliament of Canada for over twenty-four years, this scholarship has been established by his daughter, Helen D. Stevens. In the amount of \$300, it will be offered annually to a student resident in the Comox-Alberni Electoral District who is proceeding from Grade XII or XIII to studies at the University. It is intended to give needed assistance to an able student whose personal qualities, character, and achievement show him or her to be worthy and deserving of support. Applicants should apply by completing the General Application for Scholarship Form. This form must be received by the University not later than May 15th. All candidates must write the scholarship examinations conducted in June by the Department of Education.

Bralorne Pioneer Mines Limited Scholarships—Bralorne Pioneer Mines Limited offers annually to sons or daughters of employees of Bralorne Pioneer Mines Limited, graduating from Grade XII or Grade XIII, several scholarships of \$150 each. These scholarships will be awarded to promising and deserving students continuing their studies beyond the high school level at the University or some other educational institution providing post high school education. Applicants who wish to be considered must complete the General Application Form which may be obtained from the University. This application form must give details of the applicant's proposed plans for study, and the application form should be forwarded to Dean Walter H. Gage, University of B.C., Vancouver 8, B.C., not later than May 31. Awards will be

made only to candidates whose proposed plans of study and whose standings are sufficiently satisfactory.

British Columbia Forest Products Limited Entrance Scholarships-Eight scholarships of \$400 each are offered by British Columbia Forest Products Limited to sons and daughters of employees who, by June 30th of the year in which the award is made, have or will have served the Company for at least one year. They are open to students proceeding in the fall from Grade XII or Grade XIII to a full course of studies at the University of British Columbia, University of Victoria, or Simon Fraser University. Candidates for these scholarships must be eligible in all respects to compete for Government of B.C. Scholarships and must write the Government Scholarship Examinations conducted in June by the Department of Education, B.C. The scholarships will normally be awarded to the eight candidates obtaining highest standing. The grades obtained in other subjects taken during the year may also be considered. No award will be made, however, to an applicant with an overall average of less than 70%. Applicants for these scholar-ships must complete the General Application for Scholarship form, which may be obtained from the Dean of Inter-Faculty and Student Affairs, University of B.C. This application must be received by the University not later than May 15th and must contain the necessary details of family service with the Company. Before June 1st they must also complete and submit, through the school principal, the special form required by the Department of Education from all those writing the scholarship examinations.

The British Columbia Teachers' Federation Scholarships—As on page 153.

The Canadian Forestry Association of B.C. Scholarship-This scholarship of \$200 will be awarded to a student who has been active in Junior Forest Warden work, has completed First Year Arts or Science or Grade XIII (Senior Matriculation), and is proceeding to First Year Forestry at this University. Students wishing to be considered for this scholarship must apply before May 15th.

Chris Spencer Foundation Special Scholarships—Three scholarships of \$500 each, renewable annually subject to maintenance of academic standing, are offered in competition to students in Grade XII (secondary school graduation, academic-technical) or Grade XIII (Senior Matriculation) who, in the session 1969-70 will attend the University of British Columbia, University of Victoria, or Simon Fraser University for a full academic year in a full program of studies leading to a degree. For the purposes of these scholarships, an academic year at the University of British Columbia or the University of Victoria is the period extending from September to the following May, and at Simon Fraser it consists of two semesters between September of one year and the following September. Each scholarship will be paid in two instalments of \$250 each, the first when the winner begins attendance in the first half of the academic year and the second when he begins attendance in the second half.

Winners will be selected on the basis of high scholastic achievement combined with outstanding personal qualities and distinction as exemplified by service to others, interest, and participation in the school and/or community in activities such as sports, student government, youth groups, fine arts, music. Special attention will be given to the qualities developed through these activities and of indication, during the period of attendance at secondary school, of moral force of character and of instincts to lead and take an interest in classmates. These scholarships are open only to students whose ordinary domicile, home, or residence is in British Columbia and who are attending schools in British Columbia. All candidates must apply on the Chris Spencer

Foundation Special Scholarship Application Form, obtainable from Dean Walter H. Gage, University of B.C., Vancouver 8, B.C. The completed form should be returned to Dean Gage not later than April 15 and will not be accepted after May 1st. Applicants must be eligible in all respects to compete for Government of B.C. Scholarships and must write the Government Scholarship Examinations conducted in June by the Department of Education, B.C. Candidates in Grade XII should not apply unless they are likely to obtain an average of 90% or better in these examinations and first class grades (80%) in the other subjects taken during the year. Grade XIII students similarly should not apply unless they are likely to obtain an overall average 85% or better.

Winners who, in a full programme in an academic year, maintain First Class standing or rank in the upper 10% of all students in the year and faculty in which they are registered, will be awarded renewals in the amount of \$500 for the next academic year. Renewals will not be granted after graduation or more than four times after the initial award (whichever is the smaller number of academic years involved). The renewals are also conditional upon full-time attendance at the University of B.C., University of Victoria, or Simon Fraser University. A student is permitted, if he wishes, to transfer from one of these institutions to another, but only once. Deferment of awards (original or renewals) will be considered only for certified medical reasons.

Crown Zellerbach Canada Foundation Scholarship No. 1—This scholarship of \$500, offered by Crown Zellerbach Canada Foundation, is available annually to dependent sons, daughters, or legal wards of employees of Crown Zellerbach Canada Limited in B.C., including Vancouver office, Richmond paper products division, Ocean Falls, Elk Falls, Kelowna sales office, and Crown Zellerbach Paper Co. employees in B.C. Selection of the winners will be made by the Scholarship Committee of the University of B.C., on the basis of scholastic standing, leadership, and citizenship. The award will be made to a student with full high school graduation (academic-technical programme) who is proceeding to a full academic year (two consecutive semesters) of studies at the University of B.C., University of Victoria, Notre Dame University of Nelson, or Simon Fraser University. Application forms should be obtained from the Public Relations Department, Crown Zellerbach Canada Limited, 1030 West Georgia Street, Vancouver, or the Industrial Relations Department of any of the Divisions. Completed application forms must be received not later than May 15th.

Crown Zellerbach Canada Foundation Scholarship No. 2—This scholarship of \$500, offered by Crown Zellerbach Canada Foundation, is available annually to dependent sons, daughters, or legal wards of employees of Crown Zellerbach Canada Building Materials division in B.C., S. M. Simpson Ltd., Crown Zellerbach Canada Timber Department, Canadian Tugboat Company Limited, Beaty Laminated Division, and Bridge Lumber Division. Selection of the winner will be made by the Scholarship Committee of the University of B.C., on the basis of scholastic standing, leadership, and citizenship. The award will be made to a student with full high school graduation (academic-technical programme) who is proceeding to a full academic year (two consecutive semesters) of studies at the University of B.C., University of Victoria, Notre Dame University of Nelson, or Simon Fraser University. Application forms should be obtained from the Public Relations Department, Crown Zellerbach Canada Limited, 1030 West Georgia Street, Vancouver, or the Industrial Relations Department of any of the Divisions. Completed application forms must be received not later than May 15th.

The Dairyland Credit Union Scholarship—A scholarship of \$250 is offered

annually by the Dairyland Credit Union to students who are proceeding to the University of B.C. or Simon Fraser University in the fall from Grade XII or XIII in a full programme of studies leading to a degree in any field. To be eligible, an applicant must (a) be the son, daughter, grandson or granddaughter of an active member of Dairyland Credit Union; (b) write the Government Scholarship Examinations conducted in June by the Department of Education, B.C., and obtain clear standing with an overall average of not less than 70%; (c) file with the Dean of Inter-Faculty and Student Affairs a letter indicating his or her connection with Dairyland Credit Union and complete the University Bursary Form of the University of B.C. This form, which requires details of the applicant's financial circumstances and those of his or her family, must be filed with the University not later than July 15th. Candidates should note that intention of writing the Government Scholarship examinations must be filed with the Department of Education, Victoria, B.C., through the school principal, before June 1st. The Dairyland Credit Union Scholarship will be awarded to the candidate who, in the opinion of the University in consultation with the Credit Union, is best qualified in terms of academic merit and financial need.

The East Asiatic Company (Canada) Ltd. Entrance Scholarship—The East Asiatic Company (Canada) Ltd. offers annually a scholarship of \$500 to a first year student. This scholarship is open in competition to sons and daughters of employees of the Company and its affiliated Companies, Johnson, Walton Steamships Ltd. and Eacom Timber Sales Ltd., entering the University of British Columbia, Vancouver, in the fall from Grade XII or Grade XIII and proceeding in a full programme of studies leading to a degree in any field. Students who wish to compete must submit an application by May 31st to the Dean of Inter-Faculty and Student Affairs, University of B.C., Vancouver 8, B.C. The application must state (i) the name and address of the candidate; (ii) the names of his or her parents, who must have been employed by one or more of the above companies for a minimum of one full year, and brief details of their service with the Company; (iii) the school attended this session by the candidate and the grade in which he or she is registered. All candidates must write the Government Scholarship examinations, conducted in June by the Department of Education, B.C. The award will normally be made to the candidate obtaining the highest standing provided a minimum overall average of 70% has been achieved in the Grade XII or XIII examinations. However, consideration may also be given to the grades obtained in the other subjects taken during the year. In the event that the candidate wins another scholarship, the University and the Company reserve the right to decide whether the East Asiatic Company (Canada) Ltd. Scholarship shall be paid to the winner or revert to the eligible candidate with the next highest standing.

The Faculty Scholarship—A scholarship of approximately \$200, provided by donations from the Faculty, is offered to sons and daughters of Faculty members who obtain high standing in the written examinations for University Entrance and who are not winners of other major awards. The selection of the winner will be made in accordance with the terms laid down for the Chris Spencer Foundation Special Scholarships. Applications must be received not later than May 15th.

The Federation of Telephone Workers of British Columbia, Plant Division, Scholarship—The Federation of Telephone Workers of British Columbia, Plant Division, offers a scholarship of \$500 to sons and daughters of members (with at least twelve months continuous service) or of deceased members (with the same service). It is open in competition to students pro-

ceeding in the fall from Grade XII or XIII of secondary school to a full programme of studies at the University of British Columbia, Simon Fraser University, or University of Victoria. To be eligible for consideration a candidate must have an overall average of at least 70% in the subjects of the grade in which he or she is registered. Candidates in Grade XIII will be considered on the basis of standing obtained in the Departmental Examinations written in June; those in Grade XII will be considered on the basis either of standing received by recommendation or in the June Departmental Examinations. The winner will be selected by the University, in consultation with the Federation, from those who so qualify. In the final selection, a major factor will be the financial circumstances of applicants and their families. All candidates must apply to the University of B.C. not later than May 15th by completing the "General Application for Scholarship" form. Applications should contain details of family service with the Federation and other pertinent information.

General Motors of Canada Limited Scholarships-Under the General Motors of Canada Canadian Scholarship Programme, one scholarship is provided annually for students from secondary school beginning studies at the University of British Columbia. The programme is designed to provide young people of limited financial resources, but high scholastic ability, the opportunity to receive benefits of higher education. These scholarships are available to outstanding students selected by the University who are citizens of Canada. Winners who maintain high academic standing are eligible for renewals for three further years. The value of each award each year is \$1000. Secondary school students in British Columbia who wish to be considered should obtain the "General Application for Scholarship" form from the Dean of Inter-Faculty and Student Affairs, University of British Columbia, Vancouver 8, B.C. The completed form must be returned to the University not later than May 15th. The application should include full information regarding the financial circumstances of the applicant and his family. Intending applicants in British Columbia must be eligible to compete for Government of B.C. Scholarships and must write the scholarship examinations conducted by the Department of Education, B.C., in June.

Girl Guides of Canada, Vancouver Council (Elizabeth Rogers Trust) Scholarships—Two scholarships, one of \$150 and the other of \$100, are offered by the Vancouver Girl Guides Council to students who are entering the University of B.C. in the fall from Grade XII or XIII in a full programme of studies leading to a degree. To be eligible, an applicant must be an active member of the Girl Guide Movement in Vancouver, West Vancouver, North Vancouver (City or District), Richmond, or Burnaby. In selecting the winners the academic standing of the applicants will, and the financial circumstances of their parents may, be considered together with the applicant's interest in Girl Guide activities. Those selected to receive the awards assume a moral obligation to maintain association with the Girl Guide Movement. Winners are selected by the University in consultation with the Vancouver Girl Guide Council. Applications, on the general form available from the Dean of Inter-Faculty and Student Affairs, must be submitted to the University not later than May 15th.

Greater Vancouver Real Estate Board Scholarships—Five scholarships of \$500 each are offered in competition by the Greater Vancouver Real Estate Board to Grade XII or XIII students enrolling for full-time studies in the fall in a course of at least two years duration leading to a recognized degree, diploma, or certificate at the University of British Columbia, Simon Fraser University, or the British Columbia Institute of Technology. The parent or legal

guardian of the applicant must be an Active or Financial Member, Active Associate Member, or a Member of the Salesmen's Division of the Board, and have been such for a period of not less than two years at the time the application is made. The applicant must be qualified in all respects to compete for Government of B.C. Scholarships and must write the Government Scholarship Examinations conducted in June by the Department of Education, B.C. Candidates with an overall average of less than 70% will not be considered. The successful applicants will be selected primarily on the basis of academic standing. Candidates for attendance at all institutions must apply by completing the General Application for Scholarship Form, which may be obtained from Dean Walter H. Gage, University of B.C., Vancouver 8. The completed form must be received not later than June 30th.

The Hon. W. C. Woodward University Memorial Scholarships-These scholarships, each of \$500 per year and renewable annually in the same amount at the beginning of each undergraduate year (up to a maximum of five payments in all), are offered in competition to sons, daughters and legal dependants of regular full-time staff, of retired staff (retired on Store pension), and of deceased staff (who died while a Woodward's regular full-time staff member). One of these scholarships is available for attendance at the University of Alberta or the University of Calgary, and two are available for attendance at the University of British Columbia, the University of Victoria, Simon Fraser University, or Notre Dame University of Nelson. They are open to applicants, beginning University attendance for the first time, and entering from Grade XII or XIII of secondary school (or any other source provided they are qualified for admission). Alberta candidates must write the Provincial examinations and British Columbia candidates the Provincial Scholarship examinations, conducted in June by appropriate Provincial Department of Education. Awards will be made on the basis of (a) academic standing, (b) activity and interest in youth programmes, organizations and athletics within school and community, and (c) personal qualities, character, and demonstration, during attendance at school, of citizenship, leadership, and service. Annual renewals are subject to maintenance of satisfactory academic standing, progress, and conduct. Application forms are available from the Personnel Offices of all Woodward's Stores from February 1st onwards and must be completed and returned by July 15. The applicant must include the official transcript of his Secondary School record issued by the Department of Education of the Province. If the transcript is not available by July 15th, it must be forwarded by the student at the earliest possible date after July 15th.

The Hospital Employees' Union Local 180 Scholarships—Two scholarships of \$250 each are offered annually by the Hospital Employees Union Local 180 to students who are proceeding in the fall from Grade XII and XIII of high school to a full programme of studies at the University of B.C., University of Victoria, Notre Dame University of Nelson, Vancouver City College, or Simon Fraser University in any field leading to a degree. To be eligible an applicant must (a) be the son or daughter of an active member of the Union ("active" being interpreted as on the staff of a hospital within the jurisdiction of Local 180, or on the staff as of January 1st of the year of award but since superannuated); (b) write the Government Scholarship Examinations conducted in June by the Department of Education, B.C., and obtain clear standing with an overall average of not less than 70%; (c) obtain from the Dean of Inter-Faculty and Student Affairs the University of B.C. Bursary Application form and file the completed form with the University of B.C. not later than July 15th. The information given in the form must clearly establish the applicant's connection with Local 180. Candidates should note that the intention to

write Government Scholarship Examinations must be filed with the Department of Education, Victoria, B.C., through the school principal, before June 1st. The scholarships will be awarded to the two candidates who, in the opinion of the University (in consultation with the Union), are best qualified in terms of academic standing and financial need.

Inland Natural Gas Co. Ltd. Scholarship in Home Economics—A scholarship of \$250, the gift of Inland Natural Gas Co. Ltd., is offered annually to students proceeding from Grade XII or XIII to a course of studies at the University leading to the degree of B.H.E. This scholarship, open to students who reside in the area served by Inland Natural Gas Co. Ltd., will be awarded on the basis of academic standing, personal qualities, character, and promise and interest in the field of Home Economics. Consideration may also be given to the financial circumstances of those who apply. Applications must be submitted by May 15th.

The International Longshoremen's and Warehousemen's Union Entrance Scholarships—Four scholarships of \$400 each are offered to members, and sons and daughters of members, in good standing, of the International Longshoremen's and Warehousemen's Union. They will normally be awarded to the candidates who obtain the highest standing in Grade XII or XIII Government Scholarship examinations conducted in June by the Department of Education, Victoria, B.C., and who are proceeding in the fall to a full programme of studies at the University of B.C., the University of Victoria, or Simon Fraser University. Students who wish to compete for these awards must apply on the General Application Form for Scholarships, which may be obtained from the office of the Dean of Inter-Faculty and Student Affairs, University of B.C., Vancouver 8, B.C. The completed application must be received at the University by May 15th. The donors reserve the right to withhold awards if the academic standing of candidates is not sufficiently high or to re-award scholarships if winners receive other scholarhips of substantial value.

International Nickel Scholarship—As on page 22.

The I.W.A. (New Westminster) Credit Union Scholarship—A scholarship of \$250, established by the I.W.A. (New Westminster) Credit Union, is offered annually to members, or to sons or daughters or legal dependants of members, of the Credit Union who are proceeding from Grade XII or XIII to begin their studies at the University of British Columbia or Simon Fraser University. The basis of award will be a combination of high academic standing, active interest in school and community affairs, and character and personal qualities. In the case of a close decision the financial circumstances of applicants and their families will be considered. Applications, on forms obtainable from the Dean of Inter-Faculty Affairs, should reach the University not later than May 15th.

Japanese-Canadian Citizens' Association B.C. Centennial Scholarship—A scholarship of \$100, the gift of the British Columbia Japanese-Canadian Citizens' Association, is offered annually to a Japanese-Canadian student residing in British Columbia and proceeding from Grade XII or Grade XIII to a full course of study at the University of British Columbia. The award will be made on the basis of scholastic ability, character, and promise of achievement. In making the award, consideration will be given to interest and participation in extra-curricular activities. Applications for this award will be considered by the University in consultation with the Association. The June Government Scholarship Examinations must be written. Applications must be submitted by May 15th.

The Kiwassa Club of New Westminster Scholarship—A scholarship of

\$250, the gift of the Kiwassa Club of New Westminster, will be awarded annually to a woman student resident in the City of New Westminster area who is entering the University of B.C. from Grade XII or XIII of high school. The purpose of this award is to give encouragement to a worthy student who has high standing and who needs financial assistance to begin her studies at the University. Applications must be received by the University not later than May 15th.

Margaret Delmage Award—The British Columbia Parent-Teacher Federation offers annually the sum of \$200 to a son or daughter of a native Indian of British Columbia who is entering the University of British Columbia, or some other university or college of recognized standing within the Province, from Grade XII or Grade XIII or is proceeding from Grade XII to Grade XIII and who shows promise of success in continuing studies at the university level. This award is known as the Margaret Delmage Award and is presented in honour of Mrs. Margaret Delmage as a tribute to her outstanding contribution to parent-teacher work in British Columbia. Applications must be received by the University not later than May 30th.

The Mrs. Robert Ewin Memorial Prizes—A total of ten prizes of \$25 each, given as a memorial to Mrs. Robert Ewin by her daughter Mrs. Ethel Lewis, and other relatives, are offered to students whose homes are in the Richmond area and who are entering the University from secondary school. Mrs. Robert Ewin was the first woman trustee member of the Richmond School District on Lulu Island. Two or more of these prizes will be awarded each year to students selected by the University on the basis of academic standing and qualities of leadership.

The Nancy Ryckman Scholarship—As on page 23.

Norman MacKenzie Alumni Scholarship Fund—Alumni contributions to the 1968 Alumni Annual Giving Campaign have made possible the establishment of sixty-four Regional Scholarships, as a tribute to the outstanding contribution of Dr. Norman A. M. MacKenzie in the field of higher education in this Province, in the amount of \$350 each. These scholarships are available to students proceeding from Grade XII (High School Graduation, Academic-Technical Programme) or Grade XIII to the University of British Columbia. The number of scholarships in each Provincial Electoral District will be based on the number of members of the Legislative Assembly elected by the district. Winners will be selected by special Alumni Screening Committees in each electoral district representing the University and the Alumni Association. Application forms may be obtained from Dean Walter H. Gage, University of B.C., Vancouver 8, B.C., and completed application forms should be received by April 15th, and cannot be accepted after May 1st. All applicants must write the Government of B.C. Scholarship examinations conducted by the Department of Education, British Columbia, in June, 1969.

Ocean Cement Limited Entrance Scholarships—Ocean Cement Limited annually offers scholarships to a total of \$1000, open in competition to employees' sons and daughters who are proceeding in the fall from Grade XII or XIII to a full course of University studies. Three scholarships of approximately equal value are provided, one for attendance at each of the University of British Columbia, the University of Victoria, and Simon Fraser University. Candidates for these scholarships must (a) write the Government of B.C. scholarship examinations conducted in June by the Department of Education, B.C., and (b) complete the General Application for Scholarship Form, which may be obtained from Dean Walter H. Gage, University of B.C., Vancouver 8, B.C. The completed application must be returned to Dean Gage not later than May 31st. These scholarships will be awarded to the applicants who,

in the opinion of the Selection Committee, are best qualified in terms of academic merit combined with interest and participation in school or community affairs.

The Pacific Brewers' Warehousing Ltd. Scholarships—Approximately twelve scholarships of \$400 each, provided by The Carling Breweries (B.C.) Limited, Lucky Lager Breweries Ltd., Molson's Capilano Breweries Ltd., and O'Keefe Old Vienna Brewing Co. (B.C.) Limited, are available annually for students who are resident in British Columbia and who are proceeding directly from Grade XII or Grade XIII to a full course of study at the University of British Columbia. Winners will be selected by the University on the basis of scholastic standing, character, and interest in school and comthe Province. Candidates must be eligible in all respects to compete for and must write the Government Scholarship Examinations, conducted by the Department of Education in June. Applications must be received by the Dean of Inter-Faculty Affairs at the University by May 15th.

Pacific Coast Terminals Co. Ltd. Scholarship—One scholarship of \$475, the gift of Pacific Coast Terminals Co. Ltd., New Westminster, is offered to students who have completed Grade XII or XIII and who are beginning their studies at the University of British Columbia. This award is available for students resident in New Westminster or surrounding districts. In selecting the winner consideration will be given not only to academic standing but also to general interest and participation in school and community activities, and to the financial circumstances of those eligible. An applicant must write the Government of B.C. Scholarship Examinations.

Pacific Resins, Ltd. Customers' Scholarship—A scholarship of \$300, donated annually by Pacific Resins Ltd., is offered to students entering the First Year at the University of British Columbia. This award is open to students who are planning careers in the fields of chemistry, chemical engineering, forest products, or wood utilization, or junior or senior high school teaching in science or mathematics. In selecting the recipient, consideration will be given to field of study, scholastic ability and academic record, need, interest and participation in school and community affairs, and personal qualities and character. Candidates must write the Government Scholarship Examinations in June. Applications are required by May 15th.

The Percy W. Nelms Memorial Prize—This prize, a memorial to Percy W. Nelms, who, in August 1961, lost his life while engaged in construction work in Northern British Columbia prior to entering the University of B.C. as an undergraduate, has been established by his brother and sister-in-law, Dr. and Mrs. G. LeRoy Nelms, and his relations and friends. The prize will be awarded annually to a student resident in British Columbia, north of the Peace River, who is entering the University for the first time. The winner will be selected by the University on the basis of academic ability, promise and personal qualities.

The Pharmaceutical Association of the Province of British Columbia

Scholarship—As on page 74.

The Phrateres Scholarship Fund—From this fund, established and maintained by Theta Chapter of Phrateres, an international organization of college women, a scholarship of \$75 will be awarded annually to an out-of-town woman student with Grade XII (academic-technical) or Grade XIII (Senior Matriculation) standing who is attending University for the first time. The award will be made to a student of high standing. In making the award, consideration may be given to financial need.

The Piping Industry Journeyman Training and Industry Promotion Fund Scholarship—A scholarship of \$500, provided by the Trustee Board of the

Journeymen Training and General Industry Promotion Fund, is offered annually to students entering the First Year at the University of B.C., or Simon Fraser University, and proceeding in a full programme of studies to a degree in any field. To be eligible a candidate must be (a) the son, daughter, or legal dependant of a member of the United Association of Plumbers and Steamfitters, Local 170, who is employed by a firm who is a contributor to the Fund; or (b) the son, daughter, or legal dependent of an employer who is a contributor to the Fund and who employs members of the United Association of Plumbers and Steamfitters, Local 170. The scholarship will be awarded to the candidate who, in the opinion of the University, has the highest academic standing. To compete for the scholarship a candidate must (1) obtain from Dean Walter H. Gage, University of B.C., Vancouver 8, B.C. the "General Application for Scholarship" form, and file the completed form by May 31st with the University; and (2) write the Government of B.C. Scholarship Examinations conducted in June by the Department of Education of Edu tion, B.C. The academic standing of candidates, which constitutes the sole basis of award, will be determined by the results of these examinations. Grades obtained in the other subjects taken during the year may be considered. The Trustees reserve the right to withhold the award if candidates do not obtain sufficiently high standing or if they receive other major awards.

Prince George Forestry Scholarship—As on page 57.

The Royal Arch Scholarships—Four scholarships, in the amount of \$300 each, have been established by the Royal Arch Masonic Order to give assistance to sons and daughters of members of Chapters in British Columbia or Yukon Territory in good standing, or of deceased members, who without assistance would be unable to continue through University. They will be awarded annually, on the basis of scholastic standing and need, to eligible students proceeding directly in the fall from Grade XII or Grade XIII to a full programme of studies at the University of British Columbia, Simon Fraser University, University of Victoria, or Notre Dame University of Nelson. Candidates for these scholarships must (a) write the Government Scholarship Examinations conducted in June by the Department of Education, B.C.; (b) complete the General Application for Scholarship Form, which may be obtained from the Dean of Inter-Faculty and Student Affairs, University of B.C. This application form, which is to be received by the University not later than May 15th, must clearly indicate (i) the applicant's relationship to a member of the Royal Arch Masonic Chapter, the name of the member, and the name of Royal Arch Chapter in British Columbia or Yukon with which he or she was connected; and (ii) the applicant's financial circumstances and those of his or her immediate family. Candidates will be considered on the basis of the Scholarship Examinations and the grades obtained in the other courses taken during the year. If, in the opinion of the University, no applicant is suitably qualified, the award will be withheld.

Standard Oil Company of British Columbia Limited Entrance Scholarship -Standard Oil Company of British Columbia Limited offers a scholarship worth \$2000 to students who are residents of British Columbia and are proceeding in the fall to studies in the First Year at the University of British Columbia, the University of Victoria, Simon Fraser University, or other approved Canadian University of recognized standing, in a full course leading to a degree. Candidates must be eligible in all respects to compete for Government of B.C. Scholarships and must write the Government of B.C. scholarship examinations for High School Graduation (Academic-Technical) conducted in June by the Department of Education, Victoria, B.C. The scholarthip will normally be awarded to the eligible applicant obtaining highest standing in these examinations, but marks obtained in other subjects taken during the year may also be considered. Should this applicant win another award, however, the scholarship may be given, at the discretion of the University, to the eligible candidate with next highest standing. No award will be made to a candidate with an overall average of less than 75%. The winner of this award will receive \$500 during the first year of attendance at the University, and is eligible for renewals of \$500 a year for three further years. Each renewal is subject to maintenance of standing satisfactory to the Selections Committee. All candidates for this award must, by May 15th, notify the Dean of Inter-Faculty and Student Affairs, University of British Columbia, of their intention to compete. Before June 1st, they must also compete and submit, through the school principal, the special form required by the Department of Education from all those writing the scholarship examinations. Postponement for one year may be granted to a student taking the equivalent of First Year through Grade XIII or at some institution other than the University of B.C., University of Victoria, or Simon Fraser University, but he must obtain satisfactory standing in that year.

Standard Oil Company of British Columbia Limited Special Scholarship -Standard Oil Company of British Columbia Limited offers a scholarship worth \$2000 to children or wards of employees or annuitants of the Standard Oil Company of British Columbia, or of deceased employees who died while in the employ of the Company or as annuitants of the Company, and who have or had not less than one year of service with the Company. It will be open in competition to students proceeding in the fall to the First Year at the University of British Columbia, the University of Victoria, Simon Fraser University, or other approved Canadian university of recognized standing, in a full course leading to a degree. Candidates must be eligible in all respects to compete for Government of B.C. Scholarships and must write the scholarship examinations for High School Graduation (Academic or Technical) conducted in June by the Department of Education, Victoria, B.C. The scholarship will normally be awarded to the eligible applicant obtaining highest standing in these examinations, but grades obtained in the other subjects taken during the year may also be considered. Should this applicant win another award, however, the scholarship may be given, at the discretion of the Selection Committee, to the eligible candidate with next highest standing. No award will be made to a candidate with an overall average less than 70%. The winner of this award will receive \$500 during the first year of attendance at the University, and is eligible for renewals of \$500 a year for three further years. Each renewal is subject to maintenance of standing satisfactory to the Selection Committee. All candidates for this award must, by May 15th, notify the Dean of Inter-Faculty and Student Affairs, University of British Columbia, of their intention to compete. Essential details of family service with the Company must also be supplied. Before June 1st they must also complete and submit, through the school principal, the special form required by the Department of Education from all candidates writing the scholarship examinations. Postponement for one year may be granted to a student taking the equivalent of First Year through Grade XIII or at some institution other than the University of B.C., the University of Victoria, or Simon Fraser University, but he must obtain satisfactory standing in that year.

The St. Joseph's Unit, Local 180, Scholarship—A scholarship of \$250 is offered by the St. Joseph's Unit of the Hospitals Employees' Union Local 180 to students proceeding in the fall from Grade XII or XIII of secondary school to a full programme of studies at the University of B.C., University of Victoria, Notre Dame University of Nelson, Vancouver City College, or Simon

Fraser University in any field leading to a degree. To be eligible an applicant must (a) be the son or daughter of an active member of the Hospital Employees' Union Local 180 ("active" being interpreted as on the staff of a hospital within the jurisdiction of Local 180, or on the staff as of January 1st of the year of the award but since superannuated); (b) write the Government Scholarship Examinations conducted in June by the Department of Education, B.C., and obtain clear standing with an overall average of not less than 70%; (c) obtain from the Dean of Inter-Faculty and Student Affairs the University of B.C. Bursary Application Form and file the completed form with the University of B.C. not later than July 15. The information given in the form must clearly establish the applicant's connection with Local 180 and one of the hospitals. Candidates should note that intention to write Government Scholarship Examinations must be filed with the Department of Education, Victoria, B.C., through the school principal, before June 1st. The scholarship will be awarded to the candidate who, in the opinion of the University (in consultation with the Union), is best qualified in terms of academic standing and financial need.

Tahsis Company Ltd. Entrance Scholarship—Tahsis Company Ltd. offers annually a scholarship of \$500 to a first year student to attend the University of B.C., the University of Victoria, or Simon Fraser University. This scholarship is open in competition to sons and daughters of employees of the Company proceeding in the fall from Grade XII or XIII to studies leading to a degree in any field. Students who wish to compete must complete the General Application for Scholarship Form, obtainable from Dean Walter H. Gage, University of B.C., Vancouver 8, B.C. It must be received at the University by May 30th. The application must state the names of the applicant's parents. one of whom must have been employed by the Company for a minimum of one full year, and give brief details of their service with the Company. All candidates must write the Government of B.C. Grade XII or XIII Scholarship examinations, conducted in June by the Department of Education, B.C. The award will be made to the candidate obtaining the highest standing. In the event that the candidate wins another scholarship, the University and the Company reserve the right to decide whether the Tahsis Company Ltd. Scholarship shall be paid to the winner or revert to the candidate with the next highest standing.

The T. E. and M. E. Ladner Memorial Scholarship—As on page 25.

Trans Mountain Oil Pipe Line Company Scholarships—Trans Mountain Oil Pipe Line Company offers scholarships to a total of \$4500 plus an additional grant of \$500 to the University. These scholarships, ranging from \$400 to \$700 each, will be awarded to students with high academic standing in Grade XII or Grade XIII who are entering the University of British Columbia for the first time from high school. These scholarships are open to students who are proceeding to degrees in Engineering, the Physical Sciences, or Geology and who reside in areas along the route of the Trans Mountain Oil Pipe Line, i.e. lower and upper Fraser Valley, Chilliwack, Hope, Merritt, Kamloops, and the North Thompson River region. In selecting the winners, the financial circumstances of applicants, as well as their academic standing, will be considered. Winners are not normally permitted to hold other scholarships. The Company also provides the sum of \$2500 for renewals at the discretion of the University to winners with high standing and financial need. Applicants must be eligible in all respects to compete for Government of B.C. Scholarships and must write the Government Scholarship Examinations conducted in June by the Department of Education, B.C. Applications must be submitted not later than May 15th to the Dean of Inter-Faculty and Student Affairs.

The Truck Loggers' Association Scholarships—Through a gift of \$250 from the Truck Loggers' Association, two scholarships of equal value are available for students entering First Year Forestry or Forest Engineering. These scholarships will be awarded to students with high standing who are worthy and deserving of encouragement and assistance.

UBC Chris Spencer Foundation Entrance Scholarships—Fifteen one-year scholarships of \$500 each (\$275 contributed by the Chris Spencer Foundation and \$225 by the University of B.C.) will be awarded on the results of the Government of B.C. Grade XII Scholarship Examinations conducted in June by the Department of Education, B.C. The grades obtained in the other subjects taken during the year may also be considered. These scholarships are open only to students who are eligible in all respects to compete for Government of B.C. Scholarships and are proceeding in the fall to a full programme of studies at the University of B.C., Vancouver. To be eligible, a candidate must, before June 1st, notify Dean Walter H. Gage, University of B.C., Vancouver 8, B.C., by completing the General Application for Scholarship Form, that he intends to enter the University of B.C. in the fall. Before June 1st he must also complete and submit to the Division of Examinations, Department of Education, B.C., through his school principal, the necessary scholarship application form. These scholarships will be offered as follows:

- (a) \$500 to the eligible candidate with highest standing in the Province;
- (b) \$500 to the eligible candidate with next highest standing in the Province;
- (c) \$500 to the eligible candidate with next highest standing in each of the following areas:
  - Area 1-School Districts 1 to 11 inclusive, and 18, 19;
  - Area 2-School Districts 12 to 17 inclusive, 21, 22, 23, 77, 78;
  - Area 3-School Districts 20, 24 to 31 inclusive, 57, 58, 82;
  - Area 4-School Districts 32, 33, 34, 35, 42, 75, 76;
  - Area 5-School Districts 36, 37, 38;
  - Area 6—School District No. 39 (Britannia, David Thompson, Gladstone, Killarney, Technical, Windermere, any private schools in the area);
  - Area 7—School District No. 39 (Eric Hamber, John Oliver, King Edward, King George, Sir Winston Churchill, Sir Charles Tupper, and any private schools in the area);
  - Area 8—School District No. 39 (Kitsilano, Lord Byng, Magee, Point Grey, Prince of Wales, University Hill, and any private schools in the area);
  - Area 9-School Districts 40, 41;
  - Area 10-School Districts 43, 44, 45;
  - Area 11—School Districts 46 to 56 inclusive, 59, 60, 80, 81, 83;
  - Area 12-School District 61;
  - Area 13-School Districts 62 to 74 inclusive, 79.

If the winner in any of the above categories receives another award, or if no candidate in a category qualifies, the University of B.C. reserves the right to award the scholarship to the candidate who, in the opinion of the University, is best qualified. Winners, when notified by the University, must confirm their acceptance immediately. Postponement will be granted on medical grounds only.

UBC Royal Institution Scholarships for Grade XIII—Six general proficiency scholarships of \$200 will be awarded by the University of B.C. on the results of the Grade XIII Scholarship Examinations conducted in June by the Department of Education, B.C. They are offered only to students who, in the fall, will attend the University of B.C., Vancouver, in a full programme of studies. To be eligible, a candidate must, before June 1st, notify Dean Walter H. Gage, University of B.C., Vancouver 8, B.C., by completing the General Application for Scholarship Form, that he proposes to enter the University of B.C. in the fall. The candidate must also complete and submit to the Division of Examinations, Department of Education, B.C., through the school Principal, the form "Application—Scholarship Candidate" before June 1st. These scholarships are offered as follows:

- (a) \$200 to the candidate of highest standing in the Province;
- (b) \$200 to the candidate of next highest standing in the Province;
- (c) \$200 to the candidate of next highest standing in all school districts of the Province other than School Districts No. 39, 40, 41, 44, and 45; and
- (d) \$200 each to the three candidates of next highest standing in School Districts No. 1 to 82 inclusive (other than Nos. 39, 40, 41, 44, 45, 61).

United Steelworkers of America Scholarships—Two scholarships of \$500 each are offered annually to students who are sons or daughters of active members of the Union residing in the lower mainland, and who are proceeding in the fall from Grade XII or XIII of secondary school to a full programme of studies at the University of British Columbia or Simon Fraser University leading to a degree in any field. Each candidate must apply by letter, received not later than June 1st, and addressed to the Secretary, United Steelworkers of America, 33 East Broadway, Vancouver 10, B.C. The letter must contain the following details: applicant's full name, address, age; name of school and grade attended; brief outline of proposed studies at the University; name and address of parent or guardian and of his or her service with the Union. Candidates must be eligible in all respects to compete for Government of B.C. Scholarships and must write the Government Scholarship Examinations conducted in June by the Department of Education, B.C. Winners will be selected by the University.

University of British Columbia Employees, Local Union No. 116, Scholarship—A scholarship of \$350, the gift of the University of British Columbia Employees, Local Union No. 116, is available to sons, daughters, and legal dependants of active members having at least one year's service with the Union. This scholarship will be awarded to a student proceeding from high school to begin studies at the University in a full course leading to a degree. In the selection of the winner, consideration will be given to academic standing, character, interest and participation in school and community affairs, and financial circumstances. Applications, on forms available from the office of the Dean of Inter-Faculty and Student Affairs, must be submitted to the University not later than June 30th.

The Vancouver Elementary School Teachers' Association Scholarships—As on page 45.

The Vancouver and District Home Economics Association Scholarship—A scholarship of \$250, the gift of the Vancouver and District Home Economics Association, is open in competition to women students in Vancouver and District, who are entering the School of Home Economics at the University from Grade XII. In the selection of the winner consideration

will be given to academic standing; aptitude for, and promise in, the field of home economics; personal qualities and character; and interest and participation in school and community affairs. The financial circumstances of the applicants and their families may also be a factor. Applications, on forms obtainable from the Dean of Inter-Faculty and Student Affairs, must be submitted to the University not later than May 15th.

The Vancouver Federal Employees Credit Union Harold Pocock Memorial Scholarship—A scholarship of \$400, established by the Vancouver Federal Employees Credit Union in memory of Harold Pocock, first manager and secretary of this Credit Union, is offered to sons, daughters and legal dependants of employees of the Dominion Government residing in the Vancouver area (including the City of Vancouver, the City and District of North Vancouver, and the Municipalities of West Vancouver, Burnaby and Richmond), or of persons who are eligible to become or are members of the Vancouver Federal Employees Credit Union. The scholarship will be awarded to a student completing Grade XII or XIII in high school and proceeding in the fall to the University of B.C. or Simon Fraser University in a full course leading to a degree. In selecting the winner, consideration will be given to academic standing, ability, and promise in future studies, character, and participation and interest in school and community affairs. Applications, on forms obtainable from the University of B.C., must be submitted by June 30th. In the application, the candidate must give a full account of his extracurricular activities and of his and his parents' financial circumstances. At least two confidential letters of reference, from teachers of others who are acquainted with the candidate's academic record and participation in activities of the school or community, and submitted in sealed envelopes, must be forwarded with the completed application form.

Vancouver General Unit, Local 180, Scholarships—Two scholarships of \$250 each are offered annually by the Vancouver General Unit of the Hospital Employees' Union Local 180 to students proceeding in the fall from Grade XII or XIII of secondary school to a full programme of studies at the University of B.C., University of Victoria, Notre Dame University of Nelson, Vancouver City College, or Simon Fraser University in any field leading to a degree. To be eligible an applicant must (a) be the son or daughter of an active member of the Hospital Employees' Union Local 180 ("active" being interpreted as on the staff of a hospital within the jurisdiction of Local 180, or on the staff as of January 1st of the year of the award but since superannuated); (b) write the Government Scholarship Examinations conducted in June by the Department of Education, B.C., and obtain clear standing with an overall average of not less than 70%; (c) obtain from the Dean of Inter-Faculty and Student Affairs the University of B.C. Bursary Application form and file the completed form with the University of B.C. not later than July 15. The information given in the form must clearly establish the applicant's connection with Local 180 and one of the hospitals. Candidates should note that intention to write Government Scholarship Examinations must be filed with the Department of Education, Victoria, B.C., through the school principal, before June 1st. The scholarships will be awarded to the two candidates who, in the opinion of the University (in consultation with the Union), are best qualified in terms of academic standing and financial need.

The Vancouver Island Recreation Scholarship—A scholarship of \$300, the gift of the Vancouver Island Council of the British Columbia Recreation Association, will be awarded to a student in the degree programme in Recreation at the University. The scholarship is financed by participation of Vancouver Island Recreation Commissions. The award will be made on

the basis of academic standing, leadership qualities, activity in student affairs, participation in Community activities, personal qualities, and financial need. To be eligible a candidate must have an overall average of at least 65% in the final written examinations conducted in June by the Department of Education, or for students in the University, in the final sessional examinations. In any subjects where written examinations are not provided by the Department of Education, marks obtained through recommendation will be considered. The scholarship will be awarded to a student in the First Year from Vancouver Island. If there is no suitably qualified candidate in this category, preference will be given to a Vancouver Island candidate in the Second, Third, or Fourth Year in that order, and then to a First Year student from some other area of the Province. Applicants must apply on the General Application for Scholarship form, to be received by Dean Walter H. Gage, University of B.C., Vancouver 8, B.C., not later than May 15th. The letter must contain full details covering the factors on which the award is based.

The Vancouver Police Force Scholarships—To encourage and assist sons and daughters of members of the Vancouver Police Force to attend the University, six scholarships of \$250 each are offered on an annual basis by individuals, firms, and organizations as follows:

The J. Douglas Maitland Scholarship;

The MacMillan Bloedel Limited Scholarship;

The Police Mutual Benevolent Association Scholarship (two awards): The Vancouver Policemen's Union Scholarship; (two awards).

These scholarships are open in competition to the children of (1) serving members of the Force who, on June 1st of the year of the award, held a rank not above Staff Sergeant; (2) superannuated former members who, on retirement from the Force, held a rank not above Staff Sergeant; (3) members who died while serving with the Force and who, at the time of death, held a rank not above Staff Sergeant; (4) Officers of the Force, but applications will be considered only when there is not a sufficient number of qualified applicants in (1), (2), and (3) above. They are available either to students entering the University from high school (Grade XII or Grade XIII) or to those who have previously attended and are continuing their studies at the University. Preference, however, will be given to those entering University from high school. In selecting the winners, the academic standing of the applicants and the financial circumstances of their parents will be considered. Application forms may be obtained from and must be received by Mr. R. Pickering, Secretary, Vancouver Police Force Scholarship Committee, 312 Main St., Vancouver 4, B.C., not later than June 30th.

The Vancouver Postal Club Scholarship—A scholarship of \$200 is offered by the Vancouver Postal Club to sons, daughters, and legal dependants of full-time postal employees who have or will have been employed in the Vancouver Postal Area for at least one year prior to June 30th of this year. It will be awarded by the University, in consultation with the Club, to a student entering the University from Grade XII or XIII to begin a full course of studies leading to a degree in any field. Applicants will be considered on the basis of academic standing, qualities of leadership as shown by their interest and participation in school and community affairs, and personal qualities and character. The final date for submitting applications is June 30th.

The Vancouver Sun Scholarships for Carriers—The Vancouver Sun offers mnually two scholarships of \$500 each to students proceeding in the fall from Grade XII to the First Year at the University of British Columbia, the University of Victoria, or Simon Fraser University, in a full programme leading to a degree in any field. To be eligible applicants must have been carriers of The Vancouver Sun for at least two years, must be eligible in all respects to compete for Government of B.C. Scholarships, and must write the Scholarship examinations conducted in June by the Department of Education, B.C. The Vancouver Sun Scholarships will normally be awarded to the two eligible applicants who rank highest in these examinations, but standing obtained in the other subjects taken during the year may be considered. Winners who obtain and maintain First Class standing (or who, in successive years of their undergraduate course, rank in the top 10% of the Faculty and Year in which they are registered) will be eligible for renewals of \$500 a year until graduation, not exceeding a total of five payments in all. Selection of the winners will be made by the University. An applicant must apply on the "General Application Form," which may be obtained from and must be returned by May 15th to Dean Walter H. Gage, University of British Columbia, Vancouver 8, B.C. The application must be accompanied by the service certificate of The Vancouver Sun. The winner of one of these scholarships, while not also permitted to hold The Vancouver Sun Special Scholarship for Carriers may, however, accept other awards offered to him.

The Vancouver Sun Special Scholarship for Carriers—The Vancouver Sun offers annually a scholarship of \$500 to students proceeding in the fall from Grade XII to the First Year at the University of British Columbia, the University of Victoria, or Simon Fraser University, in a full programme leading to a degree in any field. To be eligible an applicant must have been a carrier for the Vancouver Sun for at least two years, must be eligible in all respects to compete for Government of B.C. Scholarships, and must write the Scholarship examinations conducted in June by the Department of Education, B.C. An applicant will be considered only if he obtains an overall average of at least 75%. The scholarship will be awarded to the eligible applicant who, in the opinion of the University is the most outstanding in combining high scholastic attainment with achievement in one or more areas such as service to the school and community; writing, drama, fine arts; debating and public speaking; sports. A winner who, in successive years of his undergraduate course, obtains and maintains First Class standing (or who ranks in the top 10% of the Year and Faculty in which he is registered) will be eligible for renewals of \$500 a year until graduation, not exceeding a total of five payments in all. All candidates must complete the "General Application for Scholarship Form" obtainable from Dean Walter H. Gage, University of B.C., Vancouver 8, B.C. The completed application, accompanied by the service certificate of The Vancouver Sun, must be received by the University not later than May 15th. Candidates will be judged on the basis of their examination grades, their personal letters (see application form for details), and letters of recommendation from their references. The winner of this scholarship, while not also permitted to hold one of the Vancouver Sun Scholarships for Carriers, may accept other awards offered to him.

The Walter C. Koerner Scholarship in Creative Writing—This scholarship of \$500, the gift of Mr. Walter C. Koerner, is open in competition to students in Grade XII or XIII in British Columbia secondary schools beginning studies in any faculty at the University of B.C., Vancouver, in the fall of 1969. It will be awarded to a student with a good all-round academic record who shows promise in the writing of imaginative literature, particularly in the fields of poetry, prose fiction, or the drama. Candidates

must apply by letter addressed to the Walter C. Koerner Creative Writing Scholarship, c/o Dean Walter H. Gage, University of B.C., Vancouver 8, B.C. The letter of application should indicate the student's school, and state briefly the student's interests and aims as a writer. It should be accompanied by a selection of the applicant's creative work (in typescript or in printed or mimeographed form). Applications must reach the University by May 15th.

W. H. MacInnes Entrance Scholarships in English-Through the generosity of Mr. W. H. MacInnes of Vancouver, scholarships of \$100, \$75, and \$50 respectively are available to the three students entering the University of British Columbia in September with highest standing in English Literature 12. To be eligible a candidate must write the scholarship examinations conducted in June by the Department of Education, Victoria, B.C. In the event of a tie the award will be made to the qualifying student with highest overall average. Winners of these awards will not be precluded from holding other awards given by the University.

The W. H. MacInnes Entrance Scholarships in Mathematics—Through the generosity of Mr. W. H. MacInnes of Vancouver, scholarships of \$100, \$75, and \$50 respectively are available to the three students entering the University of British Columbia in September with highest standing in Mathematics 12. To be eligible a candidate must write the scholarship examinations conducted in June by the Department of Education, Victoria, B.C. In the event of a tie the award will be made to the qualifying student with highest overall average. Winners of these awards will not be precluded from holding other awards given by the University.

# Extension Courses and Miscellaneous

Scholarships in the Diploma Program in Adult Education—In 1969-70 three scholarships provided by the Department of University Extension are offered to students who undertake the Faculty of Education-Extension Department Diploma Program in Adult Education. Selection of the winners will be made by the Faculty of Education and the Department of Extension on the basis of scholastic standing, demonstrated interest in adult education and apparent ability to make a significant contribution to the field. In making the awards, financial circumstances of the candidate may also be considered. The specific amounts and terms of the awards are as follows: one scholarship of \$500 and two scholarships of \$200 available to students who will be in full-time residence for one academic year.

# In Summer Session

The British Columbia Teachers' Federation Postgraduate Scholarships for **Teachers**—As on page 144.

The British Columbia Teachers' Federation Undergraduate Scholarships or Teachers—As on page 153.

The Dr. H. T. J. Coleman Scholarship—This scholarship of \$100 is offered annually in the summer session, in honour of the late Dr. H. T. J. coleman, who contributed greatly to the development of the Summer School the University. The award will be made by the Scholarship Committee a student in the Third or higher year who has an outstanding record in me or more of the fields of psychology, philosophy, and education.

Summer Session Association Prizes—Prizes of \$100 each, the gift of the ummer Session Association, will be awarded at the conclusion of each summer session to the five top ranking students who complete the final

units required for an undergraduate degree by attendance at that summer session. To be eligible a candidate must have taken the final fifteen units for the degree by means of University of British Columbia Summer Session, Extra-Sessional or Correspondence Courses.

Summer Session Association Prize for Graduate Students—A prize of \$100, gift of the Summer Session Association, will be awarded at the conclusion of each summer session to the most outstanding student who completes the final units for a Master of Arts in Education or a Master of Education degree by attendance at that summer session. To be eligible, a candidate must have taken the final twelve units for the degree by means of University of B.C. Summer Session, Extra Sessional, or Correspondence Courses.

Summer Session Scholarships in Personal and Business Finance—A gift of the Canadian Life Insurance Association has been made to the Faculty of Commerce and Business Administration to assist teachers from the Prairie Provinces to participate in the Summer Session Course in Personal and Business Finance. In 1969, three awards will be available for Alberta of \$200 each, three for Saskatchewan of \$250 each, and three for Manitoba of \$300 each. Awards will be made to practising secondary teachers selected by the Faculty of Commerce and Business Administration of the University of British Columbia.

# STUDENT ASSISTANCE

Students who require financial assistance to continue or begin their studies at the University of British Columbia are referred to the sections of this Calendar describing the Self-Help Programme, Bursaries (in the next section), and Loans (page 130).

#### BURSARIES

#### For The Winter Session

Applications for bursaries awarded by the University and tenable in the winter session, must be received by the Dean of Inter-Faculty and Student Affairs not later than July 15th. Application forms may be obtained at the office of the Dean of Inter-Faculty and Student Affairs after June 1st. See also "Government Bursaries" below.

Unless announced otherwise in the Calendar description, bursaries are awarded only to undergraduates who are beginning or continuing a full course of study in Vancouver at the University of British Columbia, and in special cases, to graduates taking the one-year Teacher Training Course, the Library Course, or Social Work, at this University. To be eligible for a bursary, a student must normally show clear evidence of financial need and have at least Second Class standing in the full year's work most recently taken.

A student applying for a University Bursary (described below) will automatically be considered as an applicant for any other bursaries given by the University. Only one bursary application is therefore required for the session. Separate application must be made, however, for any bursary aid from the Provincial Department of Education (Government Bursaries). Application forms for this assistance may be obtained from the Department of Education, Victoria, B.C., to whom inquiries should be directed.

Bursaries and Loans are not normally awarded to students entering the University for the first time from outside British Columbia. They become eligible for consideration after attending the University for a full winter session.

Government Bursaries—The Government of the Province of British Columbia (with a contribution also from the Federal Government) provides funds annually for the award of bursary assistance to selected capable persons who can show financial need and who fulfil certain requirements of being domiciled in British Columbia. These awards will be made to assist students entering their first year of undergraduate studies at the University of British Columbia, from Grade XII or XIII. If funds permit, however, awards may be made for undergraduate studies in higher years (including the one-year teacher-training course, the one-year Librarianship course, and Social Work), or for acceptable university studies at a recognized institution outside the Province in fields for which training is not available at universities in British Columbia. Awards are normally in the range of \$100 - \$200. Applications must be submitted to the Department of Education, Victoria, B.C., by August 5th. Application forms may be obtained from the Department of Education, Victoria, B.C., from the Dean of Inter-Faculty and Student Affairs of the University of B.C., or, where the student is attending school, from the principals of senior secondary schools.

University Bursaries—For the session of 1969-70 a University Bursaries Fund has been made available by the Board of Governors to enable a limited number of undergraduates to attend the University who would not otherwise be able to do so. Applications from students taking the one-year Teacher Training Course, the course in Librarianship, and Social Work will also be considered. To be eligible for an award from this fund a student must normally have attained at least Second Class standing in the full year's work last taken, and must give evidence of need. Applications, on the University Bursary form available at the office of the Dean of Inter-Faculty and Student Affairs, must be received not later than July 15th.

Agricultural Bursary (Anonymous)—This bursary of \$60 is offered in the session of 1969-70 to assist a student in Agricultural Sciences from a rural area, other than the Fraser Valley, who has completed at least the First Year.

The Agriculture Women's Undergraduate Society Bursary—This bursary of \$100, gift of the Agriculture Women's Undergraduate Society, is offered to a woman student entering the Faculty of Agricultural Sciences for the first time. It will be awarded to a student on the basis of qualities of character and leadership and financial need.

The A. Johnson Bursaries—A bequest from the late Alfred Johnson provides bursaries from time to time for selected students in the United Kingdom to enter the University to proceed to an undergraduate degree. Each award, covering tuition, board and room and incidental expenses, is renewable annually until graduation, subject to satisfactory standing.

The Allied Officers' Auxiliary Bursary—To commemorate the services and sacrifices of members of the armed forces and the merchant navies of the Allied Nations, the Allied Officers' Club Auxiliary has established a bursary of the annual bursary of \$125, open to students in any year and faculty. This bursary is available for a veteran of the Second World War or for the son or daughter of a veteran. The award will be made on the basis of scholastic standing and financial need.

Allstate Insurance Co. Bursary—A bursary of \$100 will be awarded annually to a student in the Faculty of Commerce and Business Administration, entering either the Third or Fourth Year, who has good scholastic standing, shows an interest in the area of insurance and risk management, and is in need of financial assistance.

The Alpha Gamma Delta Mothers' Club Bursary—A bursary of \$100, the gift of the Alpha Gamma Delta Mothers' Club, is offered to a woman

student in any year and faculty. It will be awarded to a worthy and deserving student who needs financial assistance.

The Alpha Omega Society Bursary—This bursary of \$100, gift of the Alpha Omega Society, a University organization for students of Ukrainian descent, is offered to active members of the Society who have good academic standing, need financial assistance, and are continuing in a full programme of undergraduate studies. The recipient will be selected by the University in consultation with the Club.

The Alvin Cunningham Bursary—A bursary of \$200, the gift of Alvin Cunningham, is offered annually to a student entering the Second or Third Year of the course in Pharmaceutical Sciences. The award will be made on the recommendation of the Dean of the Faculty, to a student who has shown definite ability and has need of financial assistance.

The American Woman's Club Bursary—A bursary of \$250, given by the American Woman's Club of Vancouver, will be available in the session 1969-70 to assist a woman undergraduate who has completed at least one year in Arts and Science with satisfactory standing, and who cannot otherwise continue her course.

The Angus MacInnis Bursary—A bursary of \$350, the gift of the British Columbia Federation of Labour, C.L.C., is offered annually, open in competition to the sons and daughters of trade unionists. It will be awarded to an undergraduate who has completed at least one year of university studies and who is enrolling for a course in political science or labour economics and industrial relations.

The Anna E. Sprott Memorial Bursary in Nursing—This bursary of \$100, given in memory of Anna E. Sprott by the R.C.A.F. Chapter, I.O.D.E., will be awarded in the winter session to a student taking her Final Year in the course leading to the degree of B.S.N. in the School of Nursing. The award will be made to a student who has good academic standing and is in need of financial assistance.

The Anne S. Campbell Bursaries—The annual income from a fund bequeathed by the late Anne S. Campbell will be used to provide bursaries for undergraduates who show qualities of leadership and who need financial assistance.

The A. Rothstein Memorial Bursary—This bursary of annual value of \$100, in memory of the late Mr. A. Rothstein, will be awarded to an undergraduate in any year or faculty who has good scholastic standing and is in need of financial assistance.

B.C. Chapter of Alpha Delta Phi Fraternity Bursary—A bursary of \$50, the gift of the B.C. Chapter of Alpha Delta Phi Fraternity, is available for a male undergraduate in any year and faculty who has good academic standing and needs financial assistance to continue at University.

The B.C. Dental Association Bursaries—The B.C. Dental Association offers annually three bursaries of \$250 each, open to residents of British Columbia who are enrolled in the Faculty of Dentistry at the University of British Columbia. These bursaries will be awarded to students with good academic records who, in the opinion of the Committee, need, and are deserving of, financial assistance. The winners will be required to assume a moral (but not a legal) obligation to reimburse the Fund after completion of their training. Applicants for bursaries must complete the University Bursary application form and submit it to the University not later than July 15.

The B.C. Dentist Wives Association Bursary—A bursary or bursaries to the total of \$2000, the gift of the B.C. Dentist Wives Association, are offered

annually to pre-dental students and dental proceeding in the fall to an approved Faculty or School of Dentistry. They will be awarded to worthy and deserving students at the University who have completed all pre-dental requirements, have good academic standing, and need financial assistance. Applications, on the University Bursary Form, must be received at the University by July 15th. The winners are asked to assume a moral obligation, if and when circumstances permit, to reimburse this bursary fund.

The B.C. Society of Internal Medicine Bursary—A bursary of \$550, the gift of the B.C. Society of Internal Medicine, will be awarded annually to a student or students in the Faculty of Medicine who have good scholastic standing and need financial assistance. The award is open to dependents of deceased physicians and to students proceeding to a career in fundamental medical science, or showing aptitude for and interest in a career in internal medicine. Preference will be given to students in the Final Year.

B.C. Tuberculosis — Christmas Seal Society Bursaries—Bursaries, gift of the B.C. Tuberculosis — Christmas Seal Society, will be offered to students who have had tuberculosis. Awards will be made to students who have satisfactory standing and need financial assistance.

The Bella Koch Memorial Bursary—This bursary, of annual value of \$100 the gift of Mr. Albert O. Koch and family, will be awarded to a student who has good scholastic standing and who, without financial assistance, will be unable to continue studies at the University.

The Bennett & White Construction Co. Ltd. Bursaries—Bursaries to the total of \$2,000, gift of Bennett & White Construction Company, Ltd., are provided annually for deserving students in the Totem Park Residences. These bursaries will be offered each year for a period of five years, commencing in September, 1965.

The Ben Shapiro Memorial Bursary—This bursary of \$50, established in memory of Mr. Ben Shapiro by his children, provides assistance for worthy and deserving students. It will be awarded to a student in any year and faculty who has good standing and requires some financial aid.

The Brissenden Bursary—A bursary of \$350, the gift of P. R. Brissenden, Esq., Q.C., is offered in alternate years. It will be awarded to a student in any year and faculty whose standing is satisfactory and who could not continue his studies at the University without financial assistance. The next award will be made in August, 1969.

British Columbia Forest Products Limited Bursaries—Bursaries to a total of \$5500, each with a maximum value of \$300, are offered by British Columbia Forest Products Limited to sons and daughters of employees who, by June 30th of the year in which the award is made, have or will have served with the Company for at least one year and whose earnings are limited (see Company brochure for details). They are open to students beginning or continuing studies in the fall in a full undergraduate programme of studies at the University of British Columbia, the University of Victoria, or Simon Fraser University. Awards will be made at the discretion of the University of B.C. to students selected on the basis of their academic standing and need for financial assistance. No award will normally be made, however, to a candidate who obtains an overall average of less than 60% or who is required to write supplementals to obtain clear standing in a full year's work. Winners of the Company's Entrance Scholarships will not be permitted to receive a Company Bursary in the same year. All candidates must apply on the University Bursary form, which may be obtained from the Dean of Inter-Faculty and Student Affairs, University of B.C. This application must be received by the University

of B.C. not later than July 15 and must contain the necessary details of family service with the Company.

The British Columbia Institute of Agrologists Bursary—A bursary of \$250 is offered by the Institute of Agrologists to a student entering the degree course in Agricultural Sciences for the first time. This bursary will be awarded to an applicant who has a record of good scholastic standing and has need of financial assistance. In choosing the recipient, consideration will be given to farm background and participation in community activities. Winners of this bursary will be selected by the Joint Faculty Committee on Prizes, Scholarships, and Bursaries, after consultation with the Bursary Committee of the Institute of Agrologists and the Dean of the Faculty of Agricultural Sciences. Candidates must have their applications approved by a resident agrologist in the district where the application is made. Applications, on forms available from the Dean of Inter-Faculty and Student Affairs, must be received by the University not later than July 15th. The application form should contain an outline of the applicant's record in community activities and an indication of his background in farming.

British Columbia Institute of Agrologists, Dean Blythe A. Eagles, Bursary—A bursary of \$75, a gift of the British Columbia Institute of Agrologists in honour of Dean B. A. Eagles, Dean Emeritus of Agriculture, for his outstanding contributions to the profession of agrology, will be awarded annually to a student who has completed at least one year in the Faculty of Agricultural Sciences. The award will be made on the recommendation of the Faculty to a student with high academic standing and awareness of the role of agricultural sciences in the modern world.

The British Columbia Loggers' Association Bursary in Forestry—The B.C.L.A. Bursary in Forestry amounting to \$300 per annum was established by the British Columbia Loggers' Association as an award to a student registered in Fourth Year Forestry or Forest Engineering. To be eligible for the award a student must have been a resident in British Columbia for the previous two years, must have a scholastic average of at least 65 per cent in the work of the Second and Third Years at the University of British Columbia, and must give evidence of leadership, sterling character, and physical vigour. He must also have been engaged during at least two summer sessions, or the equivalent thereof, in woods employment, logging operations, cruising, or logging engineering. In November 1966, the Association amalgamated with other forest industries on the Coast and is now known as the B.C. Loggers' Division of the Council of Forest Industries of B.C.

The British Columbia Medical Association Bursary Fund—This fund, established by the British Columbia Medical Association, and maintained by contributions at the level of \$1000 annually, provides financial assistance for undergraduate students in the Faculty of Medicine. Those who are assisted are asked to accept a moral obligation to reimburse the Fund when they are able to do so.

The British Columbia Surgical Society Bursary Fund—Through annual contributions of \$500 the British Columbia Surgical Society has established a fund to assist promising and deserving students in the Faculty of Medicine. Students receiving assistance are asked to assume a moral obligation to reimburse the Fund on completion of their training.

The Buell, Ellis, Sargent & Russell Bursary—A bursary ot \$150, gitt of Buell, Ellis, Sargent & Russell, Barristers and Solicitors, Vancouver, B.C., is offered annually to students beginning or continuing studies in Law. It will be awarded to a student with a good academic record who needs financial assistance.

Bull, Housser & Tupper Bursary—A bursary of \$300, gift of Bull, Housser & Tupper, Barristers and Solicitors, Vancouver, B.C., is offered annually to students beginning or continuing studies in Law. It will be awarded to a student with a good academic record who needs financial assistance.

The Canadian Anaesthetists' Society, British Columbia Division, Bursary -Two bursaries of \$100 each, the gift of the British Columbia Division of the Canadian Anaesthetists' Society and given to honour the memory of Dr. Angus Alexander MacMillan and Dr. Neil A. Stewart, are offered to students in the Faculty of Medicine. They will be awarded by the University to worthy and deserving students who have good records, show promise, and need assistance. Those who are assisted, although not required to undertake a legal obligation, are asked to assume a moral responsibility to reimburse the fund after completion of their studies, if circumstances permit.

The Canadian Bechtel Limited Bursary—A bursary or bursaries to the total of \$600 are offered annually by Canadian Bechtel Limited to undergraduates in engineering or to matriculants entering engineering. The awards will be made by the University on the basis of financial need and scholastic standing.

The Canadian Cancer Society, British Columbia and Yukon Division, Bursary—This bursary of \$500, the gift of the Canadian Cancer Society, British Columbia and Yukon Division, will be available for worthy and deserving students who are bona fide pre-medical students, or who will have completed the pre-medical stage of their training and will be entering medical school. To be eligible for this award an applicant must be a graduate of a secondary school in British Columbia. It is hoped that students who are assisted by this bursary will in the future contribute in some way to assist other medical students in a similar situation.

The Canadian Officers' Training Corps (C.O.T.C.) Bursaries—Bursaries to the total of \$400, each ranging in value from \$75 to \$150, established by the trustees of the C.O.T.C. Trust Fund, are available to students who were former members of the C.O.T.C. (U.B.C. Contingent) or their sons or daughters, students who are serving members on leave from officer training in the Canadian Armed Forces, and students who are undergoing officer training under the University Reserve Officer Training Plan and are recommended by the Commander, Pacific Region. In selecting winners, consideration will be given to financial need, academic standing, and record of achievement in the Canadian Armed Forces, if applicable. Applications, on forms available from the Dean of Inter-Faculty and Student Affairs, must be submitted to the University not later than July 15th.

The Canadian Scottish Chapter, I.O.D.E., Bursary in Education—A bursary of \$100, the gift of the Canadian Scottish Chapter, I.O.D.E., will be awarded to a woman student in the Second Year of Education. This bursary will be given to a student who needs financial assistance to continue her studies. In considering applicants, attention will be paid to academic standing, personal qualities, character, and aptitude for teaching.

The Captain LeRoy Memorial Bursary-This bursary of the annual value of \$240, was given by the Universities Service Club in memory of their comrades who fell in the First Great War. It is named after Captain O. E. LeRoy, who commanded the overseas contingent from this University and who was killed at Passchendaele in 1917. It will be awarded to a student, or students, requiring financial assistance to enable him, or them, to attend the University. For this purpose it may be awarded to a matriculant, to a student of any year, or to a graduate student of the University proceeding to graduate

work in this or any approved university. In making the award preference will be given first to returned soldiers, then to the dependents of soldiers, and finally to suitable candidates from the student body at large. Applications must contain a statement of the academic record and special circumstances of the applicant, with two supporting references, and, in the case of the preferred categories, of the war record of the soldier.

The Cariboo Bar Association Bursary (in memory of P. E. Wilson, Q.C.) —A bursary of \$250, offered in memory of P. E. Wilson, Q.C., is given annually by the Cariboo Bar Association. It will be awarded by the University to a student in any year of Law who has good academic standing and needs financial assistance. Preference will be given to a student from the area of the Province served by the Cariboo Bar Association.

The Catholic Women's League of Canada, Vancouver Diocese, Bursary—This bursary of \$50, gift of the Catholic Women's League of Canada, Vancouver Diocese, is offered as a tribute to the women who have voluntarily served at the Catholic Library and Information Centre. It will be awarded to a woman student in the School of Librarianship who needs assistance.

The Chapter AD Memorial Bursary—As a memorial to deceased members, Chapter AD of the P.E.O. Sisterhood offers annually a bursary of \$100. This bursary will be awarded to a woman student beginning or continuing her studies in the Second Year in the Faculty of Education. In selecting the winner consideration will be given, not only to the need of applicants for financial assistance, but also to their academic standing and their promise of success in the teaching field.

Charles Brooks Memorial Bursary—A bursary of \$100, given as a memorial to Charles Brooks by his wife, is offered to students entering the final year of Mineral Engineering. The award will be made to a student with a sound academic record who needs financial assistance.

The Charles Chan Kent Golden Wedding Scholarship and Charitable Foundation Bursaries—Two bursaries of \$200 each, the gift of the Charles Chan Kent Golden Wedding Scholarship and Charitable Foundation, are offered to students who are proceeding to a degree in any field, have successfully completed at least one year at the University of B.C., and need financial assistance. They will be awarded to students of Chinese extraction. If possible, one award will be reserved for a Chinese student from overseas.

The Chartered Life Underwriters, Vancouver-New Westminster Chapter, Bursary—A bursary of \$250, the gift of the Vancouver-New Westminster Chapter of the Institute of Chartered Life Underwriters of Canada, will be offered in 1969-70 to students who are proceeding to the Third Year of Commerce and who are including life insurance in their programme of studies. The award will be made to a student whose academic standing, character, and need for financial assistance are, in the opinion of the Faculty of Commerce and Business Administration, judged to be meritorious.

Chilliwack University Women's Club Bursary-As on page 154.

The Clark, Wilson & Co. Bursary—A bursary of \$200, gift of Clark, Wilson, & Company, Barristers and Solicitors, Vancouver, B.C., is offered annually to students beginning or continuing studies in Law. It will be awarded to a student with a good academic record who needs financial assistance.

The Comitas Club Bursary—A bursary of \$200, gift of the Comitas Club of Vancouver, whose object is to help cerebral-palsied children, will be offered to students in training as physiotherapists in the School of Rehabili-

tation Medicine. The award will be made to a student with promise in this field who is worthy and deserving of financial assistance.

The Coronation Chapter (1902-1960) Imperial Order Daughters of the Empire Memorial Bursary—To commemorate its services and achievements for nearly sixty years, the Coronation Chapter Imperial Order Daughters of the Empire, on relinquishing its Charter in February, 1960, presented an endowment fund to the University. The income from this endowment annually provides a bursary in perpetuity, at present \$140, which is to be used to assist worthy and deserving women students beginning or continuing studies at the University in any field of study. In the selection of recipients, consideration will be given to the need for financial assistance, academic standing, and promise of service to the Commonwealth and Empire, with special preference for descendants of veterans.

The Cowichan Valley Medical Society Bursary—A bursary of \$300, the gift of the Cowichan Valley Medical Society, is offered annually to a student from the Cowichan Valley area who is taking pre-medical or medical studies at the University of British Columbia. The award will be made to a student who has good academic standing and needs financial assistance. If, in any year, no applicant qualifies, the funds contributed will be available either to provide a larger award or several awards in a future year.

The David and Marlene Webster Memorial Bursary-To honour the memory of David and Marlene Webster, who tragically lost their lives in the summer of 1967, their friends have established a bursary fund to assist deserving students in the Faculty of Education. The fund at present provides an annual bursary of \$50.

The David Fouks Memorial Bursary—A bursary of \$1000, established as a memorial to David Fouks by his brother, Arthur Fouks, Esq., Q.C., B.A., LL.B., is offered annually to undergraduates in any year and faculty. The award will be made by the University to a student of good academic standing who shows promise of success in his chosen field of studies and who is deserving of financial assistance.

The David Thom Bursaries—From the funds of the David Thom Estate a sum of \$300 is available annually for the following bursaries:

- 1. A sum of \$100 for the student who has passed Grade XII or Grade XIII with the highest standing and who is registered for the first time in the Faculty of Agricultural Sciences. In the awarding of this bursary, regulation 8 under General Regulations for Medals, Scholarships, Prizes, and Bursaries does not apply.
- 2. A sum of \$100 for a student who has satisfactorily completed the work of the First Year in Agricultural Sciences and is proceeding to a higher year in that Faculty.
- 3. A sum of \$100 for a student who has satisfactorily completed the work of the Third Year in Agricultural Sciences and is proceeding to the Fourth Year in that Faculty.

The Davis & Company Bursary—A bursary of \$400, the gift of the law firm of Davis, Hossie, Campbell, Brazier & McLorg, Vancouver, B.C., is offered annually to students in the First or Second Year in the Faculty of Law. At the discretion of the Bursary Committee it may be divided to provide assis-Pance in the amount of \$200 each for two students. These bursaries will be warded to students with good academic standing and promise who need nancial assistance to continue their studies.

The Dean A. W. Matthews Testimonial Bursary—As part of a testimonial

tendered to Dr. A. W. Matthews, who retired as Dean of Pharmacy in June, 1967, this bursary was established through the Pharmaceutical Association of the Province of British Columbia by his friends and colleagues. It serves to mark the outstanding esteem in which he is held and to pay tribute to his effective leadership. This bursary, in the amount of \$100, will be awarded annually to a promising student in Pharmaceutical Sciences who needs financial assistance.

Delta Gamma Bursary For the Blind—A bursary of \$100, given by the Delta Gamma Fraternity, will be a awarded to a blind student requiring financial assistance to enable him or her to enter the University or to proceed to further studies. The award will be made by the Senate upon recommendation of the Joint Faculty Committee on Prizes, Scholarships, and Bursaries acting in consultation with the Principal of the Jericho Hill School and/or secondary school concerned, the Superintendent of the Canadian National Institute for the Blind of Vancouver, and an accredited representative of Delta Gamma Fraternity.

Delta Zeta Chapter of Alpha Gamma Delta Fraternity Bursary—A bursary of \$50, the gift of the Delta Zeta Chapter of Alpha Gamma Delta Fraternity, is available annually for a woman undergraduate student in any year and faculty. The award will be made to a student on the basis of scholastic standing and need of financial aid.

The Department of Social Welfare, Province of British Columbia, Bursaries in Social Work—Two bursaries of \$1500 each, established by the Department of Social Welfare, Province of British Columbia, are offered annually to graduates of Canadian Universities. Preference will be given to persons who are residents of British Columbia, regardless of the university from which they have graduated. The awards are available to persons entering their first year of Social Work education or to persons continuing on to the second year. In the case of the former the award is renewable to enable the student to complete two years of professional education. The awards will be based on scholastic standing, personal qualities and display of special interest in public affairs. Consideration will also be given to the financial circumstances of the applicants. The successful applicant for the bursary must be prepared to enter the employ of the Department of Social Welfare for a period of sixteen months following graduation. Applicants who are assisted for two academic years must be prepared to enter the employment of the Department for thirty-two months. In the case of the latter the Department will, when possible, offer employment between the two academic terms for a period of four months and when this is done the final commitment is reduced to twenty-eight months. Applicants should consult the director of the School of Social Work about their admission to the School and the procedure for applying for these bursaries. They will be awarded by a special committee composed of representatives of the Department and the School.

The Doctor Joseph Vickar Memorial Bursary—A bursary of \$100, established as a memorial to Dr. Joseph Vickar by his friends, and given through the Vancouver B'nai B'rith Hillel Foundation, is offered to pre-dental and pre-medical students in attendance at this University. In making the award consideration will be given to need and academic standing.

The Donald Buckland Memorial Bursary Fund for the Blind—In memory of Donald Channing Buckland (1917-1956), a graduate of this University and a distinguished member of its Faculty, and in tribute to his scholarship, unfailing devotion to duty, and especially to his courage when, a few years before his untimely death, he was himself overtaken by blindness, the Canadian National Institute for the Blind has established a fund to assist and

encourage blind students. This fund will be administered by a special committee representing the Institute and the University, and will be used to assist students proceeding to studies beyond the level of secondary school. Awards will be made only to those who show evidence of ability and promise.

The Donald S. McPhee Forestry Awards—A bequest from the late Donald S. McPhee has established the Donald S. McPhee Forestry Scholarship Fund. Under the terms of the bequest, the yearly income is to be used to provide prizes, scholarships and bursaries in the fields of forestry and forest engineering for worthy and deserving students who are in attendance at this University and are selected by the Joint Faculty Committee on Prizes, Scholarships, and Bursaries.

The Dorothea Lundell Bursary for Students of French—This bursary of \$150, in memory of Dorothea Lundell (B.A., UBC, 1932 and Teacher Training, 1933), was established through a bequest from her mother, Kirsten Cedarholm Lundell. It will be awarded to a worthy and deserving student who is majoring or hopographic in French language or literature.

who is majoring or honouring in French language or literature.

The Douglas F. Johnston Bursaries—A bequest from the late Douglas F. Johnston provides bursaries annually of \$500 each. One of these bursaries will be awarded to a student entering the Final Year of Engineering and another to a student entering the Final Year of Agricultural Science. When possible the bursary in Agricultural Sciences will be awarded to a student specializing, or intended to specialize, in stock raising.

The Douglas, Symes & Brissenden Bursary in Law—A bursary of \$300, gift of the firm of Douglas, Symes & Brissenden, Vancouver, is offered annually in the Faculty of Law. It will be awarded to a student who has good academic standing, shows promise of success in legal studies, and needs

financial assistance.

The Dr. Ernest Billig Memorial Bursary—This bursary, established as a memorial to Dr. Ernest Billig by his wife, is offered to students proceeding to a degree in Medicine or in Education. It will be awarded annually, in the amount of \$150, to a student who needs financial assistance, has good academic standing, and shows promise of success in his or her chosen field.

The Dr. Rolf S. Manson Memorial Bursary—A bursary of \$500, established and endowed as a memorial to Dr. Rolf Stuart Manson by Mrs. Manson and her son, Rolf S. Manson Jr., is offered annually to a worthy and deserving student in the Faculty of Medicine. Augmented by contributions from friends and colleagues, it serves to pay tribute to his professional skill and to his generous and devoted public service. It is the hope of the donors that those who benefit from this fund will themselves, if and when circumstances permit, contribute to this or similar funds to give assistance to other students.

Dr. William Campbell Memorial Bursary—The Class of Medicine 1954 (University of British Columbia) decided on the occasion of its tenth anniversary reunion to establish a bursary as a memorial to Dr. William Campbell. The annual bursary of approximately \$100 will be awarded to a student who is entering his Third Year of Medicine, has satisfactory scholastic stand-

ing, and needs financial assistance.

The Edith Cavell Hospital Bursary—A bursary of \$50, the gift of the Edith Cavell Hospital Ltd., Vancouver, is offered to a worthy and deserving student beginning or continuing studies in the Faculty of Medicine. Preference will be given to a student with financial need who has a special interest or excels in studies concerning diseases peculiar to the ageing process.

The Education Undergraduate Society Council Bursaries—Two bursaries of \$100 each, provided by the Education Undergraduate Society Council are offered to students in Education in the 1969-70 session. These will be awarded,

one in the Secondary Programme and the other in the Elementary Programme, on the basis of activity within the Education Undergraduate Society and of need on the recommendation of the Dean, the Director of Secondary and Elementary Education, and the President (or other member) of the Education Undergraduate Society Council. The bursaries will be awarded in early October. Students must submit a separate application for these bursaries.

The Edward J. Meilicke Fund—A bequest to the Vancouver Foundation by the late Edward J. Meilicke provides an annual bursary of approximately \$240 for the University. This bursary will be awarded to a student or students taking studies leading to a Bachelor of Science degree.

The E. Frances Gunning Memorial Bursary—This bursary of \$200 is offered annually as a memorial to Mrs. H. C. Gunning. It pays tribute to her gift for lasting friendships and to her sympathetic and active concern for others, including the students of this University. It will be awarded to a student in engineering or nursing who has comparable qualities, good academic standing and financial need.

The Elizabeth and Diana McManus Memorial Scholarship Fund Bursary —A bursary of approximately \$300, provided by a bequest from the late William McManus, will be awarded to the son, daughter or legal dependent of a member of Branch No. 48, Royal Canadian Legion, or failing a suitable candidate, to a student or students in any year and faculty. The recipient must have good academic standing and be in need of financial assistance.

The Ellen Ethel McHattie Memorial Bursary Fund—A bequest to the Vancouver Foundation by the late C. T. McHattie provides an annual bursary of approximately \$350 for the University. This bursary will be awarded through the University to a graduate student registered in the Social Work Course, or to an undergraduate in the Second or higher years in Arts and Science planning to enter Social Work. To be eligible an applicant must have financial need and high scholastic standing.

Elwood Peskett Memorial Bursary—As a memorial to Elwood Peskett, a student in the final year of Mechanical Engineering at this University who tragically lost his life on Christmas Day, 1968, this bursary has been established by his friends. It serves to pay tribute to his fine sportsmanship and athletic prowess, his outstanding academic record, and his exceptional qualities of character. This bursary, in the amount of \$100, will be awarded to a student whose home is in School District No. 15 (Penticton, Kaleden, Naramata), who has satisfactory academic standing, participates actively in athletics, and needs financial assistance.

The Engineers' Wives' Association Bursary—Bursaries provided by generous donations from the Engineers' Wives' Association will be awarded to undergraduate students in engineering who have good scholastic standing and who, without financial assistance, will be unable to continue their course.

The E. S. H. Winn Memorial Bursary in Dentistry—To honour the memory of E. S. H. Winn Esq., Q.C., and his wife, Agnes Winn, to pay tribute to their fine personal qualities, and to give recognition to the lifelong encouragement and assistance which they gave to students, this bursary has been established by Dr. Ronald Waddell. In the amount of \$100 annually, it will be awarded to a student who has completed the pre-dental requirements at the University of British Columbia and is proceeding to an approved School or Faculty of Dentistry. The award will be made to a student worthy and deserving of financial aid.

The Esmond Lando Bursary-A bursary of \$100, the gift of Mr. Esmond

Lando, will be available annually to a student in Law. The award will be made to a student with a good academic record who shows promise in his field of studies, and who, without financial assistance, would be unable to continue with his studies.

Eva Shortreed Memorial Bursary (donated by Princess Betty Chapter, I.O.D.E.)—A bursary of \$150, given as a memorial to Mrs. Eva Shortreed by the Princess Betty Chapter, I.O.D.E., will be available for a woman undergraduate entering the University of British Columbia from Grade XII. This award will be made to a student who has at least Second Class standing, and who, without financial assistance, would be unable to begin her studies at the University.

The Florence E. Heighway Medical Bursary Fund—This fund, endowed by a bequest from the late Florence E. Heighway, and named to honour her memory, provides bursaries for students taking medical training at this University.

The Florence M. Butchart Fund.—The annual income of \$900, derived from the Florence M. Butchart Fund, established by a bequest from William Broadfoot Butchart, provides financial assistance for worthy students attending the University.

The Flying Officer Reverend George Robert Pringle Memorial Bursary—A bursary of the annual value of \$330, endowed by his friends and associates, in memory of the late Flying Officer Reverend George Robert Pringle, a much beloved graduate of outstanding Christian character and athletic ability who was killed on January 24th, 1943, while on active service overseas, will be awarded to a student who has completed two years at this University and has registered at the University for further study. To be eligible for this award the student must show evidence of academic ability, sterling, unselfish character, and active participation and leadership in University sport.

The Fort Camp Bursary Fund—To provide assistance for needy students, the residents of Fort Camp, University of British Columbia, at a general meeting held in November, 1951, initiated a fund at the University by contributing 25 per cent. of their current year's net canteen profits. The annual donation will be used to provide bursaries for students in attendance during the winter session. Preference will be given to a resident of Fort Camp.

The Frances Milburn PEO Bursaries—Two bursaries of \$200 each, given by the Vancouver Chapters of the PEO Sisterhood in memory of the late Frances Milburn, will be available in the winter session to assist women students who have completed at least one year in Arts and Science with high standing in English. The awards will be made in consultation with the Dean of Women.

The Fraser Valley Bar Association Bursary—Through the generosity of the Fraser Valley Bar Association a bursary of \$300 is awarded annually in the Faculty of Law. Students with good scholastic standing, who have completed at least one year in Law, and who need financial assistance to continue their studies, are eligible for consideration.

Fraser Valley Chapter of the Society for Children with a Hearing Handicap Bursary for Teachers of the Deaf—This bursary of \$250, the gift of the Fraser Valley Chapter of the Society for Children with a Hearing Handicap, will be awarded to one or two students in the Diploma Programme in Education of the Deaf. The award will be made on the basis of promise and ability in this field and on need for financial assistance.

The Fraser Valley Dental Society Bursary—The Fraser Valley Dental Society offers annually a bursary to a student beginning or continuing studies in

the Faculty of Dentistry. The bursary will be awarded by the University to a student who needs financial assistance and has a satisfactory academic record, and whose home is in the Fraser Valley. The recipient of this bursary is asked to assume a moral obligation to reimburse the fund when he has completed his training.

The Fraser Valley Milk Producers' Association Entrance Bursary for Agriculture—A bursary of \$300, gift of the Fraser Valley Milk Producers' Association, is available annually to students who are entering the Faculty of Agricultural Sciences for the first time and who have graduated from any high school in the Province of British Columbia. The award will be made to a deserving and promising student. Applicants will be considered on the basis of qualities of character and leadership as indicated by their interest in, and contribution to, school and community affairs.

The Fraser Valley Milk Producers' Association Bursary in Dairy Technology—A bursary of \$500, the gift of the Fraser Valley Milk Producers' Association, is offered annually to a student entering Third Year Agricultural Sciences and specializing in dairy technology. The award will be made to a student who has a special interest in a career in the dairy industry. In addition to the bursary, the winner may be given, between the Third and Fourth Years, the opportunity of summer employment in some phase of the Association's operations. Should no Third Year applicant be considered suitable, the bursary may be offered to a student entering the Fourth Year.

The Fred D. Mulholland Bursary in Forest Management—An annual bursary of \$75, established by Mrs. F. D. Mulholland and family as a memorial to an outstanding leader in forestry in British Columbia, is offered to students in forestry. This bursary will be awarded to a student completing the Third Year who has good academic standing in specified courses in the field of Forest Management, and needs financial assistance.

The Fred W. Rollins Bursaries—Two bursaries, each of the value of \$250, the gift of Mr. F. W. Rollins of Vancouver, are offered annually to male students who have achieved sound scholastic standing, have indicated strong moral character and qualities of leadership, and have participated with proficiency in tennis. One award will be made to a student entering the University from a secondary school in British Columbia. To be considered for this award an applicant must submit a letter of recommendation from his secondary school principal and from an individual in the community actively interested in tennis. The other award will be made to a student who is a Canadian citizen, who has completed at least one year at this University, and who has been a regular member of the University Tennis team. Prior to making these awards, the Joint Faculty Committee on Prizes, Scholarships, and Bursaries will consult with the Director of the School of Physical Education and Recreation.

The Freeman, Freeman, Silvers & Koffman Bursary in Law—This bursary of \$100, the gift of Messrs. Freeman, Freeman, Silvers & Koffman, is available annually for a student registered in the Faculty of Law. It will be awarded to a student who has good scholastic standing and is worthy and deserving of financial assistance.

The Fresco Club Bursary—A bursary of at least \$50, donated by The Fresco Club of Vancouver as part of its welfare programme, will be offered to undergraduates in the session 1969-70. This bursary will be awarded to a promising student deserving of financial assistance.

The Fryer Book Binding Ltd. Bursary—A bursary of \$250, gift of Fryer Book Binding Ltd., Burnaby, is offered annually to a student beginning studies in

the School of Librarianship. It will be awarded to a student with good academic record who shows promise in the field of library science and needs financial assistance.

The Fyfe-Smith Bursary—A bursary of \$500, the gift of Florence Fyfe-Smith, is offered annually to a Native Indian student attending the University of B.C. in a full programme of studies. It will be awarded to a student who is registered in the School of Social Work or in the Faculty of Education. The award will be made to a student with satisfactory standing who needs financial assistance.

Gamma Phi Beta Bursary—A bursary of \$100, the gift of the Vancouver Alumnae Chapter of Gamma Phi Beta Sorority, will be awarded annually to a student in any year of the Home Economics course. To be eligible for this award a student must have financial need and high scholastic standing.

The George Rush Bursaries—From the income on a bequest from the late George Rush, two or more bursaries of equal value will be awarded annually to students of scholastic ability who are registered in any year of any faculty and who need financial assistance to continue their studies.

Globelite Batteries Limited Bursary—Globelite Batteries Limited offers annually a bursary of \$500 to the son or daughter of an employee of the Company who, having completed a secondary school programme which meets the admission requirements of the University, enrols in the next ensuing academic session at the University of British Columbia. This bursary will be awarded on the basis of satisfactory academic standing and of the financial circumstances of the applicants. If, in the opinion of the Selection Committee, the circumstances warrant, the award may be divided into two bursaries of \$250 each. If there are no qualified applicants among children of employees of the Company, the bursary or bursaries shall be awarded to other entering students who are suitably qualified. Selection will be made by the Joint Faculty Committee on Prizes, Scholarships and Bursaries of the University. Candidates who wish to be considered for this bursary must apply on the University Bursary Form, obtainable from the Dean of Inter-Faculty and Student Affairs, University of British Columbia, Vancouver 8, British Columbia. The completed application form must be received by the University not later than July 15.

Government of B.C. Bursaries—As on page 99.

The Graduating Class of 1959 Bursary—A bursary of approximately \$180, established and endowed by the Graduating Classes of 1959, is offered annually to undergraduates in any year and faculty. It will be awarded to a student with good academic standing who requires financial assistance to begin or continue his or her University studies.

The Graduating Class of 1965 Bursary—A bursary of approximately \$200, established and endowed by the Graduating Class of 1965, is offered to undergraduates in any year and faculty. It will be awarded to a student with good academic standing who requires financial assistance to begin or continue his or her university studies.

The Grahame M. Budge Rugby Award—A bursary of \$250, gift of Grahame M. Budge, is offered annually to a student who has played on the Varsity Rugby team in a previous year and who registered for further study at the University in a full programme. The winner of the award will be selected by the Joint Faculty Committee on Prizes, Scholarships, and Bursaries, after consultation with the Chairman of the Men's Athletic Committee, the Director of Athletics and the head Rugby Coach. The award will be made on the basis of academic ability, qualities of character, and demonstrated proficiency in rugby.

The Grand Lodge Masonic Bursaries—The Grand Lodge of Antient Free and Accepted Masons of British Columbia annually offers bursaries in the range of \$200 to \$500 each to the sons, daughters, and legal wards of active members of Masonic Lodges in British Columbia or of deceased members who at the time of death were active members of these Lodges. The purpose of these bursaries is to give assistance to students who, without financial aid, would find it impossible or difficult to continue their education. Selection of winners will be made by the University from applicants with satisfactory academic standing who are beginning or continuing undergraduate studies at the University of British Columbia, Simon Fraser University, University of Victoria, or the B.C. Institute of Technology in a full programme leading to a degree or certificate in any field. First preference will be given to applicants entering the University or College from Grades XII and XIII, then to undergraduates in the second year of studies. In order to be considered a candidate must obtain from the office of the Dean of Inter-Faculty Affairs, University of B.C., Vancouver 8, B.C., a Bursary Application form. The completed application must be received by the University not later than July 15th. The application must be accompanied by a letter from the Secretary of the Lodge indicating the applicant's association with the Lodge. Since a special committee considers applications for these bursaries, those who also wish to apply for other bursaries should submit a separate application form for them.

The Gulf and Fraser Fishermen's Credit Union Bursary—This bursary of \$350 is offered annually by the Gulf and Fraser Fishermen's Credit Union to students beginning or continuing studies at the University of B.C. in a full programme of studies leading to an undergraduate degree in any field. To be eligible an applicant must be an active member, or a son or daughter of an active member, of the Gulf and Fraser Fishermen's Credit Union. It will be awarded by the University, in consultation with the Credit Union, to the applicant who, in terms of financial need and academic standing, is the most deserving of assistance. Candidates must apply by completing the University Bursary Form. This form, which may be obtained from the Dean of Inter-Faculty and Student Affairs, University of B.C., Vancouver 8, B.C., must be submitted to the University not later than July 15th.

The Harry and Hilda Smith Foundation—This Foundation, created in 1964, provides financial assistance from time to time for needy and deserving students at the University of British Columbia.

The Hawk Eilertson Bursaries—Two or more bursaries of \$500 each are provided each year from the Hawk Eilertson Bursary Fund. These bursaries will be awarded to students beginning or continuing their studies leading to a degree in engineering, forestry, or agriculture. They are available to students from underdeveloped countries in the British Commonwealth who are selected on the basis of academic standing and promise of success in university studies, need for financial assistance, and personal qualities and character.

The Helen Gordon Stewart Bursary—A bursary of \$100, the gift of the Fraser Valley Regional Library, is offered annually to a student beginning studies in the School of Librarianship. The award will be made to a student with good academic standing who shows promise in the field of librarianship and needs financial assistance. In offering this bursary, the Fraser Valley Regional Library pays tribute to Dr. Helen Gordon Stewart for her manifold leadership in the development of British Columbia Libraries and particularly for her pioneering efforts in the establishment of regional library service in the Fraser Valley. Application forms may be obtained from the Dean of Inter-Faculty Affairs, University of British Columbia.

The Hoffmann-La Roche Canadian Centennial Bursary-This bursary of \$500, the gift of Hoffmann-La Roche Limited, Montreal, will be available annually to a student continuing studies in the Faculty of Pharmaceutical Sciences. The bursary will be awarded on the recommendation of the Dean of the Faculty to a student of high scholastic standing who has need of financial assistance.

The IBM-Thomas J. Watson Memorial Bursary Programme-Bursaries to the total of \$1000, provided annually by a gift from International Business Machines Company Limited, Don Mills (Toronto), Canada, are offered to needy undergraduates in any year of any faculty who are of good academic standing. The awards will be made by the University. Students should apply on the University Special Bursary form. The completed applications must be received not later than July 15th.

The Institute of Chartered Accountants of British Columbia Bursary-A bursary of \$250, given by the Institute of Chartered Accountants of British Columbia in memory of the late William George Rowe, F.C.A., will be awarded at the discretion of the Dean of Commerce and Business Administration to a student registered in the Second Year of the accounting option and proceeding to the Third Year. Selection of the winner will be made on the basis of scholastic standing and record.

Interior B.C. Dental Association Bursary-A bursary of \$250, gift of the Interior B.C. Dental Association, is offered to students in the Faculty of Dentistry. It will be awarded by the University to a student with a good academic record who needs financial assistance. Preference will be given to a student from the Interior.

The International Union Local 300 Bursary—A bursary of \$250, the gift of the International Union of United Brewers, Flour, Cereal, Soft Drink and Distillery Workers of America, Local 300, is offered to students entering the University from high school. It is open to applicants who are residents of B.C. and are proceeding in any faculty to a full course of study leading to a degree in any field, with preference to sons and daughters of Local 300. It will be awarded on the basis of need for financial assistance and of academic aptitude.

The Jack Aron Memorial Bursary—A bursary of \$50, given by Mrs. Jack Aron as a memorial to her husband, is offered to undergraduates in the Faculty of Medicine. It will be awarded to a student with a good academic record who shows promise in the field of Medicine and has need of financial assistance.

James Ruggles Macdonell Memorial Bursary—As a memorial to James Ruggles Macdonell, honours graduate in philosophy in the Class of 1966, who lost his life accidentally in his graduating year, his family and friends have established a bursary to the value of approximately \$200 annually, to be awarded to a promising honours student who is entering his final undergraduate year in philosophy. Financial need will be a consideration.

The Jean Rose Bursary in Social Work—This bursary, of annual value \$100, has been made possible by the "Orphan Group" which came to Vancouver from Europe in 1947. It serves to express the gratitude of the members of the group to Mrs. Jean Rose, who represented the Canadian Jewish Congress of Vancouver in their rehabilitation programme. Mrs. Rose, in December, 1966, at a Centennial Celebration sponsored by the Congress and the Jewish Community Centre, was presented with a plaque by the Orphan Group to commemorate her efforts on its behalf, and also with a cheque which will provide this bursary for several years. The bursary is offered annually to students in the School of Social Work. It will be awarded by the Joint Faculty Committee on Prizes, Scholarships, and Bursaries to a student with satisfactory standing who needs financial assistance.

The Jennie Wolochow Memorial Bursary—A bursary of \$25, the gift of Dr. Michael Wolochow, in memory of his mother, is offered to a worthy and deserving student who is beginning or continuing studies at the University in any field of study leading to a degree.

The Jessie F. Gordon Chapter, I.O.D.E., Bursary in Education—A bursary of \$75, a gift of the Jessie F. Gordon Chapter, I.O.D.E., will be awarded to a student preferably from Senior Matriculation who is beginning studies in Second Year Education. The award will be made to a student with good academic standing and promise as a teacher, and who needs financial assistance.

The John MacRae Memorial Bursary—A bursary of \$250 will be awarded annually from the proceeds of an endowment made by Mrs. John MacRae to commemorate the ideals of her husband, who was among the early practitioners of pharmacy in this community. The award will be made to a student of good academic standing in the Faculty of Pharmaceutical Sciences who is in need of financial assistance and whose qualities of character indicate that he will regard his profession as a means of public service. It is the donor's hope that the recipient, without obligation, will in due course assist others in a similar manner.

The Josephine Dauphinee-Ella Hathaway Bursaries—Two bursaries of \$100 each, the gift of the Board and Members of the Vancouver Business and Professional Women's Club in honour of Josephine Dauphinee and Ella Hathaway, are offered to teachers training specifically in the field of the instruction of retarded children. The awards will be made on the recommendation of the Faculty of Education to the Scholarship Committee of the University.

The John William Hartley and Joseph Warren Revere Murphy Bursary—A fund established in honour of John William Hartley and Joseph Warren Revere Murphy by Mr. and Mrs. Fred L. Hartley provides an annual bursary, at present in the amount of \$100. This bursary is open to students taking a full programme of studies toward a degree in the First or Second Year of any Faculty. It will be awarded to a student with the necessary academic standing, who, because of his financial circumstances and his personal qualities and character, is deserving of assistance.

The John Owen Memorial Athletic Award—As a memorial to John Owen, in recognition of his many years of dedicated service as trainer to the thousands of U.B.C. athletes with whom he had been associated, this award has been established by the John Owen Memorial Bursary Fund Committee. The award in the amount of \$250 will be made annually to a student with good scholastic standing who has demonstrated outstanding service in the Student Athletic Training Programme, or to a student participating in the extramural athletic programme whose academic ability, sterling, unselfish character and athletic proficiency in the opinion of the selectors merits the award. Winners of the Award will be selected by the Joint Faculty Committee on Prizes, Scholarships and Bursaries, after consultation with the Chairman of the Men's Athletic Committee, the Director of the School of Physical Education and Recreation, and the Athletic Director.

The Jonathan Rogers Awards—The annual income from a fund bequeathed by the late Jonathan Rogers will be used to provide awards for undergraduates who require financial assistance and who have high scholastic standing. Selection of the recipients will be made by the Joint Faculty Committee on Prizes, Scholarships, and Bursaries.

The J. Roddy Pegg Memorial Bursary—A bursary of \$50, established as a memorial to the late James Rodney Pegg by his family and many friends, will be available annually to a student in Commerce. The award will be made to a student with satisfactory academic record who shows sufficient interest in student activities and athletics and who, without financial assisance, would be unable to continue his studies.

Kamloops and District Fish and Game Association Bursary—This bursary of \$150, the gift of the Kamloops and District Fish and Game Association, is offered to students entering the Third or Fourth Year and majoring in the field of fish or game management. It will be awarded to any resident of British Columbia who has sound academic standing, and needs financial assistance.

Kappa Kappa Gamma Alumnae Bursary—A bursary of \$150, provided annually from the proceeds of an endowment fund donated by the Alumnae of Kappa Kappa Gamma, is offered annually to a woman undergraduate in any year and faculty who has good scholastic standing and has need of financial assistance. The award will be made by the Joint Faculty Committee on Prizes, Scholarships, and Bursaries, in consultation with the Dean of Women.

The Katherine Leshgold Bursary in Commerce—A bursary of \$100, established and endowed by Mrs. Katherine Leshgold, is offered annually in the Faculty of Commerce and Business Administration. It will be awarded to a student who has need for financial assistance and who has good academic standing.

The Kenneth George VanSacker Bursary—This bursary, in the amount of \$100, was established by his wife as a memorial to Kenneth George VanSacker, who graduated from the University of B.C. in 1957 with the degree of B.A.Sc. in Electrical Engineering. It will be awarded to an undergraduate with good academic standing who is proceeding to a degree in this field and who has need for financial assistance.

The Kerrisdale Chapter, I.O.D.E. Bursary—This bursary of \$100, the gift of the Kerrisdale Chapter, I.O.D.E., will be awarded to a student who has good scholastic standing and is in need of financial assistance.

The Ketchum Manufacturing Sales Limited Bursary—A bursary of \$100, gift of the Ketchum Manufacturing Sales Limited, Ottawa, will be available in the winter session for a student in the field of animal husbandry. The award will be made to a worthy student who has satisfactory academic standing.

The Khaki University and Young Men's Christian Association Memorial Fund Bursaries—A sum of money given to the University by the administrators of the Khaki University of Canada provides a fund from which are awarded annually six bursaries of the value of \$100 each, known as the Khaki University and Young Men's Christian Association Memorial Bur-saries. Under conditions specified by the donors these bursaries may be used for undergraduate purposes only, and in making the awards a preference is given to the sons and daughters of soldiers of the First Great War. The financial necessities of candidates are also taken into account. To be eligible for an award a soldier's dependent must obtain at least Second Class standing, i.e., 65 per cent.; for all others 75 per cent. is required. Dependents of soldiers and others who have attained the standing as stated above and who are in need of financial assistance should apply not later than July 15th.

Kiwanis Club of Uptown Vancouver Ted Lewis Memorial Medical Bursary -A bursary of approximately \$300, the gift of the Kiwanis Club of Uptown Vancouver, is offered annually to students in the Faculty of Medicine. This

bursary will be awarded by the University to a student who has a good academic record, who shows promise in the field of Medicine, and who needs financial assistance to continue his studies.

The Ladies Pharmaceutical Auxiliary Bursary in Pharmacy—A bursary of \$100, the gift of the Ladies Pharmaceutical Auxiliary, Lower Mainland, is available annually in the Faculty of Pharmacy. It will be awarded to a student with a good academic record who, without financial assistance, would be unable to begin or continue his studies in the Faculty of Pharmaceutical Sciences.

The Ladies Pharmaceutical Auxiliary (Victoria) Bursaries—Two bursaries of \$100 each, gift of the Ladies Pharmaceutical Auxiliary (Victoria), are offered annually to Vancouver Island students beginning or continuing studies in the Faculty of Pharmaceutical Sciences.

The Lady Laurier Club War Memorial Bursary—As a special award the Lady Laurier Club provides a bursary for women students who have good scholastic standing. The award, in the amount of approximately \$75, will be made in consultation with the Club.

The Lady May Cambridge Chapter, I.O.D.E. Bursary in Teacher Training—A bursary of \$100, the gift of the Lady May Cambridge Chapter, I.O.D.E., will be offered to students in the Final Year of the teacher training course in the session 1969-70. The award is open to daughters of veterans.

The Lambda Kappa Sigma Alumnae Bursary—A bursary of \$100, donated by the Alpha Lambda Chapter of Lambda Kappa Sigma Society, will be available in the 1969-70 session to assist a female pharmacy student, with preference given to a member of the sorority who is continuing her studies in the Faculty of Pharmaceutical Sciences.

The Lieut.-Col. Cecil Merritt, V.C., Chapter, I.O.D.E., Bursary—This bursary of \$85, the gift of Lieut.-Col. Cecil Merritt, V.C., Chapter, I.O.D.E., is offered to students who have completed at least one year in Agriculture. Preference will be given to a student from a rural area. It will be awarded to a student who needs and merits financial assistance.

The Lighthall Memorial Bursary—A bursary of \$100, given by Sigma Phi Delta Fraternity in memory of Professor A. Lighthall, a member of the Department of Civil Engineering of this University from 1920 to 1945, will be available annually for a male undergraduate in any year of the Faculty of Applied Science. The award will be made to a student who has good scholastic standing and who, without financial assistance, would be unable to continue his course.

The Lillian Slusman Meyers Memorial Bursary—A bursary of \$50 established in memory of Lillian Slusman Meyers by her sister, Sara Slusman of Winnipeg, will be awarded annually in the Faculty of Medicine. The bursary will be awarded to a student who has a good academic record, shows promise of success in the field of Medicine, and needs financial assistance to continue his or her studies.

The Manly Cohen Memorial Bursary—As a memorial to Manly Cohen (B.Com., U.B.C., 1953), this bursary has been established by his friends. An annual award of \$50 will be made to a worthy and deserving student in the Faculty of Commerce and Business Administration.

The Marcy Miller Bursary in Dental Hygiene—A bursary of \$75 is offered annually to students in pre-dental hygiene. The award will be made to a student with satisfactory academic standing who has need for financial assistance. If no candidate in this category is eligible, the award will be made to a pre-dental student or a needy student in another field.

The Mary Jane Murrin Bursaries—A bequest from the late Mary Jane Murrin provides bursaries for women students who have good academic standing and who, without financial assistance, are unable to continue their University education. Recipients are selected by the Joint Faculty Committee on Prizes, Scholarships and Bursaries.

Maud LeGallais Memorial Bursary—To honour the memory of Maud LeGallais and her contributions in the field of education as founder and head of St. Michael's School for Girls, Vernon, this bursary has been established by former students and friends. It will be awarded annually to a woman student who has completed high school in Vernon, B.C., and is beginning her studies at the University of B.C. The award will be made to a student worthy and deserving of financial aid.

The M. B. Cohen Memorial Bursary—This bursary of the annual value of \$25, the gift of Mrs. M. B. Cohen of Vancouver, will be awarded to an undergraduate in any year or faculty who has good scholastic standing and is in need of financial assistance.

The Mildred Brock Memorial Bursary—The Mildred Brock Fund, established by Delta Gamma Fraternity in memory of Mrs. Mildred Brock, wife of the late R. W. Brock, Dean of Applied Science, serves to pay tribute to her personal charm, high ideals, sympathetic understanding and qualities which were an inspiration to all students, particularly to members of Delta Gamma Women's Fraternity. In the amount of \$125, it will be available to a woman student of high scholastic standing.

The M. M. Waterman Memorial Bursary—A bursary of \$50, in memory of Mr. M. M. Waterman, is offered annually by Dr. and Mrs. S. B. Gelfand. It will be awarded to a promising and needy student in the Faculty of Dentistry.

The M. M. Waterman Grandchildren Bursary-A bursary of \$50, given as a memorial to the late M. M. Waterman by his grandchildren, is offered to students in any year and faculty who have good academic standing and need financial assistance.

The Moe Cohen Bursary—This bursary of the annual value of \$50, the gift of Mr. and Mrs. Moe Cohen of Vancouver, will be awarded to an undergraduate in any year or faculty who has good scholastic standing and is in need of financial assistance.

The Moses Fouks Bursary—This bursary, in the amount of approximately \$150, established by a bequest from the late Moses Fouks, is offered to students in any year and faculty. It will be awarded to a student who has a good academic standing and needs financial assistance.

Mount Baker High School, Cranbrook, Bursary—A bursary of \$250, gift of an anonymous donor, is offered annually to students from Mount Baker Senior Secondary School in Cranbrook who have satisfactory academic standing and are beginning their studies at this university.

Mt. Garibaldi Chapter, I.O.D.E. Bursary—A bursary of \$100, the gift of the Mt. Garibaldi Chapter, I.O.D.E., is offered to students in the final year of Social Work. The award will be made to a student with good academic standing who shows promise in the field of Social Work and has financial need. In the event that there is no suitable candidate in this field the award will be made to a student in the final year of Nursing with similar qualifications.

The Mr. and Mrs. Louis Zack Memorial Bursary—In memory of Mr. and Mrs. Louis Zack, this bursary of \$200 has been established by their son and daughter-in-law, Mr. and Mrs. Sidney Zack. The award will be made to a student in the field of political science who has need for financial assistance and is specializing in the field of political science.

The Mr. and Mrs. M. Fouks Bursary—In memory of Mr. and Mrs. M. Fouks, this bursary of \$200 has been established by their daughter and son-in-law, Mr. and Mrs. Sidney Zack. It will be awarded to a student in the Faculty of Education who has need for financial assistance, has good academic standing, and shows promise of success for a career in teaching.

The Mr. and Mrs. Myer Wine Bursary—A bursary of \$50, the gift of Mr. and Mrs. Myer Wine, is offered to undergraduates in any year of any faculty. It will be awarded to a student who has good academic standing and needs financial assistance.

The Mr. and Mrs. Sidney Zack Bursary—A bursary of \$100, gift of Mr. and Mrs. Sidney Zack, is offered annually in the School of Librarianship. It will be awarded to a student who has a good academic record, shows promise in the field of library science, and needs financial assistance.

Municipal Chapter, I.O.D.E. Bursary in Pharmaceutical Sciences—A bursary of \$100, gift of the Municipal Chapter, I.O.D.E., is offered to students with good academic standing and with need for financial assistance. It will be awarded to a student proceeding to the degree of Bachelor of Science in Pharmacy.

The Nat Bell Bursary—A bursary of \$150, given by Angela Bell in memory of her father, will be awarded annually to a student registered in any year and any faculty who has ability, character, and financial need.

The Netherlands' Association Bursary Fund—Bursaries to the total of \$750 are provided by the Netherlands' Association for children of full-time members of the Association of Dutch descent. Applicants must be beginning or continuing full-time undergraduate studies at the University of British Columbia, Simon Fraser University, or the University of Victoria. Awards will be made on the basis of academic standing and need for financial assistance, with preference to students who are not able to commute. Selection of winners will be made by the University of B.C. in consultation with the Executive of the Association. Eligible candidates who wish to be considered must complete the University Bursary form, obtainable from the Dean of Inter-Faculty and Student Affairs, University of B.C., Vancouver 8, B.C. The completed application must be received at the University of B.C. not later than July 15th.

The New Westminster Rotary Club Bursary—A bursary of \$250, the gift of the Rotary Club of New Westminster, is available for an undergraduate who has graduated from a secondary school in the territorial limits of the Club, and who is taking a full course of study in any year and faculty at the University. To be eligible for consideration applicants must have high scholastic standing and need of financial assistance. The territorial limits of the Club include the following secondary schools: New Westminster Secondary, Port Coquitlam, North Surrey, Princess Margaret, and Queen Elizabeth. The winner of this bursary will be selected by the Joint Faculty Committee of the University.

The Norris-Mebius Bursary Fund—This fund, the gift of Mrs. Ann Norris Niemen, honours the memory of her mother, Mary Norris and her father, Joshua Norris (a resident of Nanaimo for over fifty years), and pays tribute to their indomitable courage and sterling qualities of character. It is also a memorial to her teacher, Lucy Mebius, who taught in Nanaimo for many years at Quennel School, and who, through her generosity and personal interest, encouraged and inspired her students.

The annual income provides bursaries for male graduates of British Columbia secondary schools who are residing in the Province. These bursaries will be awarded to needy students with good academic records who are registered at the University in studies leading to careers in medicine, law, creative writing, forestry, engineering, and secondary teaching.

The North Shore Medical Society Bursary—This bursary of \$300, the gift of the North Shore Medical Society, is available for a student in the Faculty of Medicine who has good academic standing and needs financial assistance to proceed with his course. It will be awarded to a student whose permanent residence is and has been for some time in the City or District of North Vancouver, or the District of West Vancouver.

The Oscar Soderman Memorial Bursary Fund—The annual income from this fund, a bequest of the late Daisy Sidney Soderman, will be used to provide bursaries, scholarships, or other assistance, for worthy and deserving students beginning or continuing studies in Forestry and allied fields or Forest Engineering. If no suitable candidates are eligible in these fields the income will be used at the discretion of the Board of Governors on recommendation from the Scholarship Committee.

The Oswyn John Boulton Bursaries—These bursaries, to a total of approximately \$500 annually, are provided from a capital bequest made by the late Margaret Jane Boulton. They will be awarded to students in the Faculty

of Law on the basis of academic standing and financial need.

Pacific Coast Fishermen's Mutual Marine Insurance Company Bursary—A bursary of \$450 is offered by Pacific Coast Fishermen's Mutual Marine Insurance Company to sons, daughters and legal wards of past and present members of this Company. It is open to students entering university from Grades XII or XIII. Applicants must apply on the University Bursary Forms, obtainable from Dean Walter H. Gage, not later than July 15. The application must be accompanied by a letter describing the family fishing history in general terms and detailing types of fishing and boat names.

Pacific Meat Company Bursary—A bursary of \$200 is offered annually by Pacific Meat Company of Vancouver for research related to problems of the meat industry. The award is open to a student, or students, in the

field of animal husbandry.

The Panhellenic Association and the Inter-Fraternity Council Bursary Fund—The annual income of \$50 from this fund, established in January, 1950, by the Panhellenic Association and the Inter-Fraternity Council, representing the sororities and fraternities on the campus, is used to provide a bursary for an undergraduate in need of financial assistance. The award is available for a student in any year and faculty.

The P.E.O. Sisterhood, Chapter A.M., Memorial Bursary—A bursary of \$100, the gift of the P.E.O. Sisterhood, Chapter A.M., will be awarded to a woman student in the Faculty of Education who is proceeding to a certificate or a degree in the teaching field. The award will normally be made to a student in the First Year but if she maintains satisfactory standing she will be given consideration for a renewal in successive years of her course. In selecting the winner consideration will be given to financial need, academic standing and promise in the field of teaching.

The P.E.O. Sisterhood, Chapter B, Bursary-A bursary of \$100, the gift of Chapter B of the P.E.O. Sisterhood, is available to a woman student from the New Westminster area who is beginning or continuing her studies at the University in a full course leading to a degree. The award will be made to a student who not only has good standing and shows promise but who also

needs financial assistance.

The P.E.O. Sisterhood, Chapter F., Bursary—A bursary of \$50, gift of Chapter F., P.E.O. Sisterhood, is offered annually to a student in any year of the degree course in Nursing or in the Social Work course. It will be awarded to a woman student who has good academic standing and needs financial assistance.

The Pharmaceutical Association of the Province of British Columbia Entrance Bursary—A bursary of \$100, the gift of the Pharmaceutical Association of the Province of British Columbia, will be available annually to a student entering the First Year of the Pharmaceutical Sciences course who has good scholastic standing and is in need of financial assistance.

Place Vanier Residents' Association Bursary—A bursary of \$150 the gift of Place Vanier Residents' Association, is offered annually to students in any year and faculty who have good scholastic standing and need financial assistance. Preference will be given to those residing in the residences in Place Vanier.

The Plimsoll Club Bursary (donated by the Canadian Stevedoring Company Limited)—This bursary, in the amount of \$300, is available for a student registered in any year and faculty. It will be awarded to a deserving student who has satisfactory standing but who, without financial assistance, would be unable to begin or continue his studies at the University.

The Plimsoll Club Bursary for Law (donated by the Anglo-Canadian Shipping Company Limited)—This bursary of \$300 is available for students registered in any year of the Law course. It will be awarded to a student or students who, by their records, show promise of success in Law, and who not only would be unable to continue their courses without financial assistance, but are also worthy and deserving of it.

The Plimsoll Club Bursary in Medicine (donated by the Empire Stevedoring Company Limited)—This bursary of \$300 is available for award in the Faculty of Medicine at the University of British Columbia. It will be awarded to a worthy and promising woman student who is registered in the Faculty of Medicine and is continuing in studies leading to the degree of M.D.

The Poultry Industries Fund—This fund, established by the Trustees of the Poultry Blood Testing Fund, provides an annual bursary, ranging from \$100 to \$150, depending upon the financial circumstances of the recipient. It will be awarded, on the recommendation of the Chairman of the Division of Poultry Science, to a student, graduate or undergraduate, who has a good academic record, shows promise in the field of poultry science, and needs financial assistance.

The Procter & Gamble Student Bursary Fund—A bursary fund of \$1,500 annually for the University has been set up by the Procter & Gamble Company of Canada Limited, to benefit needy students in any faculty or year who are of good academic standing. Recipients must expect to maintain permanent residence in Canada, but there are no other restrictions. It is hoped by the Company and the University that any student who benefits from the Fund will later contribute to the general bursary funds of the University when in a position to do so. These bursaries may be held concurrently with other awards. Applications, on the University Bursary Form, must be filed at the University before July 15th.

The Provincial Council of British Columbia, Canadian Daughters' League Bursaries—Two bursaries of \$100 each, the gift of the Provincial Council of British Columbia, Canadian Daughters' League, will be available annually to assist women students who could not otherwise continue their courses. The awards, which will be made on the basis of character, academic record, and scholastic ability, will be open to graduates entering the Teacher Train-

ing Course. In the event that no applicant in this course can qualify, the awards will be open to students entering Social Work.

The Quan Memorial Bursary Fund—This fund, established as a memorial to Mrs. Quan Gow and Mrs. Jean Quan Yee by their family and friends, provides a bursary annually of \$100. This bursary will be awarded to a student with First Class standing entering the Third or Fourth Year.

The Queen Elizabeth II Coronation Bursary—This bursary of \$100, the gift of the Provincial Chapter of British Columbia, I.O.D.E., will be available in the winter session. The donation will be used for a student who has good scholastic standing and is deserving of financial assistance. The award will be made after consultation with the Provincial Educational Secretary and the Provincial President, I.O.D.E.

The R.A.F. Silver Jubilee Chapter, I.O.D.E., Bursary—A bursary of \$100, the gift of the R.A.F. Silver Jubilee Chapter, Imperial Order Daughters of the Empire, is offered in the Faculty of Medicine. It will be awarded to a promising and deserving male student in the Fourth Year who has high standing and needs financial assistance.

The R.C.A.F. Chapter, I.O.D.E., Bursary in Medicine—A bursary of \$150, gift of the R.C.A.F. Chapter, I.O.D.E., will be awarded in the winter session to a student in the First Year of the Faculty of Medicine. The award will be made to a student who, without financial assistance, would have been unable to continue in the course.

The R.C.A.F. Veterans' Bursary Fund—A sum of money given to the University by the Wartime Convalescent Home, War Charity Funds, Incorporated, Vancouver Division, provides an annual fund of approximately \$550 for bursaries. These bursaries will be available for R.C.A.F. Veterans of the War 1939-45 and for their dependents. Awards will be made on the basis of scholastic standing and financial need.

The Retail Wholesale & Department Store Union Local 535 Bursary—This bursary of \$250 is offered by the Retail Wholesale & Department Store Union Local 535 to active members, or sons, daughters and legal wards of active members of the Union in good standing. It is open in competition to applicants who are proceeding from Grade XII or Grade XIII to begin studies at the University of British Columbia, the University of Victoria, or Simon Fraser University, in a full programme leading to a degree in any field. To be eligible for consideration a candidate must have satisfactory academic standing (normally an overall average of at least 65% in Grade XII or XIII). In the selection of the winner, the basic factor will be the financial need of the candidates and their families. Those who wish to apply for this bursary must obtain the University Bursary Form from Dean Walter H. Gage, University of B.C., Vancouver 8, B.C. The completed application must be received by him not later than July 15th. The winner will be selected in cunsultation with the Union.

The Robert D. Sheret Memorial Bursary—To honour the memory of Robert D. Sheret, and to pay tribute to the respect and affection in which he was held by those with whom he was personally and professionally associated, his friends, colleagues, and members of the dental profession have established a fund. From this fund a bursary of \$100 will be awarded annually to a student in dentistry who has good academic standing and needs financial assistance.

The Robert Donald Mitchell Memorial Bursary—This bursary has been established by Mr. and Mrs. R. F. Mitchell of Rossland in memory of their

son, Robert Donald, who attended this University in the sessions 1961-62-63. In the amount of \$300, it will be awarded to a student with good personal qualities and academic record, and who is worthy of and in need of financial assistance. The bursary is open to students who have completed two years of study in the Faculty of Science in a full programme leading to a degree.

The Robin Charles Asselstine Memorial Bursary—In memory of Robin Charles Asselstine, a member of Phi Gamma Delta Fraternity and a student in the Faculty of Commerce who tragically lost his life in January, 1967, this bursary has been established by friends. It pays tribute to his fine personal qualities and the esteem and affection in which he was held. This bursary, of the annual value of \$100, will be awarded to a student in Commerce on the basis of academic standing, personal qualities, and need.

The Roche Entrance Bursary—The Roche Entrance Scholarship donated by Hoffmann-La Roche Limited provides a bursary of \$750 per year for two years and is awarded annually to a student beginning studies in the Faculty of Medicine toward the M.D. degree. The award will be made on the recommendation of the Dean of Medicine and the Medical Screening Committee to a student selected on the basis of satisfactory academic achievement, promise, and personal qualities. Renewal of the scholarship in the second year will be subject to maintenance of satisfactory standing and progress.

The Rhoda Cohen Memorial Bursary—A bursary of \$100, the gift of the Vancouver Section of the National Council of Jewish Women of Canada, will be awarded to a woman student who is a graduate registered in the Teacher Training Course. To be eligible for this award a student must have good ability and financial need.

The Rotary Club of Vancouver Memorial Bursaries—As part of its programme in the field of education, welfare and understanding, the Rotary Club of Vancouver offers annually to students at the University eight bursaries of the value of \$300 each. These bursaries are open to students in any year and in any faculty. To be eligible for the awards, applicants are required to be of good moral character and to have a reasonable interest in extra-curricular activities and a good record of scholastic attainment. Awards will be made only to those who have limited financial ability and who are beginning or continuing their University studies.

Royal Emblem, I.O.D.E., Bursary in Education—A bursary of \$100, the gift of the Royal Emblem, I.O.D.E., is offered to a student who has completed Grade XIII or First Year University and who is proceeding toward a degree or certificate in teaching. The awards will be made only to those who have need of financial assistance.

The Ruskin Chapter, I.O.D.E., Alfred Newton Wolverton Memorial Bursary—A bursary of \$300, established by the Ruskin Chapter of the I.O.D.E. through a bequest from Alfred Newton Wolverton, is offered annually to worthy and deserving undergraduates in Mining Engineering. In making the award preference will be given, first to students entering the Third Year, and second, to those proceeding from the Third to the Final Year. Awards will be made on the basis of scholastic ability, promise in the field of mining, and financial need.

The Sam and Jake Bass Bursary—This bursary of \$250, the gift of Sam and Jake Bass, will be awarded to a student entering the final year in the Faculty of Pharmaceutical Sciences with high standing. It will be awarded on the recommendation of the Faculty to a student who needs financial assistance.

The Sam Bass Bursary-In honour of Sam Bass, and to commemorate in 1965 his birthday on April 25, this bursary was established and endowed through the gift to the University of \$1000 by his wife and children. The income provides an annual bursary for a worthy and deserving student in the Faculty of Pharmaceutical Sciences who has a good record in pharmacology.

The Sapperton Fish and Game Club Bursary-This bursary of approximately \$100, the gift of Sapperton Fish and Game Club, is offered to students entering the final two years of the undergraduate course in Wildlife Biology, or to a graduate student in this field. It will be awarded on the recommendation of the Department to a student with good academic standing who is in need of financial assistance. The selected student must be proceeding to studies in the field of Wild Game Biology.

The Sea Going Hacks Bursary—A bursary of \$200, given by the Sea Going Hacks, an association of drug travellers in British Columbia, will be awarded to a student in Pharmacy who is recommended to a Committee of the Association by the University Joint Faculty Committee on Prizes, Scholarships and Bursaries in consultation with the Dean of the Faculty of Pharmaceutical Sciences. The award will be made on the basis of scholarship and need.

The Section of General Practice, B.C. Division, C.M.A., Student Aid Fund The income of this fund, established by contributions from the Section of General Practice, B.C. Division, Canadian Medical Association, provides bursaries for medical students who have good academic standing and require financial assistance.

South Vancouver B.C. Branch 16 of the Royal Canadian Legion Bursaries -Two bursaries of \$125 each are offered to students in the Second Year from David Thompson or John Oliver High School, Vancouver. Preference will be given to sons and daughters of veterans. The awards will be made on the basis of academic standing and need.

The Sperry Phillips Memorial Bursary—A bursary of the annual value of \$190, endowed by friends and associates of the late Sperry S. Phillips (B.S.A., U.B.C., 1923), who prior to his untimely death by accident in 1945, contributed much to the development of Junior Farmer Activities in British Columbia, will be awarded to a student entering the Faculty of Agriculture or the School of Home Economics for the first time. In making the award, consideration will be given to academic ability and 4-H Club membership.

The Stork Craft Limited Bursary—A bursary of \$100, the gift of Stork Craft Limited through Mr. Morris Feldstein, President, is offered to students in any year and any Faculty. The award will be made to a student with good academic standing who has need for financial assistance.

The St. Paul's Hospital Medical Staff Bursary—An annual bursary in the sum of \$300 will be granted by St. Paul's Hospital Medical Staff to a student in the Faculty of Medicine, University of British Columbia, who has shown satisfactory scholastic attainment and is deserving.

The Steel Company of Canada Limited Bursaries—Nineteen bursaries, each of \$500 a year, until graduation, but for a maximum of four years, are offered annually by the Steel Company of Canada, Limited to selected students attending certain universities across Canada. They are provided to give aid to capable students in any field of study who are permanent residents of Canada and who, without financial assistance, might otherwise not be able to attend. Selections of the winners are made by the Universities concerned. One of these awards will be made by the University of British Columbia. In order to qualify for renewal each year, the holder of an award must maintain standards of achievement satisfactory to the University. Each bursary is accompanied by a grant-in-aid of \$500 per annum to the general funds of the University.

The Stry Credit Union Bursary—A bursary of \$400 is offered by Stry Credit Union to students who are members of the Stry Credit Union, for six months prior to July 1st of the year of application, and who are the sons, daughters, or legal dependents of members of at least one year's standing. It is open in competition to students proceeding from Grade XII or Grade XIII to attendance at the University (or University of Victoria or Simon Fraser University) in a full course leading to a degree. The winner will receive \$300 during the first year of studies and, subject to satisfactory standing, \$100 during the second year. The award will be made on the basis of financial need and academic standing. If no suitable candidates apply in any year, the award will not be made in that year, but will accrue for the purpose of making additional awards in a future year, when more than one suitable candidate has applied.

The Student Nurses' Association of British Columbia Bursaries—Two bursaries of \$100 each, the gift of the Student Nurses' Association of British Columbia, are offered to students graduating from a Diploma School of Nursing in British Columbia in 1968, and planning to enter the degree programme of Nursing at the University of British Columbia in September, 1968. Applications, on the University Bursary Form, must be submitted by July 15th.

The Summerland Kiwanis Club Bursary—A bursary of \$300, the gift of the Kiwanis Club of Summerland, is available annually for a student from Summerland who is beginning or continuing studies at a University or \$150 at a regional college. The award will be made in consultation with the Club to a student who has academic promise and is in need of financial assistance.

Surrey Co-operative Association Bursary—This bursary of \$300, given by Surrey Co-operative Association, will be awarded to a student entering the Faculty of Agriculture for the first time from the trading area of the Surrey Co-operative Association. This bursary will be awarded to an applicant who has a record of good scholastic standing. Consideration will be given to his or her agricultural background and participation in community activities. Winners of this bursary will be selected by the Joint Faculty Committee on Prizes, Scholarships and Bursaries. Applications, on forms available from the Dean of Administrative and Inter-Faculty Affairs, must be received before July 15th.

The Thomas Holmes Johnson Bursaries—Through a bequest from the late Thomas Holmes Johnson, the following bursaries have been provided:

(1) A bursary of approximately \$350 to be awarded annually to the son or daughter of a member in good standing of Tyee Lodge No. 66, A.F.A.M., beginning or continuing studies in Vancouver at the University of B.C. The selected student must be recommended for this award by the Officers of the Lodge; approved by a favourable vote of 50% of the members of the Lodge at a regular meeting; have attended high school in Prince Rupert, B.C.; and be recommended as to proficiency, good character, and need for financial assistance by the Principal of the High School. The recommendation must reach the Chairman of the University Scholarship Committee by July 15th. Final decision rests with the University Senate. If in any year, no candidate qualifies, the number of awards described in the next section will be increased to three.

(2) Two bursaries of approximately \$350 each will be awarded to students who, having attended high school in Prince Rupert, B.C., are beginning or continuing their studies in Vancouver at the University of B.C.; are recommended as to character and proficiency by the Principal of the High School and three residents of Prince Rupert holding a degree from a Canadian University; and by the Principal as to need for financial assistance. Preference will be given to students whose parents have resided in Prince Rupert for five or more years. Recommendations must reach the Chairman of the University Scholarship Committee by July 15th. Final decision rests with the University Senate.

The Tobias Tellefsen Bursary in Philosophy—This bursary in the amount of approximately \$250 has been endowed and established to honour the memory of Tobias Tellefsen by the Western Star Lodge No. 10, Independent Order of Oddfellows. It serves to mark his 52 years as Secretary of the Lodge and to indicate the high regard of his fellow members for his fine personal qualities and deep devotion to his duties. This bursary will be awarded to a student who has completed at least one year at the University, who has good academic standing and needs financial assistance, and who is specializing in philosophy at the University of British Columbia. Other factors being equal, preference will be given to the son or daughter of a member of an Oddfellows Lodge in British Columbia.

Totem Park Residence Association Bursaries—Two bursaries of \$150 each, gift of the Totem Park Residence Association, are offered annually to students in any year and faculty who have lived in Totem Park Residence for the previous year, who have good scholastic standing, and who are in need of financial assistance.

The U.B.C. Scholarship and Bursary Fund—The income from this Fund, established by the Vancouver Foundation, and initiated by a bequest from the late Archibald P. Glen, provides awards to assist deserving students at the University of British Columbia, Vancouver.

University Women's Club Bursary—The University Women's Club of Vancouver provides a fund of \$600 to be available to aid women students in need of financial assistance. Details are available from the office of the Dean of Inter-Faculty and Student Affairs.

The Unknown Warrior Chapter, I.O.D.E., Bursary in Public Health Nursing—A bursary of \$100, the gift of the Unknown Warrior Chapter, I.O.D.E., will be awarded to a woman student entering the Final Year of Public Health Nursing. The award will be granted to a student who has high scholastic standing and is in need of financial assistance.

The Upper Vancouver Island Medical Society Bursary—A bursary of \$400, the gift of the Upper Vancouver Island Medical Society, is offered annually to a First Year student in the Faculty of Medicine. The award will be made to a promising student who needs financial assistance to begin his or her medical studies. Preference will be given to a student from Upper Vancouver Island.

The Valcartier Camp Chapter, I.O.D.E., Bursary—A bursary of \$100, given by the Valcartier Camp Chapter, I.O.D.E., will be awarded annually to a woman student who has good academic standing and is in need of financial assistance. This bursary is available to a student proceeding to the First Year in Arts.

The Vancouver Bar Association Bursaries—Three bursaries of \$200 each, the gift of the Vancouver Bar Association, made by the Foundation of the

Vancouver Bar Association, will be awarded in the session 1969-70 to students in the Faculty of Law. One bursary will be available for a student entering each of the three years of the course in Law. Awards will be based on scholastic standing and financial need.

The Vancouver Business and Professional Women's Club Bursaries—Two bursaries of \$100 each, the gift of the Vancouver Business and Professional Women's Club, are offered to women students proceeding to a degree in any field. The awards will be made to students with good academic standing who need financial assistance to continue their studies at the University.

The Vancouver City Hall Employees Society Bursary—This bursary of \$300, established by the Vancouver City Hall Employees' Society, is open annually to members of the Society and to sons, daughters and legal dependents of members, who, at the time the award is made, have held membership in the Society for at least two years. It will be awarded by the University, in consultation with the Society, to a qualified member who is beginning or continuing studies at the University in a full programme leading to a degree. The basis of award will be financial need, and academic standing in previous studies. Candidates must apply on the University Bursary form, obtainable from the Dean of Inter-Faculty and Student Affairs. It must reach the University by July 15th.

Vancouver Civic Employees Union Bursary—A bursary of \$150, the gift of the Vancouver Civic Employees Union, is offered annually to (1) members of the Union; (2) sons, daughters or wards of members or deceased members; (3) sons and daughters of any trade union member. The award will be made to an applicant, on the basis of financial need and competence in studies, pursuing work in any year and faculty. If no applicants are available in the above categories the University may award the bursary to any other deserving student.

Vancouver Fire Fighters' Union Local No. 18 Bursary—A bursary of \$200, gift of the Vancouver Fire Fighters' Union Local No. 18, provides a bursary for a student beginning or continuing studies at the University. The award will be made to a physically handicapped student who needs financial assistance and is worthy and deserving of support.

The Vancouver Section National Council of Jewish Women Bursary for Social Work—A bursary of \$100, the gift of the Vancouver Section of the National Council of Jewish Women of Canada, is offered to students continuing a programme of studies leading to a degree in Social Work. It will be awarded to a student who has need of financial assistance, shows promise of success in the field of Social Work, and has a strong interest in community service.

The Vancouver Transportation Club Bursary—A bursary of \$200, the gift of the Vancouver Transportation Club, is offered to a graduate or undergraduate student in the transportation option of the Faculty of Commerce. The award will be made on the basis of financial need in the Fall term.

Vancouver Women's Transportation Club Bursary—A bursary of \$200, gift of the Vancouver Women's Transportation Club is offered to a student in the Faculty of Commerce and Business Administration. It will be awarded to give financial assistance to a student who has a genuine interest in the study of traffic and transportation related to Commerce.

The Victoria Home Economics and Dietetic Association Bursary—This bursary of \$150, the gift of the Victoria Home Economics and Dietetic Association, will be awarded annually to a woman student whose home is

in Victoria or some other centre on Vancouver Island, and who is entering the Second, Third, or Fourth Year in Home Economics at this University. The award will be made on the basis of financial need to a student of good academic standing.

The Vinten Fund Bursary—A bursary of approximately \$250, provided by a gift from Mrs. H. B. Norris through the establishment of the Vinten Fund in the Vancouver Foundation, is offered annually to a worthy and deserving student proceeding to courses in Engineering. The award will be made by the Vancouver Foundation on the recommendation of the Joint Faculty Committee on Prizes, Scholarships and Bursaries of the University.

The War Amputations of Canada, Vancouver Branch, Bursaries—Twenty bursaries of \$200 each, provided by the War Amputations Association of Canada, Vancouver Branch, are offered to children of active members of the Branch. These bursaries are available to selected students who are taking a full-time course of study past the Grade XII level at a recognized institution of learning. Applicants must have a clear academic record in a full programme of studies in the year most recently completed. Only two War Amputation Bursaries may be granted to any one student. Applicants attending the University of B.C. must apply by July 15 on the University Bursary form, which may be obtained from the Dean of Inter-Faculty Affairs.

War Memorial Bursary—This bursary of approximately \$100, provided by the income on a fund established by graduates and friends of the University through donations from G. E. Baynes, Esq., P. R. Brissenden, Esq., Q.C., Hotel Grosvenor, Alfred W. McLeod Limited, and Seeley & Company Limited, will be awarded annually to a worthy and financially deserving undergraduate in any year and faculty. In making this award, preference will be given first to veterans or members of the Merchant Navy, who served in World War II, then to sons and daughters of those who served, and finally to students generally.

The W. D. Shaffer Bursary Fund—This fund was bequeathed by the late Marion Alice Shaffer, B.A., B.Com., a graduate of this University, who served with distinction as a teacher in the Schools of British Columbia and won the affection of all for her generosity and courage. It was the expressed wish of the donor that the income from the fund be used, as a memorial to her brother, to provide assistance for worthy and deserving students, preferably those proceeding to a career of teaching in the public schools of British Columbia.

Weldwood of Canada Limited Bursaries—Bursaries to the total of \$500, the gift of Weldwood of Canada Limited, are offered to Forestry or Forest Engineering students entering the Third or Fourth Year who, in addition to having good scholastic standing, have demonstrated a genuine interest in human relations by their extra-curricular activities or their training in the humanities at the University, or both. Candidates will be selected by a committee which will judge their special qualifications. Other considerations equal, the student in circumstances of greater need will be given preference.

The West Kootenay Medical Association Bursary—A bursary of \$250 from the West Kootenay Medical Association, is offered to students registered in the Faculty of Medicine and taking a full course leading to the degree of M.D. It will be awarded to a promising and deserving student who requires financial assistance. First preference will be given to students from the West Kootenay area of the Province. The recipient is asked to assume a moral obligation to reimburse the fund when he has completed his training.

Westminster Medical Association Bursary—This bursary of \$500, the gift of the Westminster Medical Association, will be awarded to a student in the Faculty of Medicine for study in the winter session. The award will be made to a promising student of good ability who, without financial assistance, would be unable to begin or continue his studies in the Faculty of Medicine. The winner is asked to assume a moral obligation to reimburse the fund when he has completed his training.

White Spot Limited Bursaries—Two bursaries, having a total value of \$1000 each, are provided by White Spot Limited and subsidiary companies for their employees, and sons and daughters of their employees, who have served with the firm for at least two years. These bursaries are paid in annual amounts of \$250 each and are open in competition to eligible students proceeding from Grade XII or XIII of secondary school to a full programme of studies at the University of B.C., Simon Fraser University, or the University of Victoria. For purposes of qualification, "employees" shall include students having part time employment with the Company while attending secondary school. The decision as to qualification by employment shall rest with the Company. In all other matters, winners will be selected by the Scholarship Committee of the University of B.C. on the basis of academic standing and need for financial assistance. To be considered a candidate must (a) have clear standing in the year's work most recently taken with an overall average of at least 65%; (b) submit the special bursary form to the University of B.C. not later than July 15. This form may be obtained after June 1st from the Dean of Inter-Faculty and Student Affairs, University of B.C., Vancouver 8, B.C. Winners will be considered for renewals of these bursaries for their second, third and fourth years of University attendance (up to graduation). Renewals each year, however, are not automatic and will be made only to those who file a new application, pass in all subjects with a minimum overall average of 65%, and have need for financial assistance.

The Willard Kitchen Memorial Bursaries—Three bursaries of \$500 each, given by his daughters, are available for male students in the Faculty of Medicine proceeding to the degree of M.D. These bursaries have been established to assist worthy and deserving male students of academic distinction who, because of their character and ability, give promise of outstanding achievement in the field of medical studies.

William C. Moresby, Q.C., Bursary—A bursary of \$200, the gift of the Victoria Bar Association, will be awarded in the session 1969-70 to a student in the Faculty of Law. Preference will be given to students coming from the Victoria area. Awards will be based on scholastic standing and financial need.

The William G. Murrin Bursaries—The annual income from a bequest made by the late William G. Murrin, who for many years served the University as a member of the Board of Governors, provides bursaries for worthy and able students who cannot continue their studies without financial aid.

The W. Jack H. Dicks Bursary—A sum of \$275 will be awarded to a student who has completed at least one year of work in the Faculty of Agriculture, who is proceeding to a higher year in the Faculty, and who has given evidence of possessing those qualities necessary for community leadership.

The Women's Auxiliary to the Canadian Paraplegic Association Bursaries—Two bursaries of \$200 each are offered by the Women's Auxiliary to the Canadian Paraplegic Association, B. C. Division to paraplegic students or sons and daughters of paraplegics. These bursaries are available to students who

are beginning or continuing studies in one of the universities in British Columbia. They will be awarded by the University Selection Committee in consultation with the donors. To be eligible, an applicant must have satisfactory academic standing and need financial assistance.

The Worthington Memorial, I.O.D.E., Bursary-A bursary of \$300, the gift of the Worthington Memorial Chapter, I.O.D.E., will be awarded to a member of the B.C. Regiment or the Cadet Corps of the B.C. Regiment who is beginning or continuing his studies at the University. In making the award, consideration will be given not only to the financial need of those who are eligible, but also to their records with the Regiment or the Cadet Corps.

Xi Alpha Chapter of Beta Sigma Phi Sorority Bursary—A bursary of \$50, gift of the Xi Alpha Chapter of Beta Sigma Phi, an international sorority, is available annually for women students who are proceeding to the Second Year in the Faculties of Arts and Science, Education, or Agriculture, First Year Pharmacy, or the First Year in the Faculty of Applied Science. The award will be made to a student who has good scholastic standing and is in need of financial assistance. In choosing the recipient, consideration will be given to character and qualities of citizenship.

The Yates Memorial Scholarship and Bursary Fund-This fund, established by a bequest from Nora Yates as a memorial to her son, Frederick H. L. Yates, provides bursaries and scholarships, known as Yates Memorial Awards. These awards, to a total of approximately \$800, are made annually to promising and deserving students, beginning or continuing studies at this University, who have financial need or high academic standing. First preference is given to veterans of World War II, then to sons and daughters of those who so served, and finally to the student body at large.

### For Summer Session

University Summer Session Bursaries—Thirty bursaries of \$50 each are available in the summer session, for undergraduates who are taking a full course (6 units) of work in the summer session. They will be awarded to students who hold permanent teaching certificates in British Columbia and are actively engaged in teaching in the Province. Awards will be made on the basis of scholarship, financial need, interest in teaching, and participation in the activities of school and the community. Special consideration will be given to applicants from more remote parts of the Province. Applications, on forms available at the office of the Dean of Inter-Faculty Affairs, must be received not later than May 31st.

# LOAN FUNDS

Inquiries relating to the following loan funds, and all applications for loans, should be addressed to the Dean of Inter-Faculty and Student Affairs, Room 207, Buchanan Building, unless the description indicates otherwise.

Applications for loans should be made in advance of the opening of the session. Although loans in limited amounts may also be made during the session, provided funds are available, students should not begin attendance on the assumption that they will be eligible for or receive assistance. In particular, they must meet academic requirements acceptable to the Loan Committee. Students with weak academic records, or those on probation, or who have failed in the previous year of attendance at school or university, or who are on probation, will not be granted loans.

Loans are not normally made to students outside British Columbia until they have attended the University for at least one winter session.

Students are also advised that adult guarantors satisfactory to the Accountant's office are required.

#### Winter Session Loan Funds

Canada Student Loans—The academic year 1969-70 will be the fifth year of operations for the Canada Student Loans Plan. This plan was introduced by the Federal Government as a broad programme to assist students who, in the absence of a loan, would be unable to pursue full-time post-secondary studies at a university or other educational institution. Canada Student Loans, available only on the basis of certificates of eligibility issued by the appropriate authority (issuing agency) for a province, may be made by any branch of the chartered banks and by certain designated credit unions with the guarantee of the Federal Government. Applications for certificates of eligibility must be made to provinces participating in the plan, and decisions on individual applications are made by the Provincial appropriate authority (issuing agencies). Students applying for certificates who meet residence and other requirements must also demonstrate that the financial means available to them from all other sources are insufficient so that a guaranteed loan is needed. In no case will a loan for an academic year exceed a maximum of \$1,000 or total loans exceed \$5,000 during a student's academic career. Provincial authorities may issue certificates of eligibility under the plan up to the limits of provincial allocations in each loan year. Borrowers under the plan are required to repay principal and pay interest, but no payments are required as long as they are full-time students at a specified post-secondary educational institution and for six months thereafter; interest during this period is paid by the Federal Government on behalf of the student. After a student's interest-free period has expired, he is required to make regular monthly payments which include repayment of principal and 5¾ percent per annum simple interest on the outstanding balance. The number of years over which a loan may be repaid depends on the loan amount and other considerations but may not exceed ten years from graduation. A student should apply for a loan under this plan only for the funds needed to enable him to continue his studies and in doing so he should give responsible consideration to the repayment obligations he is assuming; a student who actually borrowed the maximum of \$5,000 would, for instance, be obligating himself to pay, after the expiry of his interest-free period, about \$58.00 each month until ten years after he leaves university. A student in need of a Canada Student Loan should, as a first step, obtain an application form and further information from the appropriate authority (issuing agency) of his Province. Students proposing to attend the University of British Columbia should apply to Dean Walter H. Gage, University of B.C., Vancouver 8, B.C.

The Student Aid Loan Fund—By an Act of the Provincial Legislature the University was authorized in 1959 to borrow money for the establishment of this Fund. Loans will be made only to students with satisfactory standing who fulfil (to the satisfaction of the Loan Committee) requirements of being domiciled in British Columbia, and who require financial assistance. Loans bear interest from the date of issue, and are repayable in regular instalments commencing not later than October 1st of the year in which the approved training programme will be completed. For fuller details and application forms, apply to the Dean of Inter-Faculty and Student Affairs, University of British Columbia, Vancouver 8, B.C.

The A. B. Wing Student Aid Bequest and Fund-This fund was established by a bequest from Marjorie Thelma Wing to assist selected students with financial need to begin or continue their studies at the University of British Columbia, Vancouver. Preference is given to students in mechanical engineering or related studies. In providing this bequest the donor expressed the hope that those who benefit from the Fund will, if and when circumstances permit, establish similar funds or contribute to the maintenance and perpetuation of this Fund.

The Alma Mater Loan Fund—This fund was established by the graduating classes of 1937 as a trust to be used for loans to undergraduates who have attained satisfactory academic standing. Loans to any one student are limited to a total of \$100. Loans, which are free of interest until May 31st of the session in which they are issued, become due in one year.

The Burrows Moore Smythe Loan Fund-This fund, established by a bequest from Burrows Moore Smythe, provides loans for deserving students in medicine and in science. Terms governing loans will be arranged in accordance with the individual circumstances of applicants.

Canada Western Cordage Co. Ltd. Student Aid Fund—Established by Canada Western Cordage Co. Ltd., Vancouver, this revolving loan fund provides assistance to students in any year and faculty who have satisfactory academic standing and need financial help. Provided they apply early in the session, preference will be given to sons and daughters of employees of the Company. Terms and conditions for repayment of each loan will be decided by the University on the basis of the applicant's financial circumstances.

The Caribbean Students' Association Loan Fund—Through contributions from members of the Caribbean Students' Association, a fund has been established to provide assistance in the form of loans to students from the Caribbean Area in attendance at the University.

The Carl J. Culter Student Aid Fund-This is a memorial fund established by the family of Carl J. Culter (1884-1948) to help deserving students. To this fund students with satisfactory academic standing and showing promise of service to their communities may apply for loans to help them in beginning or continuing their studies at the University of British Columbia.

The Carroll Howe Corkum Student Aid Fund—This fund, the gift of Carroll Howe Corkum, provides loans for students taking Teacher Training at this University, the awards being based on academic and personal qualities. In order of preference, they are open to male graduates of King George High School, Vancouver, female graduates of the same school, and members of Phi Gamma Delta Fraternity. If in any year, no candidate is suitably qualified, the awards may be made to students proceeding to a degree in another field or withheld to provide larger awards in the next session.

The Charles J. Thompson Student Aid Fund in Architecture—A fund of \$5000, to assist students in Architecture, was established by the late Charles J. Thompson, Esq., LL.D., A.R.I.B.A., F.R.A.I.C., a member of the firm of Sharp and Thompson which won the open competition for the building project of the University in 1912. Since that time, Mr. Thompson contributed much of professional skill and personal interest to construction and development on the campus. The purpose of the fund is to assist promising and needy students proceeding to a degree in Architecture. Loans from the fund, which do not become repayable or bear interest until after the student's graduation, are available for undergraduates registered in the Second or a higher year. The Christmas Seal Medical Student Loan Fund—From this fund, the gift of the British Columbia Tuberculosis Society, loans are available to deserving medical students in any year of the medical course. Terms of repayment will be recommended by the Committee after a review of the financial circumstances of the applicant.

C.I.M.M., B.C. Section, Loan Fund—A fund established and maintained by the Canadian Institute of Mining and Metallurgy, B.C. Section, provides loans for students at the University of British Columbia who are members of the Dawson Club. Loans from this fund will be made to promising and deserving applicants. Application should be made to the Dean of Inter-Faculty Affairs.

The Class of 1929 Student Assistance Fund—This fund was established by the Class of '29 in commemoration of the observance of its twenty-fifth anniversary. The fund is used to provide loans for worthy and deserving students.

The College of Dental Surgeons of B.C. Loan Fund for Dental Hygiene—Loans up to \$500 each are offered annually by the College of Dental Surgeons of B.C. to women students with at least University Entrance standing who are residents of British Columbia and have been accepted or are continuing at an approved school or faculty in a course leading to certification in British Columbia as dental hygienists. Selection of recipients will be made on the basis of academic standing and need for financial assistance. Loans will be interest free until completion of the course, after which they will bear interest at the rate of 5% per annum. Recipients may make arrangements to repay the loans in regular monthly instalments over a two-year period following graduation. The promissory note covering the loan will require the signature of the applicant and of her parent or guardian (or other adult satisfactory to the University). A candidate must apply by letter to the Dean of Inter-Faculty and Student Affairs, University of B.C. The letter of application must be accompanied by evidence of acceptance by an approved school or faculty and a transcript of the candidate's academic record. The candidate will also be required to complete a University loan application form.

The Col. Herbert Mercer Loan Fund—Loans from this Fund, a bequest from Patricia Edwina de Boinne Bower, are offered to deserving students beginning or continuing attendance at the University of British Columbia.

Columbia Preceptory, No. 34, Knights Templar, Student Aid Fund—From this fund, established by a gift of Columbia Preceptory, No. 34, Knights Templar, Vancouver, assistance is available for members of the student body of the University. The purpose of this fund is to provide a measure of financial aid for students who, by virtue of their personal qualities, academic records, and promise, are worthy and deserving of support. In granting assistance, first preference will be given to those proceeding to a career in theology.

The Cromie-Dix Memorial Fund—This fund was established as a memorial by the friends of Samuel Patrick Cromie and William Derek Dix, who lost their lives in a tragic accident on February 16th, 1957. Samuel Cromie, born in Vancouver in 1918, was at the time of his death, Vice-President and Assistant Publisher of The Vancouver Sun; and William Dix, born in London, England, in 1918, was Vice-President of Sales for Canada of Neon Products of Canada Limited. Both served in the Second World War and contributed generously of their time and talents to the welfare of their fellow citizens, especially through their work with the Community Chest.

In keeping with the tenor of their public service the fund provides assistance to male students in the fields of boys' work, leadership training, education, social work and welfare, social sciences, advertising, journalism, community and regional planning, and related areas of study. Students in these fields needing assistance to begin or continue their university studies may obtain information from the Dean of Inter-Faculty and Student Affairs.

Dal Grauer Graduate Student Aid Fund-This fund, established as a memorial to Dr. A. E. Dal Grauer by Frank McMahon, provides loans for students accepted as candidates for the Ph.D. degree at the University of British Columbia in the fields of Economics, Physics and Engineering, and who are worthy and deserving of aid. In general, loans from this fund are interest free until the student obtains his degree, and terms of repayment will be arranged on an individual basis.

The Dean Clement Student Aid Fund in Agriculture—In honour of Frederick M. Clement, who served as a member of the Faculty of Agriculture from 1916 to 1949 and as Dean from 1919 to 1949, and in recognition of his contributions and achievements, the Agricultural Undergraduate Society has established a loan fund to assist undergraduates in Agriculture who, during the session, require emergency financial assistance. Loans from this fund are subject to the approval of the Dean of Agriculture. Further information may be obtained from the offices of the Dean of Women, the Dean of Agriculture, or the Dean of Inter-Faculty and Student Affairs. It is the hope of the Agricultural Undergraduate Society that those who have been assisted from this fund or those who have benefited from Dean Clement's guidance and instruction in past years will contribute to this undergraduate student effort.

The Dean E. D. MacPhee Commerce Student Aid Fund-In honour of Earle D. MacPhee, who served this University from 1950 to 1963 as Professor, Director, and Dean of Commerce and Business Administration, and as Honorary Bursar and Dean of Administrative and Financial Affairs, this fund was established through the Alumni Annual Giving by contributions from Commerce graduates. It marks the affection and esteem in which Dean MacPhee is held by his former students, and gives recognition to his distinguished services to the University and community. Loans from this fund will be made to graduate and undergraduate students in Commerce.

The Dean E. L. Woods Memorial Loan Fund—In honour of the memory of Esli Longworth Woods, first Dean of the Faculty of Pharmacy at this University, the Pharmacy Alumni have established a loan fund to assist students registered in the Faculty. Loans from this fund will be available for those who are recommended by the Dean of Pharmacy. Application forms are available at the office of the Dean of Inter-Faculty and Student Affairs.

Dr. A. E. H. Bennett Medical Student Aid Fund—This fund, established by a bequest from the late Dr. Allan Edward Hingston Bennett, provides loans for students registered in the Faculty of Medicine. Loans from this fund are interest-free until the completion of medical training and internship. Further information is available from the Dean of Inter-Faculty and Student

The Dr. Marianne Jetter Student Aid Fund—This fund, a bequest from Dr. Marianne Rose Jetter, provides assistance, in the form of loans, for deserving students.

The E. M. Kierstead Student Aid Fund—This fund, established in memory of Professor E. M. Kierstead, a beloved professor in Acadia and McMaster Universities, has been made available to provide loans for students requiring limited financial assistance in emergency situations.

The Ernest G. Sherwood Student Aid Fund—This fund, the gift of Ernest G. Sherwood, Richmond, B.C., provides assistance for students in attendance at the University who have satisfactory academic standing and are worthy and deserving of encouragement and support.

The Faculty Women's Club Jubilee Loan Fund—This Fund, established by the Faculty Women's Club of the University of British Columbia, provides loans for qualified mature women students returning to studies at the University of British Columbia. Loans will be made on the recommendation of the Dean of Women, who should be consulted by those wishing to be considered.

The Georgian Club Fiftieth Anniversary Student Aid Fund—This fund, established in 1961 by the Georgian Club of Vancouver to mark the fiftieth Anniversary of its founding, provides assistance to women graduates of the Faculty of Arts and Science who are continuing studies in Librarianship, Social Work, or Teacher Training, or in the Faculty of Graduate Studies toward a higher degree in any field. This fund is administered by the University Committee on Scholarships, Bursaries, and Loans. Loans will be arranged on an individual basis.

The G. T. Cunningham Memorial Loan Fund—As a memorial to the late George T. Cunningham and in tribute to his services to the profession of pharmacy, to his long and continued interest in the University, and to his outstanding contributions in many phases of public life, the Pharmaceutical Association of the Province of British Columbia has established a loan fund. Loans from this fund will be made by the University Committee on Prizes, Scholarships, and Bursaries in consultation with the Dean of Pharmacy.

The Graduating Classes of 1952 Student Aid Fund—This fund was established from a gift made to the University by the Graduating Classes of 1952 for the purpose of assisting deserving undergraduates. Loans for limited amounts are available, without interest, for a period of one year.

The Graduating Classes of 1955 Student Aid Fund—This fund was established as a graduation gift by the Classes of 1955 for the purpose of assisting deserving students. It is administered by the Joint Faculty Committee on Prizes, Scholarships, and Bursaries.

The Graduating Classes of 1956 Student Aid Fund—This fund, established by a gift from the Graduating Classes of 1956, provides loans for deserving students. Further information may be obtained from the Dean of Inter-Faculty and Student Affairs.

The Graduating Classes of 1961 Student Aid Fund—This fund, the gift of the graduating classes of 1961, provides assistance in the form of loans for undergraduates taking a full programme of studies leading to a degree. The terms and conditions of repayment are determined after consultation with the applicant.

The Graduating Classes of 1962 Student Aid Fund—As a gift to the University on the occasion of graduation, the Classes of 1962 established a fund to provide loans for deserving students. It is administered by the Joint Faculty Committee on Prizes, Scholarships, Bursaries and Loans, Conditions of repayment will be decided on the basis of the applicant's circumstances.

The Graduating Classes of 1963 Student Aid Fund—As a gift to the University on the occasion of graduation, the Classes of 1963 established a fund to provide loans for deserving students. It is administered by the Joint Faculty Committee on Prizes, Scholarships, Bursaries and Loans. Conditions of repayment will be decided on the basis of the applicant's circumstances.

Graduating Class of Agriculture Student Aid Fund—This fund, initiated by the Graduating Class of Agriculture 1962, and augmented by the Class of 1963, provides loans for worthy and deserving students in any year in the Faculty of Agricultural Sciences. Loans will be arranged to meet the needs of individual applicants. It is the hope of the Graduating Class of 1962 that individuals and future graduating classes will contribute to this fund as their means may allow.

Home Economics Loan Fund—From a fund established from gifts of anonymous donors, loans are available for undergraduates registered in any year of the Home Economics Course. Loans are also available for graduates in Home Economics taking further work at the University in a related field or in Education. Loans to any one student will not exceed \$200, and are repayable commencing one year after the applicant discontinues attendance at the University, until which time no interest will be charged. Applicants must be recommended by the School of Home Economics.

The H. R. MacMillan Loan Fund—Through the generosity of Dr. H. R. MacMillan, C.B.E., a loan fund has been established to assist students in Forestry. Loans from this fund are to be repaid within three years from graduation, and until then no interest will be charged. Assistance to any one student is limited to \$300. Loans will be made on the basis of scholarship and financial need.

The H. R. MacMillan Special Loan Fund—This fund has been established by Dr. H. R. MacMillan, C.B.E., to provide assistance, in the form of loans, for the sons and daughters of employees of the MacMillan, Bloedel and Powell River Company Limited, the British Columbia Packers Limited, or subsidiaries of these companies. Loans, which are available only for study at this University, are for limited amounts. Applicants must have good scholastic records. They are repayable commencing one year after termination of studies at the University, until which time they do not bear interest. The fund may also be used to provide loans for other students.

The Hugo E. Meilicke Loan Fund—This fund was established and is maintained from the annual income on a gift to the University by Mr. Hugo E. Meilicke through the Vancouver Foundation. It provides loans for students registered for a full programme in the Faculty of Graduate Studies.

The Oswyn John Boulton Student Assistance Fund—This fund, established through a bequest from Margaret Jane Boulton, provides loans for students in Law at this University. Conditions of repayment of loans will be arranged in accordance with the individual circumstances of applicants.

Judge Helen Gregory MacGill Memorial Student Aid Fund—A loan fund initiated by the Phi Delta Delta Legal Sorority has been established in memory of Judge Helen Gregory MacGill who from 1902 to 1947 worked ceaselessly for better laws and conditions for women and children in Canada. Loans from this fund, intended for use in emergency situations to assist women students in the Final Year of the Law course or the degree course in Social Work, are granted on the recommendation of the Joint Faculty Committee on Prizes, Scholarships, and Bursaries, in consultation with the Dean of Women. Assistance to any one student is limited to \$100. Loans are repayable commencing one year from the end of the session and do not bear interest until that time.

The Lambda Chi Alpha Fraternity Student Aid Fund—To honour the association of Lambda Chi Alpha Fraternity with the University, this loan fund of \$1000 was contributed by the Auxiliary to the Fraternity. From

this fund loans will be made to worthy and deserving students. In each case the terms of repayment will be decided on the basis of the applicant's circumstances.

Law Alumni Student Aid Fund—This fund, established by the Class of Law '48 on the occasion of its tenth anniversary, provides loans for undergraduates in the Faculty of Law.

The Lemuel F. Robertson Memorial Fund in Classics—Professor Lemuel F. Robertson, Classical Gold Medalist at McGill University in 1899, was appointed to the staff of old Vancouver College in 1901. He taught in McGill College of B.C. from 1906 to 1915 and became the first active Head of the Department of Classics of the University of British Columbia in 1915, a position that he held until his retirement in 1941. He was, quite literally, one of the Makers of the University. This fund, established by his family and to which his many friends have been invited to contribute, is intended to assist students, both undergraduate and graduate, who are pursuing Classics as their major field of study.

The Lorne Dawson Sims Loan Fund—This fund, established by a bequest from Lorne Dawson Sims, provides loans for students in any year and faculty who have satisfactory scholastic ability and need financial assistance. Terms governing loans will be arranged in accordance with the individual circumstances of applicants.

The Medical Students Loan Fund—This fund, initiated by a donation to the University Development Fund from Mr. W. Clarke Gibson, and increased by contributions from other donors, was established to assist worthy and deserving students in the Faculty of Medicine. Loans will be made in accordance with the individual needs of applicants.

The Mr. and Mrs. P. A. Woodward's Foundation Medical Students' Fund—A gift from Mr. and Mrs. P. A. Woodward's Foundation provides assistance in the form of loans for undergraduate medical students in attendance at this University. Loans from this fund, repayable within a reasonable period after graduation, are arranged to meet the individual needs of applicants.

The Mrs. Amy E. Sauder Trust Fund—This fund, in the amount of approximately \$17,000, was established by donations from the estate of the late Mrs. Amy E. Sauder and from the E. L. Sauder Lumber Company Limited. In providing assistance for students beginning or continuing their studies at this University, the Fund serves to mark the desire of the late Mrs. Sauder, her family, and the Company to help young students who are worthy and deserving of support.

The Mr. and Mrs. T. Sato Loan Fund—This fund has been established by Mr. and Mrs. Tsutae Sato for students of Second Class standing, or better, in the Third or Fourth Years in the Faculties of Arts and Science, Agriculture and Applied Science, or for students in the Fifth Year of a Double Course. Loans from this fund do not bear interest until May 31st of the session in which they are granted, and are repayable in one year.

The 1958 Graduates in Engineering Loan Fund—This fund was established in 1968 by the 1958 Graduates in Engineering. It provides loans without interest to students in the Fourth Year of Engineering who are in need of financial assistance. It is the hope of the donors that those who are assisted and other Engineering groups will contribute from time to this fund.

The Nursing Students' Assistance Fund—This fund has been established to provide loans for students in the School of Nursing. It is maintained by donations from friends and contributions received through the University Development Fund.

The Pacific Coast Branch, Technical Division, Canadian Pulp and Paper Association Student Aid Fund-This fund, established by the Pacific Coast Branch, Technical Division, Canadian Pulp and Paper Association, provides a fund for assistance in the form of loans to students in any year and faculty.

The Paul E. Murphy Student Aid Fund-From this fund, bequeathed by the late Paul E. Murphy of Ocean Park, loans may be obtained by undergraduates and graduates who have satisfactory standing and who are beginning or continuing their studies in the winter session at the University of British Columbia. Loans from this fund bear interest only after the recipient leaves the University, and are repayable in monthly instalments commencing one year after the date of leaving. Loans must be secured by a promissory note signed by the recipient and two guarantors. The recipient is also required to protect the loan by a policy of life insurance, in which the University shall be beneficiary to value, in an amount adequately covering advances made from the fund, until full repayment is made. Attention is called to the following clause in the agreement between the University and the late Paul E. Murphy:

"The donor and the University share the hope that students who have had help from this fund will themselves help others, as their means may allow, either by contributing to this fund

or by establishing similar funds."

The Pharmaceutical Association of the Province of British Columbia Student Aid Fund—This fund, established by the Pharmaceutical Association of the Province of British Columbia, provides assistance in the form of loans for students who have completed the First Year of Pharmaceutical Sciences and are continuing with further studies in the Faculty. Only those who are recommended by the Dean of the Faculty and the Scholarship Committee are eligible. Loans do not become repayable or bear interest until one year after graduation. Those who are assisted are invited to contribute, as their means may allow, to this fund.

Pi Beta Phi Loan Fund-Pi Beta Phi Fraternity has established a fund at the University for the use of Social Work students in financing their training or in meeting temporary or emergency needs. Loans, which are interest-free, will be made on the recommendation of the Director of the School.

The R. L. and Ruth Maitland Loan Fund—This fund, established by a bequest from the late Ruth Hildred Maitland, provides loans for undergraduates in the Faculty of Law.

The Ronald L. Cliff Student Aid Fund—This fund was established by a bequest from Ronald Lorraine Cliff to assist promising and deserving students who are attending the University. In providing this bequest, the donor expressed the hope that those who benefit from the fund would, if and when circumstances permit, contribute to the perpetuation and maintenance of it.

The Rotary Club of Marpole Student Aid Fund—This fund, donated by the Rotary Club of Marpole, has been established to provide financial assistance for worthy and deserving students in attendance at University.

The Roy Graham Memorial Loan Fund—In memory of Roy Graham, M.A.Sc. (Brit. Col.), Ph.D. (Chicago), a distinguished graduate of this University in Geological Engineering, a loan fund has been established by his family to assist worthy and deserving students in any year and faculty. Students in need of assistance may apply to the Dean of Inter-Faculty and Student Affairs, from whom further information may be obtained.

The Special Spring Session Students' Loan Fund—A sum of over \$2000, donated by the students of the Special Spring Session conducted in May and June, 1946, for ex-service personnel and former members of the Merchant Navy, provides a fund for loans. The order of preference is (a) ex-service personnel and former members of the Merchant Navy; (b) dependents of those in (a); (c) the student body at large.

Student Emergency Aid Fund—This fund, initiated by Robert Matchett, M.S.A., and maintained by gifts from students and graduates, provides loans

for students requiring limited assistance in emergency situations.

The Tina and Morris Wagner Foundation Student Aid Fund.—This fund, established through a bequest from Mr. and Mrs. Morris Wagner, provides loans for students in attendance at the University of British Columbia pursuing studies in the field of the humanities. In each case the conditions of repayment will be decided on the basis of the applicant's record and circumstances.

The University Sopron Memorial Fund—This fund, originally established by the University to assist students in the Sopron Division of the Faculty of Forestry, provides loans for students in any year and faculty. In each case the conditions of repayment will be decided on the basis of the applicant's circumstances.

University Student Assistance Fund—Through the generosity of the late D. A. Hamilton of Vancouver, a fund has been established to assist selected students who would otherwise be unable to begin or continue their studies at the University. In making awards, consideration will be given to character, ability and promise.

The University Student Liberal Club Loan Fund—From this fund, sponsored by the University Student Liberal Club and maintained by donations from members of the Liberal Party, loans are available for students interested in public affairs. Loans are repayable, without interest, within one year, but in the case of students in attendance for further work, may be renewed under the same terms.

The Vancouver Normal School Fund—This fund, given to the University when the Vancouver Normal School became a part of the University, provides assistance in the form of loans for students in the Faculty and College of Education.

Vancouver Provincial Normal School Graduates Student Aid Fund—From contributions made by graduates of the Vancouver Provincial Normal School at their reunion in June, 1956, and donated to the University, a fund of approximately \$500 has been established to assist students in the Faculty of Education. From this fund loans in limited amounts will be made to students who, having been in attendance at the Winter Sessions, must attend the following Summer Session to complete requirements for teachers' certificates. Loans become repayable in one year and are interest free for that period.

The Walter D. Frith Student Aid Fund—This fund, established by gifts from Walter D. Frith, Esq., of Vancouver, is used to provide loans for students who, without financial assistance, are unable to begin or continue their studies at the University of British Columbia. To be eligible for loans,

applicants must have satisfactory scholastic standing.

The Wesbrook Memorial Loan Fund—From this fund, established by a gift of the Graduating Class of 1928 as a memorial to the late Dr. F. F. Wesbrook, President of this University from 1913 to 1918, loans are available in limited amounts for undergraduates or graduates in regular attendance in the winter or summer session.

The Westcoast Transmission Student Loan Fund—This fund, donated by Westcoast Transmission Company Limited, provides loans for graduate students in the field of Mineral Engineering. Loans will be made to students recommended to the Scholarship Committee of the University by the Head of the Department of Mineral Engineering. Terms of repayment and other details will be decided on the basis of individual circumstances.

The Wheatley Memorial Loan Fund-The Association of Professional Engineers of the Province of British Columbia has established a loan fund in memory of Edward Augustus Wheatley who, as Registrar of the Association during the years 1921 to 1938, exerted a vital influence on the engineering profession, not only in this Province but throughout Canada. The fund is available to engineering pupils of the Association in attendance at the University, and all applicants for loans must be recommended by the Dean of the Faculty of Applied Science. Application should first be made to the Dean of Inter-Faculty and Student Affairs. Loans, which are interestfree until May 31st of the session in which they are granted, are repayable within one year.

The W. K. Kellogg Foundation Loan Fund—A grant from the W. K. Kellogg Foundation, Battle Creek, Michigan, provides a fund for loans to medical undergraduates.

The W. K. Kellogg Foundation Loan Fund (Dentistry)-A grant from the W. K. Kellogg Foundation, Battle Creek, Michigan, provides a fund for loans to undergraduates in Dentistry.

The Worthington Memorial Chapter, I.O.D.E., Student Aid Fund-This fund, established by the Worthington Memorial Chapter, I.O.D.E., provides loans in limited amounts for students who are beginning or continuing studies in a full programme leading to a degree in any field. Applicants must have satisfactory academic standing. Terms and conditions of repayment are determined by the University on an individual basis.

The Worthington Memorial Loan Fund—This revolving loan fund was established by a bequest from the late Dr. G. H. Worthington, Vancouver, in memory of his sons, Lieutenant-Colonel Donald Grant Worthington and Major John Robert Worthington.

#### Special Funds for Women Students

Dean of Women's Fund-Through the generosity of several donors a fund has been established to assist women students who are temporarily in financial need. The fund is intended for use in emergency situations where limited assistance is required, and is administered by the Dean of Women.

# Contributions have been received from the following:

Faculty Women's Club	\$2200.00
President's Alumni Fund	2000.00
Kappa Kappa Gamma Mother's Club	100.00
Miss Flora Musgrave	
National Council of Jewish Women (Vancouver)	
(Eleanor Roosevelt Chapter)	
University of Toronto Alumni	75.00
Mary M. Fallis	50.00
I.O.D.E., R.C.A.F. Chapter	50.00
Students' Wives' Association (U.B.C.)	35.00
P.E.O. Sisterhood, Chapter A.H.	20.00
Mrs. K. M. Sabiston	25.00
Mrs. Florence Buchanan	20.00
Mrs. E. W. Darby	1.00

The Mary L. Bollert Loan Fund—To honour the memory of the late Mary L. Bollert, first Dean of Women at the University of British Columbia, women graduates of the University and members of Miss Bollert's family have established a loan fund to assist women students. Those in need of an emergency loan should apply to the Dean of Women, on whose recommendation the Committee on Loans will arrange for payment. Loans are repayable in periods up to two years and will not bear interest during the period.

#### Summer Session Loan Funds

The Summer Session Students' Loan Fund—This fund, established in 1947, provides loans for students proceeding to a degree by University of B.C. Summer Sessions. A limited number of loans, to a maximum of \$150 each, are available to (a) teachers (as defined by the Public Schools Act of British Columbia) and (b) Non-winter session students who have previously completed at least six units by summer session at this University. Loans are available to teachers and non-teachers respectively in the same proportion as their numbers in attendance in the previous summer session. Loans are repayable in full by March 1st next, until which time no interest is charged. Application must be made to the Dean of Inter-Faculty and Student Affairs. Loans cannot be made until the beginning of summer sessions but those who will require loans may write in advance to determine whether they are eligible.

The University Summer Session Loan Fund—This fund provides loans limited at present to a maximum of \$100 for teachers registering for academic credit in the summer session. Loans are repayable by June 30th, and until that time do not bear interest.

#### AWARDS ADMINISTERED BY A.U.C.C.

The Association of Universities and Colleges of Canada administers a number of national and international programmes on behalf of Canadian and foreign donors. Since conditions of awards, closing dates and other factors are subject to amendments from time to time, candidates should obtain the most up to date conditions of award, as well as application forms, from the Director of Awards, Association of Universities and Colleges of Canada, 151 Slater St., Ottawa, Ontario. Completed applications must be submitted to arrive no later than the closing date. A comprehensive list of awards is published annually by the Association. Among the fifty-two competitions in the list published in September, 1968, were the following:

Bank of Nova Scotia Bilingual Exchange Scholarships (for Graduate Students)—For any recognized degree course; value \$2500 each; six awards including undergraduates available, three to French speaking candidates and three to English speaking candidates; English speaking winners must attend any Canadian French-language university or college and French speaking winners any English-language university or college, provided the institution is a member of, or affiliated to a member of, A.U.C.C.; Candidates must be Canadian residents and have graduated from or be attending a Canadian University; closing dates for application March 15th.

Bank of Nova Scotia Bilingual Exchange Scholarships (for Undergraduates)—Similar to awards for graduate students, but awards have value \$1500, and are for undergraduate students who will be entering their second last year of a first university degree programme and whose applications are endorsed by the applicant's University.

British American Oil Company Limited Graduate Fellowships (for Graduates)—Field of study unrestricted; nine awards of \$3500 each; open to any Canadian citizen or landed immigrant of one year's status who is a graduate of a Canadian University or College which is a member, or is affiliated to a member, of the A.U.C.C. Tenable at a similar institution; closing date for application March 1st.

C. D. Howe Memorial Fellowships—Field of study unrestricted; not less than three awards of \$5000 each, plus reasonable travel expenses; if winner is married at time of application, additional allowance of \$2000 plus travel expenses of family. May be held by men or women who are Canadian citizens or normally resident in Canada. Candidates must hold a doctoral degree or equivalent level of achievement. Preference will be given to candidates who are not more than 35 years of age. Applications will not be considered from candidates more than 38 years of age by December 31st in year of competition. No restriction on location except that it must be suitable to programme.

Frank Knox Memorial Fellowship for Harvard University (for Graduates) —For Arts and Science, Engineering, Business Administration, Dental Medicine, Design, Divinity, Education, Law, Medicine, Public Administration and Public Health; two awards of \$2400 each plus tuition; open to Canadian male and female citizens who have graduated or are about to graduate from a University or College in Canada; no application will be considered from a student already in the United States; tenable at Harvard; closing date for applications December 1st.

Steel Company of Canada Limited Graduate Research Fellowships in Metallurgy—Four new awards of \$4000 each; candidates must be Canadian citizens or have held landed immigrant status for one year prior to submitting applications and be a graduate of a Canadian University; application for renewal may be made in succeeding years, but the award may not be held for more than three years; two copies of thesis, or detailed account of work done, should be sent to Director of Awards, A.U.C.C.; tenable only at Canadian Universities having a qualifying course in Metallurgical research; closing date for applications March 1.

## NATIONAL RESEARCH COUNCIL OF CANADA AWARDS

The National Research Council of Canada offers annually the following types of awards for advanced studies and/or research.

## Postdoctorate Fellowships

Value: \$6000 for single and married and \$7200 for married Fellows (males only) with children, plus travel.

Period of Tenure: Awarded for 12 months and may be renewed once.

Place of Tenure: In Canadian universities and universities or research institutions abroad.

Age: The candidate must not have reached his 35th birthday by 31 March

of the competition year.

Citizenship: A candidate must be a Canadian citizen or a landed immigrant who has received his Ph.D. from a Canadian university.

#### Postdoctorate Fellowships

Value: \$6000 for single and married and \$7200 for married Fellows (males only) with children plus travel.

Period of Tenure: Awarded for one year with a possibility of renewal for a second year.

Place of Tenure: Canadian Government Laboratories.

Age: A candidate should not be more than 35 years of age.

Citizenship: No restriction regarding nationality of applicants, but successful candidates must meet all Canadian immigration requirements.

1967 Science Scholarships

Value: \$5000, plus academic tuition fees and travel grants. It also includes a Supervisor's grant in the amount of \$1500 per year.

Period of Tenure: Awarded for 36 months and may be renewed for an additional 12 months.

Place of Tenure: In Canadian universities only.

Age: A candidate must not have reached his 30th birthday by 31 March of the competition year.

Citizenship: A candidate must be a Canadian citizen.

Note: Students are not eligible to apply for one of these awards; they must be proposed by a member of the faculty and invited to apply by their Head of Department.

Postgraduate Scholarships

(A) For First Year of Graduate Studies:

Value: \$3600 plus travel.

Period of Tenure: Awarded for 12 months and not renewable.

Place of Tenure: In Canadian universities and a very limited number may be awarded for tenure abroad.

Age: A candidate must not have reached his 30th birthday by 31 March of the competition year.

Citizenship: A candidate must be a Canadian citizen or a landed immigrant.

(B) For Second or Subsequent Year of Graduate Studies:

Value: \$3600 plus travel.

Period of Tenure: Awarded for 12 months and may be renewed twice.

Place of Tenure: In Canadian universities and a very limited number may be awarded for tenure abroad.

Age: A candidate must not have reached his 30th birthday by 31 March of the competition year.

Citizenship: A candidate must be a Canadian citizen or landed immigrant. Note: Tenure abroad will not be granted to landed immigrants unless they have received a degree in science or engineering from a Canadian university.

#### Bursaries

Value: \$3000 for 12 months.

Period of Tenure: Awarded for 12 months and are not renewable. However, a student may receive a maximum of four of the Bursaries or any combination of these awards and Postgraduate Scholarships to a maximum of four.

Place of Tenure: At the Canadian university that recommended the award only.

Age: A candidate must not have reached his 30th birthday by 31 March of the competition year.

Citizenship: A candidate must be a Canadian citizen or a landed immigrant.

## P.I.E.R. Fellowships

Value: \$6000 for single and married and \$7200 for married Fellows (males only) with children, plus travel grants.

Period of Tenure: Awarded for 12 months; holders of Bachelor's degree may renew their award twice and holders of Master's degree may renew their award once.

Place of Tenure: In Canadian universities.

Age: No age restriction.

Citizenship: A candidate must be a Canadian citizen or a landed immigrant. Eligibility: A candidate must have a minimum five years industrial experience, involving the candidate's professional training, two of which must have been obtained in Canada.

Postgraduate Scholarship in Science Librarianship and Documentation

Value: \$3600 plus travel grants.

Period of Tenure: Awarded for 12 months and are not renewable. Place of Tenure: In Canadian universities and universities abroad.

Age: No age restriction.

Citizenship: A candidate must be a Canadian citizen or a landed immigrant. Eligibility: A candidate must have a degree in science or engineering.

#### AWARDS MADE BY OTHER INSTITUTIONS

The Rhodes Scholarships—The Rhodes Trustees offer annually for award in the Province of British Columbia one Rhodes Scholarship of the value of £1100 a year. Of this sum, £720 is paid to the scholar as a maintenance allowance and the balance is paid by the Trust in respect of University and College fees and dues. The cost of travel to and from England must be borne by the Scholar.

The Scholarship is tenable ordinarily for two years at Oxford University. A third year (at Oxford or elsewhere abroad) may be authorized in proper cases.

A candidate must be a male Canadian citizen or British subject and have been ordinarily resident in Canada for at least five years by October 1st, 1969. A Rhodes Scholarship is forfeited by marriage after election, or during a scholar's first year of residence. Thereafter a Rhodes Scholar may marry and retain his stipend if he is able to give appropriate assurances of support and accommodation for his wife.

A candidate must be at least 19 but under 25 years of age on October 1st, 1970.

He must have completed two years of university study by October 1st, 1969.

A candidate may compete in a province in which he is eligible under either

(a) or (b) below:

- (a) The province in which he is ordinarily resident. If he is ordinarily resident in the North-West Territories he may compete in a province in which he is eligible under (b) or, if there is no such province, in Manitoba, Saskatchewan or Alberta. If he is ordinarily resident in Prince Edward Island he may compete in a province in which he is eligible under (b) or, if there is no such province, in Nova Scotia or New Brunswick.
- (b) The province in which his university study has taken place, provided that if he is ordinarily resident outside Newfoundland he may not compete in Newfoundland.

In that section of the Will in which he defined the general type of scholar he desired, Mr. Rhodes mentioned four groups of qualities, the first two of which he considered most important:

- 1. Literary and scholastic attainments;
- 2. Qualities of manhood, truth, courage, devotion to duty, sympathy, kindliness, unselfishness, and fellowship;
- 3. Exhibition of moral force of character and of instincts to lead and to take an interest in his fellows;
- Physical vigour, as shown by fondness for and success in outdoor sports.

Some definite quality of distinction, whether in intellect or character, or both, is the most important requirement for a Rhodes Scholarship, and it is upon this that Committees will insist. Success in being elected to office in student organizations may or may not be evidence of leadership in the true sense of the word. Mr. Rhodes evidently regarded leadership as consisting in moral courage and in interest in one's fellow men quite as much as in the more aggressive qualities. Physical vigour is an essential qualification for a Rhodes Scholarship, but athletic prowess is of less importance than the moral qualities developed in playing outdoor games. Financial need does not give a special claim to a Scholarship.

A candidate for a Scholarship is required to make application by October 25, 1969, and, if elected, to go to Oxford in October, 1970. Further information and application forms may be had from the Dean of Inter-Faculty and Student Affairs, University of British Columbia, Vancouver 8, B.C.

## For Graduate Study

The Athlone Fellowships — The United Kingdom Government offers annually a limited number of fellowships to enable Canadian graduates in engineering to undertake special or advanced training in industry or in educational or research establishments in the United Kingdom. The fellowships cover the cost of travel, tuition, and maintenance, and are tenable for a period of two years. Further particulars may be obtained from the Dean of Inter-Faculty and Student Affairs or the Dean of Applied Science. Applications must be received by October 1st.

British Columbia Library Association Bursary—One or more bursaries, given by the British Columbia Library Association, are available annually for students intending to adopt librarianship as a profession. To be considered, an applicant must be eligible for acceptance in an accredited School of Librarianship. The recipient will be selected on the basis of scholarship, personality, ability to work with others, aptitude for library work, physical fitness and financial need. It is to the student's advantage to have had some library experience. Application forms and further information may be obtained from the Director of School of Librarianship, U.B.C., or the Chairman, Bursary-Loan Committee, British Columbia Library Association, c/o School of Librarianship, U.B.C.

The British Columbia Teachers' Federation Postgraduate Scholarships for Teachers—The British Columbia Teachers' Federation offers annually four scholarships to teachers with a Bachelor's degree who are proceeding with studies toward a higher degree and have completed at least five years of successful teaching in British Columbia. The BCTF Awards and Scholarships Committee will consider only those applicants who have at least a Second Class average (or its equivalent) in previous work and First Class standing

(or its equivalent) in the particular area or areas in which they propose to major or take postgraduate work. These awards, which are tenable at any recognized university or college, are of two types: (a) two scholarships of \$1500 each for teachers taking leave of absence to engage in full-time studies in the regular University session; and (b) two scholarships of \$250 each for teachers proceeding to full-time studies in the regular summer session. The completed application form and all necessary documents must be received by the Scholarships & Awards Committee, B.C. Teachers' Federation, 2235 Burrard St., Vancouver 9, B.C., not later than February 15th.

Canada Council Grants—The Canada Council offers fellowships and grants in the social sciences and humanities and a variety of assistance to professional artists.

Among Council programmes of aid are:

Doctoral fellowships\*
Post-doctoral fellowships\*
Leave fellowships\*
Research grants

Arts awards\*
Arts bursaries\*
Short term grants

(Asterisked items are annual competitions, with specified deadlines in fall each year.)

Brochures giving detailed information, including deadlines for annual competitions, on these and other Canada Council programmes of aid are available on campus from:

Dean of Graduate Studies

Registrar

Student Awards Officer

(Or other officer coordinating the administration of research)

or from The Canada Council, 140 Wellington St., Ottawa 4, Ontario, as follows:

Awards Service-For annual competitions

Social Sciences and Humanities Division—For research grants

Arts Division—For short term grants

# Canadian Federation of University Women Fellowships

Margaret McWilliams Travelling Fellowship \$3500—This is a pre-doctoral Fellowship open to any woman scholar who holds a degree from a Canadian university, has completed the Master's Degree or equivalent, is already well advanced on a Doctoral Programme, and wishes to continue her work outside of Canada. The candidate must be a resident of Canada but she may be studying elsewhere at the time of application.

Junior Fellowship \$2500—This fellowship is open to any woman holding a Bachelor's Degree or equivalent from a Canadian university, who wishes to embark on a Course for the Master's Degree or equivalent and whose domicile is in Canada.

Professional Fellowship \$2500—This Fellowship is open to any woman holding a Degree from a Canadian university, whose domicile is in Canada

and who wishes to spend a year at an accredited library school, college of education, or similar professional school.

Information may be obtained from the Chairman of the Fellowships Committee, Miss Gladys R. Munnings, 14 Hirondelle Place, Don Mills, Ontario, Canada. Applications must be completed and in the hands of the Chairman before 1st February.

The Canadian Foundation for the Advancement of Pharmacy Fellowships in Hospital Pharmacy—These fellowships of \$750 each have been established to assist graduates of Canadian schools of Pharmacy during a one-year programme of graduate studies in the field of hospital pharmacy, subject to the conditions outlined in the report of the Committee on Pharmaceutical Education and Research. Candidates should apply to the Secretary-Treasurer of the Foundation, 175 College Street, Toronto 2B, Ontario, prior to June 1st, setting out their plan of study and submitting a transcript of their academic record together with a letter of recommendation from their dean and at least one other person, preferably a practising pharmacist. The winners must agree to return to the practice of hospital pharmacy in Canada for at least one year.

Canadian Institute of Chartered Accountants Research and Assistance Grants and Graduate Fellowships—The Canadian Institute of Chartered Accountants, together with the provincial Institutes of Chartered Accountants, has established a research grants and graduate fellowships programme with two main objectives: (1) To encourage the continuing improvement of accounting knowledge and to assist basic research in areas served by the accounting profession, and (2) To assist teachers of accounting to improve their own qualifications and education. While it is hoped that some of the grants awarded will result in publishable material - which the Institute would encourage either commercially or through its own publications programme — this prospect is not a requirement for an award. The programme consists of two types of award: (1) Graduate Fellowships: Fellowships will be available to members of the Canadian Institute now teaching at a Canadian university, junior college, or institute of technology, and who are candidates for a graduate degree in business; or who are candidates for a graduate degree beyond a first master's degree and who are studying with a view to a teaching career in Canada. Fellowships to a maximum amount of \$2500 each will be awarded for one year. In particular cases a further grant of up to \$2500 may be made for a second year upon renewal of application. (2) Research Grants: Research grants will be available to members of the Canadian Institute to enable them to carry out research in accounting, auditing, taxation or other areas of importance to the accounting profession. Grants to a maximum amount of \$2500 each will be awarded each year to allow such teachers to devote a reasonable amount of time to their chosen project and/or to meet out of pocket expenses for books, travel, stenographic or other assistance in connection with the project. A renewal grant may be applied for if warranted by the project. A Graduate Fellowship or Research Grant may be held simultaneously with another scholarship, fellowship or similar award. Six copies of applications, setting out the academic and pro-fessional background of the applicant as well as complete details of the academic course or research project planned, should be sent before 28 February to: The Director of Research, The Canadian Institute of Chartered Accountants, 250 Bloor Street East, Toronto 5. Successful applicants will be notified of the terms of their award by 30 April.

Central Mortgage and Housing Corporation Fellowships in Urban and Regional Affairs—For the academic year 1969-70, up to ninety fellowships are offered by Central Mortgage and Housing Corporation for full-time graduate work in planning and other fields of urban and regional studies. Seventy-five fellowships are available for study at Canadian Universities and fifteen fellowships are available for study elsewhere. Fellowship amounts are \$3000 for students proceeding to a Master's degree and \$4000 for postmaster's candidates proceeding to the Ph.D. degree, plus tuition fees in each case. Successful applicants having one or more dependent children will receive an additional amount of \$1000. Candidates must be Canadian citizens or landed immigrants in Canada. Awards will be made only to candidates of demonstrated ability and high academic promise. Appropriate professional fields of study for which fellowships are tenable include urban and regional planning, urban, civic and landscape design; housing and urban renewal; housing design; community facilities planning; urban engineering; urban transportation; law of planning and development; urban and regional administration and finance; real estate finance and management; community organizations and planning; and urban environmental health. Appropriate fields of study in the social and behavioural sciences include: urban economics, history, philosophy; geography, sociology and anthropology; and demography; local government urban ecology; regional science environ-mental studies. Applications must be submitted, on the approved form, through the university at which the candidate proposes to enroll and must be transmitted to Central Mortgage and Housing Corporation by the candidate's academic advisor in that university. Completed applications for 1969-70 must be submitted to C.M.H.C. not later than March 1, 1969, for study at Canadian Universities, and April 1, 1969, for study at universities outside Canada. The prospective candidate is urged to submit his application to his academic advisor well before that date. Winners of fellowships and amounts of their awards will be announced in May, 1969. Present holders C.M.H.C. Fellowships will be advised through their universities of the procedures to be followed in applying for fellowship renewal. Information and application forms are available from: Administrator, Advisory Group, Central Mortgage and Housing Corporation, Ottawa 7, Ontario.

C-I-L Fellowships in Wildlife Management—Canadian Industries Limited offers several post-graduate fellowships for research in wildlife management. The value of each fellowship is \$1500, of which \$1200 is awarded to the student and \$300 to the university to defray expenses. In addition, summer grants of up to \$1000 for field work are available. Applications must be submitted by the university on behalf of the student and must be forwarded by March 15th to Wildlife Fellowship Board, Canadian Industries Ltd., P.O. Box 10, Montreal, P.O.

Commonwealth Scholarships—Under a plan drawn up at a conference held in Oxford in 1959, participating countries of the Commonwealth offer a number of scholarships to students of other Commonwealth countries. These scholarships are mainly for graduate study and are tenable in the country making the offer. Awards are normally for two years and cover travelling, tuition fees, other university fees, and a living allowance. The closing date for receiving applications for scholarships awarded by countries in the Northern Hemisphere is normally October 31st. For the dates of countries below the Equator and other details of Commonwealth Scholarships write to Canadian Commonwealth Scholarship and Fellowship Committee, c/o The Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa, Ontario.

The Exhibition of 1851 Scholarship—Under the revised conditions for the ward of the Exhibition of 1851 Scholarship in Science, the University of British Columbia is included in the list of universities from which nominations for scholarships allotted to Canada may be made. These scholarships,

which are tenable for two, or in certain areas, three years, are of the value of £750 p. a., of which £100 is to be regarded as an allowance toward fees and research expenses. For Canadian students, the National Research Council of Canada supplements each scholarship by £250 a year. The scholarships are granted only to citizens of the British Commonwealth of not more than 26 years of age who have already completed a full university course and given evidence of capacity for scientific investigation. The scholarships are open to graduates of any university who have spent not less than three years in the study of science. Detailed information may be obtained from the Dean of Inter-Faculty and Student Affairs. Inquiry should be made before the end of December.

French Government Book Prizes and Medals—Book prizes and medals, offered by the French Government, will be awarded to students in French on the recommendation of the Head of the Department of Romance Studies.

French Government Scholarships—Scholarships of the present value of approximately \$800 are donated by the French Government for graduate study in France. They are tenable for an eight-month period. Travelling expenses for the return to Canada and university fees are defrayed by the French Government. These scholarships are open to students of all faculties. Candidates must, however, produce satisfactory evidence that they are able to profit by instruction given in French. The awards are made by the French Embassy on the recommendation of the University, from whom further information may be obtained.

The Imperial Oil Graduate Research Fellowships—Imperial Oil Limited in 1946 established for annual competition Graduate Research Fellowships, now five in number and having a potential value of \$9000 each (\$3000 a year for a maximum of three years). No restriction is placed on the amount of similar assistance held concurrently. The fellowships are open to any graduate of any approved university in Canada and are offered for research leading to a Doctor's degree in the following fields: pure and applied natural and/or exact sciences, including mathematics—3 fellowships; social sciences and humanities—2 fellowships. Nomination of students for the fellowships is made by the University—such nominations to be received by the Secretary of the Committee on Higher Education, Imperial Oil Limited, 111 St. Clair Avenue West, Toronto 7, not later than February 1st of each year.

I.O.D.E. War Memorial I Scholarship (Canada and Overseas)—This fund was established by the I.O.D.E. in order to perpetuate the memory of the men and women who gave their lives in the defence of the Empire in the First Great War. Five graduate scholarships to the value of \$3000 each for study in Canada and \$5000 each for study at any Commonwealth University outside Canada, are offered annually. Each candidate must have done or be doing postgraduate work. The conditions under which they are awarded may be obtained from the Educational Secretary of the Provincial Chapter, I.O.D.E., 716—207 West Hastings St., Vancouver 3, B.C. Applications must be submitted by November 15th of each year.

I.O.D.E. War Memorial II Scholarship (Canada and Overseas)—This fund was established by the I.O.D.E. in order to perpetuate the memory of the men and women who gave their lives in defence of the Empire in World War II. Four postgraduate scholarships to the value of \$3000 each for study in Canada and \$5000 each for study at any Commonwealth University outside Canada, are to be offered annually in Canada. Each candidate must have done or be doing postgraduate work. In view of the fact that for many years

the emphasis for advanced study has been placed on science rather than on the humanities, these scholarships provided under War Memorial II will be offered annually to carry on postgraduate work in History, Philosophy, English or French Laterature. The conditions under which they are awarded may be obtained from the Educational Secretary of the Provincial Chapter, I.O.D.E., 716—207 West Hastings St., Vancouver 3, B.C. Applications must be submitted by November 15th of each year.

International Fellowships for Women in Senior Graduate Work-The American Association of University Women Educational Foundation announces three fellowships in the Natural Sciences:

- 1. Sarah Berliner Fellowship in Physics, Chemistry or Biology;
- 2. Ida H. Hyde Fellowships in Euthenics or Eugenics.
- 3. Marie Curie Fellowship in Radiology, Physics or Chemistry.

These fellowships, open to women of any country represented in the International Federation of University Women, have a stipend of \$5000 each. require a doctorate in the field of research, and are unrestricted as to age or place of research.

The American Association of University Women Educational Foundation offers to women of other countries which are represented in the International Federation of University Women, thirty international fellowships of \$2500 each, for study in the United States, and a few international fellowships in any country other than the fellow's own.

The International Federation of University Women Committee for the award of International Fellowships announces: six AAUW awards of \$2500 each; the CFUW A. Vibert Douglas Fellowship of \$3000; the IFUW Winnifred Cullis Fund grants not exceeding 300 pounds sterling each; the IFUW Ida Smedley MacLean Fellowship of 850 pounds sterling. These Fellowships are for research only and candidates must be full members of their national Federation of University Women.

IFUW applications must be completed by November 31st; AAUW applications must be completed by December 1st; Newnham College applications must be completed by January 1st.

Canada may present a maximum of four candidates for the fellowships awarded by IFUW and four for those fellowships awarded by AAUW. Graduates of Canadian Universities may obtain application forms from: Miss Gladys R. Munnings, Chairman, Fellowships Committee, Canadian Universities of Living Miss Committee, Canadian Miss Federation of University Women, 14 Hirondelle Place, Don Mills, Ontario.

The International Nickel Graduate Research Fellowships in Engineering and Science-The International Nickel Company of Canada has established a number of Graduate Research Fellowships to promote and encourage research in the technical fields serving the Canadian metal industries and to further public interest in industrial science in Canada. Each has a possible tenure of three years with an annual payment of \$4500, of which \$3800 is payable to the fellow and \$700 is placed at the disposal of the directing professor for necessary materials or equipment. It is expected that eight new fellowships will be awarded in 1969. Applications on behalf of competent graduate students will be considered from any Canadian university qualified to confer the Master's or Doctor's Degree in Chemistry or Physics of Metals or Minerals, Geology (including Geophysics and Geochemistry), Metallurgy (both physical and extractive), Mineral Processing, and Mining. Awards are made by a committee of six professors chosen on a rotational basis from Canadian universities. Universities desirous of receiving one or more of these fellowships should address their applications to The International Nickel Company of Canada, Limited, P.O. Box 44, Toronto-Dominion Centre, Toronto I, Ontario, not later than January 15. Not more than one application (either new or renewal) will be considered from any one university department annually.

The Mackenzie King Travelling Scholarships—These scholarships of not less than \$2000 each are available for graduates of any Canadian university who propose to engage, either in the United States or the United Kingdom, in postgraduate studies in the fields of international or industrial relations. Information may be obtained from Dean Walter H. Gage, University of B.C., Vancouver 8, Canada. Applications for those proposing to proceed to study in the fall of 1969 must be submitted by March 1st, 1969.

The PEO International Peace Scholarships—Believing that education is fundamental to world peace and understanding the members of the PEO Sisterhood contribute funds for the purpose of providing scholarships for selected women from other countries to study in the United States and Canada. The applicant must have full time graduate status and be working toward a degree in this University. She must state her intention to return to her own country on completion of her educational programme. Two or more awards of varying amounts per session will be made each year. Requests for application forms should be made before December 1st. Further information may be obtained from the Dean of Women.

Rotary Foundation Fellowships—The Board of Directors of Rotary International and the Rotary Foundation Trustees have established a number of Rotary Foundation Fellowships, each to the value of \$2500 approximately, for advanced study for a period normally of one year. Candidates are expected to pursue studies outside their own country. Preference will be given to a candidate who proposes to study in a country where the language is different from that of his own homeland and who is reasonably proficient in that language. These fellowships are open to unmarried male students between the ages of twenty and twenty-eight. Applicants must be graduates or in their graduating year. They are advised to make application early in the year to the Rotary Club in their home district. It is suggested that complete information be obtained from the Rotary Club of Vancouver or any other Rotary Club. These fellowships are awarded every other year.

Shell Canada Fellowship in Engineering—Shell Canada Limited offers a number of fellowships in Engineering for postgraduate study and research at Canadian universities. The fellowships are valued at \$4000 per year (\$4500 for married students) and are tenable for up to three years. In addition, a grantin aid of \$1000 is paid to the university where the fellow is carrying out his research. Candidates must have completed, or expect to complete in 1969, at least one year of graduate study and research in one of the following fields of engineering: Chemical, Civil, Electrical, Geological, Mechanical, Metallurgical, Mining, Petroleum or Engineering Physics. Application forms, obtainable from the Dean of Inter-Faculty and Student Affairs, must be submitted by January 15th to the Selection Committee, Shell Canada Fellowships in Engineering, c/o National Research Council, Ottawa, Ontario.

Shell Postgraduate Scholarships—Shell Canada Limited provides a number of postgraduate scholarships tenable at Cambridge, Oxford, London or at such other university in the United Kingdom as may be indicated by the nature of studies which the scholar intends to follow. Each scholarship is valued at £1100 per annum for two years. An extension into a third year will be considered. Shell Canada Limited will provide travel assistance. Candidates should be Canadian citizens or landed immigrants, and under 25 years of age. They should have completed with high honours a first degree

in science or engineering and have completed or expect to complete one year of postgraduate research in the field of study in which, if elected to a Shell Postgraduate Scholarship, they would propose during the succeeding two years to continue. They shall be prepared to take a two-year postgraduate course in one of the following: Chemistry, Physics, Chemical and other fields of Engineering, Geophysics, Geology. At the end of this period they will be expected to submit themselves for the degree of Master of Science or Doctor of Philosophy or such postgraduate degree as is awarded by the university attended. Application forms, obtainable from the Dean of Inter-Faculty and Student Affairs, must be submitted by January 15th to the Selection Committee, Shell Postgraduate Scholarships, c/o National Research Council, Ottawa, Ontario.

The Society of Industrial Accountants of Canada Business Fellowship—A total of five fellowships of \$1200 each are available annually to students enrolled in a graduate business programme at Canadian universities. Awards are to be granted to students whose programme indicates an interest in management accounting and accounting research. Selections are made by the Fellowship Committee of the Society of Industrial Accountants. Applications should be made directly to: Administrative Secretary, Fellowship Selection Committee, Society of Industrial Accountants of Canada, P.O. Box 176, 154 Main Street East, Hamilton, Ontario.

Soroptimist Fellowship Award—The Western Canada Region of the Soroptimist Federation of the Americas, Inc. offers a biennial Fellowship Award of \$1500 to a woman graduate who is a resident of the western provinces and who wishes to pursue postgraduate studies in any field. Interested students should get in touch with the Office of the Dean of Women.

Theological Education Fellowship Programs—One-year awards are available to enable students to study with expenses paid at any accredited protestant theological college in the United States or Canada. Fellowships are for male students with a Bachelor's degree, who are interested in the possibility of entering the ordained ministry, but who are not already committed to this career. Students wishing information may contact Dr. R. M. Clark, Office of Academic Planning, Old Administration Building, before October 25th. Telephone: 228-2045.

Viscount Bennett Trust Fund—Under the terms of a deed of gift to The Canadian Bar Association from the Right Honourable Viscount Bennett, P.C., K.C., LL.D., D.C.L., a fund known as the Viscount Bennett Trust Fund has been established. The sum of \$5000 may be paid annually to one student as a fellowship for postgraduate study in Law at an institution of higher learning to be approved by the Viscount Bennett Fellowship Committee. It is the condition of the award that the successful applicant shall not accept any other fellowships, scholarships, bursaries or prizes to assist in his postgraduate studies other than minor prizes available to members of the graduating year at the law school attended by the applicant. The fellowship is open to a person of either sex who has graduated from an approved law school in Canada or who, at the time of application, is pursuing his or her final year of studies as an undergraduate student at an approved law school. The awards will be made by the Council of the Association at the mid-winter meeting of the Council. The Faculty of Law of this University has been approved by the Committee. Full information as to qualifications of applicants may be had on application to the Dean of Inter-Faculty Affairs or the Dean of the Faculty of Law. Applications must be in the hands of the Secretary, The Canadian Bar Association, Room 320, 90 Sparks St., Ottawa, Ontario, by December 31st.

The Woodrow Wilson National Fellowships—The purpose of these fellowships is to attract men and women to the profession of college teaching in the humanities and the social and natural sciences. Outstanding seniors and graduates who are not registered in a graduate school are eligible for nomination provided they are, or intend to become, Canadian or U.S. citizens and are seriously considering a career in college teaching. Successful nominees must undertake a full programme of graduate study in a U.S. or Canadian graduate school. The stipend is \$2000; married male Fellows with children also receive \$1000 for the first child and \$250 for each additional child. Tuition fees are paid directly to the Fellow's graduate school by the Foundation. The Foundation offers fellowships to 150 students, 50 of whom will be Canadians. In addition it selects 1000 Woodrow Wilson designates whose names are submitted to Universities and other agencies as deserving financial aid. Nominations for Woodrow Wilson Fellowships are by faculty members and are made early in the academic session; students should indicate their interest to a faculty member as soon as possible after registration in their final year.

## For Undergraduates

The Alliance Francaise Scholarship—This scholarship is offered in alternate years through L'Alliance Francaise de Vancouver to a member of the University group of the Alliance. It provides for a stay of four weeks at the residence of the French Alliance in Paris during which time the winner must attend, without fee, the lectures of the practical school (Ecole Pratique), as well as two weeks travelling time in France and for a further six-week stay at the University of Bordeaux Summer School in Pau during which time the winner must attend, without fee, the lectures at the University. The largest part of the cost of transportation from Vancouver to France and return is provided by several benefactors. A contribution of \$150 toward expenses will also be made by the University. The winner of this award, valued at not less than \$1500, is selected in consultation with the University.

Association for Retarded Children of British Columbia Bursaries—Bursaries in various amounts are offered by the Association for Retarded Children of British Columbia to students in education, medicine, nursing, psychology, and social work in graduate or undergraduate programmes who: (a) are undertaking a full year, part-time or summer school course at a recognized University or College; and (b) intend to pursue studies related to mental retardation. Awards will be made on the basis of combined academic standing and need. Closing dates for submission of application forms are July 15th and December 15th. Forms of application may be obtained from: Association for Retarded Children of British Columbia, Room 221, 119 West Pender St., Vancouver 3, B.C.

The Aubrey A. Brown Memorial Award in Pharmacy (donated by the Canadian Foundation for the Advancement of Pharmacy)—A cash prize of \$100, together with a gold medal and a certificate of merit, will be awarded annually by the Canadian Foundation for the Advancement of Pharmacy to the student in the graduating class in any College, School, or Faculty of Pharmacy in Canada, who, in the opinion of the Awards Committee appointed by the Foundation submits the best paper on some phase of pharmacy administration, pharmaceutical history (particularly Canadian), or on any topic having some clear connection with the practice of retail or hospital pharmacy. Further information may be obtained from the Dean of the Faculty of Pharmaceutical Sciences. The closing date for receiving applications is April 15th.

The B.C. Indian Arts and Welfare Society Memorial Bursary—A bursary of \$100 will be awarded annually by the B.C. Indian Arts and Welfare Society in memory of those Indian Canadians who gave their lives in either World War. The award will be made by the Executive Committee of the B.C. Indian Arts and Welfare Society. If no application is received from a student entering the first year of university, then the bursary may be awarded to a student enrolled in any of the senior years. Applications may be directed to: The Honorary Secretary, B.C. Indian Arts and Welfare Society, c/o Provincial Museum, Victoria, B.C.

The B.C. Women's Institute Memorial Scholarship in Home Economics—A scholarship of \$250 will be awarded annually by the Women's Institute of B.C. It is available to the daughter of a member of a Women's Institute of B.C. The member must have been in good standing for at least three years. Preference is given to a student registering at the University toward a degree in Home Economics. Applications by letter from the sponsoring Institute to the Secretary-Treasurer, Provincial Board, B.C. Women's Institute, 545 Superior St., Victoria, B.C., must be received before August 1st.

The B.C. Women's Institute Memorial Scholarship in Agriculture—A scholarship of \$250 will be awarded annually by the Women's Institute of B.C. It is available to the son or daughter of a member of a Women's Institute of B.C. The member must have been in good standing for at least three years. Preference is given to a student registering at the University toward a degree in Agriculture. Application by letter from the sponsoring Institute to the Secretary-Treasurer, Provincial Board, B.C. Women's Institute, 545 Superior St., Victoria, B.C., must be received before August 1st.

The British Columbia Teachers' Federation Undergraduate Scholarships for Teachers—The British Columbia Teachers' Federation offers annually six scholarships tenable at the University of British Columbia, at the University of Victoria, or at Simon Fraser University. An applicant must be actively engaged in teaching in the Province, must hold a B.C. Teaching Certificate, must have at least a Second Class average (or its equivalent) in his previous work and First Class standing (or its equivalent) in the particular area or areas in which he proposes to major. The awards are of two types: (a) two scholarships of \$1500 each for teachers taking leave of absence to proceed in a full programme of studies in the regular winter session toward a B.Ed. degree. One scholarship is for the elementary field, the other for the secondary field. (b) Four scholarships of \$250 each for teachers proceeding in a full programme of studies in the summer session toward the B.Ed. degree. Two of the scholarships are for the elementary field and two for the secondary field. The completed application form and all necessary documents must be received by the Scholarships & Awards Committee, B.C. Teachers' Federation, 2235 Burrard Street, Vancouver 9, not later than February 15th.

The British Columbia Teachers' Federation Scholarships for Student-Teachers—The following scholarships, the gift of the British Columbia Teachers' Federation, are offered annually to students proceeding to a degree or certificate in the field of elementary or secondary school teaching:

- (1) three scholarships of \$250 each, available to students continuing in the Faculty of Education, from Grade XIII or First Year University;
- (2) three scholarships of \$250 each, available to students continuing in the Third Year in the Faculty of Education;
- (3) three scholarships of \$250 each, available to students continuing in the Fourth Year in the Faculty of Education;

(4) three scholarships of \$250 each, available to students continuing in the Fifth Year of the Programme for the degree of B.Ed. in the secondary teaching field or entering the one-year teacher training programme for graduates.

All of the above scholarships are tenable at U.B.C., University of Victoria or Simon Fraser University. At least three of these scholarships will be awarded to students attending each of the Universities.

All awards will be made on the basis of academic standing, personal qualities, and aptitude for and interest in teaching. Except in the case of the scholarships (1) and in the case of graduates from other faculties, the scholarships (4), only those students who achieve First Class standing in practice teaching will be eligible. Applications, on forms available from the Awards and Scholarships Committee, B.C. Teachers' Federation, 2235 Burrard Street, Vancouver 9, must be submitted to the Federation not later than April 15.

Canfor Plywood and Hardboard Division Social Club Scholarship—This scholarship of \$300 is offered annually to the children or grandchildren of active members of Canfor P and H Social Club. It is open to students proceeding from Grade XII or XIII in a British Columbia school to university in the fall in a full degree programme. An intending candidate must submit a letter of application to the Secretary of the Club, not later than June 30th, giving his full name, age and address; name and address of school he is attending; name and address of member of the Social Club to whom he is related; name of the university he will attend; and a brief account of his interest and participation in school and community activities. Further details may be obtained from the Secretary of the Club, 440 Canfor Ave., New Westminster, B.C.

The Central Mortgage and Housing Corporation Travelling Scholarships in Architecture—Seven scholarships may be awarded to undergraduates who are proceeding to their Final Year at a School of Architecture in Canada. Winners will receive expenses to travel as a group to selected housing projects in Canada and the United States for a period of four to five weeks. After completion of the tour, conducted by a staff member of one of the schools, students will be required to work at the Head Office of C.M.H.C. for eight weeks to gain experience in housing, during which period they will be paid a salary of \$90 a week. Each student will be expected to submit a paper on the summer's tour and work experience to the director of his school, and on receipt of this paper by C.M.H.C. through the director, will receive \$650. Winners will be chosen on the basis of scholastic achievement and marked interest in housing. Awards are available only to Canadian citizens or landed immigrants in Canada. Applications must be submitted to the School of Architecture by March 15th.

The Canadian Arthritis and Rheumatism Society Book Prize—The B.C. Division of C.A.R.S. offers a book prize of approximately \$35 to be awarded each year for the best work done by a student in the management of rheumatology. The competition is open to all undergraduates of the University but preference will be given to students enrolled in Medicine, Rehabilitation Medicine, Nursing, or Social Work. Further information may be obtained from: C.A.R.S., 895 W. 10th Ave., Vancouver 9, B.C.

The Chilliwack University Women's Club Bursary—A bursary of \$100 is offered to a woman student of the Chilliwack district who has completed Second or Third Year University in any faculty and who is continuing her University education. The Chilliwack district comprises the following postal areas: Chilliwack, Sardis, Yarrow, Cultus Lake, Lindell Beach and Rosedale.

Application forms should be obtained from and returned to Mrs. John R. Peers, R.R. 1, Yarrow, B.C., before July 5, 1968.

Cominco Diamond Jubilee Higher Education Awards (Entrance)—Cominco Ltd. offers annually two classifications of one year awards to children of employees who on the completion of their senior secondary school register in an institution of higher education. Class I awards in the amount of \$500 will be made to all student sons or daughters of employees who obtain 86% or better standing in their senior secondary school leaving course. Class II awards in the amount of \$350 will be made to all student sons or daughters of employees who obtain an average in the 73% to 86% range. Further information and application forms are available from the Secretary, Higher Education Awards Committee, Cominco Ltd., Trail, B.C.

The Crown Zellerbach Canada Foundation Entrance Scholarships—Eight scholarships, each with a maximum value of \$2000, are offered annually by Crown Zellerbach Canada Foundation to students proceeding from secondary school to studies in any field at the University of British Columbia, University of Victoria, Simon Fraser University, or Notre Dame University of Nelson. Of these awards, one will be offered in each of the the following areas: (1) Courtenay-Comox; (2) Campbell River; (3) Ladysmith (Ladysmith Secondary School only); (4) Nanaimo; (5) Ocean Falls; (6) Richmond School District No. 38; (7) the combined areas of the School Districts of Vernon (No. 22), Kelowna (No. 23), Summerland (No. 77), Keremeos (No. 16), Penticton (No. 15), South Okanagan (No. 14); and (8) the combined areas of New Westminster (No. 40), Coquitlam (No. 43), and Surrey (No. 36). To be eligible for consideration a candidate must attend school in one of these areas and the candidate's parents must also reside in one of these areas. Selection of winners will be made by the School Boards concerned on the basis of academic standing, leadership and citizenship. In the event the winning candidate be awarded a scholarship of greater value, the selection committee may make the award to a second qualifying student. Application to compete should be made by June 1st through the school principal. Payment of awards, in the amount of \$400 per annum, will be made to winners in two equal instalments, half near the end of October and half early in January. To be eligible, a winner must take full-time undergraduate studies over a full academic year (two consecutive semesters). Renewals each year are subject to satisfactory academic progress. A scholarship may be held for a maximum of five academic years of undergraduate studies, or until the winner completes his undergraduate studies, whichever is the shorter period. If, however, he fails to maintain satisfactory academic standing, or discontinues attendance at university, he will forfeit the remaining payments of his scholarship, unless he has been granted postponement for a specified period for medical or similar reasons.

The Dr. Wickham and Dr. Mitchell Clinic Scholarship—A scholarship of \$200, the gift of the Medical Clinic of Dr. T. Wickham and Dr. J. M. Mitchell, is offered to student proceeding from Grade XII at Ladysmith Secondary School to a full programme of studies at the University of British Columbia, Victoria University, or Simon Fraser University. The winner will be selected by the scholarship Committee of the School on the basis of academic standing, and interest and participation in school affairs.

The Elizabeth Bentley Scholarships—The Order of the Eastern Star offers annually a number of scholarships to students who have completed at least two years of university courses. Scholarships are awarded on the basis of need, marks and difficulty of courses. Persons eligible for scholarships are members, wives, husbands, fathers, mothers, sisters, brothers, sons, daughters, grandchildren or step-children of a member of a chapter of the Order of the Eastern Star of B.C. Applications may be obtained from the Worthy Grand Secretary, O.E.S., and should be sent to the local Eastern Star secretary by July 15.

The E. L. Woods Memorial Prize in Pharmacy (donated by the Canadian Foundation for the Advancement of Pharmacy)—A cash prize of \$100, together with a gold medal and a certificate of merit, will be awarded annually by the Canadian Foundation for the Advancement of Pharmacy to the student in the graduating class in any College, School, or Faculty of Pharmacy in Canada, who, in the opinion of the Awards Committee appointed by the Foundation submits the best paper on some phase of laboratory research in pharmacy. Papers entered for this award will be selected by the Faculty of Pharmacy from the theses submitted as part of the Fourth Year requirements. The closing date for receiving applications is June 1st.

Hector J. MacLeod Scholarship—The Vancouver Section of the Institute of Electrical and Electronic Engineers, in honour of Dr. H. J. MacLeod, Dean Emeritus, Faculty of Applied Science, offers annually in recognition of his pioneering efforts in education and science, a scholarship of \$350 to a student registered in Electrical Engineering. The award will be made to either an undergraduate or graduate student who has attained high scholastic honours and demonstrated initiative in his chosen field.

The IBM-Thomas J. Watson Memorial Scholarship-Up to four scholarships, each ranging from \$200 to \$1000 and based on individual need and the cost of studies concerned, are offered each year in competition by International Business Machines Company Limited, Don Mills (Toronto), to children of (a) regular employees; (b) retired employees; (c) deceased employees who died while employed; (d) employees receiving total and permanent disability benefits from IBM; (e) employees on an authorized leave of absence. Each scholarship is renewable, in an amount to be determined annually, for three further years subject to maintenance by the holder of the necessary academic standing for progression from year to year. Applicants who have completed or will complete the prescribed secondary school course necessary for University entrance prior to the commencement of the university year, are eligible to apply. Awards are tenable at a Canadian University (or an affiliated college) which is a member of the National Conference of Canadian Universities and Colleges. Selection of the winners will be made by a committee appointed by the Canadian Universities Foundation. Financial need will not be a factor in the selection. A minimum average grade of 70% in the University entrance year is a prerequisite. Winners will not be permitted to hold other scholarships. Awards, prizes and bursaries to a maximum of \$1000 over four years may be accepted.

The Icelandic Canadian Club Scholarships—The Icelandic Canadian Club of British Columbia awards two annual scholarships to students of Icelandic origin attending an institute of higher learning in British Columbia. The first award will assist a student who is beginning a programme of post-secondary education and the second will assist a student who is continuing such a programme. The awards are worth \$100 each and will be made primarily on the basis of academic excellence. Full details and application forms may be obtained from the chairman of the selection committee: Dr. R. E. Helgason, 4668 Burke Street, South Burnaby, B.C., or the committee's secretary: Mr. Gustav Tryggvason, 958 Diamond Road, Richmond, B.C.

Imperial Oil Higher Education Awards—Imperial Oil Limited offers annually free tuition and other compulsory fees to all children or wards of employees and annuitants who proceed to higher education courses. The

courses may be taken at any Canadian university or other approved institution of higher learning. Each award is tenable for a maximum of four years. To be eligible a student must attain an average mark of 70% in the appropriate secondary school examinations in the subjects required for admittance to the approved institution. Further information and application forms may be obtained from the Secretary, Committee on Higher Education, Imperial Oil Limited, 111 St. Clair Avenue West, Toronto 7, Ontario.

The Independent Order of Odd Fellows Bursaries—Six bursaries of \$300 each, provided by the Grand Lodge of B.C., I.O.O.F., the Grand Encampment, and the Rebekah Assembly, are available annually for students in any year of any faculty. The awards will be made by a joint committee consisting of two representatives from each of the Grand Bodies. All applicants must have direct connection with one or more branches of the Order, through parents, grandparents, or close relatives. Special consideration will be given to applicants with financial need. Full details of the awards and application forms may be obtained from the Secretary of any Odd Fellows Lodge or Rebekah Lodge, I.O.O.F. Applications should be submitted to the Odd Fellows or Rebekah Lodge by May 1st so that they may be received by the Committee not later than May 15th. All applicants must be sponsored by an Odd Fellows Lodge, Rebekah Lodge, or Encampment.

The above Committee will award annually an additional bursary of \$200 to a student in a recognized theological college of university status. This bursary will be known as the Dr. A. M. Sanford Memorial Bursary. Applicants will follow the same procedure as for all other I.O.O.F. bursaries, except that family connections with the I.O.O.F. will not be required.

Irene Samuel Bursary Fund—These awards are available for young Jewish women students who have demonstrated leadership ability through participation in youth groups, organizational work, and similar extra-curricular activities, as well as aptitude for an academic career as indicated by performance at high school. Awards are tenable at any approved Canadian university. Application by letter should be made to National Council of Jewish Women of Canada, 4700 Bathhurst Street, Second Floor, Willowdale, Ontario, before May 1st. The letter of application should contain name, age, academic standing and details of course to be entered, extra-curricular activities, family background (how many in family, occupations of parents), financial requirements, summer occupations and earnings, other awards applied for, and similar pertinent facts. References should also be supplied.

The International Woodworkers of America, Local 1-80, Bursary—The International Woodworkers of America Local 1-80 offers a Bursary in the amount of \$400 open in competition to all I.W.A. Local 1-80 members or a wife, son, or daughter of an I.W.A. Local 1-80 member. For the purpose of eligibility in applying for the Bursary, the wife, son, or daughter of a deceased I. W. A. Local 1-80 member in good standing at the time of his decease, or a member who has retired from the industry because of age or disability and holds a retirement card from this Local Union, shall also be deemed eligible.

In making the award, the Bursary Committee will be guided by the following:

- The average marks obtained by the Grade XII student during that school term.
- Indication of need.
- 3. All applicants must be on the University programme proceeding to any degree granting University, or to the B.C. Institute of Technology.

All those desiring to compete must notify Ed. Linder, Financial Secretary of the I.W.A. Local 1-80, 351 Brae Road, Duncan, B.C., by a letter not later than May 15th, 1968. The I.W.A. Local 1-80 reserves the right to withhold the Bursary if no candidate makes sufficiently high standing.

Langley Scholarship Fund—Information regarding the following awards may be obtained from N. A. Sherritt, Chairman, Langley Scholarship Fund,

c/o Aldergrove Secondary School, Aldergrove, B.C.

(1) Langley Memorial Hospital Medical Staff Bursary—A scholarship of \$100 open to graduates of Langley or Aldergrove Secondary Schools, proceeding to First Year Medicine at the University of British Columbia or other approved university. Applications required by June 15th.

(2) Langley Pharmacists Scholarship—A scholarship of \$100, open to graduates of Langley or Aldergrove Secondary Schools, proceeding to the First or higher year in Pharmacy at the University of British Columbia or

other approved university. Applications required by June 15th.

(3) Langley Anglican Theological Scholarship—A scholarship of \$100 open to graduates of Langley or Aldergrove Secondary Schools enrolling or enrolled in Anglican Theological College. Applications required by June 15th.

(4) Alex Woykin Memorial Scholarship—A scholarship of \$100, open to graduates of Langley Secondary School proceeding to the First or higher year in Engineering at the University of B.C. or other approved university,

Applications required by June 15th.

Leonard Foundation Scholarships—This National Foundation awards each year a number of scholarships for which students of the University of British Columbia are eligible. Application forms and further information may be secured from Professor C. W. J. Eliot, or, in his absence, Professor M. F. McGregor, University of B.C., both members of the General Committee of the Foundation. These forms should be forwarded to the Honorary Secretary of the Foundation, c/o Canada Permanent Trust Company, 253 Bay Street, Toronto, not later than March 31st of each year. Whenever possible these applications should be filed in February. The awards are made at the annual meeting of the General Committee on the last Friday in May.

The Michael Bowker Memorial Bursary—A bursary of \$350, the gift of Dr. and Mrs. H. A. Bowker, is offered to students proceeding from Grade XII or XIII at Ladysmith Secondary School to a full programme of studies at the University of British Columbia, University of Victoria, or Simon Fraser University. The winner will be selected by the Scholarship Committee of the School on the basis of academic standing, and interest and participa-

tion in school and community activities.

MacMillan Bloedel Limited Scholarships—Eleven scholarships of \$500 each, ten in British Columbia and one in Saskatchewan, are offered by MacMillan Bloedel Limited. The British Columbia awards are available, one in each of School Districts 65 (Duncan-Cowichan), 67 (Ladysmith-Chemainus), 68 (Nanaimo), 69 (Qualicum), 70 (Alberni), 79 (Ucluelet-Tofino), 48 (Howe Sound), 85 (Vancouver Island North), and two in School District No. 47 (Powell River). The Saskatchewan Award is made in the Hudson Bay School District. These scholarships are open to students beginning their studies at the University of British Columbia or affiliated Theological Colleges on the Campus, the University of Victoria, or Simon Fraser University, with the exception of the Saskatchewan Award, which is tenable at the University of Saskatchewan. Awards will be made on the basis of academic ability and potential leadership as indicated by grade achievements in Grades XI and XII and participation in school activities. Further information may be obtained from the Principal of the School.

MacMillan Bloedel Limited Bursaries to Inter-Term (or Vacation Relief) Employees-MacMillan Bloedel Limited offers annually a number of bursaries to part-time employees who will be returning for further study at the University of British Columbia, the University of Victoria, Simon Fraser University or the British Columbia Institute of Technology. The total amount of such bursaries shall not exceed \$2500 in any one year. Amounts of individual awards are not fixed. Selection of recipients will be determined by the student's interest in the forest industry, his success during part-time employment, and his financial need. Further details may be obtained by the student from the Personnel Supervisor at the Division where he is employed.

MacMillan Bloedel Limited Special Scholarships for Dependents of Employees—Ten scholarships of \$500 each, offered by MacMillan Bloedel Limited, are available annually to sons and daughters (or legal dependents) of employees of the Company serving in any MacMillan Bloedel Limited Division in North America. Because the majority of employees work in British Columbia, it is expected that most will be awarded in B.C. However the diversity of the Company's operations will make it possible for awards to be made in other Provinces and in the United States. These scholarships are open to students beginning their studies at the University of British Columbia or affiliated Theological Colleges on the Campus, the University of Victoria, or Simon Fraser University. Awards will be made on the basis of academic ability and potential leadership as indicated by grade achievements in Grade XI and XII and participation in school activities. Further information may be obtained from the Personnel Supervisor at the Division at which the parent is employed.

Naval Officers' Association of British Columbia Scholarships-Several scholarships in amounts up to \$250 each, provided by the Naval Officers' Association of British Columbia are offered to students beginning or continuing studies at the University of B.C., Simon Fraser University, Notre Dame University of Nelson, or University of Victoria with the intention either of following a permanent career in the Royal Canadian Navy or following a course of study which, coupled with such person's past association, will qualify such person as potential personnel for the Royal Canadian Navy in times of national emergency. Preference will be given to present or former members of a cadet force, of a reserve force or of the permanent force, or the sons or daughters of any Commissioned Officer, Warrant Officer, Rating or man who has served or is now serving in the British Commonwealth naval forces or Merchant navies. Awards will be made on the basis of all-round proficiency in the combination of academic studies, need and present or former interest in or association with a cadet force, reserve force or permanent force. Applications should be filed not later than October 15 with the Naval Officers' Association of British Columbia, Box 823, Station A, Vancouver, B.C. Winners of these awards are not precluded from accepting other awards which they may be offered.

Naval Officer's Association of British Columbia Bursary Loans—Several bursary loans not exceeding \$300 each are offered to students beginning or continuing studies at the University of B.C., Notre Dame University of Nelson, Simon Fraser University or the University of Victoria, with the intention either of following a permanent career in the Royal Canadian Navy or following a course of study which, coupled with such person's past associations, will qualify such person as potential personnel for the Royal Canadian Navy in times of national emergency. Preference will be given to present or former members of a cadet force, of a reserve force or of the permanent force, or the sons or daughters of any Commissioned Officer, Warrant Officer, Rating or man who has served or is now serving in the British Commonwealth naval forces or Merchant navies. Awards will be made on the basis of combined academic standing and need. These loans are repayable without interest within eighteen months after graduation. If by the due date the student has joined the permanent force, the loan may be cancelled in its entirety; if he has joined the reserve force 50% of it may be cancelled. Applications should be filed not later than October 15 with the Naval Officers' Association of British Columbia, Box 823, Station A, Vancouver, B.C.

The Ocean Falls Local No. 312, International Brotherhood of Pulp, Sulphite and Paper Mill Workers Scholarship—A scholarship of \$250, given by Ocean Falls Local No. 312, of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers, is available annually for a student entering First Year at the University of British Columbia. This scholarship, which is restricted to students of Charleson High School, Ocean Falls, B.C., will be awarded to the applicant who meets the following conditions: (1) obtains highest standing in the written examinations in the scholarship subjects for High School Graduation (University Programme); (2) qualifies for no other scholarship or bursary award. Without prejudice to any of the above conditions, the Executive of Local No. 312 reserves the right to consider any application on its own individual merits and make the award accordingly. Further information may be obtained from the Secretary, Ocean Falls Local No. 312, I.B.P.S. & P.M.W., Box 190, Ocean Falls, B.C.

Prince George and District Dental Society Bursary—The Prince George and District Dental Society offers a bursary of \$200 to a graduate of the Prince George Senior Secondary School who has a career in dentistry at an accredited dental school. Application may be made to the Prince George and District Dental Society and the recipient of this bursary will be judged primarily on his or her financial need and scholastic standing.

Royal Canadian Engineers Memorial Scholarships—Scholarships of up to \$500 each are offered annually to students, both male and female, who are attending any educational course of study or practical training course beyond secondary school level. Scholarships are awarded on the basis of merit and need to the most suitable candidates from among those students who apply for the scholarship. A candidate to be eligible for the Royal Canadian Engineer Memorial Scholarship must be the child or grandchild of a person who served in any rank in any of the following components of the Canadian Armed Forces: (a) A Royal Canadian Engineer component of the Canadian Army during World War 1, World War 2, or under the United Nations in Korea; or (b) The Royal Canadian Engineers in the Canadian Army Regular or Permanent Force or Militia or Non-Permanent Active Militia, for not less than three continuous years; or (c) The Military Engineers Branch of the unified Canadian Armed Forces for not less than three continuous years after the first day of February, 1966.

Royal Canadian Legion (Pacific Command) Bursary/Scholarships—The Royal Canadian Legion (Pacific Command) offers annually a number of awards for students proceeding from secondary school to university and a limited number of awards for students in the Second, Third, and Fourth Years. These scholarships are awarded on the basis of academic standing, financial need, and participation and achievement in student and community affairs. Preference is given to sons and daughters of deceased, disabled, or other veterans, but applications from other worthy students are also considered. The deadline date for receipt of applications is May 31. Further information may be obtained from Pacific Command, The Royal Canadian Legion, 1531 West Pender St., Vancouver 5, B.C.

The Saint Thomas More Law Burses—Three bursaries of \$250 each, sponsored by the Catholic Lawyers' Guild and provided by the Catholic Archdiocese of Vancouver, are offered to Catholic students entering, or presently in, the Faculty of Law. The winners will be selected by the Guild. Information may be obtained from Peter J. deVooght, 409 Granville Street, Vancouver, B.C.

The Summerland Scholarship—A scholarship of \$250, given by the citizens of Summerland, is available annually for a student of Summerland High School proceeding to the University of British Columbia, or some other institution of higher learning in the event that courses of the winner's choice are not available at the University of British Columbia. The scholarship will be awarded to the applicant who, in the opinion of the Summerland Selection Committee, best exemplifies the qualities of the all-round student. If two applicants are considered equal in qualifications, the scholarship is divided.

Thurb D. Cushing Scholarship—The Vancouver Section of the Institute of Electrical and Electronic Engineers, in memory of the late Thurb D. Cushing, formerly Vice-President and Engineering Manager, Lenkurt Electric Co. of Canada, Ltd., awards annually a scholarship of \$250. In recognition of Mr. Cushing's enthusiastic leadership and engineering contribution in telecommunications. The award will be made to an undergraduate in Electrical Engineering who has shown high scholastic attainment and has demonstrated an interest in student affairs, particularly in the Student Branch of the I.E.E.E.

The Westminster Regiment Association Scholarship—This scholarship of \$500, the gift of the Westminster Regiment Association, will be awarded annually to a worthy and deserving student who is continuing his or her formal education beyond secondary school in recognized institutions of higher learning in any place within Canada or outside Canada. To be eligible, applicants must be direct descendants, male or female, of a member of the Westminster Regiment Association, of a member of the Westminster Regiment CA(M) or of one of those battalions which the Westminster Regiment perpetuates, i.e., the 47th, 104th or 131st. The applicant may be in his or her final year of secondary school or any year of post secondary study, and may be resident in any place within Canada or outside Canada. The basis of the award will be academic standing in previous studies and need of financial assistance. Except under unusual circumstances this award will not be made to a previous winner. The Application for Scholarship Form is obtainable from the Scholarship Committee, The Westminster Regiment Association, Box 854, New Westminster, B.C. The cut-off date for applications is July 31st.

The William Gray and Alan J. MacSween Scholarships—Six scholarships of \$200 each are offered by the North Vancouver Teachers' Association to students proceeding to studies at the University toward a degree or certificate in the teaching field. One scholarship will be awarded to a graduate of each of the following: Argyle Secondary School, Carson Graham Senior Secondary School, Delbrook Senior Secondary School, Handsworth Secondary School, North Vancouver Senior Secondary School and Windsor Secondary School. The awards will be made on the basis of academic standing, personal qualities and character, interest and participation in school and community affairs, and aptitude for teaching. Letters of application giving information pertinent to the above qualifications, and accompanied by two letters of recommendation, must be submitted to "The Scholarship Committee" c/o The Principal, of any of the above named schools, North Vancouver, not later than June 1st.

#### Loan Funds

The British Columbia Library Association Loan Fund—This loan fund is available to students who wish to attend an accredited school of librarianship. The recipient will be selected primarily on the basis of financial need and aptitude for library work. Application forms and further information may be obtained from the Director of the School of Librarianship, U.B.C., or from the Chairman, Bursary-Loan Committee, British Columbia Library Association, Mr. T. J. Shorthouse, Law Library, University of B.C., Vancouver 8, B.C.

The Canadian Arthritis and Rheumatism Society Bursary Loans—The Canadian Arthritis and Rheumatism Society offers bursary loans of up to \$500 per annum to students qualifying for first, second or third year training in the School of Rehabilitation Medicine at U.B.C. Conditional upon employment with C.A.R.S., repayment of the loan may be waived. Particulars and application form may be obtained from: C.A.R.S., 645 W. Broadway, Vancouver 9, B.C.

The Harry F. Bennett Educational Fund of the Engineering Institute of Canada—This fund was established by subscription from members of the Engineering Institute of Canada in memory of the late Harry F. Bennett, M.E.I.C., who for six years was Chairman of the Institute's Committee on the Training and Welfare of the Young Engineer. One purpose of the fund is to provide loans for deserving students who need financial assistance to enable them to study engineering sciences at university level, and who have successfully completed the First Year in Engineering. Loans will be made largely on the basis of character and qualities essential to leadership. Application blanks may be obtained from the office of the Dean of Inter-Faculty Affairs, or from The Trustees, Harry F. Bennett Educational Fund, 2050 Mansfield St., Montreal 2, Quebec.

Maude Abbott Memorial Scholarship Loan Fund—This fund was established by the Federation of Medical Women of Canada. Loans up to Three Hundred and Fifty Dollars are available to any woman medical student or first year interne. A second loan up to Three Hundred and Fifty Dollars may be granted to a previous recipient. In special cases, a loan up to One Thousand Dollars may be granted to a medical woman for recognized postgraduate training. Loans are payable within seven years of date of issue, after which time, interest will be charged at the rate of 5% compounded annually. Information regarding these loans may be obtained from the Convenor, Scholarship Loan Committee, Federation of Medical Women of Canada, C.M.A. House, 150 St. George St., Toronto 5, Ontario.

The PEO Sisterhood Educational Loan Fund—Loans are available to women students in any year of a university course, and may be requested at any time. The maximum amount of a loan to any student is \$1250. Fourth year or graduate students may be granted loans and draw the maximum loan in one year. Undergraduates may apply for and be granted the maximum loan of \$1250 for two or more years of study, but may draw only \$625 of the loan in one academic year. Freshmen must complete one term's work satisfactorily before making application. Loans may be granted for Summer School to the amount of \$400. Loans are made for periods up to five years. Interest at the rate of 4% is to be paid annually, and the student is expected to begin payment of the principal as soon as she is out of university and employed. Further information may be obtained from the Dean of Women and from the area chairman, Mrs. F. O. R. Garner, 1705 West 58th Ave., Vancouver 14, B.C.

### LECTURESHIPS AND SPECIAL FUNDS

The Ben Hill-Tout Memorial Fund—This fund has been established as a memorial to Benjamin William Hill-Tout, who, from 1949 to 1954, served as staff photographer in the audio-visual services of this University. In founding this fund his friends, colleagues, and family desire to perpetuate the remembrance of a fine artist, a generous friend, and a man of exceptional courage and character. In furtherance of this aim, the annual income from the fund will be used to provide the Ben Hill-Tout Memorial Prizes, which will be awarded from time to time in competitive exhibitions of photographic art at the University.

The British Columbia Heart Fund Grant-A generous grant from the British Columbia Heart Foundation to the Department of Continuing Medical Education assists in providing a comprehensive continuing education programme in British Columbia for physicians in the field of cardiovascular disease.

The British Columbia Medical Association Grant—A generous grant from the British Columbia Medical Association to the Division of Continuing Medical Education assists in providing a comprehensive continuing education programme for physicians in British Columbia.

British Columbia Tuberculosis-Christmas Seal Society Grant—A generous grant from the British Columbia Tuberculosis-Christmas Seal Society to the Department of Continuing Medical Education assists in providing a comprehensive continuing education programme in British Columbia for physicians and allied professional personnel in the field of tuberculosis and respiratory disease.

The Canadian Arthritis and Rheumatism Society Grant for Professional Education—A generous grant from the Canadian Arthritis and Rheumatism Society (British Columbia) to the Department of Continuing Medical Education assists in providing a comprehensive continuing education programme in British Columbia for physicians and allied rehabilitation personnel in the field of rheumatic disease. This programme includes lectureships, symposia, special courses and the inclusion of rheumatic disease topics in general courses in the health sciences.

Canadian Cancer Society Grant—A generous grant from the Canadian Cancer Society, B.C. and Yukon Division, to the Division of Continuing Medical Education assists in providing a comprehensive continuing education programme in British Columbia for physicians in the field of cancer.

Canadian Cancer Society, British Columbia Division, Lectureship—Through the generosity of the Canadian Cancer Society, B.C. and Yukon Division, a lectureship has been established in the Faculty of Medicine in the field of cancer work. The annual lecture provided by this contribution will be arranged to coincide with the Annual Meeting of the B.C. and Yukon Division of the Canadian Cancer Society.

The CIBA Lectureship—Through the generosity of CIBA Company Limited, a lectureship has been established on an annual basis to provide a distinguished speaker on some topic connected with medical education or research.

The Garnett Sedgewick Memorial Fund-The interest from this fund, established by friends of the late Garnett G. Sedgewick, Professor and Head in the Department of English from 1918 to 1948, will be used to provide special lectures in the University by speakers of scholarly distinction and broad sympathies; alternatively, to supply scholarship aid to exceptional students or to add books, pictures or music to the permanent cultural assets of the University.

The Guy Fowler Memorial Fund—This fund, established by his widow in memory of Guy Fowler, outstanding dairy cattle breeder of British Columbia, provides an income of \$1000 annually for research, scholarship and lecture-ship assistance to the Division of Animal Science in furtherance of its work in relation to the dairy cattle industry and animal breeding.

The Hewitt Bostock Lectureship—Through the generosity of the Misses Bostock, a lectureship has been established in honour of their father, the late Senator Hewitt Bostock, providing for a public lecture at least once in three years by a speaker of national or international reputation on a subject of educational or social importance.

The H. R. MacMillan Lectureship in Forestry—Through the generosity of H. R. MacMillan, C.B.E., D.Sc., LL.D., and the H. R. MacMillan Family Fund, a fund has been established to provide for the presentation and publication of lectures in forestry by outstanding figures in forestry or the forest industries. In addition, the lecturer is available for several days to speak to forestry students, to consult with members of the Faculty, and to address professional and other groups.

The Merck Sharp & Dohme Lectures—Through the generosity of Merck Sharpe and Dohme of Canada Limited, annual lectures have been established in the Faculty of Medicine in the field of medicine and allied sciences, including biochemistry, physiology, pathology, bacteriology and pharmacology.

The Simmons and McBride Lectureship—Through the generosity of Simmons & McBride Ltd., a lectureship has been established on an annual basis which will bring to the University a distinguished lecturer in some field of medical research.

# APPOINTMENTS IN HER MAJESTY'S OVERSEAS CIVIL SERVICE AND OTHER APPOINTMENTS UNDER COLONIAL GOVERNMENTS

Vacancies exist from time to time in H.M. Overseas Civil Service (formerly the Colonial Service), and in various posts in territories for which the British Government remains responsible. The Service comprises an administrative branch and various professional branches, including medical, engineering, legal, agricultural, forestry, veterinary, educational, survey, geological survey and nursing.

Appointments are on a permanent and pensionable basis, subject to a satisfactory period of probation. In some branches, appointments may be made on a contract basis. Opportunities may arise for promotion to higher posts after some years service.

Further information may be obtained from the Liaison Officer for British Columbia, Dr. J. S. Conway, Department of History, University of British Columbia.