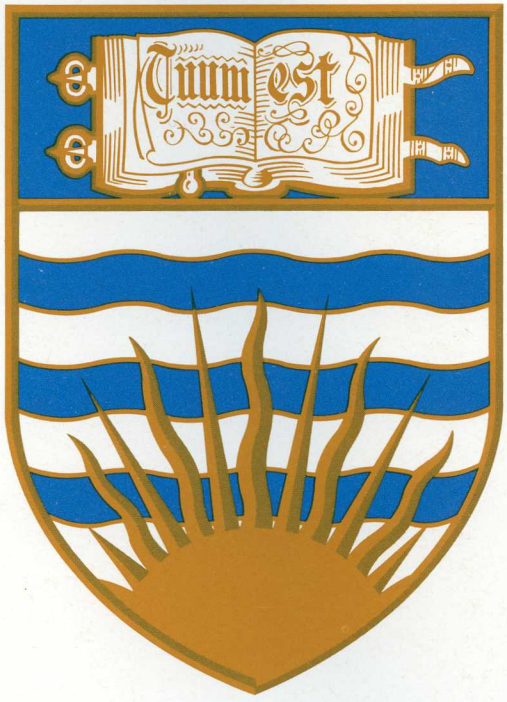
THE UNIVERSITY OF BRITISH COLUMBIA

FIFTY-EIGHTH SESSION



CALENDAR 1972/3

THE UNIVERSITY OF BRITISH COLUMBIA FIFTY-EIGHTH SESSION

CALENDAR 1972/73

Some Important Telephone Numbers
Exchange 228

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ACADEMIC YEAR 1972

(Some important dates of previous academic year)

March 1972

15 Wednesday — Last day for application for B.C. Government Scholarships.

April 1972

14 Friday — Graduate studies—last day for submission to Departments of Master's theses in final form.

30 Sunday — Last day for application for admission to next Winter Session by *students from other countries.*

Last day for application *all students* to following:
- Architecture
- Dentistry
- Dental Hygiene
- Librarianship
- Rehabilitation Medicine (Second Year)

May 1972

21 Sunday — Medicine, Phase IV (Fourth Year); last day of classes.

23 Tuesday — Baccalaureate Service 8:00 p.m.

24 Wednesday, 25 Thursday, 26 Friday — Congregation, Memorial Gymnasium 2:15 p.m.

June 1972

30 Friday — Last day for submission of applications by *all other students* except for those applying to Faculty of Graduate Studies.

Last day for requests for transfer from other faculties to:
- Education—one-year course for graduates.
- Pharmaceutical Sciences.

July 1972

15 Saturday — Last day for submission of applications for University of British Columbia bursaries.

August 1972

1 Tuesday — Last day for requests for re-registration for students not in attendance in last Winter Session, most faculties.

Note: Offices are closed Saturdays.

Students wishing to change faculties are warned that deadlines for admission to some programmes are June 30, or earlier.

Supplemental examinations, August 1-9 (except Faculty of Medicine).

14 Monday — Architecture—First Year Workshop begins.

15 Tuesday — Medicine—application forms available for 1973-74 Session.

16 Wednesday — Medicine—supplemental examinations August 16, 17, 18.

29 Tuesday — Forestry—Second Year students begin Field Work at the University Research Forest, Haney, B.C.

September 1972

1 Friday — ACADEMIC YEAR 1972-73 begins.
Meeting of new students from other countries, 9:00 a.m. Lasserre 102.
Last day for registration for Winter Session evening credit courses on campus.

4 Monday — Labour Day, University closed.

5 Tuesday — Registration Week begins.
Registration takes place daily 8:30 a.m. to 4:30 p.m., Tuesday to Friday.
Classes begin:
- Dentistry (all years)
- Law (all years)
- Pharmaceutical Sciences (Third and Fourth Years)

Agricultural Sciences Field Trip, September 5-9 inclusive.
Forestry, Third Year students begin six-day Field Trip.
Text-books available, University Bookstore.

6 Wednesday — Dental Hygiene students register.
Classes begin:
- Medicine (First and Second Years)
- Community and Regional Planning (First Year)
- Librarianship (First and Second Years)
- Rehabilitation Medicine (except First Year)

7 Thursday — Architecture: First Year students register.
Classes begin:
- Medicine (Third Year)

8 Friday — Last day of Registration Week. Late registration fee assigned after this date.

10 Sunday — Assigned accommodation in residences available in evening—special arrangements can be made for earlier registrants.

11 Monday — Classes begin all faculties not already in session.

13 Wednesday — Meeting of the Senate.
Last day for registration for students registering in the *Faculty of Graduate Studies* only.

15 Friday — Education—last day for late registration.

19 Tuesday — Law—last day for course changes.

22 Friday — Last day for adding courses in most faculties and in the Faculty of Arts for those courses final at Christmas.
Last day for payment of first instalment of fees. Students paying fees after this date will be assessed an additional fee.

29 Friday — Last day for adding courses in Faculty of Arts for those given from September to April.

October 1972

2 Monday — Education—first cycle of school experience begins.

9 Monday — Thanksgiving Day. University closed. No field instruction for *Social Work* students.

11 Wednesday — Meeting of the Senate.

November 1972

11 Saturday — Remembrance Day. Service in Memorial Gymnasium for all students, faculty, alumni, staff and friends, 10:45 a.m. University closed.

15 Wednesday — Meeting of the Senate.

December 1972

1 Friday — Education—first cycle of school experience completed.

12 Tuesday — Last day of classes for most faculties scheduling formal Christmas examinations.

13 Wednesday — Meeting of the Senate.

19 Tuesday — Medicine—First, Second and Third Years, last day of classes.

21 Thursday — First term ends.
Accommodation in Residences for Fall term ends.

25 Monday — Christmas Day. University closed December 25 and 26.

29 Friday — Medicine—last day for submission of applications for admission to the 1973-74 Winter Session.

January 1973

1 Monday — New Year's Day. University closed.

2 Tuesday — Assigned accommodation in Residences available in evening.

3 Wednesday — Second term begins.
Final instalment of fees due and payable; students are advised to mail fees to the Accountant by this date.

8 Monday — Education—second cycle of school experience begins.

15 Monday — Last day for payment of final instalment of fees. Students paying fees after this date will be assessed an additional fee.
Last day for adding courses that commence in January.

17 Wednesday — Meeting of the Senate.

February 1973

9 Friday — Last day for submission of applications from Faculty of Education students for graduate scholarships.

14 Wednesday — Medicine—Third Year (Phase III): last day of classes.

15 Thursday — Medicine—Third Year (Phase III): break 15th and 16th.

21 Wednesday — Meeting of the Senate.

22 Thursday — Mid-term break most faculties, February 22, 23, lectures and laboratories cancelled; Library and other facilities open. Social Work—no field instruction.

26 Monday — Medicine, Third Year (Phase III): Sessional examinations begin.

March 1973

9 Friday — Education—second cycle of school experience completed.

15 Thursday — Application deadline for admission to the following:
Nursing D (for students entering Summer Session)
Social Work
Last day for submission of applications for B.C. Government Scholarships.

16 Friday — Medicine, Fourth Year (Phase IV): Classes begin.

21 Wednesday — Meeting of the Senate.

April 1973

2 Monday — Graduate Studies—last day for applying to Faculty for final examinations for all doctoral candidates.

6 Friday — Last day of classes, most faculties, excluding among others: Dentistry, Law, Medicine. Last day for submission of graduating essays and theses, Bachelor degree programmes.

9 Monday — Sessional examinations begin, most faculties, excluding among others, Dentistry, Law and Medicine.

13 Friday — Graduate Studies—last day for submission to departments of Master's theses in final form.

19 Thursday — Medicine, First and Second Years: last day of classes.
Fine Arts—B.F.A. Studio Programme: last day of classes and last day for submission of applications, including portfolio, for admission to 1973-74 Winter Session.
Intersession evening credit courses (May-July): last day for registration.

20 Friday — Good Friday. University closed April 20 and April 23.

25 Wednesday — Meeting of the Senate.

26 Thursday — Education—post-sessional cycle of school experience begins.

27 Friday — Medicine, First and Second Years: sessional examinations begin.

30 Monday — Sessional examinations end, most faculties.
Applied Science: Field School begins.
Last day for submission of application by *students from other countries.*
Last day for application *all students* to following:
Architecture
Dentistry
Dental Hygiene
Librarianship
Rehabilitation Medicine (Second Year)
Last day for registration for Summer Session.
Forestry—Third Year students begin Field Work at the University Research Forest, Haney, B.C.
Intersession evening credit courses, classes begin.

May 1973

11 Friday — Education—post-sessional cycle of school experience completed.

20 Sunday — Medicine—Fourth Year (Phase IV): last day of classes.

21 Monday — Victoria Day. University closed.

23 Wednesday — Meeting of the Senate.

29 Tuesday — Baccalaureate Service, 8:00 p.m.

30 Wednesday }
31 Thursday } Congregation, Memorial Gymasium 2:15 p.m.

June 1973

1 Friday — Congregation, Memorial Gymnasium 2:15 p.m.

6 Wednesday — Meeting of the Senate.

30 Saturday — Last day for submission of applications by *all other students* except for those applying to Faculty of Graduate Studies.
Last day for requests for transfer from other faculties to:
Education—one-year course for graduates
Pharmaceutical Sciences.

July 1973

1 Sunday — Dominion Day.

3 Tuesday — Summer Session classes begin.
Last day for submission of applications for supplemental examinations.

15 Sunday — Last day for submission of applications for University of British Columbia bursaries.

27 Friday — Intersession evening credit courses: last day of classes.

August 1973

1 Wednesday — Last day for requests for re-registration for students not in attendance in last Winter Session, most faculties.
Students wishing to change faculties are warned that deadlines for admission to some programmes are June 30, or earlier.
Supplemental examination period August 1-9.

15 Wednesday — Medicine: supplemental examinations, August 15, 16, 17.

17 Friday — Summer Session ends.

31 Friday — ACADEMIC YEAR ENDS.

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, C.C., M.A., LL.D.

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The President

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PAUL S. PLANT, B.A., Vancouver.
DAVID R. WILLIAMS, Q.C., B.A., LL.B., Duncan.
(Terms expire August 31, 1972)

Appointed by the Lieutenant-Governor in Council:

His Honour Judge A. LESLIE BEWLEY, LL.B., Vancouver.
(Term expires October 31, 1973)
RICHARD M. BIBBS, B.A.Sc., West Vancouver.
ARTHUR FOUKS, Q.C., B.A., LL.B., Vancouver.
WALTER C. KOERNER, C.C., K. St. J., LL.D., D.B.A., Vancouver.
JOHN E. LIERSCH, S.M., B.A., B.A.Sc., M.F., Vancouver.
DONOVAN F. MILLER, B.Com., S.M., Vancouver.
(Terms expire September 1, 1972)

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The President, Chairman.
The Deans.
The Registrar, Secretary.

Elected by the Faculties:

Agricultural Sciences: W. D. KITTS, M.S.A., Ph.D.
Applied Science: S. D. CAVERS, M.A.Sc., Ph.D., P.Eng., F.C.I.C.
Arts: I. S. ROSS, M.A., B.Litt., Ph.D.
Commerce and Business Administration: R. F. KELLY, B.S., M.B.A., D.B.A.
Dentistry: J. D. SPOUGE, M.D.S. F.D.S., R.C.S., M.R.C.S., L.R.C.P., F.R.C.D.(C).
Education: R. F. GRAY, B.A., M.Ed., Ph.D.
Forestry: J. H. G. SMITH, B.S.F., M.F., Ph.D., R.P.F.
Graduate Studies: J. K. STAGER, B.A., Ph.D.
Law: P. T. BURNS, LL.M.
Medicine: S. ISRAELS, B.Sc., M.D., F.R.C.P.(C), F.A.C.P.
Pharmaceutical Sciences: T. H. BROWN, B.S.P., M.S., Ph.D.
Science: R. A. RESTREPO, B.A., Ph.D.
(Terms expire 1972)

Elected by a joint meeting of the Faculties:

W. M. ARMSTRONG, B.A.Sc., P.Eng., M.C.I.M., F.R.S.C.
C. S. BELSHAW, M.A., Ph.D., F.R.S.C.
S. BLACK, R.S.W., D.A., A.T.D.
C. B. BOURNE, B.A., LL.B., S.J.D.
C. A. BROCKLEY, B.A., B.A.Sc., Ph.D., P.Eng.
D. G. BROWN, M.A., D.Phil.
J. D. CHAPMAN, M.A., Ph.D.
D. H. CHITTY, B.A., M.A., D.Phil., F.R.S.C.
R. M. CLARK, B.A., B.Com., A.M., Ph.D.
R. DANIELS, B.A., Ph.D., LL.D., D.Litt., F.R.S.C.
S. 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., M.R.C.P.
N. A. HALL, B.Com., M.B.A., D.B.A.
C. S. HOLLING, M.Sc., Ph.D.
D. S. M. HUBERMAN, B.A., LL.B., LL.M.
J. M. KENNEDY, M.A., Ph.D.
P. A. LARKIN, M.A., D.Phil., F.R.C.S.
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B. N. MOYLS, M.A., Ph.D.
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R. F. SCAGEL, M.A., Ph.D., F.R.S.C., F.L.S.
A. D. SCOTT, B.Com., B.A., A.M., Ph.D.
G. R. SELMAN, M.A.
H. V. WARREN, S.M., B.A., B.A.Sc., B.Sc., D.Phil., A.I.M.M., F.G.S.A., F.R.S.C.
W. A. WEBBER, M.D.
B. L. WHITE, B.Sc., D.I.C., Ph.D.
W. E. WILLMOTT, M.A., Ph.D.
W. D. YOUNG, B.A., M.A., Ph.D.
(Terms expire 1972)

Appointed by the Lieutenant-Governor in Council:

C. J. CONNAGHAN, M.A., Vancouver.
(Term expires 1973)
G. H. D. HOBBS, Vancouver.
(Term expires 1973)
A. J. LONGMORE, B.A., B.Ed., Victoria.
(Term expires 1974)
R. F. SHARP, B.A., D.Paed., Vancouver.
(Term expires 1973)

Elected by Convocation:

A. E. AHO, B.A.Sc., B.A., Ph.D., Vancouver.
R. 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, B.A., B.A.Sc., Vancouver.
M. F. CLARKE, B.S.A., M.S.A., Ph.D., Agassiz.
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S. S. LEFEAUX, B.A.Sc., Vancouver.
D. F. MILLER, B.Com., S.M., Vancouver.
J. V. ROGERS, B.A.Sc., Trail.
B. B. TREVINO, LL.B., West Vancouver.
D. R. WILLIAMS, Q.C., B.A., LL.B., Duncan.
(Terms expire 1972)

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(Terms expire 1972)

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St. Mark's College (Theological), REV. R. W. FINN, C.S.B., M.A., L.M.S.

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

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12 students elected by the membership of the Alma Mater Society:

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(Terms expire April 1974)
S. E. GARROD, G. A. LETCHER, J. A. McEWEN.
(Terms expire October 1972)
A. C. L. FOX, S. J. PERSKY, A. R. ROBBINS.
(Terms expire April 1973)
D. V. ANDERSON, J. T. SYDOR, A. P. YORK.
(Terms expire October, 1973)

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Assistant Director of Physical Plant (Design and Planning)—A. W. SLIPPER, M.R.A.I.C.
Manager Administrative Services Division—M. R. LANG, B.A.Sc. (Brit. Col.), P.Eng.
Superintendent New Construction Division—F. CONRADS, P.Eng.
Superintendent Operations and Maintenance Division—F. A. KEETLEY, B.E., P.Eng.
Purchasing Agent—H. A. LEMARQUAND.
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JOHN M. BUCHANAN, B.A., LL.D. (Brit. Col.), (1969).

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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).

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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).

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MRS. ANNE TORRANCE, M.A. (Brit. Col.), Counsellor.
D. MAGREGA, B.A. (Brit. Col.), Assistant Counsellor.
J. C. CRAIK, B.A. (Sask.), Placement Officer.

Dean of Women's Office
MRS. HELEN MCCRAE, B.A. (Toronto), M.S.W. (Brit. Col.), Dean of Women
MISS MARGARET C. FREDERICKSON, B.A. (Toronto), Assisant to the Dean.
MRS. JOYCE E. SEARCY, B.A., M.Ed. (Brit. Col.), Assistant to the Dean.

Academic Board of the Province of British Columbia.
Appointees of the Lieutenant-Governor in Council:
DEAN S. N. F. CHANT (Vice-Chairman).
MR. E. C. ROPER.
MR. A. E. SOLES.

Nominees of the Senate of the University of British Columbia:

DR. C. S. BELSHAW
DEAN I. MCT. COWAN (Chairman).

Nominees of the Senate of the University of Victoria:

DR. E. B. HORNE.
DR. R. E. L. WATSON

Nominees of Simon Fraser University:

DR. J. F. HUTCHINSON
DR. B. G. WILSON

Financial Advisory Board of the Province of British Columbia.

Provincial Government Appointees:

MR. W. G. RATHIE (Chairman)
MR. R. M. BAGSHAW
MR. S. E. ESPLEY
MR. H. G. WATSON

University Representatives:

University of British Columbia—MR. ALLAN M. MCGAVIN
Simon Fraser University—MR. H. L. DONALDSON.
University of Victoria—MR. G. F. AUCHINLECK

GENERAL INFORMATION

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 the School of Community and Regional Planning and the Institutes of Animal Resource Ecology, Applied Mathematics and Statistics, Astronomy and Space Science, Industrial Relations, International Relations, Oceanography.

The degrees offered are as follows:

Agricultural Sciences:	Bachelor of Science in Agriculture (B.Sc. (Agr.))
	Master of Science (M.Sc.)
	Master of Applied Science (M.A.Sc.)
	Doctor of Philosophy (Ph.D.)
Applied Science (Engineering):	Bachelor of Applied Science (B.A.Sc.)
	Master of Applied Science (M.A.Sc.)
	Master of Engineering (M.Eng.)
	Master of Science (M.Sc.)
	Doctor of Philosophy (Ph.D.)
Architecture:	Bachelor of Architecture (B.Arch.)
	Master of Architecture (M.Arch.)
Arts:	Bachelor of Arts (B.A.)
	Bachelor of Music (B.Mus.)
	Bachelor of Fine Arts (B.F.A.)
	Master of Music (M.Mus.)
	Master of Arts (M.A.)
	Doctor of Philosophy (Ph.D.)
Commerce and Business Administration:	Bachelor of Commerce (B.Com.)
	Licentiate in Accounting (Lic. Acct.)
	Master of Business Administration (M.B.A.)
	Master of Science (M.Sc.—Bus. Ad.)
	Doctor of Philosophy (Ph.D.)
Community and Regional Planning	Master of Arts (M.A.)
	Master of Science (M.Sc.)
	Doctor of Philosophy (Ph.D.)
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.)
Forestry:	Bachelor of Science in Forestry (B.S.F.)
	Master of Forestry (M.F.)
	Master of Science (M.Sc.)
	Master of Applied Science (M.A.Sc.)
	Doctor of Philosophy (Ph.D.)
Home Economics:	Bachelor of Home Economics (B.H.E.)
Law:	Bachelor of Laws (LL.B.)
	Master of Laws (LL.M.)

Librarianship:	Master of Library Science (M.L.S.)
Medicine:	Doctor of Medicine (M.D.) 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 (BSc. (Pharm.)) Master of Science (M.Sc.) Doctor of Philosophy (Ph.D.)
Physical Education and Recreation:	Bachelor of Physical Education (B.P.E.) Bachelor of Recreation Education (B.R.E.) Master of Physical Education (M.P.E.)
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.)
Social Work:	Master of Social Work (M.S.W.)

In addition to the above, courses are offered in the School of Nursing leading to a diploma in Public Health Nursing; in the Faculty of Applied Science to a Diploma in Surveying and a Diploma in Administration for Engineers; in the Faculty of Dentistry to a Diploma in Dental Hygiene; 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 Children with Learning and Behaviour 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), LL.D., D.Sc., and D.Litt., respectively, 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.F.A.	University blue with magenta cord	B.R.E.	malachite green with gold and green cord.
B.A.Sc.	scarlet	B.Sc.(Agr.)	maize
B.Com.	light grey with black and grey cord	B.S.F.	brown with green cord
Lic.Acct.	light grey with white cord	B.S.N.	scarlet with twisted cord of University blue and white
B.Ed.	white with cord of University blue	B.Sc.(Pharm.)	dark green with cord of scarlet
B.H.E.	turquoise	B.S.R.	scarlet and white twisted cord on royal blue
M.L.S.	cadmium yellow	M.S.W.	magenta
B.Mus.	University blue with cord of alizarin crimson	LL.B.	amethyst violet
B.Sc.	light blue	M.D.	scarlet and royal blue
B.Arch.	scarlet with white cord	Ph.D.	blue and gold
D.M.D.	lilac and red		
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 M.Eng. hood is the same as that of the M.A.Sc. except that it is trimmed with a University blue cord. 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

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 offered in soil sciences, including the microbiology, chemistry, physics and mineralogy of soils, and in the role of soils in ecology and environmental quality. 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, Plant Protection, Plant Pathology and Weed Science
- Poultry Science:
  - Nutrition, Physiology, Genetics and Embryology
- Soil Science:
  - Soil Chemistry
  - Soil Physics and Biometeorology
  - Soil Genesis and Classification
  - Forested Soils
  - Soil and Water Conservation and Pollution Control

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 Saskatchewan, and, in cooperation with the Centre for Continuing Education, specialized non-credit courses in various areas of agriculture.

Requests for further information regarding the courses available in the Faculty of Agricultural Sciences should be addressed to the Dean of Agricultural Sciences.

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, Master of Engineering or Doctor of Philosophy. Acceptance as a candidate for a Master's degree requires a high level of accomplishment in the undergraduate course. For the M.A.Sc. degree a substantial programme of academic courses and research, occupying at least twelve months, is required. For the M.Eng. degree, additional academic courses are required in lieu of a thesis. 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 section of the 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.

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.

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.

The Department of Mathematics offers programmes leading to the degree of B.A.

The academic departments of the Faculty are: Anthropology and Sociology, Asian Studies (including Chinese, Japanese, Indic Languages), Classics (including Classical Studies, Greek, Latin), Economics, English, Fine Arts, French, Geography, German, Hispanic and Italian Studies (including Spanish, Italian, Portuguese), History, Linguistics, Music, Political Science, Psychology, Religious Studies (including Hebrew), Slavonic Studies (including Polish, Russian), Theatre. There are interdepartmental programmes in Asian Area Studies, Comparative Literature, International Relations, Slavonic Area Studies.

The Faculty offers two routes to the degree of Bachelor of Arts: the Major programme and the Honours programme. Before graduating, each student must take at least one course in the Faculty of Science or Geography 101. 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 or 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 Major programme. Those who intend to enter graduate study often select an Honours programme.

In his first year, a student may take the special programme, Arts I, for which nine units of credit are accorded of the normal study programme of fifteen units.

Inevitably, students entering the Faculty of Arts will be confronted by a wide variety of courses and programmes. They should read the Faculty's section of the calendar with care and if they need assistance and advice, consult one of the faculty advisers.

In preparation for admission to the Faculty of Arts, secondary school students should obtain in their fields of interest as strong an academic background as possible. 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.

● *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) mythology and religion, (11) 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, Philosophy, 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 Creative Writing 515; English 507 and 512; French 502, 511, 512, 514; German 507; Slavonic Studies 542; Spanish 502, 506; and Theatre 510) and graduate courses offered by language and litrature 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 depart-

ments), attention should also be paid to such courses as Asian Studies 302, 335, 345; Classical Studies 310, 315 and 316; Creative Writing 405; English 310; French 400; Germanic Studies 310 and 411; Slavonic Studies 306, 431; Theatre 320. 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), offered in Summer Session only, is open to all students, including freshmen, and concentrates on short prose forms. Its secondary 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.405—Writing of non-fiction; C.W.406—Radio, Screen, Television; C.W.407—Drama; C.W.408-9—Fiction; C.W.410—Poetry; C.W.415—Translation) are designed for students on the Major Programme and those who are combining an interest in Creative Writing with another major field of study. C.W. 494, 495, 496, 497 and 498 are senior tutorials for unusually talented writers, both those in the Major Programme and others who are majoring in another field of study. C.W. 447 is a reading course for Majors in Creative Writing.

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, industrial organization, natural resources, international trade, mathematical economics and statistics, 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 indicates 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.

● *English.* The Department offers undergraduate training in the Major and Honours programmes and graduate work leading to the M.A. and Ph.D. degrees. The Department publishes a pamphlet (Senior Courses Offered), available before the end of the session, showing details of courses to be given in the next academic year.

● *Fine Arts.* The Department offers introductory courses and a Major and Honours programme within the structure of the B.A. degree. Some of these are studio courses, but the main emphasis is on the history of Western Art and of Asian Art. At the graduate level, the Department offers a programme leading to the M.A. degree.

For students with a vocation for a career in the visual arts, the Department offers a programme leading to the Bachelor of Fine Arts degree. This is normally a three-year programme beginning in the second year at U.B.C. Numbers in this programme are strictly limited, and entry is by selection.

The Department is also responsible for the University Art Gallery and its programme of exhibitions and lectures.

Broadsheets giving details of the B.A., M.A., and B.F.A. programmes, indicating which courses will be offered in any one year, will be available from the departmental office.

● *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.

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 and French-Canadian 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 opportunity for specialized study and research in all areas of French language and literature including those of French Canada and French Africa.

● *Geography* offers undergraduate training in the Honours and Major programmes and graduate work leading to the M.A. and Ph.D. degrees.

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, urban and rural settlement, underdeveloped areas, historical and 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.

● *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 Iberian Peninsula and Latin America. It cooperates closely with the Departments of French and of Linguistics 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 (Hispanic Literature). 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 and a graduate programme leading to the M.A. in Linguistics.

● *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, Organ, 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 orchestras and chamber ensembles.

● *Philosophy* offers two 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.

The Department offers graduate study leading to the M.A. and Ph.D. degrees, in epistemology, metaphysics, ethics, aesthetics, political philosophy, logic, philosophy of language, philosophy of science, and philosophy of mathematics.

● *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. The Ph.D. degree is offered in Chinese and Japanese.

● *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 are welcome to 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 college) leading to the degree of Bachelor of Commerce. It also offers programmes of study leading to the degrees of Licentiate in Accounting, Master of Business Administration, Master of Science 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.

DENTISTRY—*See under Health Sciences*

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 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 full-time 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 *must* complete the full four years before their standing will be reported to the Provincial Department of Education as complete for teacher certification.)

B.Ed. (Secondary) — requiring five years of University study beyond Grade 12. (Note: Students must complete the full five years before their standing will be reported to the Provincial Department of Education as complete for teacher certification.)

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 M.A. or M.Ed.

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 so 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.

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.

FORESTRY

The profession of forestry offers diverse opportunities to young men and women with a wide range of talents, interest in, and a special concern for the management, utilization and conservation of forest and wildland resources of goods and services. These goods and services comprise wood products, water, flood and avalanche control, soil and stream productivity, wildlife, recreation, and environmental quality. High standards of motivation, ability and professional qualification are required for the maintenance and wise management of these values.

Many and diverse opportunities exist for employment of professional foresters and forest scientists for forest resources management, research, professional consultation, and education.

The Faculty of Forestry offers a four-year course, following First Year 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 12,500 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 four main groups:

Forest Biology, Forest Resources Management, Forest Harvesting and Wood Science and Industry. Forest Biology deals with the living and environmental constituents and influences in forests. Forest Resources Management encompasses the management and utilization of all the resources of forestland. Forest Harvesting includes the harvesting of timber crops to serve market needs, and manipulation of forest cover to serve silvicultural and other objectives. Wood Science and Industry deals with wood properties and behavior as related to production and marketing aspects of wood-based products. The foregoing main groups are further subdivided into specific component "interest areas". Each of these areas is planned to facilitate either 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 (see the Faculty of Science section of the calendar).

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.

HEALTH SCIENCES CENTRE

The Health Sciences Centre of the University of British Columbia provides a common learning environment for the students of the Health Sciences and Professions.

A Co-ordinating Committee is in charge of the planning of the physical and administrative structure of the Health Sciences Centre.

Members of the Co-ordinating Committee:

John F. McCreary, M.D. (Toronto), F.R.C.P.(C), D.Sc. (Memorial), LL.D. (Toronto), Professor of Paediatrics, Dean of the Faculty of Medicine (to June 30, 1972) and Co-ordinator, Health Sciences.

Lloyd F. Detwiller, M.A. (Brit. Col.), M.H.A. (Minn.), Consultant-Administrator, Health Sciences Centre, and Clinical Associate Professor of Health Care and Epidemiology.

Brock M. Fahrni, M.D. (Man.), F.R.C.P.(C), F.A.C.P., Director of the School of Rehabilitation Medicine and Associate Professor of Medicine.

W. D. L. Finn, B.E. (Nat. Univ. Ireland), M.Sc., Ph.D. (Washington), Professor of Civil Engineering and Dean of the Faculty of Applied Science.

Donald C. Graham, M.D. (Toronto), F.R.C.P.(C), F.A.C.P., Assistant Professor and Associate Dean of Medicine.

George M. Hougham, B.A., M.A. (Toronto), Ph.D. (Pennsylvania), Professor and Director of the School of Social Work.

Douglas T. Kenny, M.A. (Brit. Col.), Ph.D. (Wash), Professor of Psychology and Dean of the Faculty of Arts.

Melvin Lee, B.A. (Los Angeles, Calif.), M.A., Ph.D. (Berkeley, Calif.), Professor and Director of the School of Home Economics.

S. Wah Leung, B.Sc., D.D.S. (McGill), Ph.D. (Rochester), F.A.C.D., F.I.C.D., F.R.C.D.(C), Professor of Oral Biology and Dean of the Faculty of Dentistry.

Bernard E. Riedel, C.D., B.Sc., M.Sc. (Alta.), Ph.D. (Biochem.) (Western Ont.), Professor and Dean of the Faculty of Pharmaceutical Sciences.

Miss Muriel Uprichard, B.A. (Queen's), M.A. (Smith), Ph.D. (London), Professor and Director of the School of Nursing.

Three divisions are responsible to the Co-ordinator, Health Sciences:

Office of Interprofessional Education in the Health Sciences

George Szasz, M.D. (Brit. Col.), Assistant Professor in the Faculty of Medicine and Director of the Office.

Alice J. Baumgart, B.S.N. (Brit. Col.), M.Sc. (Applied) (McGill), R.N., Associate Professor in the School of Nursing.

Division of Continuing Education in the Health Sciences

Edward J. Hyde, B.Sc. (Sir Geo. William's Univ.), D.D.S. (McGill), M.S.D. (Indiana), Assistant Professor in the Faculty of Dentistry and Chairman of the Working Committee of Continuing Education in the Health Sciences.

Ralph A. Barnard, Ph.D., Executive Director of the Division.

Division of Health Services Research and Development

Donald O. Anderson, B.A., M.D. (Brit. Col.), S.M. in Hyg. (Harvard), F.R.C.P.(C), Professor and National Health Research Scientist in the Faculty of Medicine and Director of the Division.

A number of accredited and experimental programs (courses, projects, summer work opportunities, conferences, and seminars) are available from the Faculties of Dentistry, Medicine, Pharmaceutical Sciences, and the Schools of Home Economics, Nursing, and Rehabilitation Medicine, to a limited number of selected students of the Health Professions on an elective basis and at the discretion of the Departments, Schools and Faculties concerned.

The following is a partial list of such courses:

Faculty of Dentistry:

Orthodontics 429—Introduction to Orthodontics (Craniofacial Growth)
Oral Biology 410—Oral Histology
Oral Biology 423—Oral Pathology
Oral Biology 430—Selected Topics in Oral Biology
Restorative Dentistry 411—Communication in Dentistry (Second Term only) including Dental Hypnosis.

School of Home Economics:

Home Economics 205—Community and Public Health Nutrition
Home Economics 303—World Problems in Nutrition
Home Economics 340—Human Growth and Development I
Home Economics 341—Human Growth and Development II
Home Economics 342—The Contemporary Family I

Home Economics 343—The Contemporary Family II
Home Economics 450—Communications

Faculty of Medicine:

Anatomy 390—Basic Human Anatomy
Biochemistry 410—Outlines of Biochemistry
Health Care & Epidemiology 400—Statistics in the Health Sciences
Health Care & Epidemiology 425—Epidemiology
Health Care & Epidemiology 426—Health Care and Epidemiology.
History of Medicine and the Health Sciences 400—History of the Health Sciences
History of Medicine and the Health Sciences 501—History of Medicine Seminar (Second Term).
Paediatrics 351—Growth and Development
Paediatrics 430—Human Genetics
Pathology 375—Introduction to Human Pathology
Physiology 301—Human Physiology
Interdepartmental 400—Preclinical Sessions

School of Nursing:

Nursing 253—Human Behaviour
Nursing 281—Introduction to Statistics and Research Methods
Nursing 458 Teaching
Nursing 460—Administration

Faculty of Pharmaceutical Sciences:

Pharmacy 310—Biopharmaceutics
Pharmacy 320—Organic Medicinal Products
Pharmacy 325—Pharmaceutical Chemistry
Pharmacy 424—Quality Control
Pharmacy 340—General Pharmacology
Pharmacy 440—Applied Pharmacology
Pharmacy 350—Pharmaceutical Law & Ethics
Pharmacy 454—Hospital Pharmacy Administration
Pharmacy 455—Community Health

School of Rehabilitation Medicine:

Rehabilitation Medicine 201—Medicine I and Surgery I
Rehabilitation Medicine 203—Psychiatry I (Growth and Development)
Rehabilitation Medicine 301—Medicine II and Surgery II
Rehabilitation Medicine 401—Medicine III and Surgery III
Rehabilitation Medicine 403—Psychiatry III (Clinical Psychiatry)
Rehabilitation Medicine 303—Psychiatry II (Introduction to Psychiatry)

A number of non-credit seminar series, conferences, summer work opportunities, and projects during the school term are offered to a selected number of students of the Health Professions through the Office of Interprofessional Education in the Health Sciences.

In addition, students wishing to formulate community-oriented projects of their own may obtain consultation from that office.

For further information, students are directed to the Faculties and Schools involved, or to the Office of Interprofessional Education in the Health Sciences, Fourth Floor, Instructional Resources Centre.

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.

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 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.

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 inquiry.

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. Graduates of the general programme may be employed in teaching, extension services, community agencies, and business and industry.

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 almost any personality or temperament. Because of the wide selection of careers in clinical medicine, a 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.

The academic sessions in each of the first two years of the medical school course are of 32 weeks' duration, that in the third year (Phase III) is of 24 weeks' duration, and Phase IV, the final phase or clinical clerkship, is of 62 weeks' duration.

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.

Students planning to enter a pre-medical programme at the University of British Columbia must have completed satisfactorily Chemistry 11, Mathematics 12 and, if possible, Biology 11. In addition they must have completed at least one of Biology 12, Chemistry 12, or Physics 12.

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.

Admission of registered nurses to the baccalaureate programme (leading to the degree of Bachelor of Science in Nursing) requires senior secondary school graduation (academic-technical programme), 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 the diploma programme offered by the School. This programme requires senior secondary school graduation (academic-technical programme) for admission, is designed to meet present day needs of British Columbia health agencies for nursing personnel prepared to function as community health 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 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 the health profession concerned with the identity, nature, potency, toxicity, side-effects, dosage, source of supply, storage, effect of combinations, efficacy of dosage forms and legal status of an ever-increasing armamentarium of drugs. Some of the functions of the modern pharmacist may be summarized as follows:

(1) to compound and dispense therapeutic agents as prescribed by a qualified medical practitioner.
(2) to control the distribution of therapeutic agents, including specifically the control of narcotics and other restricted drugs and poisons.
(3) to ensure that the prescribed medication is safe, potent and correct.
(4) to act as an advisor to the public on matters pertaining to health and the use of therapeutic agents.
(5) to assist in protecting the public against the misuse and abuse of drugs.
(6) to act as a consultant on matters relating to therapeutic agents, their dosage, formulation, side-effects, interactions, adverse reactions etc. to the medical practitioner.

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 Faculties of Pharmacy of Canada. The curriculum in Pharmacy has been designed to provide a core of required subjects comprising the necessary basic chemical and medical 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, pharmaceutical science 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.

Admission to the Faculty of Pharmaceutical Sciences follows a full year or two semesters of study in a university or college.

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.

HOME ECONOMICS—*See under Health Sciences.*

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. Applicants are *required* to take the Law Schools Admission Test. Full information may be obtained by writing to the "Law School Admission Test, Educational Testing Service, Box 944 Princeton, New Jersey 08540."

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 two-year post-graduate programme leading to the degree of M.L.S. (Master 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 audio-visual materials 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. The instructional pattern employs a wide variety of approaches, including lectures, laboratories, discussions, seminars, directed study, colloquia, field trips and field work. Students are encouraged to work closely with faculty members and each student has his own advisor available for consultation and specific assistance.

In the first year, students take required courses constituting the core of librarianship studies. These basic studies 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 year, 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, library work and literature for children and young people, cataloguing, reference service and technical services.

A reading knowledge of 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 major foreign languages other than English.

No special curriculum need be followed by students in secondary school who plan to enter the School of Librarianship.

MEDICINE

NURSING

PHARMACEUTICAL SCIENCES

—*See under Health Sciences.*

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 and the bachelor's degree in recreation. 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.R.E. degree.

Students may also study toward the Bachelor of Education degree with specialization in physical education and in an academic subject.

Students on the B.P.E. programme (Physical Education) also undertake studies in another subject suitable for teaching in the secondary schools.

REHABILITATION MEDICINE

—*See under Health Sciences.*

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.

Astronomy concerns itself with the study of the universe outside the bounds of our own earth. The field extends from the study of our sun and the solar system to the study of external galaxies and cosmology. Undergradute courses in astronomy are taught by the Department of Geophysics, which offers a Majors Program in Astronomy leading to a B.Sc degree. A Combined Honours Program in Physics and Astronomy is also jointly offered by the Physics and Geophysics Departments.

Graduate programs in astronomy leading to the Master's and Ph.D. degree are offered by several departments. The programs are coordinated by The Institute of Astronomy and Space Science. Students planning to do graduate work in Astronomy should obtain a good background in physics and mathematics while they are undergraduates. Further information about the graduate programs in Astronomy can be obtained in the Faculty of Science and Faculty of Graduate Studies sections of the calendar.

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. General Inquiries may be directed to the Chairman, Room 2340, Biological Sciences Building.

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.

Chemistry offers undergraduate training to chemistry specialists in an Honours programme and also in a Major programme; students may also take Combined Honours programmes in Chemistry and Physics, Chemistry and Mathematics, Chemistry and Biology, etc.; 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. The Honours and Combined Honours programmes are 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 standard 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.

Computer Science

Computer Science offers Honours and Majors programmes as outlined in the Faculty of Science section of the calendar. A combined Honors programme with Mathematics is available. Students specializing in Computer Science are encouraged to take as many Mathematics courses as they can.

Geology offers Honours and Major programmes as outlined in the Faculty of Science section of the calendar. Combined Honours programmes are available in Geology and Geophysics and in Geography and Geology. 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 and petroleum industries, or in engineering 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.

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.

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.

Physics offers courses leading to the B.Sc. degree (Honours, Major and General) described in the Faculty of Science section of the calendar and to the B.A.Sc. degree in Engineering Physics described in the Faculty of Applied Science section of the 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.

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.

SOCIAL WORK

The School of Social Work offers work leading to the degree of M.S.W. The School is a member of the Canadian Association of Schools of Social Work, the policy and standards-setting organization for social work education in Canada.

Accepted education for the profession of social work consists of a minimum of two university years of graduate study including lectures, field practicum and a research paper or project, 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. Preference will be given to students whose major concentration of undergraduate studies has been in the humanities and/or the social sciences. The minimum standing required for admission to the School is Second Class standing of this University (65% average) or the equivalent, based on the final two years of the undergraduate degree programme.

(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 education.

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 suitable for undergraduates proceeding to social work are anthropology, economics, English, philosophy, political science, psychology and sociology. A basic knowledge of statistics is highly desirable.

No special programme of studies in secondary school need be followed to prepare a student for admission to Social Work.

ADMISSION
to
The University of British Columbia

Enquiries: to the Office of the Registrar, The University of British Columbia, Vancouver 8.

Deadlines: Winter Session, June 30.
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.

An applicant admitted to the University may be given credit, where appropriate, for subjects previously taken at a college or another university, but such advance credit will be tentative only and will be subject to review after one or more sessions have been completed by the student in attendance at the University.

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.

Secondary School students whose standing is between C and C+ or better will be considered for admission in order of their academic performance. Applicants will be selected on the basis of their overall secondary school records, on the results of Department of Education examinations where applicable, on possible other tests (in which case applicants will be so notified), and on a general assessment of their capacity for success in university studies as made by the Admissions Committee.

Only those students will be admitted in September who complete in full the requirements for admission as a result of recommendation or written Departmental examinations in the preceding June. Any applicant who, after the June examinations, has any deficiency due to failures that would require him to write a supplemental examination or to attend a summer school to meet the admission requirements, will not be considered for admission in that same year. No student will be admitted with incomplete or conditioned standing.

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 study before applying for admission to the University.

B. Admission on Transfer from a 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.

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.
2. 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. Moreover, the University will grant transfer on the basis of two full semesters of study being equivalent to one year of University study regardless of slight differences that may exist in the credit evaluation of some of the college courses as compared with their University counterparts. 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. Where a course-to-course equivalent cannot be established, credit is granted, provided the standing is C or better, as "unassigned"; unassigned credit may be either in a particular discipline, e.g. "Economics ($1\frac{1}{2}$) unassigned," or in a Faculty, e.g. "Arts (3) unassigned." *Students should be cautioned that specific requirements exist at the Faculty level and in most Department programmes. These cannot normally be fulfilled by unassigned credit.*
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 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.
6. 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.
8. *Challenge credit*—some institutions will permit a student who has not enrolled for nor taken a course to "challenge" the course by writing an examination covering the course content; if the examination is passed the student may be given credit for the course. The University of British Columbia does not have this policy and will grant credit on transfer only where the course concerned is recognized by the University as suitable for transfer credit and is taken in the normal way by the student. Courses that have been successfully "challenged" at other institutions will be useful to provide advance placement at the University, but credit for such "courses" will not be given toward a degree.

C. 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 Secondary 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).

Admission is considered on an individual basis, subject to the conditions set out in the following statement of admissions policy and explanatory note:

The minimum academic qualification for admission is matriculation in a public university (i.e. eligibility for admission to a public university) in the applicant's own province, provided that the subject-matter presented and the standing obtained meet the requirements of The University of British Columbia, and:

(a) no university degree credit will be granted for studies completed in secondary school, but where studies have been taken beyond the usual secondary school level advance placement will be considered (i.e. consideration will be given to permit the starting of university studies at a higher level than usual);

(b) applicants from Newfoundland where Grade 11 represents the end of secondary schooling will require successful completion of at least First Year at Memorial University or the equivalent before consideration can be given to their transfer to The University of British Columbia;

(c) applicants from the Province of Quebec will normally be expected to hold le diplôme d'études collégiales (D.E.C.), having completed the two-year academic course of studies at a collège d'enseignement général et professionnel (CEGEP) and, upon acceptance, would in general be given advance credit for the equivalent of one year of university studies; applicants could be considered for admission to the First Year following completion of Grade 12 or two semesters of a CEGEP.

Note. The University of British Columbia, under present conditions, is not able to accept all qualified applicants. Applicants must give their reasons for seeking admission to this University. Applicants seeking admission to Faculties offering professional studies are normally expected to have completed in full the pre-professional requirements at another institution.

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.

Students must not travel to Canada in the hope that they will be admitted, either directly or following studies in a secondary school, a college or another university, with qualifications inferior to those specified in this calendar.

Minimum standing for admission in terms of some educational credentials:

(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 and Pakistan must, as a minimum requirement, possess a bachelor's degree, division I.

(vii) International Baccalaureate—three subjects at Higher and three subjects at Subsidiary level.

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 of 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 May 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) A student admitted to the University may be required to take a test of his knowledge of English upon arrival on the campus, and if he is found to be inadequately prepared in English will be required to take remedial studies in the English language at his own expense concurrently with his university studies. If the deficiency is serious the student will be required to reduce his university studies to part-time and will consequently need to extend the period required to earn a degree. Where preparatory English courses are provided by the University their costs to students will be on the same basis as regular University courses.

(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 student on a student-visa 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.

D. 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.

E. 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 in a winter session 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 must be submitted before June 30 by student's seeking admission from Grade 12. Students seeking admission at higher levels or to special programmes must check the application dates of the various faculties and schools.

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.

2. *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 accordance with instructions given in the *Registration Guide.*

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 the one he submitted for the records 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 obtains credit for only sixty per-cent of 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.

(b) A student 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 the 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.

Students may not, concurrently with their University attendance, take studies for University degree credit through any other institution by correspondence, evening or regular session class without the specific written approval of the Dean of the Faculty in which they are studying at the University.

GRADUATION

Every candidate for a degree must make formal application for graduation. Application for graduation must be made not later than February 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.

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.
2. The passing mark in most Faculties 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.
3. 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.
4. 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 at least two semesters at a college or its equivalent. 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.
5. A student who passes in fewer than 9 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 four semesters at a college.
6. A student in any year taking a full programme of studies who does not pass in at least sixty per cent of it will be required to withdraw from the University for at least a year.
7. 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 Dean of the Faculty concerned and upheld by the Senate Admissions Committee.
8. Except in special cases, no student may repeat a course more than once.

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.

SUPPLEMENTAL EXAMINATIONS

1. 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. Normally in the Final Year he may write it twice.

2. 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 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 $10.00; at a regular outside centre, $15.00; at a special centre, $30.00. In the event that a candidate does not appear for an examination a refund will be considered 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.

3. 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.

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 $10.00 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 written 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 circum-

stances 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 with respect to sessional fees.

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.

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 cheque, bank or postal money order or by travellers cheque (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" and "Athletic" fees but not the "Graduating Class" or "Hospital" fee.

4. The Alma Mater and Athletic fees, authorized by the Board of Governors are assessed all students in the winter session for the support of the Alma Mater Society and extramural athletics. The total of these fees is $29.00 which is made up of the following:

Alma Mater Society fee:	
Building Fund (Amortization of the loan for construction of the Student Union Building)	$ 15.00
Operating expenses of the Alma Mater Society programme	9.00
Total fee collected by the Board of Governors at the request of the Alma Mater Society	$ 24.00
Athletic fee	5.00
	$ 29.00

5. The Board of Governors approves, on the recommendation of the Alma Mater Society, special fees for Undergraduate Societies. The fees recommended for 1972-73 are as follows:

Agriculture	$ 5.00	Library	5.00
Dentistry (incl. Dent. Hygiene)	20.00	Medicine (Third & Fourth Years)	15.00
Engineering	3.00	Nursing	2.00
Forestry	4.00	Pharmacy	5.00
Home Economics	2.00	Rehabilitation Medicine	6.00
Law	4.00		

6. The Graduating Class fee, authorized by the Board of Governors, is assessed 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. or the D.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.

7. **Refund of Fees**

A student who withdraws from the University must notify the Registrar's Office either in person or in writing. Refund of fees, if any, is calculated from the day on which the Registrar's Office is notified. Fees are not transferable from one session to another.

The following table shows the fees that will be charged full-time students who withdraw after registration. The term "sessional fee" refers to the full academic year. (See #13.)

First Term

During first two weeks of lectures — assessed 10% of sessional fee plus $1.00 A.M.S. fee
During third week of lectures — assessed 20% of sessional fee plus $2.00 A.M.S. fee
During fourth week of lectures — assessed 30% of sessional fee plus $3.00 A.M.S. fee
During fifth week of lectures — assessed 40% of sessional fee plus $4.00 A.M.S. fee

In addition the full Athletic fee will be refunded for those students who withdraw during the first three weeks of lectures; thereafter no refund of the Athletic fee is possible.

No refund of any part of the first instalment of fees, A.M.S. fee or the Athletic fee for withdrawals after the fifth week of lectures.

Second Term

During first two weeks of lectures — assessed 60% of sessional fee
During third week of lectures — assessed 70% of sessional fee
During fourth week of lectures — assessed 80% of sessional fee
During fifth week of lectures — assessed 90% of sessional fee

A student who withdraws after the fifth week of second term lectures will receive no refund of fees.

8. A student registered in one faculty taking the greater part of his studies in another faculty will be assessed the greater of the two faculty and course fees.

9. When permission to register late is granted, a late fee additional to all other fees, will be charged. The late fee is $25 and must be paid with the first instalment of the tuition fee. 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 $25.00 additional to all other fees will be assessed if payment of the first instalment is not made on or before September 22 or the second instalment on or before January 12, 1973. Refund of this fee will be considered only on the basis of a medical certificate covering illness or on evidence of domestic affliction. If fees are not paid in full by the following dates registration will be cancelled and the student concerned excluded from classes. First instalment — October 6, 1972. Second instalment — January 26, 1973.

If a student whose registration has been cancelled for non-payment of fees applies for reinstatement and his application is approved by the Registrar, he will be required to pay a reinstatement fee of $25.00, the late fee of $25.00, and all other outstanding fees before he is permitted to resume classes.

11. Students from outside the Province of British Columbia must be covered with some form of hospital insurance as a condition of their acceptance to the University. See "The Student Health Service" for details.

Faculty and Course:	Sessional fee amount	
1. Agricultural Sciences (B.Sc., Agr.)	$474.00	(254)*
2. Applied Science—		
Architecture (B.Arch.)	551.00	(290)
Engineering (B.A.Sc.)	554.00	(293)
Nursing (B.S.N. or Diploma)	411.00	(221)
3. Arts—		
Arts (B.A. and B.F.A.)	457.00	(243)
Home Economics (B.H.E.)	459.00	(245)
Librarianship (M.L.S.) each year	508.00	(271)
Music (B.Mus.)	573.00	(301)
Social Work (M.S.W.), 1st Year	503.00	(266)
2nd Year	457.00	(243)
4. Commerce and Business Administration—		
First Year (B.Com.)	457.00	(243)
Other Years (B.Com.)	535.00	(282)
5. Dentistry—		
Dentistry (D.M.D.)	693.00	(371)
Dental Hygiene	555.00	(302)
6. Education—		
Education (B.Ed.)	457.00	(243)
Industrial Arts Emergency Day Programme	24.00	(—)
Physical Education (B.P.E. or B.R.E.)	457.00	(243)
7. Forestry (B.S.F.)	539.00	(286)
8. Law (LL.B.)	539.00	(286)
9. Medicine—		
Medicine (M.D.) - First and Second Year	673.00	(351)
- Third and Fourth Year	659.00	(337)

Rehabilitation Medicine (B.R.M.)		
First Year	463.00	(249)
Other Years	415.00	(225)
10. Pharmaceutical Sciences (B.Sc., Pharm.)		
First Year	462.00	(248)
Other Years	540.00	(287)
11. Science (B.Sc.)	457.00	(243)

*September instalment in parentheses.

12. Graduate Studies

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 $8.00. The Alma Mater Society fee of $24.00, and the Athletic fee of $5.00, authorized by the Board of Governors, are required of all students in their first year in the Faculty.

(a) Ph.D. or Ed.D. degree:

	September	January	Sessional Fee
First Year	$255.00	$200.00	$455.00
Each of Second, Third and Fourth Years	226.00	200.00	426.00
Each subsequent year	176.00	—	176.00

A student taking a Master's degree at The University of British Columbia and then proceeding to a Doctor's degree will be exempt the First Year fees of the doctoral fee schedule.

(b) Master's degree:

	September	January	Sessional Fee
First Year	$255.00	$200.00	$455.00
Second Year	226.00	200.00	426.00
Each subsequent year	176.00	—	176.00

(c) A candidate is required to register and pay the prescribed fees in each successive year of his candidacy whether he is registered as a full-time or as a part-time graduate student. A student who fails to continue his candidacy will forfeit it; 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 outstanding fees have been paid.

(d) After the first year the fee for the terminal year in any degree programme will be computed on a 4-month basis. Candidates who finish their studies by January 31, including the submission of their theses or essays, will be charged one-third of the fee for that year, and those who finish by May 31 will be charged two-thirds of the fee for that year.

NOTE: Candidates registered in 1970-71 entitled to the assessment of fees under the former fee schedule will come under the provisions of the current schedule beginning in September, 1973.

(e) Candidates for the M.Ed. degree taking their course work during Summer Sessions or as part-time students during Winter Sessions will be assessed fees on a course basis. Candidates for the M.Eng. and M.B.A. degrees beginning studies other than in regular Winter Sessions will be assessed fees on a course basis and revert to the regular fee schedule when normal Winter Session studies are begun. A Graduate Student Centre fee and either the Summer Session Association or A.M.S. fee will be assessed on registration in each session.

(f) Graduate students accepted as candidates for a graduate degree who are required to take prerequisite or additional courses may do so without additional fee, except for those beginning graduate studies by taking courses offered in Summer Session or Intersession.

(g) Students not admissible to the Faculty of Graduate Studies who hope to qualify for admission will register as Qualifying and will be assessed fees as undergraduates on a course 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.

(h) Students not working toward a graduate degree will be registered as Unclassified and will be assessed fees as undergraduates on a course basis.

(i) Course fees—Faculty of Graduate Studies (applicable to candidates defined by para (e) above):

3 unit course	$180	2 unit course	$120
1½ unit course	90	1 unit course	60

13. Part-time Students, day or evening classes EXCEPT those registered in Faculty of Graduate Studies

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 enrolled in the Winter Session taking 6 units or less must pay fees in full in September.

All part-time students will be assessed A.M.S. and Athletic fees: $14 and $5, respectively, a total of $19 on a course up to and including 6 units or a study programme less than 2/5 of a full programme; $24 and $5 respectively, a total of $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. and Athletic fees 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.

14. Summer Session

Fees payable on Registration: (except Graduate Studies, see 12(i))

3-unit course	100.00
2-unit course	68.00
1½-unit course	50.00
1-unit course	34.00
½-unit course	17.00
Summer Session Association	3.00
Change of course	5.00
Graduate Student Centre	8.00

Auditor only—three-quarters regular tuition fee.

15. Extension Credit Courses

Fees will be assessed on the same basis as for Summer Session (the $3.00 S.S.A. fee is *not* applicable) and are payable in full on registration with the exception of the fee for auditing which is $75.00.

A student who withdraws must notify the Registrar's Office either in person or in writing.

The following table shows the fees that will be charged students who withdraw.

Before classes begin	$10.00
During second week of lectures	20% of course fee
During fourth week of lectures	40% of course fee
During sixth week of lectures	60% of course fee
During eighth week of lectures	80% of course fee

No refund of any part of the course fee for withdrawals after the eighth week of lectures.

16. 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.

17. Special Fees

For late registration, winter session	$25.00
Evaluation fee for non British Columbia documents	10.00
For Late Payment:	
First instalment — after September 22	25.00
Second instalment — after January 12	25.00
For late registration, summer session	20.00
For reinstatement after cancellation of registration	25.00

Change of course, summer session	5.00
Regular supplemental examination, per paper	10.00
Supplemental examination at regular outside centres, per paper	15.00
Supplemental examination at special outside centres, per paper	30.00
Special examination (where permitted), per paper	25.00
Review of Assigned Standing, per paper	10.00
Evaluation of practice teaching for teachers trained elsewhere	100.00
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	3.00

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 STUDENT HEALTH SERVICE

The Student 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 that is issued to all new applicants. Others may obtain copies of this brochure at the Health Service office.

Medical Requirements for Registration

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, and a chest X-ray or negative Tuberculin Test within the previous six months. Registration for those students who do not comply with this examination may be cancelled.

A complete medical examination is required for students entering the following Faculties or Schools:

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
Physical Education—Professional

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, the School of Rehabilitation Medicine, 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.

Free chest X-rays are provided by the University Health Service in cooperation with the Provincial Board of Health, Tuberculosis Division. Tuberculin tests are also available at the Health Service.

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.

General Information on Medical and Hospital Insurance

(a) Hospital Insurance

(i) 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.

Students who attend U.B.C. and are not residents of Canada are required to produce evidence of adequate sickness and hospital insurance before registration can be considered complete. Non-resident students can purchase a Medical and Hospital Plan at the time of registration This provides acceptable sickness and hospital insurance with no deductibles. The rates for 1971-72 were $65.00 for a single student and $139.00 for a married student for 12-month coverage. These rates are subject to yearly change.

(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 student 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) *Non-Resident Hospital-Medical Plan:* See separate brochure provided at time of acceptance. For further information, contact the Student Health Service, Room 114, Wesbrook Building.

Students covered by an insurance plan with a non-Canadian carrier will be billed directly for services received. Receipts should then be submitted by the student to the insurance company for reimbursement. *Canadian students who allow their insurance to lapse will be billed directly.*

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 Director of Residences is open Monday - Friday, 8:45 a.m. to 5 p.m. except for the period May 8 to August 25, 1972, when the hours are 8:15 a.m. to 4:30 p.m. All enquiries should be directed to the Office of the Director of Residences, 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 the academic year (Fall and Spring Terms), for single students on a room and board or room only basis. All rooms are completely furnished, and all bedding is supplied, however, students are expected to bring their own towels. Information booklets containing further details are available on request.

Application forms are valid only if accompanied by a $25.00 application deposit, two photographs (1½" x 1½" with name on reverse) for either Fall or Spring terms. *The application deposit is refunded only if the applicant is not offered accommodation, or if the applicant is rejected by the Registrar (in which case Housing Administration must be notified immediately in writing.)*

Rates

Single Accommodation

	Term Fees		
	Fall	Spring	Total
Walter H. Gage Residences (Room Only)*			
Single Room in High-Rise Quadrant	$252.00	$291.00	$543.00
Shared Suite in Low-Rise (Double)	$252.00	$291.00	$543.00
Totem Park Residences (Room and Board)			
Senior Single Room	$429.00	$497.00	$926.00
Single Room	$396.00	$458.00	$854.00
Double Room	$379.00	$439.00	$818.00
Place Vanier Residences (Room and Board)			
Single Room	$396.00	$458.00	$854.00
Double Room	$379.00	$439.00	$818.00
Acadia Dormitories (Men Only)			
Single Room (With Board)	$359.00	$415.00	$774.00
Single Room (Room Only)**	$192.00	$222.00	$414.00

*Each quadrant of six singles has common cooking facilities. Food Services outlets are also provided in the Common Block.

**No meals provided. No cooking allowed in the rooms.

Dons and Resident Fellows. A limited number of positions as Dons and Resident Fellows are offered each year to students in their senior years and graduate studies. Those with excellent academic records and leadership abilities should apply directly to the Director of Residences. Personal interviews are necessary.

Family Housing is provided in a limited number of unfurnished suites in Acadia Park and Acadia Camp. Conditions and rates are detailed in a separate booklet available from the Office of Director of Residences.

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., Telephone: 228-2901.

Special Accommodation

The Dean of Women's Office 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. Telephone: 228-2416.

International House provides help in finding off-campus accommodation for foreign students. Telephone: 228-4535.

Theological Colleges provide a limited number of beds in the following residences. Please contact the Dean of Residences directly.

Carey Hall (Baptist)	224-6939
St. Andrew's Hall (Presbyterian)	224-7720
Vancouver School of Theology	228-9031

Fraternities offer limited accommodation. They should be contacted directly.

FOOD SERVICES

The office of the Director of Food Services is open Monday-Friday from 8:45 a.m. to 5:00 p.m. (Aug. 28-May 5) or 8:15 a.m. to 4:30 p.m. (May 8-Aug. 25). All enquiries or comments with respect to Food Services should be sent to the Director.

Food Services operate dining rooms in the Walter Gage, Place Vanier and Totem Park Residence areas and provide three meals a day, seven days a week. See Student Housing.

Campus Food Services consist of cafeterias and snack bars located at the Bookstore, Auditorium, Buchanan Lounge, War Memorial Gymnasium, the Barn, Ponderosa, Student Union Building and a Mobile Snack Bar.

All hours of operation are posted in each area.

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, vocational guidance, 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 list of private homes is maintained which offer free room and board in return for services. Women students wishing to avail themselves of these facilities should contact the office of the Dean of Women in person to discuss their over-all academic responsibilities and financial resources.

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., except during the period May 8 to August 25 when they are 8:15 to 4:30 p.m. Saturday appointments may be made where necessary.

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:* Organized counselling services staffed by trained advisors are available for students either registered at the University or those considering registering. The Counselling Service offers the students an opportunity to discuss, in a confidential and professional setting, any matter that may be of concern to them. This might include concerns regarding vocational and educational choice, or students may wish assistance with concerns of a more personal nature that seem to be impairing their University performance. The emphasis is on helping the student increase his competency in determining realistic goals and in choosing rational means of attaining them. On matters dealing with course requirements and pre-requisites for study programmes for specific objectives, students should consult advisors in the faculty in which they are registered or plan to register. 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:* A programme of voluntary aptitude testing is available to all students who are either attending the University or planning to attend. The purpose of these tests is to provide assistance to students in determining educational and vocational goals. The results of these tests will not, in themselves, indicate definite objectives. When measures of aptitude, achievement and interest are used in conjunction with other information, they often can assist students to choose satisfactory and realistic goals.

For those wishing to write the UBC Aptitude Test Battery, arrangements can be made by contacting the Counselling Office, Office of Student Services. Freshman students are encouraged to complete them during the early part of the summer. They will then be able to arrange a counselling appointment during the summer months prior to registration. No fee is charged for this service.

Testing and consultation are available for students and prospective students throughout the year. Individualized testing programs may be arranged by the student if he wishes more specific information about his interests and aptitudes. Appointments can be made at the Counselling Office, Office of Student Services.

Students wishing to write the following tests can obtain further information at the Counselling Office.

The College Entrance Examination Boards
The American College Testing Programme
The Graduate Record Examination
Test for Graduate Study in Business
Test of English as a Foreign Language
The Law School Admission Test
The Dental Aptitude Test
The Medical College Admission Test
The Graduate School Foreign Language Testing Program
Miller Analogies Test

Service for Admission to College and University (SACU)

(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. 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.

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, *except during the period May 8, to August 25, 1972, when they are 8:15 to 4:30 p.m.*

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.

The Bookstore is operated on a self-sustaining financial basis with respect to both operating and capital development costs in accordance with the requirement of the Government of the province of British Columbia.

A student-faculty advisory committee, appointed by the President, meets regularly throughout the academic year to formulate policy recommendations and to review operating practices of the Bookstore. Any comments with respect to the services of the Bookstore should be forwarded to the Chairman, Bookstore Committee, c/o the Bookstore.

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 may 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 and school is represented 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 used to finance the construction of the Student Union Building, brings the Alma Mater fee to a total of $24.

The offices of the Alma Mater Society are located in the north west corner of the second floor in the Student Union Building.

Student Union Building

The 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), 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 student-sponsored 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.

Publications

The Alma Mater Society publishes "The Ubyssey", the student newspaper which appears twice weekly; 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. They may be contacted through the U.C.C. office in the 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 thirteen extramural sports and eleven intra-mural sports. This programme is run entirely by the students.

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.

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.

ALUMNI ASSOCIATION OF THE UNIVERSITY OF BRITISH COLUMBIA

Board of Management:
1971-72

Honorary President

Dr. Walter H. Gage, President, U.B.C.

Officers

President: Mr. Frank C. Walden*
Past President: Mr. T. Barrie Lindsay*
First Vice-President: Mrs. H. Frederick Field*
Second Vice-President: Mr. George Morfitt*
Third Vice-President: Mr. R. M. Dundas.
Treasurer: Mr. Donald J. Currie*

Members-at-Large

Mrs. Geoffrey Bird*
Mr. Kenneth L. Brawner*
Mr. Chuck Campbell*
Mr. David Helliwell*
Dr. J. Reid Mitchell*
Dr. Ross Stewart*
Mrs. R. W. Wellwood*
Mr. Harry White*

Degree Representatives

Agricultural Sciences: Mr. Robert S. Tait
Applied Science: Mr. J. Keith Brimacombe
Architecture: Mr. Steven Zibin
Arts: Mr. Graham Nixon
Commerce and Business Administration: Mr. R. Bernie, Treasurer
Dentistry: Dr. E. Fukushima
Education: Mr. James Killeen
Forestry: Mr. J. F. McWilliams
Home Economics: Miss Barbara Wood
Senate Representatives: Mrs. John MacD. Lecky, Mr. Kenneth R. Martin, Mr. Paul Plant
Faculty Association Representatives: Dr. R. V. Kubicek, Dr. Patricia Montgomery
Student Council Representatives: Mr. Grant Burnyeat, Mr. David Dick
Law: Mr. G. T. Bowden
Librarianship: Mrs. Roderick V. M. Cardin
Medicine: Dr. S. J. Peerless
Music: Mr. John S. Chappell
Nursing: Miss Ann Taylor
Pharmaceutical Sciences: Mr. W. F. Baker
Physical Education: Mr. Earl R. Farenholtz
Recreation: Miss Betty Ross
Rehabilitation Medicine: Miss Betty Smith
Science: Mr. Rodger Ramage
Social Work: Mrs. Helen McCrae
Ex-Officio Members: Miss J. Peskett, Mr. J. Denholme, Mr. Robert W. Johnson*

*Member of Executive Committee

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 of the University and is automatic upon graduation.

The Association is governed by a Board of Management elected each year. The Association offices are in Cecil Green Park, 6251 N.W. Marine Drive, Vancouver 8, B.C.

There are now about 56,000 U.B.C. graduates around the world. The Association produces and distributes its magazine, the *Chronicle*, to all graduates. A complete address file is maintained on all alumni. This forms part of the rolls of Convocation from which the Chancellor and Convocation members of Senate are elected every three years.

Contributions by alumni and friends of the University to the Alumni Fund make possible the awarding of eighty scholarships and bursaries of $350.00 each to B.C. High School graduates and former B.C. regional college students under the Norman MacKenzie Scholarship and John B. Macdonald bursary plans. The Fund also provides four National Scholarships and financial aid to the Library, athletics, the President's Fund, and a variety of special student and faculty initiated projects which can not be covered by the university's budget.

The Association sponsors a wide range of programmes on a continual year-round basis, such as class and group reunions, the Young Alumni Club, Alumni Conferences, alumni meetings in other cities of Canada and the U.S.A., programmes of graduates of particular faculties such as Commerce and Business Administration, Nursing and Law. The Association conducts research and prepares reports on many aspects of University affairs and maintains contact and discussion of university problems with members of the Provincial government.

University graduates have always maintained an interest in their alma mater to insure that generations to come have equal if not better educational opportunity. Your participation will be appreciated by the University and to-day's students. For further information contact Jack Stathers, Executive Director, at Cecil Green Park, 228-3313.

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, or for the May-July intersession combined with summer session, 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 1. A late registration fee of $20.00 is assessed all registrants registering after May 1. (These deadlines may be extended for students enrolled in the immediately preceding winter session.)

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. Summer session examinations are held at the close of the summer session.

5. 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 Centre for Continuing Education. The Centre sponsors a limited number of evening credit courses, May through July. Students interested may contact the Centre 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 $3.00 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 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.

EXTENSION CREDIT COURSES

1. Evening or late afternoon courses 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. All students must be formally admitted to the University prior to registering in the Extension-Credit Division. All applications for admission together with all the necessary documents should be sent directly to the Registrar's Office before the published deadline (see the Academic Year).

3. Students attending the September/April classes will normally be tested by the ordinary winter session examinations. May/July course examinations will be held at the end of July.

4. Regulations in respect to credit, standing, extra-mural work, examinations and supplementals are given in the appropriate Faculty calendars.

5. Correspondence and off-campus courses may be offered as prerequisites, but they are not acceptable for credit on a Master's programme.

6. Most 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 Extension-Credit Division of the Centre for Continuing Education.* 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 Centre for Continuing Education. 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. An Independent Study Calendar is available from the Centre for Continuing Education or from the Office of the Registrar.

Admission. Correspondence courses are open to applicants with full First Year University or College or equivalent 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. Registration for all courses may take place at any time throughout the year. Some courses must be completed within a specific time period. Most courses are open to students who do not wish to take them for credit. Non-credit students should register through the Correspondence Course Division of the Centre for Continuing Education. 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.

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.

The Correspondence Course Division of the Centre for Continuing Education also offers certificate programmes. Courses are listed and described in the Independent Study Calendar.

For non-credit diploma courses in the Faculty of Commerce and Business Administration, see that faculty.

A student wishing to change from a correspondence course for which he has registered to another must apply to the Registrar within 30 days of the date of registration.

THE UNIVERSITY LIBRARY

The University of British Columbia Library is the largest university library in Western Canada, with almost 2,000,000 volumes including microforms. It serves the University through a system of twelve 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 40,000 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 Dr. 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

U.B.C.'s central book collection is held in the Main Library. The front (west) sections of the building house the card catalogue, public services and reference divisions. The rear of the Library is made up of several floors of bookstacks, where the bulk of the 500,000-volume collection is held. Anyone may use the Library and its resources, but a U.B.C. library card must be presented when material is charged out.

Just inside the centre front doors is an entrance hall, with a building directory which will help you find all Main Library working areas and services. Stairs in the entrance hall lead up to the Main Concourse, where U.B.C.'s central card catalogue lists and locates virtually all material held in the library system. The staff at the nearby Information Desk will give assistance with the card catalogue, help you locate material in the bookstacks, and give general information about library holdings and services.

The Main Library's reference divisions can offer further help if you are working in a particular subject area. Specialized reference services are available from the following divisions: Asian Studies, Fine Arts, Government Publications and Microforms, Humanities, Maps, Science, Social Sciences and Special Collections.

The Library also provides general services such as photocopying, microform copying, and interlibrary loans. Individual study carrells are available in the bookstacks for students doing advanced research. Below the main entrance hall is a lounge area with vending machines.

Sedgewick Library

To the west of the Main Library, directly under the Main Mall, is the new Sedgewick Undergraduate Library. This large collection of books, periodicals, and reference material has been carefully selected to serve students in most undergraduate Arts courses, and in first or second year Science and Applied Science courses. Although the Main Library is open to all students, the Sedgewick Library is often the best and most convenient source of materials needed by undergraduates. Also provided are coin-operated photocopying machines, lounging areas and two floors of study space. Librarians are at the reference desk seven days a week to provide help in using and interpreting library materials.

Located on the top floor of the new Sedgewick Library, at the south end of the building, is the Wilson Record Collection and Listening Room. Listening facilities are available here at no cost, and borrowing privileges for a small fee.

Branch Libraries and Reading Rooms

In addition to Sedgewick, ten other 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 also listed in the Main Library's central catalogue. A list of these branches, with their locations, is given below.

1) Animal Resource Ecology Library (formerly Fisheries)	Room 103-A, Hut B-8
2) Crane Memorial Library for the Blind	Brock Hall Extension
3) Curriculum Laboratory	Top floor, centre block, Education Building
4) MacMillan Library (formerly Forestry/Agriculture)	Room 360, MacMillan Building
5) Law Library	Main floor, Law Building
6) Mathematics Library	Main floor, south wing, Mathematics Building
7) Music Library	Fourth floor, Music Building
8) Marjorie Smith (Social Work) Library	Basement floor, Graham House
9) Woodward Biomedical Library	Medical Sciences Complex, behind Wesbrook Building
10) Biomedical Branch Library	Vancouver General Hospital

A number of teaching departments on campus have set up their own reading rooms usually consisting of small working collections of books and journals. In many cases use of this material is restricted to graduate students and faculty members.

Hours of Service

The U.B.C. Library now has one of the longest schedules of library opening hours in North America. Hours for the three largest libraries are given below:

Winter Session (September 11 - April 30)

Main and Sedgewick Libraries	
Monday - Friday	8 a.m. - midnight
Saturday	9 a.m. - 5 p.m.
Sunday	12 noon - midnight
Woodward Library	
Monday - Friday	8 a.m. - midnight
Saturday	8 a.m. - 5 p.m.
Sunday	12 noon - midnight

Summer Session (July 3 - August 18)

Main, Sedgewick and Woodward Libraries	
Monday - Thursday	8 a.m. - 9 p.m.
Friday - Saturday	9 a.m. - 5 p.m.
Sunday	Closed

Service hours for each campus library are posted at the library entrance. A complete printed list of library hours is available from all public service desks. Advance notice will be given of any change.

Between the Winter and Summer Sessions, most campus libraries are open between 9 a.m. and 5 p.m. Monday through Friday, and are closed on weekends. In recent years, however, the Main, Sedgewick and Woodward Libraries have extended their hours of opening during May and June; information about such changes will be 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" should apply to the Circulation Office and should be prepared to pay an annual fee.

Attention New Students

Several publications are available describing the Main Library's holdings and services; these are available at the Information Desk in the Main Concourse, and at all other public service desks. In addition, some branch libraries offer brochures describing their collections 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 the early weeks of the university year. Information about these will be posted at the entrances to Sedgewick and the Main Library.

CENTRE FOR CONTINUING EDUCATION

General Administration

GORDON R. SELMAN, B.A., M.A., Director.
JOHN P. BLANEY, M.Ed., Ed.D., Associate Director.
KNUTE BUTTEDAHL, B.Com., M.A., Associate Director.

Programme Areas

Agriculture, Fisheries and Forestry
GRAHAM A. DREW, B.S.A., M.Ed., Director.

Communications and Information
JO LYNNE HOEGG, B.A., M.Sc., Director.

Community and Regional Planning and Architecture
JAMES G. SELLNER, B.A., M.A., Director.

Conference Consultation
JINDRA KULICH, B.A., M.A., Director

Creative Arts
SHEILA GREY MAXWELL, B.A., Director.

Credit Courses
AUDREY L. CAMPBELL, B.A., M.Ed., Director.

Daytime
PATRICIA THOM, B.Sc., M.A., Director.

Education-Extension
PHILIP E. MOIR, B.Ed., M.Ed., Director.

Continuing Education for Engineers
GEOFFREY T. MATTHEWS, B.Sc., Ph.D., P.Eng., M.E.I.C., Director.

Humanities and Sciences
SOL KORT, B.A., B.Sc., M.Sc., Director.

Language Programmes
MARYFRANK MACFARLANE, B.Com., M.S.W., Director.

Continuing Legal Education
KENNETH C. WOODSWORTH, B.A., Barrister and Solicitor, Director.

Public Affairs
GERALD N. SAVORY, B.A., M.A., Director.

Reading and Study Skills Centre
To be appointed.

Social Sciences
HENRY M. ROSENTHAL, B.A., B.S.W., Director and Chairman, Urban Affairs.

Social Work, Aging and Human Relations
MARJORIE V. SMITH, B.A., B.S.W., M.S.W., Director.

Administrative Assistant to the Director
GENIA KAYE, A.R.C.T.

Programme Services

ROGER G. SMITH, A.C.A., M.B.A., Accountant and Office Manager.
B. ANNE WAGGONER, B.A., Assistant, Programme Coordination.

The Centre for Continuing Education was created in July, 1970, replacing the Department of University Extension, which since 1936 had served adults in British Columbia. The name Centre for Continuing Education is representative of a transition in extension work—focusing more on the continuing education of graduates and education at an advanced level.

The Centre for Continuing Education offers opportunity for university level continuing education in the following areas:

1. degree programmes for part-time students, including on-campus and off-campus courses, correspondence study and international in-the-field courses;
2. continuing professional and technical education in cooperation with Faculties, Schools and Institutes, in the fields of agriculture, community and regional planning, education, engineering, fisheries, forestry, law, home economics, and social work;
3. certificate and diploma programmes in adult education, the education of young children, criminology, engineering, social work, and vocational instruction;
4. general non-credit or liberal education courses in humanities and sciences, creative arts, social sciences and public affairs, designed to give the individual a greater knowledge of himself and his environment and an opportunity to develop his intellectual abilities.

The Centre is also involved in experimental projects and inter-disciplinary programmes specially designed to focus on community problems and the unique interests of adults.

Other educational services of the Centre include: Reading and Study Skills Centre, Writing Improvement Programme, Counselling and Testing Service, Office of Short Courses and Conference Consultation and Speakers Bureau.

The Centre is located at the northeast corner of the campus on Chancellor Boulevard between Wesbrook Place and Newton Crescent.

For calendars and bulletins relating to specific program areas, contact the Centre at (604) 228-2181 or write Centre for Continuing Education, The University of British Columbia, Vancouver 8, B.C.

CREDIT COURSES

A variety of courses is offered in the Faculty of Arts and Education, with a few courses as well in Science, Commerce and Nursing. Emphasis is primarily at the third and fourth year levels.

Brochures are available from the Centre on credit work as follows:

—with information on Credit Courses offered each year in the September to April session.

—with information on credit courses offered in the May to July inter-session period.

—with information on Independent Study Correspondence Courses.

Admission Requirements

A. Extension credit courses may be taken for degree credit by students who are eligible for registration at least as Second Year students (full undergraduate or conditional) and who have the prerequisite standing. Those who are proceeding toward a Bachelor of Education degree must have an approved British Columbia teaching certificate.

B. Admittance to the University is *not* required for persons wishing to take Extension Credit courses on a NON-CREDIT basis.

Registration

A. Students who have not previously enrolled in credit courses for credit at The University of British Columbia either for regular session, summer session, or Extension credit courses must submit to the Registrar an Application for Admission, official evidence of matriculation and documents certifying all futher academic or professional training by JUNE 30 for the winter session and APRIL 1 for the May-July session No registration will be accepted from new students until all the above documents have beeen received and evaluated

Application for Admission forms will be sent upon request (see Extension Credit Courses Brochure)

B. *Students who have previously enrolled in credit courses for credit at The University of British Columbia:*

(1) Registration in Extension credit courses should be completed by mail.

(2) Registration material will be sent upon request; registration cards must be completed fully, including courses to be taken and returned to the REGISTRAR'S OFFICE Students are reminded that it is their responsibility to ensure that courses elected are applicable to their programs.

(3) Registration will not be considered complete unless the registration cards are accompanied by a certified cheque or a postal or bank money order to cover the total fee.

C. *Students who wish to register for Extension credit courses on a non-credit basis* should register through the Centre for Continuing Education. They should send their name, address, telephone number, course selection and cheque, made payable to the University of British Columbia to the Centre for Continuing Education.

D. Students registering for credit in off-campus courses in Education must have completed the basic teacher training programme and possess an approved B.C. teaching certificate. Off-campus courses in Education may be counted for credit on an undergraduate programme if the course selected is an approved part of the student's programme.

E. Regular session students may take a credit correspondence course during the summer months providing they have the approval of their Faculty Adviser, the instructor who marks the course and the Registrar. Students are cautioned against taking a correspondence course during the summer break because of the relative shortness of time in which to complete the assignments, and have them marked and the difficulty of having instructors available.

F. Students who are attending the regular winter session of The University of British Columbia or any other university may not avail themselves of a credit correspondence course until the session they are attending is over. Correspondence students registering for winter sessions will be required to suspend their correspondence course without the privilege of an extension of time.

G. Permission to take more than one correspondence course at a time will be granted in special cases.

H. The maximum credit for the intersession period May-July combined with the Summer Session July-August in any one academic year is 6 units.

Faculty of Arts Advisers

Enquiries concerning academic questions should be directed to The Senior Faculty Adviser, c/o The Dean of Arts, The University of British Columbia, Vancouver 8, B.C., or by telephone 228-4028.

Faculty of Education Advisers

Enquiries regarding academic questions should be directed to either the Elementary Division Faculty Adviser or the Secondary Division Faculty Adviser; by mail c/o The Faculty of Education, The University of British Columbia, Vancouver 8, B.C., or telephone 228-2141.

Teacher Certification

All enquiries concerning certification must be directed to the Registrar, Department of Education, Victoria, B.C. If work of this session changes your qualification category, obtain application form from Teacher Qualification Service, 1070 W. Broadway, Vancouver, or Records Office, Faculty of Education, U.B.C.

Master's degree Requirements

Those who wish to take any Extension Evening Credit Courses leading towards a graduate degree must first obtain the approval of the Faculty of Graduate Studies. They should contact the Office of Dean of Graduate Studies.

Faculty of Science Advisers

Enquiries related to academic matters should be directed to the Office of the Dean, Faculty of Science, The University of British Columbia, Vancouver 8, B.C. Telephone: 228-3336 or 228-3337.

School of Nursing Advisers

All enquiries 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.

Text Books

The University Bookstore is open from 9 a.m. to 5 p.m., Monday through Friday, *except from May 8-August 25 when it is open from 8:15 a.m. to 4:30 p.m.*

Books may also be obtained by writing to: University Bookstore, The University of British Columbia, Vancouver 8, B.C. The Bookstore accepts C.O.D. orders only; do not send any money with your order.

Library Services

Students enrolled in on-campus Intersession Extension credit courses have full privileges in the University Library, and are expected to make personal use of the Library. A printed handbook is available from the information desk in the Main Library. The information staff will assist students in finding material and using the Library. Students should pick up their library cards from the Circulation Desk, Main Library.

During May and June the Main Library and the Sedgewick Library will be open on Tuesday and Wednesday evenings until 10 p.m. For more current information on library hours, enquire at the information desk in the Main Library or telephone 228-2077.

Reading Lists

Reading lists, when available, may be obtained in advance by writing Credit Courses, Centre for Continuing Education, University of British Columbia, Vancouver 8, B.C. or by telephoning 228-2181, local 251.

Correspondence Courses

Information on credit correspondence course materials, completion time, examinations, text books, library services, and other specifics is available in the Independent Study Credit Calendar. For a copy contact The Centre for Continuing Education, The University of British Columbia, Vancouver 8, B.C. 228-2181.

In-the-Field Credit Courses

Each year credit courses are offered in-the-field. All efforts are made to keep costs at a minimum. Where possible, dates are arranged so students may take advantage of block bookings or charter flights arranged by such organizations as the B.C. Teachers' Federation, the U.B.C. Alma Mater Society, or a travel agency.

Persons wishing to take these courses on a non-credit basis may also apply.

Summer, 1972 Courses

Anthropology 330 (3 units), Peasants and The Third World, Mexico and Cuba.

Fine Arts 497 (3 units), Special Studies in Renaissance Art, Florence, Italy.

Fine Arts 541 (3 units), Special Advanced Course, Venice, Italy.

Geography 495 (3 units), Geography of Latin America, Mexico and Cuba.

Education (3 units), Physical Education in England and Scandinavia.

If you wish to be placed on the mailing list to receive further information please send your name and address to: Credit Courses in the Field, 1971, Centre for Continuing Education, The University of British Columbia, Vancouver 8, B.C.

CERTIFICATE AND DIPLOMA PROGRAMMES

Certificate and Diploma Programmes are offered in several fields. Each consists of a specially designed sequence of courses planned in cooperation with appropriate Faculties and Schools.

● Diploma Programme in Adult Education

The Faculty of Education and the Centre for Continuing Education 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.

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.

Required Curriculum

Introduction to Adult Education
Methods of Adult Education
Foundations of Adult Education OR *Mass Media and Adult Education*
Seminar for Diploma Students
Elective—One senior course chosen from relevant field
Short Internship

Further information concerning this programme may be obtained by writing to the Administrator, Diploma Programme in Adult Education, Centre for Continuing Education.

● Criminology Certificate Programme

The purpose of the programme in Criminology is to offer a series of courses of study on subjects related to individual and social behaviour, concepts of social and political organization, and on advanced administrative and technological methods, which will provide a broad theoretical basis of understanding for those who must deal in their daily work with problems of delinquency and criminal behaviour.

The programme is designed for working officers in the police forces, in Provincial or Federal Probation or Corrections work, or in the Federal Penitentiary Service. It is open, however, to any persons who are interested in this field of study.

A descriptive brochure is available upon request from the Centre for Continuing Education.

● **Education of Young Children Certificate Programme**

Education Extension announces a new, diversified, programme of further study leading to a certificate in the Education of Young Children. Advanced courses will be open to licensed pre-school teachers and to public school kindergarten and primary teachers and to nurses, social workers and others in the helping professions. For detailed information contact: Education Extension Programme, Centre for Continuing Education, U.B.C., 228-2181, local 220.

● **Diploma Programmes in Engineering**

The Faculty of Applied Science and the Centre for Continuing Education in cooperation with the Council on Continuing Education for Engineers, offer a Diploma in Administration for Engineers. The programme enables individuals to study the quantitative or qualitative aspects of administrative decision-making.

The curriculum for the Diploma in Administration for Engineers consists of a set of core courses, which comprise two-thirds of the curriculum, plus specified elective courses which enable individuals to lean more towards either the quantitative aspects of administrative decision-making or the qualitative. Each course listed involves approximately the same amount of work as would be covered in an average one-unit course in the regular university curriculum. The satisfactory completion of each course will be determined by examination. Examinations will either consist of written assignments completed throughout the course or by an "open-book" examination given at the conclusion of the course. The Diploma sequence will consist of a minimum of twelve units of Diploma credit and candidates will be expected to have passed the requisite examinations for all of the prescribed courses before being eligible for the award of a Diploma.

Core Courses

Basic Statistics
Contract Law for Engineers
Legal Aspects of Contract Administration
Engineering Economics
Financial Analysis and Capital Investment Decisions
Introduction to the Principles of Management
Scheduling of Engineering Projects
Statistics as an Engineering Tool
Technical Report Writing

Elective Courses

Digital Computers and Fortran Programming
Advanced Fortran Programming Techniques
Industrial Relations for Professional Engineers
Personnel Administration I and II
Management Problems
Operations Research I and II

Other *electives* will be added as the need arises.

Further information concerning this Programme may be obtained by writing to Engineering Programmes, Centre for Continuing Education.

● **Social Work Registration Programme**

British Columbia Association of Social Workers—School of Social Work Courses for Social Work Registration Programme.

This programme of courses is designed to assist practising social workers without professional education to obtain basic social work training, making it possible for them to seek registration under the 'Registered Social Workers Act' of British Columbia.

First priority in admissions will be given to applicants who are members of B.C.A.S.W. and wish to take the programme in order to obtain registration. Second priority will be given to applicants who already have the title "Registered Social Worker" and wish to extend their social work training.

Course Programme

Social Service System
Human Behaviour and Social Development
Basic Social Work Methods

Further information may be obtained by writing Social Work Registration Programme, Centre for Continuing Education.

CONTINUING PROFESSIONAL AND TECHNICAL EDUCATION

Information on continuing professional and technical education programmes, including courses offered, fees, registration, dates, times and locations, is included in the calendars of the Centre and in special brochures and information sheets on specific programmes. To receive information about a particular subject area, contact the Centre to have your name placed on our mailing lists.

Areas of continuing professional and technical education:

Agriculture, Fisheries and Forestry

In cooperation with the Faculty of Agricultural Sciences and the Faculty of Forestry, a variety of programmes relating to primary industries is offered at locations throughout the province. Kinds of programmes include: *agriculture*—roadside development, landscaping, food science, beef production, equine management; *forestry*—forest ecology, forest inventory, forest hydrology; *fisheries*—technical fisheries short courses.

Community and Regional Planning

Together with the School of Community and Regional Planning, and in consultation with the Planning Institute of British Columbia, a programme of continuing education for professional planners is offered. Also, programmes about planning concepts, issues, and methodology are arranged for other professional groups and interested members of the public.

Education-Extension

In co-operation with the Faculty of Education, Education-Extension offers off-campus courses, non-credit courses, conferences, workshops and lectures in the field of education. Programmes are directed to teachers, educational administrators, counsellors, various specialists in public school and adult education, parent teacher organizations and other interested citizens. Cooperative working relationships are maintained with agencies such as the B.C. Teachers' Federation, the B.C. School Trustees' Association, the Department of Education and other universities in the province. Activities centre on recent developments and current concerns in education. A Certificate Programme in Education of Young Children is administered by Education-Extension; a Diploma Programme in Adult Education is offered through the Centre.

Continuing Education for Engineers

Continuing Education for Engineers is sponsored jointly by the Faculty of Applied Science, the professional associations and the Centre for Continuing Education. The programme is directed to the following objectives:

(1) to provide a means by which professional engineers can systematically update their knowledge through a planned programme of instruction in specific areas of engineering. This includes the sequential programming of a Diploma in Engineering Administration.

(2) to offer programmes aimed at bridging the gap between academic knowledge acquired by recent engineering graduates and the professional knowledge gained through practice in the profession.

(3) to provide courses giving professional engineers broader and deeper insight into specialized subject areas.

(4) to provide courses directed to the needs of a particular industry, including persons involved in both mining and the pulp and paper industries.

Programmes are held in Vancouver and at a number of other locations throughout the province.

Human Relations and Staff Development

Courses are offered in group dynamics and group leadership skills for persons engaged in working with people in a variety of fields.

Continuing Legal Education

Continuing Legal Education is sponsored jointly by the Faculty of Law, the B.C. Section, Canadian Bar Association and the Centre for Continuing Education. Programmes are planned with the objectives of improving and extending lawyers' knowledge of contemporary laws and processes, directing attention to newly developing areas of law and making available information and practices gained from business or other professions where this might be useful. Courses are planned both for those who practice at the Bar and those who practice as solicitors A number of publications relating to B.C. law are produced by the Centre. Courses are held in Vancouver and in a number of centres throughout the province.

Courses for the general community are also offered in cooperation with other professional and lay groups concerned with knowledge of the law.

Social Work

Social work programmes are sponsored jointly by the Centre for Continuing Education and the School of Social Work. Institutes and evening courses are offered for professional social workers, and the Social Work Registration Programme (sponsored with the British Columbia Association of Social Workers), provides basic social work training for practising social workers without professional education.

Other Professional and Technical Continuing Education Programmes

Professional and Technical Continuing Education Programmes are offered in other fields on a less regular basis. These include: programmes in geology, home economics, computer science, pastoral education, architecture and recreation.

GENERAL CONTINUING EDUCATION PROGRAMMES

General non-credit or liberal education courses in humanities and sciences, creative arts, social sciences and public affairs, designed to give the individual a greater knowledge of himself and his environment and an opportunity to develop his intellectual abilities, are offered.

Fields of study include:

The Daytime Programme

The Daytime Programme offers non-credit courses, seminars and conferences designed for the interests of adults who are free to pursue continuing education during daytime hours. Subjects span many disciplines focusing on humanities, social sciences and creative arts. Programmes are held at locations throughout the Greater Vancouver community as well as on the UBC campus. Special emphasis is given to programmes for women.

Humanities

Courses in the humanities form a major portion of non-credit continuing education programmes offered by the Centre. Traditional humanities courses offer opportunity for intellectual enrichment in fields such as literature, philosophy, religious studies, and classical studies. At the same time, more and more programmes offer an interdisciplinary treatment of subject matter emphasizing relationships between academic disciplines. Programmes of this nature include three ongoing themes: Quest for Liberation; Explorations in Human Potential; and Humanities and Life Sciences.

Public Affairs

Public affairs programmes concentrate on local, national and international affairs and promote the objective examination of issues and problems which involve the making of public policy. These include seminars and conferences in regional centres of the province, such as the annual Okanagan Conference on International Affairs in Vernon, offered by the Centre in cooperation with local organizations.

Social Sciences

Social sciences programmes in archaeology, anthropology, sociology, psychology, economics and political science are offered by the Centre. Of special interest are programmes on contemporary social issues: the ecology movement, Canadian conflicts and social issues, society in the technological age, social and political implications of educational innovations; and programmes of British Columbia Indian cultures.

Urban Studies

Programmes in urban studies help to effect community change and development by making available university resources and knowledge to the general public. These programmes are designed for professional community planners, elected officials, and community organizations.

Creative Arts

Creative Arts programmes are offered by the Centre in a wide spectrum of creative areas. Courses are basically of two different types—lectures on appreciation of the arts which often include field trips to galleries, exhibitions, studios and the homes of artists; and studio courses where participants actually become involved themselves in mastering the techniques of the art form.

Summer Programmes

Summer programmes in the liberal arts involve participation in workshops, in-the-field programmes, daily classes and evening courses. A brochure on the Summer Programmes is available from the Centre.

NON-CREDIT COURSES

Admission

No formal admission procedure is required. Non-credit programmes generally are open to all adults. In certain cases prerequisites are required and are indicated in course descriptions.

Registration

Registration for courses and other programmes may be made by mail or in person at the Centre or at the opening session of most classes. Application forms for registration may be obtained by telephoning or writing the Centre. Enrolments are accepted in the order received and must be accompanied by full fee. Persons are admitted to classes only after full course fee has been paid.

Fees

Fees vary for courses and are listed in Centre calendars and special programme brochures. Generally special rates for students and couples apply.

Refunds

Persons applying for a refund must do so in writing before the second meeting of a class or before the opening of a seminar, conference or class with limited enrolment. An administrative charge of $3.00 is deducted. Original receipt must accompany application for refund. Refunds will not be issued after the second meeting of a class or after the opening of a seminar, conference or class with limited enrolment. Full fee is refunded in cases where courses are cancelled.

Income Tax Deductions

Persons participating in Centre programmes may claim exemption for the amount of any tuition fees if such amount exceeds $25.00. Duplicate receipts will not be issued.

Programme Locations

Most courses are held on The University of British Columbia campus. A number are held at locations throughout the Greater Vancouver community including public libraries. Most daytime programmes are held at off-campus locations. Special non-credit programmes are held at locations throughout the province.

Course Calendars and Special Programmes Brochures

The Centre publishes an Autumn and Spring Calendar of courses offered in Vancouver. Brochures, bulletins and information sheets relating to specific programmes are published throughout the year. Persons wishing to be placed on the Centre General Course mailing list to receive information about a specific subject area should contact the Centre at (604) 228-2181 or write Centre for Continuing Education, The University of British Columbia, Vancouver 8, B.C.

Educational Travel Programmes

Since 1965 The Centre for Continuing Education has offered educational travel programmes. Programmes offered include special educational components: orientation programmes and language courses related to the areas to be visited; visits to places not on the regular commercial tours; seminars and other educational events in the countries being visited involving local experts drawn from academic, governmental, business, professional and artistic circles; and in some cases taking academic leaders along with the tour group in order to assist with the general understanding of what is seen and experienced.

Programmes for 1972 include:

South East Asia—summer
Japan—spring
Scandinavian Study Tour—focussing on planning—May-June
Social Welfare Travel Programme to England and Sweden
People's Republic of China—May

EXTENSION EDUCATIONAL SERVICES

The University of British Columbia Reading and Study Skills Centre

Courses for Students and Adults in Reading and Study Skills.

The University of British Columbia Reading and Study Skills Centre offers individualized programs for students and adults who wish to improve their reading and study skills for academic, professional and personal reasons.

Course work emphasizes Increase of Reading Rate and Comprehension—Previewing, Skimming and Scanning—Study Habits and Skills—Critical Reading Skills—Flexibility of Reading Rate—Reading Skills in Subject Matter and Special and Professional Interest Areas;

Registration: For information please write or phone Secretary, Reading and Study Skills Programme, Education-Extension Centre for Continuing Education.

The University of British Columbia Writing Improvement Programme

Courses for Students and Adults to Improve Essay Writing.

Education-Extension in consultation with the English Department, Faculty of Arts and the Faculty of Education, administers a program of composition and essay writing improvement courses for students and adults. Course work emphasizes skills required for writing literary essays, problems of interpreting a topic, organizing material and presenting the final draft. All student work is marked and discussed individually.

For information please write or phone Secretary, Writing Improvement Programmes, Education-Extension, Centre for Continuing Education.

English Courses for International Students

Courses in spoken and written English to help university-level international students improve their proficiency in English will be offered during the fall and winter terms—intensive courses in the summer. Techniques used in the courses will apply the principles and research of modern linguistic science to the pronunciation, intonation and grammatical patterns of spoken English and the skills of reading and writing.

The enrolment in each section will be limited so that attention can be given to individual requirements. The courses are non-credit and do not guarantee admittance to a university.

For further information write Language Programmes, Centre for Continuing Education.

Counselling and Testing Services for Extension Students

Student Services, U.B.C., offers assistance to adult students wishing to discuss educational and vocational decisions and problems. Write for application form to: Extension Adult Services, Centre for Continuing Education.

Indian Education Resources Centre

A joint project of the Native Indian Teachers of B.C., the Faculty of Education and the Centre for Continuing Education.

The aim of the Centre is to help improve education for native Indian students by distributing resource materials, sponsoring courses on Indian culture, history and education, encouraging involvement of Indian people in educational decision-making and providing facilities for research and projects in Indian education.

For information on projects and programmes call the Indian Centre at 228-4662 or 228-2181. Located in Hut 0-12 west of Education Building. Visitors welcome.

COMPUTING CENTRE

The facilities of the Computing Centre are available for research and teaching. The Centre operates a full Duplex IBM System 360, Model 67, providing on-line time-shared facilities throughout the day and night. The present equipment includes two central processors, 1 million bytes of high-speed core storage, 2 high-speed drums, 2 model 2314 disk storage devices, and a Datacell. Terminal devices include a graphics terminal, 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 keypunching 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

The Office of Labour Relations and Personnel

The Office of Labour Relations and Personnel, situated in the Main Mall, North Administration Building, has the following responsibilities 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: Patrol and Parking, and Office Services. All inquiries should be addressed 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 broadcasts, and by written releases to all potential news outlets. The department enhances its function by the publication of *UBC Reports*, a tabloid dealing with the life and work of the University. *UBC Reports* is distributed frequently on campus, and monthly to more than 90,000 alumni, friends of the University and parents of students. It is distributed as a supplement to two local newspapers, through the Vancouver Public Library and to high school students in several school districts in Greater Vancouver. The Information Office also publishes 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 entitled, This Week at UBC. Notices for inclusion must be provided in writing to The Information Office, Campus, by 9:00 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 provide for four years of subsidization with a graduated pay and rank scale through the period of undergraduate study.

Students interested in any of the above Regular Force plans should enquire at the Canadian Forces Recruiting and Selection Unit, 545 Seymour St., Vancouver 2, Phone 666-3136.

Primary Reserve

The Reserve Officer University Training Plan provides an opportunity for a limited number of suitable students 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 Recruiting Officer, Vancouver Militia, District Headquarters, 4050 W. 4th 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 section of the 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. Peter Fribley, B.A., B.D., St. M., and Rev. George Hermanson, B.A., B.D. (Anglican-United Church Campus Ministry), Rev. David Hayward (Baptist), Rev. Donald Johnson (Lutheran Council in Canada), Rev. Bernice Gerard, B.A., M.A. (Pentecostal Assemblies of Canada), Rev. J. A. Ross, M.A., B.D., Ph.D. (Presbyterian), Rev. Neil Kelly, C.S.B., M.A. (Roman Catholic), Rabbi Marvin Hier (Jewish), Miss Thena Ayres (Advisers to Varsity Christian Fellowship), Mr. T. Fowler (Adviser to Campus Crusade for Christ).

PUBLICATIONS

The University of British Columbia Press

The University of British Columbia Press was established in March 1971. It is the successor to the Publications Centre which has been the publishing department of the University since 1961. With the change of name, the Press will expand its publishing programme and broaden its services to the regional, Canadian, and international scholarly communities.

The Press has editorial, promotion, and distribution facilities for the books it publishes. The design and printing, although controlled by the Press, is done by commercial firms.

Recently published books are *The Royal Navy and the Northwest Coast of North America, 1810 to 1914, A Reference Guide to English, American and Canadian Literature,* and *Malcolm Lowry: The Man and His Work.* Books due within the next few months are *A Biography of Frank Fairchild Wesbrook, Imperialism and Free Trade: Lancashire and India in the Mid-Nineteenth Century, Peasants of Konku, Transport Competition and Public Policy in Canada,* and *Drama in Canada.*

The Press will continue to concentrate the major portion of its book publishing activity in the four general areas of *Asia and the Pacific, Canadian Literature, Western Canada,* and *International Law.* Within these areas a wide range of academic disciplines, from the humanities through the sciences, is included. The Press will also publish works of special significance outside these areas when warranted.

In addition to books and monographs, three journals and a Yearbook are published in association with the Press.

Pacific Affairs

Edited by William L. Holland

This quarterly journal covers the political, economic, social, and diplomatic problems of Asia and the South Pacific region. Each issue contains several research articles and a comprehensive book review section.
Annual subscription $7.00. Individual copies $2.00.

Canadian Literature

A Quarterly of Criticism and Review
Edited by George Woodcock

This journal serves as a continuing symposium on the nation's literature and literature in its relation to society. The journal also contains reviews of all significant Canadian literary works, and an annual bibliography of recent Canadian writing.
Annual subscription $5.50. Individual copies $2.00.

B.C. Studies

Edited by Walter Young and Margaret Prang

B.C. Studies was established to act as a forum for research pertaining to the province. Articles covering a wide range of interests such as economics, history, sociology, and resource management are included. Each issue also contains reviews of books about the province and a bibliography of recently published material, both government and private, related to B.C.
Annual subscription $5.00. Individual copies $2.00.

The Canadian Yearbook of International Law

Edited by C. B. Bourne

The *Yearbook* presents contemporary thought and practice in the field of international law. Each edition investigates recent legal and policy changes of countries and of the multi-national organizations. Particular topics—sanctions, human rights—and their legal status are also discussed. Sections dealing with Canadian practice in international law as reflected in public statements and correspondence are included each year.

The Yearbook, published since 1963, is issued under the auspices of the Canadian Branch of the International Law Association.

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A catalogue of recently published books is available from:
The University of British Columbia Press, Vancouver 8. Canada.

MUSEUMS

These consist of (1) the Museum of Anthropological, 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.

Museum of Anthropology

HARRY B. HAWTHORN, M.Sc., B.A. (New Zealand), Ph.D. (Yale), F.R.S.C., Director.

MRS. A. E. HAWTHORN, M.A. (Columbia), Curator.

WILSON DUFF, B.A. (Brit. Col.), M.A. (Washington), Associate Curator.

GLORIA C. WEBSTER, B.A. (Brit. Col.), Assistant Curator.

MARJORIE M. HALPIN, M.A. (George Washington U.), Assistant Curator.

The **Museum of Anthropology** contains about 25,000 catalogued items. Of these, the North West Coast Collection is outstanding, consisting of a complete ethnographic range of tribal materials, both ceremonial and domestic. These were purchased by various grants made by Dr. H. R. MacMillan, Dr. Walter C. Koerner and the Leon and Thea Koerner Foundation. They include for the most part materials brought in by Indian families, and also, the very extensive collections made by early missionaries: Dr. G. H. Raley, Rev. W. E. Collison, Dr. G. E. Darby and others.

The Oriental Collections are extensive and include gifts made by the Fyfe-Smith family and items purchased by them to extend the range of materials to illustrate the history of Japanese and Chinese Art. Also included are gifts from the late Mr. and Mrs. B. E. Clegg, and the Japanese Association of Prefectural Governments.

Classical materials of Greece, Cyprus, and Rhodes are mainly from the gift of Mrs. Sid Leary and the Baroness Van Haersolte.

An extensive collection of the domestic and ceremonial life of the Oceanic cultures was the gift of Mr. Frank Burnett and was gathered before 1914.

Recent acquisitions have been made from India, S.E. Asia, and West Africa, which are adequate to represent the arts of these regions.

North and South American Indian cultures are reasonably extensive and the Eskimo material from the Coppermine River area, collected by Michelle Pierce in 1920, is excellent.

These materials are used in teaching, especially in the museum training course, and in various anthropology courses. They are also used in research work by qualified students.

Exhibits are changed frequently and the museum is open at certain hours to all students and to the general public while the University is in session.

It is expected that a new exhibit building will shortly be erected, to include the collections of the Museum and the Archaeology Laboratory. This is a Centennial gift from the Federal Government to the people of British Columbia, and its operations will be associated with the National Museums Board.

Geological Museum

M. Y. WILLIAMS, B.Sc. (Queen's), Ph.D. (Yale), F.G.S.A., F.R.S.C., Honorary Curator.

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.

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, a gift 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 and elsewhere. Upwards of 500 trays of fossils represent work done by students and staff over the past years in Canada and other places.

Herbaria

R. F. SCAGEL, M.A. (Brit. Col.), Ph.D. (Calif.), F.R.S.C., F.L.S., Curator of the Phycological Museum.

R. J. BANDONI, B.S. (Nevada), M.S., Ph.D. (Iowa), Curator of the Mycological Museum.

KATHERINE I. BEAMISH, M.S.A. (Brit. Col.), Ph.D. (Wisconsin), Associate Curator of the Vascular Plant Museum.

W. B. SCHOFIELD, B.A. (Acadia), M.A. (Stanford), Ph.D. (Duke), Curator of the Bryophyte Museum.

G. F. OTTO, Honorary Curator of Lichen Herbarium.

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 127,000 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 the late 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 Pychological Herbarium comprises over 45,000 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 Defence Research Board to the Institute of Oceanography and the Department of Botany.

In the Mycological Herbarium are over 12,000 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 other Canadian Provinces, Japan, U.S.A., Latin America 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 100,000 specimens.

The collections are available for study to students and research institutions.

Zoological Museum

IAN MCTAGGART-COWAN, B.A. (Brit. Col.), Ph.D. (Calif.), F.R.S.C., Director.

N. J. WILIMOVSKY, B.S., M.A. (Mich.), Ph.D. (Stanford), Curator of the Ichthylogical Museum.

G. G. E. SCUDDER, B.Sc. (Wales), D.Phil. (Oxon.), F.R.E.S., Curator of the Spencer Entomological Museum.

J. MARY TAYLOR, B.A. (Smith), M.A., Ph.D. (Calif.), Curator of the Vertebrate Museum.

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 vertebrates exclusive of fish now numbers 13,442 specimens of birds, 9487 mammals, and 1248 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.

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.

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 77 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 rose collections. A nursery and rhododendron species collection have been established in the south campus.

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 publishes quarterly a journal entitled *Davidsonia*. The summer number is devoted to a special study of an area or plant collection found on the campus. Inquiries should be directed to the office of The Botanical Garden, Hut M-34 on the West Mall.

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 and organized exhibitions. These are rented or borrowed from the National Gallery, the Museum of Modern Art, the Western Association of Art Museums, the Smithsonian Institution and other galleries and circuits The majority of the exhibitions are organized by the Curator and Assistant Curator drawing on work by artists from around the world, private collectors, 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, Human Performance Laboratories, and offices of the School of Physical Education and Recreation and the Athletic Department.

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 which 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 Whit Matthews Field, the Harry Warren Field, the John Owen Pavilion ,the Harry Logan Track and two un-named playing field, and Phase I of the Physical Education Centre.

Phase II, consisting of two gymnasia, locker rooms, offices and a classroom-lounge, was completed in March, 1972. It was financed by the Board of Governors at a cost slightly in excess of $500,000.

Physical Education Building

The Physical Education Building, representing Phase I of the future Physical Education Centre, was completed in January 1970. Financed by the Board of Governors at an approximate cost of $900,000.00, it consists of two gymnasia (with floors of 75′ x 120′), locker rooms, two offices and two classrooms.

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. In December, 1969 an expansion was completed and put into use. This new addition, financed from past and projected revenues at a cost of approximately $1,000,000.00, contains four squash and two handball courts, several dressing rooms and ancillary rooms, and two ice surfaces. The ice area provides for two hockey rinks, 80′ x 185′, with removable dasher boards in the centre to permit an official 100 metres speed skating course.

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 University interested in cricket and field hockey.

The Wolfson Field was developed as a result of a gift from the Wolfson Foundation, London, England, made through the British Columbia Playing Fields Association. It contains a unique cricket pitch of synthetic turf as well as an adjacent practice pitch.

The Armoury

The Armoury located in the north campus is used for activities such as tennis, golf, indoor track and field, and various team practices. It contains four indoor tennis courts, a dance studio and several offices.

INTERNATIONAL HOUSE

International House has been and is envisaged as a social and cultural centre for students primarily concerned with ensuring that students from abroad are adequately oriented toward university and community.

Canada's increased concern with the International scene has broadened the concept of International House through relating it more closely to international education studies throughout the Campus, and providing for closer coordination and cooperation between and among related international activities.

International House has established an International Information Centre on the U.B.C. Campus. The goal of this office is to answer inquiries from the campus community about educational study, travel and working abroad. Our information mainly takes the form of reference books, pamphlets, and brochures.

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. 1967—MacMillan Building for Forestry-Agriculture; Dentistry; Medical Sciences Additions; Music; Stadium; Track and Field Pavilion; Acadia Park Housing Development. 1968—Metallurgy; Student Union Building; Health Sciences Centre Stage I.; Administration Building; Faculty Club addition; Place Vanier residences; Totem Park Residences; Civil Engineering expansion for Computing Centre; Frederic Wood Workshop. 1969—Structures Laboratory; Psychiatry Wing of Health Sciences Centre; General Services, Stage I, Administration Building; TRIUMF Office Block; Animal Science—Swine Unit; Incinerator; West Mall Office and Auditorium annex; Traffic and Patrol Office. 1970—Addition to Bio-sciences (West Wing); addition to Woodward Library Physical Education building, Stage I; addition to Winter Sports building; addition to steam plant. 1971—Ponderosa Office Annex, Units A, B and C; TRIUMF, Stage I; Addition to Graduate Student Centre; Pharmacy—Cunningham Building Extension. Under construction in 1972: Geological Sciences; Mechanical and Civil Engineering Laboratories; Walter H. Gage residences; Ponderosa Office Annex—additional units; Audiology, Speech Sciences, Genetics, Data Centre and Family-Practice Centre; Physical Education, Stage II. Planned for construction in 1972—Animal Science Cattle Barn; Geology Building Offices; Faculty of Law; Accommodation for Retarded Children; Basic Medical Sciences expansion; Botanical Gardens; B.C. Hydro Substation re-arrangement; Museum of Man.

VANCOUVER SCHOOL OF THEOLOGY

Vancouver 8, B.C.

An ecumenical School of Theology incorporated by the B.C. Legislature in 1971. The School continues the former Anglican Theological College of British Columbia and the former Union College of British Columbia and is open to participation by other denominations. It is affiliated with the University of British Columbia.

Principal

REV. W. S. TAYLOR, M.A., B.D., Ph.D., D.D.

Registrar

REV. J. A. M. MOIR, L.Th., B.D.

The Vancouver School of Theology offers courses of instruction for lay men and women and provides professional training for the ministry and priesthood. It seeks to be a centre for theological research and dialogue. Courses are offered for credit toward graduate degrees.

A Summer Session is held each year, concurrent with the Summer Session of the University of British Columbia.

Enquiries about the programme of study should be addressed to: The Registrar, the Vancouver School of Theology, Vancouver 8, B.C.

ST. MARK'S COLLEGE

(Roman Catholic)

Vancouver 8, B.C.

(In affiliation with the University of British Columbia)

Principal

REV. R. W. FINN, C.S.B., M.A., L.M.S.

Registrar

REV. N. KELLY, C.S.B., M.A.

St. Mark's College offers programmes in theology during the acadmeic year and Summer Sessions.

In accordance with its purpose of developing the common interest of students and professors who are studying and teaching in the various departments of the University, these courses, together with the Library and study facilities, are designed to complement other offerings in the University community.

Facilities for the Newman Centre and other student activities are located at St. Mark's.

The Catholic chaplaincy to the University is also part of the College's services.

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)

Dean

DAVID F. HAYWARD, LL.B.

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 also 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.

B.C. RESEARCH

B.C. Research, the technical arm of the British Columbia Research Council, is an independent, non-profit, industrial research institute, now located at 3650 Wesbrook Crescent, south of 16th Avenue on the University of British Columbia Campus. Its work is in the applied fields of biology, chemistry, physics, engineering, non-poisonous insect control, and management services.

The institute is one of the few agencies in Canada which undertakes contract research on a confidential, non-profit basis. It cooperates with the National Research Council in providing free technical information and industrial engineering services. Included in its activities are product, process and equipment development, economics and market research, operations research, and productivity studies.

B.C. Research has a total staff of 100, of which 55 are professional scientists, engineers, and economists. Close cooperation is maintained with the science, engineering and other related departments of the University.

DEPARTMENT OF THE ENVIRONMENT

Canadian Forestry Service

Director: R. E. Foster, B.A., B.S.F. (Brit. Col.), Ph.D. (Toronto).

The Western Forest Products Laboratory is a unit of the Department of the Envinronment, Canada housed at 6620 N.W. Marine Drive, West of the Ponderosa Cafeteria. It has been maintained in close association with the University since 1918 and is organized to carry out research on forest products so that society will receive maximum benefit from the forests. Excellent facilities and equipment are provided for a wide range of research in timber engineering, plywood, wood anatomy, wood preservation, wood pathology, wood chemistry, harvesting, seasoning, sawmilling, pulping, physics and physical chemistry. Total staff is 129, of which 49 are professional scientists, engineers and economists.

The Laboratory co-operates closely with the University to provide research leadership and specialized equipment for graduate research.

REGISTRATION 1971-72
(as at December 1, 1971)

	Regular Session		*Extension Credit Courses*		*Total*
	M	*F*	*M*	*F*	
FACULTY OF AGRICULTURAL SCIENCES					
First Year	16	23	—	—	39
Second Year	40	25	1	—	66
Third Year	42	19	—	—	61
Fourth Year	33	22	1	—	56
TOTAL IN FACULTY	131	89	2	—	222
FACULTY OF APPLIED SCIENCE					
Engineering					
First Year	279	2	—	—	281
Second Year	231	2	—	—	233
Third Year	255	2	—	—	257
Fourth Year	233	4	—	—	237
Total	998	10	—	—	1,008
Diploma in Surveying	2	—	—	—	2
School of Architecture					
First Year	51	5	—	—	56
Second Year	38	4	—	—	42
Third Year	50	4	—	—	54
Total	139	13	—	—	152
School of Nursing					
Basic Degree Programme					
First Year	1	45	—	—	46
Second Year	—	31	—	—	31
Third Year	1	38	—	—	39
Fourth Year	—	26	—	—	26
Total	2	140	—	—	142
Post Basic Degree Programme					
Second Year	1	21	—	2	24
Third Year	—	18	—	—	18
Fourth Year	—	23	—	—	23
Total	1	62	—	2	65
Diploma Course	—	23	—	1	24
TOTAL IN FACULTY	1,142	248	—	3	1,393
FACULTY OF ARTS					
Arts	*M*	*F*	*M*	*F*	
First Year	524	602	1	5	1,132
Second Year	600	604	23	42	1,269
Third Year	677	559	19	40	1,295
Fourth Year	635	494	26	42	1,197
Total	2,436	2,259	69	129	4,893
Fine Arts					
Second Year	3	3	—	—	6
Third Year	7	1	—	—	8
Fourth Year	4	—	—	—	4
Total	14	4	—	—	18
Music					
First Year	41	32	—	—	73
Second Year	47	54	1	—	102
Third Year	34	37	—	—	71
Fourth Year	24	21	—	—	45
Total	146	144	1	—	291
School of Home Economics					
First Year	1	63	—	—	64
Second Year	1	86	—	—	87
Third Year	—	64	—	—	64
Fourth Year	—	58	—	—	58
Total	2	271	—	—	273
School of Librarianship					
First Year	14	43	—	—	57
Second Year	4	4	—	—	8
Total	18	47	—	—	65
School of Social Work					
First Year	20	37	—	—	57
Second Year	30	51	—	—	81
Total	50	88	—	—	138
TOTAL IN FACULTY	2,666	2,813	70	129	5,678
FACULTY OF COMMERCE AND BUSINESS ADMINISTRATION					
First Year	255	30	—	—	285
Second Year	234	20	2	—	256
Third Year	190	15	1	—	206
Fourth Year	189	12	4	—	205
Total	868	77	7	—	952

	Regular Session		Extension Credit Courses		Total
	M	F	M	F	
Licentiate in Accounting					
First Year	27	2	—	—	29
Second Year	6	—	—	—	6
Total	33	2	—	—	35
TOTAL IN FACULTY	901	79	7	—	987
FACULTY OF DENTISTRY					
Dentistry					
First Year	38	2	—	—	40
Second Year	38	—	—	—	38
Third Year	33	—	—	—	33
Fourth Year	28	2	—	—	30
Total	137	4	—	—	141
Dental Hygiene					
First Year	—	20	—	—	20
Second Year	—	20	—	—	20
Total	—	40	—	—	40
TOTAL IN FACULTY	137	44	—	—	181
FACULTY OF EDUCATION					
Elementary Division					
First Year	3	167	—	1	171
Second Year	28	333	15	39	415
Third Year	61	446	24	243	774
Fourth Year	67	382	55	270	774
Graduates	60	118	61	68	307
Total	219	1,446	155	621	2,441
Secondary Division					
First Year	62	117	—	—	179
Second Year	70	112	—	1	183
Third Year	119	102	8	16	245
Fourth Year	95	69	20	12	196
Fifth Year	79	61	36	12	188
Graduates	192	142	—	2	336
Industrial Education	47	—	1	—	48
Commerce Emergency Course	—	7	—	—	7
Total	664	610	65	43	1,382
Diploma Programmes					
Adult Education	6	10	3	2	21
Guidance & Counselling	7	9	1	3	20
Education of the Deaf	1	8	—	—	9
Mentally Retarded	—	—	—	1	1
Children with Learning Disorders	6	10	—	—	16
Young Children	—	6	—	1	7
Total	20	43	4	7	74
Certification	2	11	86	75	174
School of Physical Education					
First Year	31	36	—	—	67
Second Year	87	56	1	—	144
Third Year	60	35	2	—	97
Fourth Year	62	37	2	2	103
Total	240	164	5	2	411
Recreation Education					
First Year	7	12	—	—	19
Second Year	18	26	—	1	45
Third Year	15	17	—	—	32
Fourth Year	9	26	—	—	35
Total	49	81	—	1	131
TOTAL IN FACULTY	1,194	2,355	315	749	4,613

	Regular Session		Extension Credit Courses		Total
	M	F	M	F	
FACULTY OF FORESTRY					
First Year	76	—	—	—	76
Second Year	63	4	1	—	68
Third Year	37	—	—	—	37
Fourth Year	36	—	—	—	36
TOTAL IN FACULTY	212	4	1	—	217
FACULTY OF GRADUATE STUDIES					
Course leading to: Ph.D.	831	163	—	—	994
Ed.D.	48	19	—	—	67
M.A.	384	295	—	—	679
M.Sc.	376	81	—	—	457
M.A.Sc.	126	2	—	—	128
M.Arch.	9	—	—	—	9
M.B.A.	164	10	—	—	174
M.F.	21	—	—	—	21
M.P.E.	13	7	—	—	20
M.Ed.	101	67	—	—	168
M.Mus.	12	10	—	—	22
LL.M.	4	—	—	—	4
M.S.N.	2	21	—	—	23
M.Eng.	13	—	—	—	13
TOTAL IN FACULTY	2,104	675	—	—	2,779
FACULTY OF LAW					
First Year	176	27	—	—	203
Second Year	191	15	—	—	206
Third Year	171	8	—	—	179
TOTAL IN FACULTY	538	50	—	—	588
FACULTY OF MEDICINE					
First Year	42	20	—	—	62
Second Year	48	15	—	—	63
Third Year	51	13	—	—	64
Fourth Year	54	9	—	—	63
Total	195	57	—	—	252
School of Rehabilitation Medicine					
First Year	2	71	—	—	73
Second Year	2	37	—	—	39
Third Year	4	35	—	—	39
Fourth Year	1	23	—	—	24
Total	9	166	—	—	175
TOTAL IN FACULTY	204	223	—	—	427
FACULTY OF PHARMACEUTICAL SCIENCES					
First Year	27	32	—	—	59
Second Year	39	54	—	—	93
Third Year	40	36	—	—	76
Fourth Year	24	24	—	—	48
TOTAL IN FACULTY	130	146	—	—	276
FACULTY OF SCIENCE					
First Year	976	311	—	—	1,287
Second Year	707	190	—	—	897
Third Year	561	122	3	1	687
Fourth Year	480	108	9	—	597
TOTAL IN FACULTY	2,724	731	12	1	3,468

	Regular Session		Extension Credit Courses		Total
	M	F	M	F	
Qualifying Year	67	40	—	2	109
Unclassified	97	82	40	41	260
TOTAL WINTER SESSION	12,247	7,579	447	925	21,198
	19,826		1,372		
Correspondence Courses	—	—	233	456	689
Summer Session 1971	2,147	2,193	374	508	5,222
GRAND TOTAL 1971-72	14,394	9,772	1,054	1,889	27,109

DEGREES CONFERRED

1971

Spring Congregation:

May 27, 28, 29; LL.D.—1; D.Sc.—1; D.Litt.—1; Ph.D.—81; Ed.D.—2;M.A.—82; M.B.A.—33; M.S.W.—65; M.Sc.—54; M.A.Sc.—23; M.S.N.—1; M.F.—6; M.Ed.—28; M.Mus.—13; M.Eng.—3; LL.M.—1; B.L.S.—86; B.A.—799; B.H.E.—49; B.Mus.—44; B.Com.—187; LL.B.—180; B.Sc.(Agr.)—43; B.A.Sc.—227; B.Arch.—33; B.S.N.—47; B.Ed.—450; B.P.E.—49; B.S.F.—49; M.D.—61; B.Sc.(Pharm.)—35; B.Sc.—430; B.S.R.—24; B.R.E.—20; D.M.D.—19; Lic. Acct.—1; Total—3225.

Fall:

Ph.D.—65; Ed.D.—2; M.A.—93; M.Sc.—66; M.A.Sc.—13; M.Arch.—1; M.B.A.—48; M.S.N.—1; M.Mus.—2; M.Ed.—50; M.P.E.—6; M.F.—3; M.S.W.—3; B.A.—196; B.H.E.—6; B.Mus.—6; B.Sc.—66; B.A.Sc.—17; B.S.N.—6; B.Sc.(Agr.)—6; B.Sc.(Pharm.)—1; B.S.F.—4; B.Com.—24; B.Ed.—334; B.P.E.—14; B.Arch—3; B.R.E.—1; Total—1037.

THE FACULTY OF AGRICULTURAL SCIENCES

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.

A. J. RENNEY, B.S.A. (Brit. Col.), M.S. (Calif.), Ph.D. (Oregon State), Assistant Dean and Professor of Agronomy.

Department of Agricultural Economics

G. R. WINTER, B.Sc. (Alta.), M.S., Ph.D. (Iowa State), Professor and Chairman of the Department.

C. VERNER, A.M. (William and Mary), M.A., Ed.D. (Columbia), A.Hum. (HON.) (Andrew College, Georgia), Professor of Adult Education.

M. J. DORLING, B.Sc. (Reading), Diploma (Ag. Econ.) (Oxon.), M.S. (Iowa State), Ph.D. (McGill), Associate Professor.

P. L. ARCUS, M.Ag.Sc. (Massey), Ph.D. (Iowa State), Assistant Professor.

J. D. GRAHAM, M.S. (Natal), Assistant Professor.

Department of Agricultural Mechanics

W. D. POWRIE, M.A. (Toronto), Ph.D. (Mass.), Professor and Acting Chairman.

T. L. COULTHARD, B.E. (Sask.), M.Sc. (Calif.), Dip Ing. San. Eng. (Delft), P.Eng., Professor.

L. M. STALEY, B.A.Sc. (Brit. Col.), M.Sc. (Calif.), P.Eng., Professor.

E. L. WATSON, B.A.Sc. (Brit. Col.), M.Sc. (Calif.), P.Eng., Professor.

N. R. BULLEY, B.A.Sc. (Toronto), Ph.D. (Simon Fraser), Assistant Professor.

E. O. NYBORG, B.E. (Sask.), M.S. (Michigan State), Ph.D. (Brit. Col.), Assistant Professor.

Department of Animal Science

W. D. KITTS. M.S.A. (Brit. Col), Ph.D. (Iowa State), Professor and Chairman of the Department.

J. HODGES, B.Sc. (Reading), M.A. (Cantab), Ph.D. (Reading), A.M.P. (Harvard), Professor.

R. M. BEAMS, M.Agr.Sc. (Queensland), Ph.D. (McGill), Associate Professor.

C. R. KRISHNAMURTI, M.V.Sc. (Madras), Ph.D. (Alta.), Associate Professor.

R. J. HUDSON, B.S.A. (Brit. Col.), Assistant Professor.

R. G. PETERSON, B.S. (Wyoming), M.S., Ph.D. (Illinois), Assistant Professor.

R. M. TAIT, B.Sc. (Durham), Ph.D. (Newcastle), Assistant Professor.

H. S. SABEN, B.Sc. (McGill), M.Sc., Ph.D. (Alta.), Postdoctoral Fellow.

Department of Food Science

W. D. POWRIE, M.A. (Toronto), Ph.D. (Massachusetts), Professor and Chairman of the Department.

S. NAKAI, B.Sc. Ph.D. (Tokyo), Associate Professor.

J. F. RICHARDS, M.Sc. (Man.), Ph.D. (Minn.), Associate Professor.

P. M. TOWNSLEY, B.S.A. (Brit. Col.), M.S., Ph.D. (Calif.), Associate Professor.

M. A. TUNG, M.S.A., Ph.D. (Brit. Col.), Assistant Professor.

D. SCHALLER, B.Sc., Ph.D. (Wisc.), Postdoctoral Fellow.

Lecturers from other Departments

E. L. WATSON, B.A.Sc. (Brit. Col.), M.Sc. (Calif.), P.Eng., Professor.

Department of Plant Science

V. C. RUNECKLES, B.Sc., Ph.D. (London), Dipl. Imp. Coll., Professor and Chairman of the Department.

V. C. BRINK, M.S.A. (Brit. Col.), Ph.D. (Wisconsin), Professor of Agronomy.

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. (Sir Geo. Williams), Ph.D. (Calif.), Professor of Plant Science and Director of the Botanical Garden.

W. G. WELLINGTON, B.A. (Brit. Col.), M.A., Ph.D. (Toronto), Professor of Plant Science and Resource Ecology.

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 and Research Horticulturist, Botanical Garden.

R. J. COPEMAN, B.Sc. (McGill), Ph.D. (Wisconsin), Assistant Professor.

P. A. JOLIFFE, B.Sc. (Queen's), Ph.D. (Brit. Col.), Assistant Professor.

C. J. MARCHANT, B.Sc., Ph.D. (Southampton), Assistant Professor, and Research Scientist, Botanical Garden.

B. J. R. PHILOGÈNE, B.Sc. (Montreal), M.Sc. (McGill), Ph.D. (Wisconsin), Assistant Professor.

A. K. CHAKRAVORTY, B.Sc. (Gauhati), M.Sc., Ph.D. (Calcutta), Postdoctoral Fellow.

A. E. HARVEY, B.Sc. (Coll., Idaho), M.S. (Idaho), Ph.D. (Washington State), Postdoctoral Fellow.

L. N. KOSKITALO, B.Sc. (Manitoba), Ph.D. (Brit. Col.), Postdoctoral Fellow.

A. RAHMAN, B.Sc. (Ag.) (Gorakhpur), M.Sc. (Ag.) (Agra), (Alta.), Ph.D. (Sask.), Postdoctoral Fellow.

J. ROBB, B.Sc. (York), Ph.D. (Brit Col.), Postdoctoral Fellow.

M. WEINTRAUB, B.A., Ph.D. (Toronto), F.N.Y.A.S., Plant Science.

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.), Professor.

D. B. BRAGG, M.S. (West Virginia), Ph.D. (Arkansas), Associate Professor.

C. W. ROBERTS, B.Sc. (Oklahoma), M.S., Ph.D. (Minnesota), Associate Professor.

R. C. FITZSIMMONS, B.S. (Washington State), M.S., Ph.D. (Minnesota), Assistant Professor.

J. BIELY, M.S.A. (Brit. Col.), M.S. (Kansas State), D.Sc. (Brit. Col.), 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.

D. S. LACATE, B.Sc.F. (New Brunswick), M.Sc., Ph.D. (Cornell), Associate Professor.

L. M. LAVKULICH, M.Sc. (Alta.), Ph.D. (Cornell), Associate Professor.

L. E. LOWE, M.A. (Oxon.), M.Sc., Ph.D. (McGill), Associate Professor.

T. M. BALLARD, M.F., Ph.D. (Washington), Assistant Professor.

T. A. BLACK, B.S.A. (Brit. Col.), M.Sc., Ph.D. (Wisconsin), 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.

J. BANDY, B.A., M.A., Ph.D. (Brit. Col.), Plant Science.

E. BILINSKI, D.Ag.Sc. (Louvain), Food Science.

T. H. BLACKBURN, B.A., M.Sc. (Trinity), Ph.D. (Aberdeen), Soil Science.

R. J. BOSE, M.S.A. (Brit. Col.), Ph.D. (Minn.), Food 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.

A. R. FORBES, B.A. (Brit. Col), M.S. (Oregon State), Ph.D. (Calif), Plant Science.

G. G. JACOLI, B.A., Ph.D. (Bologna), Plant Science.

H. R. MACCARTHY, B.A. (Brit. Col.), Ph.D. (Calif.), Plant Science.

K. R. MACDONALD, D.V.M. (Toronto), Animal Science and Poultry Science.

F. D. MCELROY, B.S. (Washington State), Ph.D. (Calif.), Plant Science.

G. J. OKULITCH, M.S.A. (Brit. Col.), Food Science.
H. W. J. RAGETLI, Ir., Ph.D. (Wageningen), Plant Science.
V. RAUDSEPP, Dipl. C.E. (Tallinn), P.Eng., Agricultural Mechanics.
P. N. SPROUT, B.S.A. (Brit. Col.), Soil Science.
R. STACE-SMITH, B.S.A. (Brit. Col.), Ph.D. (Oregon State), Plant Science.
N. TOMLINSON, B.S.A. (Brit. Col.), Ph.D. (Calif.), Food Science.
N. S. WRIGHT, M.S.A. (Brit. Col.), Ph.D. (Calif.), Plant 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.
3. 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.

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 colour of the hood is maize, the Bachelor's hood trimmed with the colour and the Master's lined.

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 Agricultural Sciences is offered in the following departments:

Agricultural Economics	Animal Science
Agricultural Engineering (through the Faculty of Applied Science)	Food Science
	Plant Science
	Poultry Science
Agricultural Mechanics	Soil Science

Master's and Doctor of Philosophy Degrees

See Faculty of Graduate Studies.

Veterinary Medicine

The Western College of Veterinary Medicine was established at the University of Saskatchewan to serve the four western provinces. A two-year pre-veterinary programme leading to the four-year veterinary programme at the University of Saskatchewan may be pursued in the Faculty. Competition for admission to the College of Veterinary Medicine is severe. Pre-veterinary students are, therefore, strongly advised to follow a programme which satisfies the requirements for the first two years of the B.Sc.(Agr.) degree at the University of British Columbia as well as for the pre-veterinary programme. All students must consult the Chairman of the Department of Animal Science to obtain approval of their programmes.

The requirements for admission to the Western College of Veterinary Medicine at the University of Saskatchewan are:

English	(3)
Physics	(3)
Biology or Zoology (including Genetics)	(7½)
Chemistry	(6)

Electives to complete two full years. Total 30 to 33 units.

The following selection of courses meets the requirements of the Western College of Veterinary Medicine at the University of Saskatchewan and also those for the first two years of the programme for the B.Sc. (Agr.) degree at The University of British Columbia.

1. Students entering Faculty for the first time in First Year

First Year:	Units	Second Year:	
Chemistry 103 (110 or 120)	3	Chemistry 230	3
Mathematics 100	2	Agricultural Sciences 201	3
Mathematics 121	1	Animal Science 258	1½
Physics 105, 110, 115 or 120		Animal Science 313	3
English 100	3	Zoology 203	1½
Biology 101 or 102	3	Physics 110 or 120 or English 100	3
Agricultural Sciences 101	3	Agricultural Economics 258	1½
		Elective	1½
	15 units		18 units

2. Students entering Faculty for the first time in Second Year

Students entering the Faculty for the first time in second year with credit for one year of university work, should register for courses to complete the above requirements.

Continuing Education

Specialized non-credit courses in various areas of agriculture are offered periodically. Announcements giving details of the various courses are issued each year, and may be obtained from the Director of the Centre for Continuing Education, The University of British Columbia.

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, 3407 West 39th Ave., Vancouver 13, B.C.

COURSES LEADING TO THE DEGREE OF B.Sc. (Agr.)

Admission Requirements—See General Information Section on Admission.

Students may gain admission direct from secondary school or on transfer from a recognized university or college.

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.

Students from Grade 12, British Columbia Schools, should have as a minimum Chemistry 11, Biology 11, Physics 11 and Mathematics 12. Additional courses in Chemistry, Biology and Physics are desirable.

Four-Year Major Course Curriculum

Candidates for the B.Sc. (Agr.) degree in the four-year Major 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 must be approved by the chairman of the department concerned and by the Dean. Normally no more than 19 units of study may be taken by a student in any one year.

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 years.

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, 1½ units being allotted to each.

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 years.

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 must be approved by the chairman of the department concerned and by the Dean. Normally no more than 19 units of study may be taken in any one year.

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

Requirements for the first two years in the Department of Agricultural Economics vary slightly from those of other departments as indicated below. In addition to meeting the faculty requirements as outlined, the student should study and select an option from those listed under the departments. This must be done before he enters the third year, but it is to the student's advantage to consult with departmental chairmen as early as possible in his University career.

	Agricultural Mechanics, Animal Science, Food Science, Plant Science, Poultry Science, Soil Science	Agricultural Economics
First Year	Units	Units
Agricultural Sciences 101	3	3
Agricultural Economics 101	—	3
Biology 101 or 102 (Note 1)	3	3
Chemistry 103, 110 or 120	3	—
Mathematics 100	2	2
Mathematics 121	1	1
Physics 105, 110, 115 or 120	3	—
OR	OR	
English 100 (Note 2)	3	3
Totals	15	15
Second Year		
Agricultural Sciences 201	3	3
Agricultural Economics 258 (1½)	1½	—
OR	OR	
Economics 200 (3) (Note 3)	3	3
Chemistry 230	3	—
Economics 304 (1½) and Economics 305 (1½)	—	3
Mathematics 200	—	3
Physics 105, 110, 115 or 120		
OR		
English 100	3	—
Electives (Note 4)	3-4½	3
	15	15

Third Year	Major	Double Major	Honours
Agricultural Sciences 300 (Note 5)	1	1	1
Plant Science 321	1½	1½	1½
Non-science elective	3	3	3
Electives (Note 4)	10½	10½	13½
Totals	16	16	19
Fourth Year			
Departmental Research Project (425) (Note 6)	1½ or 3	3	3
Departmental Seminar (423)	1	1	1
Electives (Note 4)	12 or 13½	12	15
Totals	16	16	19
Minimum units for graduation	62	62	68

Notes:

1. See note on Biology 102 in Faculty of Science.
2. Both English 100 and one of the Physics courses listed must be taken in the first two years except for Agricultural Economics students who require only English 100. Students exempted from Biology 101 or 102 (Note 1) may take both English 100 and their Physics requirement in their first year.
3. Students contemplating entering a department other than Agricultural Economics may also satisfy this requirement by taking Agricultural Economics 101 (3).
4. 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.
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. Where two departments are involved i.e. a double major, the Research Project will be arranged jointly (3 units) or consist of a 1½ unit project and 1½ units of course work. Two copies of the report should be deposited by April 1 for Spring graduation, or September 15 for Fall graduation.

See General Information section for regulations governing:

(i) fees
(ii) attendance
(iii) withdrawal
(iv) graduation
(v) supplemental examinations
(vi) review of assigned standing
(vii) transcripts of student record.

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. 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 $30.00 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.

8. 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 any year taking a full programme of studies who does not pass in at least sixty per cent of it will be required to withdraw from the University for at least a year. A student taking a partial programme of studies who does not pass all of it will be required to withdraw.

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.

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 or 102, Chemistry 103 or 110, or 120, Mathematics 100 and 121 (120, 1968-69 or earlier), Economics 200 or Agricultural Economics 258, Physics 105, 110, 115, or 120, 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—Physical and Historical Geology, is strongly recommended.

For further particulars see **Faculty of Education** section of 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. [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]

Agricultural Sciences

The following courses are Faculty requirements for the B.Sc.(Agr.) degree. They are general courses basic to an understanding and appreciation of the role and responsibilities of Agriculture in the modern context.

A student transferring into the third year of Agricultural Sciences is required to select either Agricultural Science 101 or 201. If the student's background does not include any courses in Ecology, Agricultural Science 101 should be taken.

Transfer students should consult the Dean with regard to meeting the requirements for these courses.

101. (3) Agroecosystems I.—The ecological basis of agriculture; the nature and properties of biological and soil systems. [3-2; 3-2]

201. (3) Agroecosystems II.—The properties, production systems and processing of plants and animals used by man. [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 $25.

Agricultural Economics

The Department offers opportunities for study leading to the Bachelor's and Master's degree. Students interested in the Ph.D. may register in the Faculty of Graduate Studies through the Faculty of Arts where their programme of study and thesis will be supervised jointly by members of the Department of Economics and the Department of Agricultural Economics. Applications should be made to the Department of Agricultural Economics.

Five areas of specialization are available at the Bachelor's level. These accommodate students interested in the following: Agribusiness—for employment in secondary agriculture including marketing of agricultural products and provision of farm supplies; Farm Management—for careers in farm and ranch management, consulting, and the public service; General—preparation for graduate study; Rural Development—Canadian and international work in planning for and stimulation of the rural sector; Social Science—for those wishing to emphasize a social science other than economics.

Requirements for the B.Sc. (Agr.) degree

First Year		Second Year	
Agricultural Sciences 101	3	Agricultural Sciences 201	3
Agricultural Economics 101	3	Economics 200	3
Biology 101 or 102	3	Economics 325 and 326	3
English 100	3	Mathematics 200	2
Mathematics 100 and 121	3	Elective	4
	15		15

Third Year	Major	Honours
Agricultural Sciences 300	1	1
Agricultural Economics 307	1½	1½
Economics 301 and 302	3	3
Programme Options (below)	10½	13½
	16	19

Fourth Year		
Agricultural Economics 423	1-2	2
Agricultural Economics 425	1½-3	3
Programme Options (below)	11-13½	14
	16	19

Students in various options will take additional courses as indicated below. Electives must be chosen in consultation with the Chairman of the Department. Honours students must register for an additional three units of elective in each of their Third and Fourth Years.

Agricultural Business:

Third Year:		Fourth Year:	
Ag. Econ. 310	1½	Ag. Econ. 408	1½
Commerce 459	3	Ag. Econ. 311	1½
Commerce 271	2	Ag. Econ. 400	2
Commerce 261	2	Computer Sc. 201 or 210	1½-3
Elective	2	Elective	4-5½

Farm Management:

Third Year:		Fourth Year:	
Ag. Econ. 300	3	Ag. Econ. 400	2
Commerce 459	3	Ag. Econ. 408	1½
An. Sc. 258	1½	Ag. Econ. 406	1½
Pl. Sc. 258	1½	Commerce 271	2
Elective	1½	Computer Sc. 201 or 210	1½-3
		Elective	2-3½

General:

Third Year:		Fourth Year:	
Ag. Econ. 300	1½	Ag. Econ. 311	1½
Ag. Econ. 310	1½	Ag. Econ. 374	1½
Elective	7½	Ag. Econ. 400	2
		Ag. Econ. 406	1½
		Ag. Econ. 408	3
		Elective	2½

Rural Development:

Third Year:		Fourth Year:	
Ag. Econ. 300	3	Ag. Econ. 403	3
Ag. Econ. 340	1½	Ag. Econ. 408	1½
Elective	6	Elective	7½

Social Science:

Third Year:		Fourth Year:	
Bioscience Elective	4½	Social Science Elective	9
Social Science Elective	6	Ag. Econ. 403	3

101. (3) Introduction to Applied Economics.—Economic problems, institutions and methods of analysis. The laboratory will involve on-site applications of economic analysis to profitability of farms and agricultural businesses. [3-3; 3-3]

258. (1½) Introduction to Principles and Applications of Economics.—Emphasis on problems of pricing and incomes in primary and secondary world food industries. Elements of monetary and fiscal policy necessary for understanding of the modern mixed free enterprise system. [3-0; 0-0]

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. [3-2; 3-2]

307. (1½) 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. Prerequisite: Economics 200 or Agricultural Economics 258. [3-0; 0-0]

310. (½) Managerial Economics.—Economic analysis applied to business decisions. Functions of the business economist. Forecasting, portfolio selection, profit and capital management, cost and revenue control, demand analysis and advertising, replacement theory, scheduling, tactical and strategic alternatives. Prerequisite: Economics 200 or Ag. Econ. 258. [3-0; 0-0]

311. (1½) Managerial Economics under Uncertainty.—Concepts of classical and bayesian probability applied to economic problems in managerial economics. Useful distributions, opportunity loss, conditional and joint probability, decision rules, costs of uncertainty, value of information, bidding and games in oligopoly. Pre-requisite: Consent of the instructor. [0-0; 3-0]

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]

374. (1½) Land Economics.—Economic analysis applied to problems of land use. Rent theory. Land evaluation. Land conservation. Techniques for assessing economic efficiency of land use. Effects of institutions and public policies on land use. Prerequisite: Economics 200 or 202. (Same as Economics 374.) [3-0; 0-0]

400. (2) Enterprise Evaluation.—Observing, recording and evaluating economic performance and profitability of local agricultural firms. Laboratory only. Prerequisite: Agricultural Economics 300 or 310. [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. [2-2; 0-0] or [0-0; 2-2]

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 of instructor. [3-0; 3-0]

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 achieve market power. Prerequisite: Agricultural Economics 307 or equivalent. [3-0; 0-0]

408. (1½) 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. [0-0; 3-0]

415. (1½) Animal Economics.—Study of animal science and economic parameters; their use in design of primary production systems for growth, nutrition, reproduction, lactation and genetic improvement. Decision-making under various biological and economic constraints, options and opportunities. (Note: This course is the same as Animal Science 415). [0-0; 2-2]

423. (1-2) Seminar.—Application of economic analysis to contemporary problems in agricultural economics. [1-0; 1-0]

425. (1½ 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: consent of instructor. Offered 1972-73 and alternate years.

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: consent of instructor. Offered 1973-74 and alternate years.

504. (3) Extension Planning and Evaluation.—A study of the relative effectiveness of various methods for the diffusion of agricultural information.

508. (1½) Advanced Production Analysis.—Analytical and research procedures in production economics. Activity analysis. Production and supply functions. Simulation. Prerequisite: consent of the instructor. Offered 1973-74 and alternate years.

530. (1-3) Directed Studies.—On an approved problem.

540. (1½) Agriculture in the Developing Economies.—Role of agriculture in economic development. Technology, culture and institutions in developing countries—their relationship to agricultural development. Policies and Problems. Prerequisite: consent of the instructor.

549. (5-6) Master's Thesis.

Agricultural Mechanics

A major or double major programme in Agricultural Mechanics may be selected. For details on course requirements consult the chairman of the department.

Students wishing to pursue a programme in Agricultural Engineering should examine the Faculty of Applied Science section before the end of the first year and should consult the chairman of the department for details.

The M.Sc. in Agricultural Mechanics and the M.A.Sc. in Agricultural Engineering are offered to qualified students who wish to specialize in the following areas: Bio-Environmental Control and Waste Management; Water Quality and Hydrology; Biomachine Systems; and Food Process Engineering.

300. (1½) Principles of Food Engineering (I).—Transport of fluid and semi-fluid food systems; conveyance of particulate food; heat transfer to fluid and tissue systems; process control. [2-2; 0-0]

301. (1½) Principles of Food Engineering (II).—Thermal properties of food; air blast and immersion freezing; thawing; psychrometry; concentration and drying of food; mixing, size reduction and separation. [0-0; 2-2]

303. (1½) Machine Systems in Production Agriculture.—Mathematical models for system selection, machine-power unit-soil relationships, physical and mechanical principles of seeding, fertilization, spraying and harvesting. Prerequisite: Consent of Instructor. [2-2; 0-0]

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) Principles of Bioenvironmental Engineering.—Thermodynamic, heat and mass transfer, energy balances, electromagnetic radiation and their relationship to biosystems in closed environments. Instrumentation and control requirements. [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

The Department has teaching and research facilities in the areas of nutrition, physiology, genetics and breeding and management of domestic animals. Field units for studies on beef cattle, dairy cattle, sheep, swine and fur-bearing animals (mink and chinchilla) are located on the University Campus. Laboratory facilities for experimentation with small laboratory animals (rats, mice, guinea pigs and rabbits) are in the main Agricultural Sciences Building (H. R. MacMillan Building).

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 requirements and courses see the Graduate Studies section of the calendar.

Requirements for the B.Sc. (Agr.) degree, Major, Double Major (Note 1) and Honours Programmes:

First Year		Second Year	
Agricultural Sciences 101	3	Agricultural Sciences 201	3
Biology 101 or 102	3	Agricultural Economics 258	1½
Chemistry 103 (110 or 120)	3	Animal Science 258	1½
Mathematics 100 and 121	3	Chemistry 230	3
Physics 105 (110, 115 or 120) or English 100	3	English 100 or Physics 105 (110, 115 or 120)	3
		Elective (Note 2)	3
	15		15

Third and Fourth Years	Major	Honours
Agricultural Sciences 300	1	1
Plant Science 321 or equivalent	1½	1½
Animal Science 313	3	3
Animal Science 320	3	3
Animal Science 322	1½	1½
Animal Science 323	1½	1½
Animal Science 423	1	1
Animal Science 425	3	3
Electives (Agricultural Sciences, Science, or Arts) to be chosen with Departmental advisor (Note 3).	16½	22½
	32	38

Notes:

1. Students electing a double major programme must consult with the chairman of the department prior to registration. Students will be required to take a minimum of 7½ units of Animal Science courses numbered 200 or above (excluding Animal Science 423, 425 and 430).
2. The department suggests Microbiology 200 or 201 be taken in the second year.
3. The total programme must contain at least 3 units of non-science courses.

258. (1½) Animal Production Systems.—The livestock industry; the application of fundamental principles to the production of various classes of livestock. Prerequisite: Agricultural Sciences 201. (Note: This course is the same as Poultry Science 258). [0-0; 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 Plant Science 313 and Poultry Science 313). [2-2; 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: Frandson, Anatomy and Physiology of Farm Animals. [2-2; 2-2]

322. (1½) Fundamentals of Animal Nutrition.—Essential nutrients and their functions; nutrient relationships and animal requirements in growth, maintenance, production and reproduction. Energetics and energy units in growth and production. Textbook: Manyard and Loosli, *Animal Nutriton* (1969). (Note: This course is the same as Poultry Science 322.) [3-0; 0-0]

323. (1½) Experimental Nutrition.—A laboratory course designed to illustrate principles of nutrition and to provide experience in the use of different species in nutritional studies. Prerequisite: Animal Science 322. Enrollment limited and subject to consent of the Department. (Note: This course is the same as Poultry Science 323.) [0-0; 1-3]

402. (1½) Applied Tissue Culture.—Animal cell and tissue culture and its application to research in nutrition, genetics, physiology and pathology. Prerequisite: Microbiology 200 or 201. (Note: This course is the same as Poultry Science 402.) [1-4; 0-0]

406. (1½) Physiology of Reproduction.—Physiological mechanisms related to reproduction, breeding efficiencies, fertility and milk secretion. [0-0; 2-2]

413. (1½) Animal Breeding.—Genetic concepts and basic principles of animal breeding with application to population improvement. Prerequisite: Animal Science 313. [3-0; 0-0]

415: (1½) Animal Economics.—Study of animal science and economic parameters; their use in design of primary production systems for growth, nutrition, reproduction, lactation and genetic improvement. Decision-making under various biological and economic constraints, options and opportunities. (Note: This course is the same as Agricultural Economics 415.) [0-0; 2-2]

417. (1½) Dairy Cattle Production Systems.—Biological advantages and disadvantages of the life processes of dairy livestock in production systems in different natural environments. A study of the development of intensive cattle production, essential resources and features of organization and current biological limitations. [2-2; 0-0]

418. (3) Environmental Aspects of Livestock Production.—The effects of the environment on livestock productivity under intensive production systems. [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. [0-0; 1-4]

421. (1½) Productivity of Grazing Animals.—Principles and techniques of the study of energy flow and productivity in man-managed and natural grazing systems. Interactions of domestic and wild herbivores using common range resources. (Animal Science 322 and Plant Science 404 recommended, or permission of the Instructor). [0-0; 2-2]

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) Quantitative Genetics.—Theoretical concepts and recent research in population and biometrical genetics. Consent of instructor. (Given in 1972-73 and alternate years.) [3-0; 3-0]

518. (1½) Advances in Animal Physiology I.—The influence of environmental factors on growth and reproduction; measurement of physiological responses. (1972-73 and alternate years.) [0-0; 2-2]

520. (1½) Advances in Animal Physiology II.—Current topics in the study of metabolism in domestic animals; metabolic disorders. (1973-74 and alternate years.) [2-2; 0-0]

521. (1½) Advances in Animal Nutrition I.—Bioenergetics and growth; energy utilization and requirements in animal nutrition. Reference: Kleiber, *Fire of Life*. (1972-73 and alternate years.) [2-2; 0-0]

522. (1½) Advances in Animal Nutrition II.—Recent advances on the function of the individual nutrients in livestock. Interrelationship of nutrients. (1973-74 and alternate years.) [0-0; 2-2]

530. (1-3) Directed Studies.

549. (5-6) Master's Thesis.

649. Ph.D. Thesis.

Food Science

Food Science is a discipline which encompasses Food Chemistry and Physics, Food Process Science and Structural and Environmental Bromatology, with respect to the manufacture, preservation, quality control and development of food products.

Students at the undergraduate level (Major and Honours) may elect a general Food Science programme or specialization in Food Chemistry, Food Microbiology or Food Process Science. The minimum requirements of all bachelor's degree programmes in the Department of Food Science are outlined below. Students wishing to specialize in Food Chemistry, Food Microbiology or Food Process Science should consult the Chairman of the Department.

The department offers M.Sc. and Ph.D. degree programmes in the fields of Food Chemistry, Food Physics, Food Microbiology, Structural Bromatology and Environmental Bromatology.

Requirements for the B.Sc. (Agr.) degree
Major, Double Major and Honours

First Year		Second Year	
Agricultural Sciences 101	3	Agricultural Sciences 201	3
Biology 101 or 102	3	Agricultural Economics 258 (or 101) or Economics 200	1½-3
Chemistry 103 (110 or 120)	3	Chemistry 230	3
Mathematics 100 and 121	3	English 100 or Physics 105 (110, 115 or 120)	3
Physics 105 (110, 115 or 120) or English 100	3	Microbiology 200 or 201	3
		Elective	0-1½
	15		15

Third Year	Major	Double Major	Honours
Agricultural Sciences 300	1	1	1
Agricultural Mechanics 300	1½	1½	1½
Chemistry 205	—	—	3
Food Science 301	1½	1½	1½
Food Science 302	1½	1½	1½
Food Science 304	1½	1½	1½
Food Science 305	1½	1½	1½
Food Science 306	1½	1½	1½
Microbiology 307	1½	1½	1½
Plant Science 321	1½	1½	1½
Non-Science Electives	3	3	3
	16	16	19

Fourth Year	Major	Double Major	Honours
Biochemistry 410	—	—	3
Food Science 406	1½	1½	1½
Food Science 412	1½	—	1½
Food Science 414	1½	—	1½
Food Science 423	1	1	1
Food Science 425	1½-3	1½	3
Nutrition Elective	1½	—	1½
Electives	6-7½	12	6
	16	16	19

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 for the analysis of food products. [0-0; 2-3]

304. (1½) Food Process Science—Tissue Systems.—Principles of sequential process operations in the transformation of plant and animal tissues to food products. [3-0; 0-0]

305. (1½) Food Process Science—Fluid and Semisolid Systems.—Principles of sequential process operations in the conversion of biological fluids and semi-solids to food products. [0-0; 3-0]

306. (1½) Food Process Science Laboratory.—Experiments in the food process laboratory to illustrate principles of food manufacture and preservation. [0-3; 0-3]

406. (1½) Quality Control, Standards and Evaluation.—Laws and regulations governing food composition and grading; quality evaluation; organoleptic analysis; statistical quality control. Prerequisite: Plant Science 321 or equivalent. [0-0; 2-2]

408. (1½) Advanced Food Process Science.—Thermal and radiation inactivation of microorganisms and enzymes; concentration; dehydration; freezing. [3-0; 0-0]

410. (1½) Chemistry of Food Systems.—Physico-chemical aspects of sol-gel and liquid-solid transformations; chemistry of multi-phase food systems. [3-0; 0-0]

412. (1½) Structural bromatology.—Macro- and micro-structure of native, processed and fabricated food systems. Microtechniques. [0-0; 2-2]

414. (1½) Applied Microbiology.—Microbiological culture techniques for the production of materials of significance in Food Science. Prerequisite: Microbiology 200 or 201. [0-0; 1-4]

416. (1½) Environmental Bromatology.—Dynamic interaction between environmental components and food systems. Environmental barriers. Physical and chemical protection of food systems. Prerequisite: Microbiology 200, Chemistry 230. [3-0; 0-0]

418. (1½) Toxicants in Food Systems.—Chemical, physical and biological properties of toxicants in food systems. Degradation of toxicants during food porcessing. [0-0; 3-0]

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.

501. (1) Food Lipids.—Chemical and physical properties of food lipids. Chemical alteration of food lipids during processing and storage: hydrogenation, crystal polymorphism, hydrolysis, thermal degradation and autoxidation. Offered 1973-74 and alternate years. [0-0; 2-0]

502. (1½) Food Pigments and Colorimetry.—Deterioration of food pigments and synthetic food colors during processing; color perception and instrumental analysis. Offered 1972-73 and alternate years. [0-0; 2-2]

503. (1) Chemistry of Food Proteins.—Chemical and physical properties of food proteins. Offered 1973-74 and alternate years. [2-0; 0-0]

504. (1) Molecular Basis of Chemoreception.—Chemical and physical processes underlying the sensory properties of food. Offered 1972-73 and alternate years. [2-0; 0-0]

505. (1) Food Suspensions, Emulsions and Foams.—Physico-chemical concepts of food suspensions, emulsions and foams: surface-active agents, hydrophile-lipophile balance, emulsifiers, emulsion stability, foaming and antifoaming agents, foam stability, and rheology of these food systems. Offered 1973-74 and alternate years. [2-0; 0-0]

506. (1½) Structure and Chemistry of Food Myosystems.—Structural and chemical aspects of myosystems as related to fundamental properties and quality attributes of muscle as a food with emphasis on texture and flavor. Offered 1973-74 and alternate years. [0-0; 2-2]

507. (1) Food Carbohydrates.—Chemical, physical and structural aspects of simple sugars and polysaccharides such as starch granules, gums and pectins. Concepts of carbohydrate alterations during food processing and storage: nonenzymic browning reactions, starch granule gelatinization and retrogradation, depolymerization of polysaccharides, and polysaccharide-protein interactions in food. Offered 1972-73 and alternate years. [0-0; 2-0]

508. (1½) Biorheology.—Rheology of complex biological systems; biorheometry; rheological studies of selected biological tissues with emphasis on food systems. Offered 1973-74 and alternate years. [2-2; 0-0]

509. (1) Food Enzymes.—Chemical and physical properties of food enzymes; mechanisms of enzymic action; utilization of enzymes in food processing. Offered 1972-73 and alternate years. [2-0; 0-0]

513. (1½) Advanced Cell Culture.—Intensive study of the products of selected cell culture. Prerequisite: Food Science 414 or equivalent. Offered in 1972-73 and alternate years. [1-4; 0-0]

530. (1-3) Directed Studies.

549. (5-6) Master's Thesis.

649. Ph.D. Thesis.

Plant Science

(Agronomy, Horticulture, Plant Protection)

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 section of calendar.

Honours, Major and Double Major programmes are offered in the following options: agronomy, horticulture, and crop protection. The required and recommended courses for Honours and Major programmes are given below. Students wishing to take a Double Major programme in Plant Science must consult with the Chairman of the department prior to registration.

The department also offers an Honours programme in landscape horticulture, the requirements for which are also given below.

Requirements for the B.Sc. (Agr.) degree

Major, Double Major and Honours

First Year		Second Year	
Agricultural Sciences 101	3	Agricultural Sciences 201	3
Biology 101 or 102	3	Agricultural Economics 258 (or 101) or Economics 200	1½-3
Chemistry 103 (110 or 120)	3	Chemistry 230	3
Mathematics 100 and 121	3	English 100 or Physics 105 (110, 115 or 120)	3
Physics 105 (110, 115 or 120) or English 100	3	Recommended and elective courses (Note 1)	3-4½
	15		15

Third Year	Major	Honours
Agricultural Sciences 300	1	1
Plant Science 321	1½	1½
Plant Science 313	3	3
Plant Science 324 and 325	3	3
Plant Science 331	1½	1½
Plant Science 336	1½	1½
Recommended and elective courses (Note 1)	4½	7½
	16	19
Fourth Year		
Plant Science 423	1	1
Plant Science 424	1½	1½
Plant Science 425	1½	3
Recommended and elective courses (Note 1)	12	13½
	16	19

Notes:

1. Students should select one of the options below. It is recommended, but not obligatory, that the courses listed under the appropriate option be taken.

	Agronomy		Horticulture (Note 2)		Crop Protection	
Second Year						
	Plant Science 258	1½	Plant Science 258	1½	Plant Science 258	1½
	OR		OR			
	Botany 302	3	Botany 302	3	Microbiology 200 OR 201	3
	Electives	0-3	Electives	0-3		
Third and Fourth Years						
	Plant Science 322	1½	Plant Science 322	1½	Plant Science 322	1½
	Plant Science 326	1½	Plant Science 326	1½	Plant Science 326	1½
	Plant Science 404	1½	Plant Science 411	1½	Plant Science 431 and 432	3
	Plant Science 405	1½	Plant Science 413	1½	OR Plant Science 435	1½
	Plant Science 406	1½	Plant Science 417	1½	Plant Science 436 and 437	
	Animal Science 322	1½	Plant Science 418	1½	Plant Science 438	1½
	Soil Science 315	1½	Plant Science 426	1½	Botany 308	1½
	Non-science elective	3	Soil Science 315	1½	Non-science elective	3
	Electives	3 or 7½	Non-science elective	3	Electives	3 or 7½
			Electives	1½ or 6		

2. Students who wish to include landscape horticulture in their major should take Plant Science 316 and 416 in their Third and Fourth Years. For honours students there is a separate Landscape Horticulture Honours Program.

Landscape Horticulture Honours Programme

A programme leading to the degree of B.Sc. (Agr.) with honours in Landscape Horticulture has been developed for students interested in research and teaching in this branch of landscape architecture, with the following requirements:

First and Second Years:

As for Plant Science with Fine Arts 181 (3) required in the second year.

Third Year:

Agricultural Sciences 300 (1); Plant Science 258 (1½), 321 (1½) and 316 (1½); Architecture 305 (3); Agricultural Mechanics 304 (1½) and 305 (1½); Biology 321 (1½) and 322 (1½); Geography 350 (1½); Soil Science 315 (1½); elective (1½).

Fourth Year:

Plant Science 416 (1½), 418 (1½), 423 (1) and 425 (3); Architecture 425 (1½); Forestry 491 (1½) or 420 and 492 (1½); electives (6½).

258. (1½) Identification of Economic Plants.—A practical introduction to the identification and classification of plants of economic importance. Prerequisite: Plant collection following consultation with instructor during previous Spring Term. (Same as first term of Botany 302 with additional tutorials.) Mr. Taylor. [2-4; 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 Animal Science 313 and Poultry Science 313. Mr. Hornby. [2-2; 2-2]

316. (1½) Plants in Landscape.—Culture and identification of landscape materials. Elementary principles of landscape composition. (Suitable for students of other faculties and departments interested in landscape materials and their uses.) Mr. Neill. [2-2; 0-0]

320. (1½) Field Studies and Practices in Agronomy, Horticulture, or Crop 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. Permission of Chairman of the Department.

321. (1½) Biometrics.—Elementary principles of the analysis, presentation and interpretation of biological data. Prerequisite: First year Mathematics. Mr. Eaton. [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 430). [0-0; 2-2]

324. (1½) Physiology of Crops (Metabolism and Growth Analysis).—Elements of metabolism in crop plants; energy capture and transport; analysis of growth of plants and communities. Mr. Jolliffe. [2-2; 0-0]

325. (1½) Physiology of Crops (Nutrition and Water Relations).—Role of minerals and water in crop production. Mr. Eaton and Mr. Jolliffe. [0-0; 2-2]

326. (1½) Methods of Plant Analysis.—A practical course in the techniques of modern plant analysis; sample preparation; methods of analysis for inorganic and organic constituents. Prerequisite: Chem. 230. Mr. Brink. [1-4; 0-0]

331. (1½) Economic Entomology.—Introduction to the relationships of insects to the economic pursuits of man; benefits, damage, control mechanisms; identification and selected life histories. Mr. Philogène. [0-0; 2-3]

336. (1½) Introductory Plant Pathology.—Study of the ecology of plant pathogenic organisms; principles of disease development and control. Prerequisite: Botany 308, or permission of instructor. Mr. Copeman. [0-0; 2-2]

404. (1½) Range Ecology.—Ecology and management of rangeland. Textbook: Stoddart and Smith, *Range Management*. Mr. Brink. [2-2; 0-0]

405. (1½) Forage Ecology and Conservation.—Grasses and legumes for pasture and forage, their ecology and conservation. Textbook: Hughes, Heath and Metcalfe, *Forages*. Mr. Brink. [0-0; 2-2]

406. (1½) Field Crops.—Factors associated with classification, yield and quality of temperate zone agronomic crops used for food, oil and fibre. (1972-73 and alternate years.) Mr. Renney. [2-2; 0-0]

407. (1½) Tropical and Exotic Crops.—Production and characteristics of important tropical crops and crops for drugs and stimulants. (1972-73 and alternate years.) Mr. Taylor. [0-0; 2-2]

411. (1½) Fruit Crops.—Science and practice of small fruit and tree fruit production. Mr. Eaton. [0-0; 2-2]

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. (1973-74 and alternate years.) Mr. Hornby. [0-0; 2-2]

416. (1½) Landscape Construction and Design.—Principles of landscape design. Garden construction. Visits to landscaped sites. Landscape problems. Prerequisite: Plant Science 316. Mr. Neill. [2-2; 0-0]

417. (1½) Vegetable Crops.—Science and practice of vegetable crop production. Mr. Hornby. [2-2; 0-0]

418. (1½) Floriculture.—A study of controlled environmental factors in the greenhouse with application to commercial flower crops. (1972-73 and alternate years.) Mr. Neill. [0-0; 2-2]

423. (1) Undergraduate Seminar.

424. (1½) Crop Growth Regulation.—Effects and modes of action of growth regulators and herbicides. Mr. Jolliffe and Mr. Renney. [2-2; 0-0]

425. (1½ or 3) Research Project.

426. (1½) Post-harvest Physiology.—Changes in the metabolism and quality of harvested crops; effects of pre- and post-harvest environmental conditions. (1972-73 and alternate years.) Mr. Jolliffe. [0-0; 2-2]

430. (1-3) Directed Studies.

431. (1½) Ecology of Economic Insects.—Influence of environmental factors on behaviour, distribution and abundance of economically important insects; community structure, density relationships and insect dispersal. Prerequisite: Plant Science 331. Mr. Wellington. [1-0-2; 0-0]

432. (1½) Physiology of Economic Insects.—Physiology of insect growth and development; moulting, respiration, metabolism, nutrition, transpiration, circulation and reproduction; influence of environmental factors. Prerequisite: Plant Science 331. Mr. Philogène. [2-3; 0-0]

435. (1 or 1½) Pesticides.—Chemical properties, physiological effects and usage of insecticides, acaricides, nematocides, herbicides and fungicides. Agricultural Sciences students must register for 1½ units. Prerequisite: Chemistry 230; recommended Plant Science 331 and 432. Mr Philogène. [2-0; 0-0 or 2-2; 0-0]

436. (1½) Crop Pathology.—Study of selected diseases of economically important crops with emphasis on diagnosis and practical control measures. A disease collection of 25 specimens is required. Prerequisite: Permission of instructor. Mr. Copeman. [2-2; 0-0]

437. (1½) Physiological Plant Pathology.—Study of the mechanisms of pathogenesis and the physiological responses induced in diseased plants. Prerequisite: Permission of instructor. Mr. Copeman and Mr. Shaw. [0-0; 2-2]

438. (1½) Weed Science.—Importance, identification, dissemination and biology of weeds; preventive, cultural, biological and chemical methods of control. (1973-74 and alternate years.) Mr. Renney. [0-0; 2-2]

439. (1½) Pollution and Crop Production.—Effects of air, water and soil pollution on plants; contribution of agricultural chemicals to pollution problems. (1973-74 and alternate years.) Mr. Runeckles. [0-0; 2-0-2]

Courses for Graduate Students

500. (1-3) Graduate Seminar.

504. (3) Principles, Techniques and Problems in Applied Plant Ecology.—Analysis of grazing and cropping systems; energy conversion and conservation; trophic levels and cycles; techniques and problems in arable land and wildland management. Prerequisite: Permission of instructor. Mr. Brink.

511. (3) Advances in Pomology.— Recent topics in fruit research. Experimental methods and interpretation of results. Problems in physiology and morphology of fruit crop plants. Permission of instructor. Mr. Eaton.

513. (3) Topics and Plant Genetics and Breeding.—Discussions of special topics in plant breeding with emphases on recent achievements and methodology. Offered in alternate years (not offered in 1972-73). Mr. Hornby.

516. (1-3) Advances in Landscape Architecture.—Lectures and assigned problems. Emphasis on the role of the landscape architect in the organization and development of man's environment and the use of plant materials in landscape. Field trips. Mr. Neill.

517. (3) Topics in Vegetable Crop Production.—The improvement and production of vegetable crops, with emphasis on research methods and current problems. (1972-73 and alternate years.) Mr. Hornby.

524. (1½) Control of Plant Growth by Synthetic Chemicals.—Physiology and biochemistry of synthetic substances affecting growth and metabolism of plants: herbicides, insecticides, fungicides. Permission of instructor. Mr. Runeckles.

525. (3) Crop Ecophysiology.—The crop environment and its effects on the physiology of crop plants and communities during growth and development. Lectures and laboratories. Offered in alternate years (not offered in 1972-73). Mr. Jolliffe.

530. (1-3) Directed Studies.

531. (2) Biological Control.—Concepts, scope and limitations of biological control in the balance of nature; exploration for and exploitation of natural enemies of plant and insect pests; integrated control measures and manipulation of the environment. Lectures and laboratories. Offered in alternate years in conjunction with 1 unit of Zoology 502.

532. (1½) Arthropod Vectors of Plant Disease.—Transmission of plant disease by insects and other anthropods; morphological specializations of vectors and their role in transmitting toxins, fungi, bacteria and viruses. Lectures and laboratories.

536. (2) Plant Virology.—Structure, biosynthesis, transmission and control of viruses causing plant diseases. Laboratories will emphasize instrumental techniques used in plant virus research. Offered in 1972-73 and alternate years. Limited enrolment. Permission of instructor. Mr. Copeman and Mr. Weintraub and other C.D.A. staff.

537. (3-5) Topics in Plant Pathology.—Physiology and biochemistry of disease resistance, mechanisms of pathogenesis and the interactions between plant pathogens and their hosts. (1972-73 and alternate years.) Prerequisite: Plant Science 437 and permission of instructor. Mr. Copeman and Mr. Shaw.

538. (3) Topics in Weed Ecology.—Climatic, soil, cultural and plant characteristics associated with weed infestation; succession; effects of physical, chemical and biological control procedures on weed ecology. Prerequisite: Plant Science 438 or permission of instructor. Mr. Renney.

539. (1½) Responses of Plants to Air Pollutants.—Effects of air pollutants on the biochemistry, growth and yield of plants; involvement of climatological factors; methods of protection. Prerequisite: Plant Science 439 or permission of instructor. Mr. Runeckles.

549. (6) Master's Thesis.

649. Ph.D. Thesis.

Poultry Science

The department offers studies in the fields of nutrition, physiology, genetics and embryology. Genetics, nutrition, physiology and embryology laboratories are located in the main Agricultural Science Building (H. R. MacMillan Building). Specialized avian facilities on the Unverisity Campus are available for many types of studies involving small or large numbers of birds.

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 requirements and courses, see the Graduate Studies section of the calendar.

Requirements for the B.Sc. (Agr.) degree

Major, Double Major (Note 1) and Honours

First Year		Second Year	
Agricultural Sciences 101	3	Agricultural Sciences 201	3
Biology 101 or 102	3	Agricultural Economics 258	1½
Chemistry 103 (110 or 120)	3	Chemistry 230	3
Mathematics 100 and 121	3	English 100 or Physics 105 (110, 115 or 120)	3
Physics 105 (110, 115 or 120) or English 100	3	Electives (Note 2)	4½
	15		15

Third and Fourth Years	Major	Honours
Agricultural Sciences 300	1	1
Plant Science 321 or equivalent	1½	1½
Poultry Science 306	—	3
Poultry Science 313	3	3
Poultry Science 322	1½	1½
Poultry Science 323	1½	1½
Poultry Science 415	1½	1½
Poultry Science 420	1½	1½
Poultry Science 423	1	1
Poultry Science 425	3	3
Biochemistry 410	—	3 (Note 3)
Poultry Science elective	3	3
General Electives (Agricultural Sciences, Science, Arts, to be chosen with departmental advisor, Note 4)	13½	13½
	32	38

Notes:

1. Students electing a double major programme must consult with the Chairman of the department prior to registration.
2. The department suggests Microbiology 200 or 201 be taken in the second year.
3. The department suggests Biochemistry 410 be taken in the fourth year.
4. The total programme must contain at least 3 units of non-science courses.

258. (1½) Animal Production Systems.—The livestock industry; the application of fundamental principles to the production of various classes of livestock. (Note: This course is the same as Animal Science 258.) [0-0; 2-2]

306. (3) Experimental Embryology.—Factors controlling cellular differentiation in embryonic systems. Laboratory studies will include sperm-egg interactions, enzyme induction and the role of hormones in development. [2-3; 2-3]

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 Plant Science 313. [2-2; 2-2]

322. (1½) Fundamentals of Animal Nutrition.—Essential nutrients and their functions; nutrient relationships and animal requirements in growth, maintenance, production and reproduction. Energetics and energy units in growth and production. Textbook: Maynard and Loosli, *Animal Nutrition* (1969). (Note: This course is the same as Animal Science 322.) [3-0; 0-0]

323. (1½) Experimental Nutrition.—A laboratory course designed to illustrate principles of nutrition and to provide experience in the use of different species in nutritional studies. Prerequisite: Poultry Science 322. Enrolment limited and subject to consent of the Department. (Note: This course is the same as Animal Science 323.) [0-0; 1-3]

402. (1½) Applied Tissue Culture.—Animal cell and tissue culture and its application to research in nutrition, genetics, physiology and pathology. Prerequisite: Microbiology 200 or 201. (Note: This course is the same as Animal Science 402). [1-4; 0-0]

404. (1½) Poultry Management.—Systems of poultry management with emphasis on the relationship of environmental factors to efficiency of production. Prerequisite: Consent of instructor. [2-2; 0-0]

410. (1½) Poultry Nutrition.—Principles of poultry nutrition. Recent advances in the knowledge of the nutritive requirements of the domestic fowl. Textbook: Scott, Nesheim, and Young, *Nutrition of the Chicken*. (1965). [2-3; 0-0]

411. (1½) 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: Schaible, *Poultry Feeds and Nutrition*. (1970). [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. (1½) Hygiene.—Hygienic measures for the prevention and control of disease. Prerequisite: Microbiology 200. [2-2; 0-0]

415. (1½) Avian 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. (1½) Physiology of Reproduction.—Fundamentals of egg production and reproduction in the domestic fowl. Recent advances in endocrinology affecting poultry. Textbook: Sturkie, *Avian Physiology* (1965). [0-0; 2-2]

423. (1) Seminar.—Poultry literature; research and experimental problems; preparation of reports and bulletins.

425. (1½-3) Research Project.

430. (1-3) Directed Studies.—On an approved problem.

Courses for Graduate Students

500. (1-3) Graduate Seminar.

506. (1½) Advances in Poultry Development and Physiology.—Recent advances contributing to the understanding of embryonic development; the role of hormones in macromolecular syntheses, hormone production, effect of teratogenic compounds and mechanism of action, nutrient requirements and metabolic changes occurring during development. (Offered in 1973-74 and alternate years.) [2-3; 0-0]

513. (3) Quantitive Genetics.—Theoretical concepts and recent research in population and biometrical genetics. Consent of instructor. (Given in 1973-74 and alternate years.) [3-0; 3-0]

521. (1½) Advances in Poultry Nutrition I.—The function of fat-soluble vitamins. (Offered in 1973-74 and alternate years.) [0-0; 2-3]

522. (1½) Advances in Poultry Nutrition II.—Protein nutrition; concepts of amino acid balance; methods of evaluating protein quality. (Offered in 1972-73 and alternate years.) [0-0; 2-3]

523. (1½ or 3) Biometrical Techniques.—Advanced biometrical techniques in agricultural experimentation. Prerequisite: Plant Science 321 or equivalent.

524. (1½) Advances in Poultry Nutrition III.—Physiological functions of minerals during growth, maintenance and reproduction. (Offered in 1973-74 and alternate years.) [0-0; 2-3]

530. (1-3) Directed Studies.—On an approved problem. (Breeding, embryology, nutrition, physiology.)

549. (5-6) Master's Thesis.

649. Ph.D. Thesis.

Soil Science

The Department offers programmes to study soil as a basic natural resource, and the relationship of soil to environmental quality. Special reference is made to the subject areas of soil chemistry and fertility; soil genesis, classification, and land use; soil physics; biometeorology; soil conservation and pollution control; and forest soils. The Department has well-equipped laboratories for teaching and research in these areas. Also, the Province of British Columbia is an excellent outdoor laboratory for the study of soils and the Department's association with the Faculty of Forestry, the Soil Survey and other resource agencies facilitate students taking advantage of this opportunity.

The Department's programmes are based on a knowledge of Chemistry, Biology, Geology, Physics and Mathematics and offer work leading to Bachelors', Masters' and Doctors' degrees. Requirements for the Bachelor's degree are noted below and for information concerning the Masters' and Doctors' degrees, the Faculty of Graduate Studies section of the calendar should be consulted.

Requirements for B.Sc. (Agr.) Degree

Major, Double Major and Honours (Note 1).

First Year		Second Year	
Agricultural Sciences 101	3	Agricultural Sciences 201	3
Biology 101 or 102	3	Chemistry 230 or 205	3
Mathematics 100 and 121	3	English 100 or Physics 105 (110, 115 or 120)	3
Chemistry 103 (110 or 120)	3	Microbiology 200 or 201	3
Physics 105 (110, 115 or 120) or English 100	3	Soil Science (Note 2) or Geology 105 (Note 3)	3
	15		15

Third Year	Major	Double Major	Honours (Note 4)
Agricultural Sciences 300	1	1	1
Agricultural Economics 258, or 101 or Economics 200	1½-3	1½-3	1½-3
Plant Science 321	1½	1½	1½
Non-Science Elective	3	3	3
Chemistry 230 or 205	3	3	3
Soil Science (Note 2)	3	3	3
Electives (Note 5)	1½-3	1½-3	4½-6
	16	16	19

Fourth Year Courses	Major	Double Major	Honours
Soil Science 423	1	1	1
Soil Science 425	1½-3	3	3
Soil Science [2]	6	6	6
Electives [5]	6-7½	6	9
	16	16	19

[1]Although the order in which the courses are listed is considered a desirable progression, it is recognized that a different sequence may be necessary.

[2]A minimum of 9 units of Soil Science courses are required in the Second, Third and Fourth Years exclusive of Agricultural Sciences 101, Soil Science 200, 423 and 425. These 9 units are to be selected as follows: 6 units from Soil Science 303 or 315, and 404, 413 and 416; and 3 units from Soil Science 311, 314, 414, 417, 418, 419 and 430.

[3]If Geology 105 is not taken in First or Second Year it must be taken subsequently in Third or Fourth Year.

[4]Honours programmes are offered in the subject areas of Soil Chemistry; Soil Genesis and Classification; Soil Physics and Biometeorology; Soil Conservation and Pollution Control; and Forest Soils.

The department chairman should be consulted with regard to additional required and elective courses for these programmes.

[5]Electives should be chosen in consultation with the department chairman.

200. (1½) An Introduction to the Study of Soils.—Physical, chemical and biological properties of soils; soil formation, classification, use and conservation. Course repeated in Spring term. [3-2] or [3-2]

300. (1½) Soil and Man I.—Soil as an element of the environment and man's interactions with it. The constitution, properties and classification of soils. The course is intended primarily for students in faculties other than Agricultural Sciences and Forestry and credit will only be given for one of Agricultural Sciences 101, Soil Science 200 and Soil Science 300. [3-0-2; 0-0-0]

301. (1½) Soil and Man II.—The suitability and use of soils for different objectives including agriculture, forestry and recreation. Soils in relation to environmental quality. The course is intended primarily for students in faculties other than Agricultural Sciences and Forestry. Prerequisite: Soil Science 300 or permission of the department. [0-0-0; 3-0-2]

303. (1½) Forest Soils.—Forest soil environment, relation of soil properties to forest management, forest humus, interpretation of soil properties; emphasis on properties affecting fertility. (This course is the same as Forestry 312.) Prerequisite: Soil Science 200. [0-0-0; 2-0-2]

311. (1½) Microbial Ecology. Diversity in microbial metabolism Autotrophy. Biogeological cycles. Diversity in morphology, its ecological significance; regulation of differentiation. Microbial interactions with themselves, plants, animals and man. Prerequisite: Biology 101. (This course is the same as Biology 422). [2-1-2; 0-0-0]

314. (1½) Soil and Water Conservation.—A study of environmental quality problems related to soil and water. Topics include soil pollution, soil erosion by water and wind and the principles of re-cycling domestic and agricultural wastes by utilization in crop production. [2-2; 0-0]

315. (1½) Soil Fertility.—Principles underlying soil management practices including nutrient supply, fertilizers and soil amendments; experimental methods and soil analysis. [0-0; 2-2]

321. (1½) Soil Biology.—Soil as a habitat, soil organisms; biological and biochemical processes in soil. Prerequisites: Biology 101 or 102 and Microbiology 200 recommended. [0-0; 2-3]

404. (1½) 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. (1½) Soil Physics.—A study of physical properties and processes of soils, with emphasis on water retention and flow properties. Laboratory exercises in physical methods used in soil investigations. Prerequisites: Soil Science 200 or equivalent, Physics 105, 110, 115, or 120, or permission of instructor. [3-2; 0-0]

414. (1½) Biometeorology.—The physical processes determining the microclimate of soils, forests and agricultural crops. Topics include radiation, heat and water relations, diffusion and turbulent exchange of matter and the modification of the microclimate. Instrumentation and field measurement. Prerequisite: consent of Instructor. [0-0; 3-2]

416. (1½) Identification, Classification and Geography of Soils.—Soil formation, the soil as a natural body, principles of identification, classification, appraisal and cartography of geographic units, nature and distribution of major kinds of soils. 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. This course is the same as Forestry 422. Prerequisite: Soil Science 416. [0-0; 3-2]

418. (1½) Methods of Soil Analysis.—Selection of methods for soil 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. (1½ or 3) Research Project.

430. (1-3) Directed Studies.—Systematic work on approved problem.

Courses for Graduate Students

500. (2) Graduate Seminar.

501. (1) Hydrology Seminar.—Current research in agricultural and forest hydrology. Emphasis is placed on graduate student research problems. Mr. Black.

503. (1-3) Problems in Forest Tree Nutrition.—Nutrient requirements, mycorrhizal effects, symbiotic nitrogen fixation, factors affecting nutrient availability, processes involving nutrient loss from the ecosystem. (This course is the same as Forestry 512). Mr. Ballard.

504. (1-3) Advanced Soil Chemistry.—A study of research findings in specific phases of Soil Chemistry. Not offered in 1972-73. Offered in alternate years. Mr Lowe.

512. (1-3) 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 1972-73.)

513. (1-3) Soil Physics.—Retention and flow properties of soils with respect to water, gas and heat. Thermodynamics of soil water. Consent of instructor. Offered in 1972-73 and alternate years). Mr. de Vries.

514 (1-3) Biometeorology.—Energy and mass exchange in the biosphere with emphasis on the interfaces between the atmosphere and soils, plants and animals. Consent of instructor. Mr. Black.

516. (1-3) 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 1972-73 and alternate years. Mr. Lavkulich.

518. (1-3) Colloidal Properties in Soil.—A study of the common minerals and colloids found in sediments and soils, their reactions, properties, weathering and diagenetic characteristics, and methods used for identification and characterization. Prerequisite—consent of instructor. Not offered in 1972-73. Mr. Lavkulich. [3-2; 3-0] or [3-2; 3-2]

530. (1-3) Directed Studies.

549. (5-6) Master's Thesis.

649. Ph.D. Thesis.

COURSES GIVEN IN OTHER FACULTIES

(see appropriate sections of the calendar for description of courses)

Biology 101, 102
Chemistry 103, 110, 120, 230
Economics 200
Mathematics 100, 121, 200
Physics 105, 110, 115, 120

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.

Applied Science 270, 281; Biochemistry 410; Biology 310, 321, 322, 334; Botany 302, 330, 425, 435; Chemistry 210, 220, 304 305, 335; Commerce 151, 190, 271, 331; Computer Science 201, 210; Economics 300, 304; English 150, 200, 305; Forestry 300, 304, 307, 406, 442, 485; Geography 101, 102, 212, 350, 366, 370; Geology 150, 412; Microbiology 307, 308, 322; Physics 204; Zoology 311.

THE FACULTY OF APPLIED SCIENCE

ENGINEERING

FACULTY OF APPLIED SCIENCE

W. D. FINN, B.E. (Nat. Univ. Ireland), M.Sc., Ph.D. (Washington), P.Eng., M.Am.Soc.C.E., M.A.S.E.E., 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.

J. D. ANDERSON, B.A.Sc. (Brit. Col.), M.S. in C.E. (Washington), P.Eng., M.Am.Soc.C.E., Associate Professor and Assistant to the Dean.

Department of Agricultural Engineering

W. D. POWRIE, M.A. (Toronto), Ph.D. (Mass.), Professor and Acting Chairman of the Department.

T. L. COULTHARD, B.E. (Sask.), M.Sc. (Calif.), Dip.Ing. San. Eng. (Delft), P.Eng., Professor.

L. M. STALEY, B.A.Sc. (Brit. Col.), M.Sc. (Calif.), P.Eng., Professor.

E. L. WATSON, B.A.Sc. (Brit. Col.), M.Sc. (Calif.), P.Eng., Professor.

N. R. BULLEY, B.A.Sc. (Toronto), Ph.D. (Simon Fraser), Assistant Professor.

E. O. NYBORG, B.E. (Sask.), M.S. (Michigan State), Ph.D. (Brit. Col.), P.Eng., Assistant Professor.

T. A. BLACK, B.S.A. (Brit. Col.), M.Sc., Ph.D. (Wisconsin), Lecturer.

V. RAUDSEPP, Dipl. C.E. (Tallinn, Estonia), P.Eng., Honorary Lecturer.

Department of Chemical Engineering

FRANCIS E. MURRAY, B.Sc. (Alta.), Ph.D. (McGill), P.Eng., M.Tech. Sect. C.P.P.A., Professor and Head of 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.), P.Eng. F.C.I.C., M.A.I.Ch.E., Professor.

J. S. FORSYTH, B.Sc. (Glasgow), Ph.D. (Leeds), P.Eng. A.R.I.C., M.I.Ch.E., F.C.I.C., Professor.

K. L. PINDER, M.Eng. (McGill), Ph.D. (Birmingham), F.C.I.C., Professor.

R. M. R. BRANION, B.A.Sc., M.A.Sc. (Toronto), Ph.D. (Sask.), Associate Professor.

J. LIELMEZS, B.Sc. (Denver), M.Sc. (Northwestern), P.Eng., M.A.I.Ch.E., M.C.I.C., M.A.C.S., Associate Professor.

K. B. MATHUR, Dipl. Chem. Eng. (Delhi), M.A.Sc. (Michigan), Ph.D. (Birmingham), F.C.I.C., A.M.I.Ch.E., Associate Professor.

D. W. THOMPSON, B.Sc., Ph.D. (Birmingham), M.C.I.C., A.M.I.Ch.E., M.A.I.Ch.E., Associate Professor.

A. MEISEN, B.Sc., ACGC (Imp. College, London), M.Sc. (Calif. Inst. Tech.), Ph.D. (McGill), Assistant Professor.

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F. D. MARANDA, B.A.Sc. (Brit. Col.), P.Eng., Senior Instructor.

C. B. PRAKASH, B.Sc. (Banaras Univ.), Ph.D. (Brit. Col.), A.M.A.I.Ch.E., Research Associate.

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D. J. SHLIEN, B.Eng. (McGill), Part-time Lecturer.

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C. CRAIG WALDEN, M.A. (Sask.), Ph.D. (Minn.).

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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.

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Department of Civil Engineering

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A. VIZSOLYI, Dipl.Chem. (Budapest), Research Associate.
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Department of Mineral Engineering

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JAN LEJA, A.R.S.M., B.Sc. (London), Dipl.Ing. (Krakow), Ph.D. (Cantab.), P.Eng. F.C.I.C., Professor.
GEORGE W. POLING, B.Sc., M.Sc., Ph.D. (Alta), P.Eng., Professor.
I. WEIR-JONES, B.Sc., Ph.D. (Newcastle), P.Eng., F.G.S., Assistant Professor.
D. W. SMELLIE, B.Sc. (Queen's), M.A.Sc. (Brit. Col.), Ph.D. (Australian National U.), P.Eng., M.C.I.M., F.A.A.A.S., Part-time Lecturer.
Z. DOGAN, B.Sc. (Birmingham), Ph.D. (Cantab.), Visiting Professor.
H. KIYAMA, D.Eng. (Kyoto), Post-doctoral Fellow.
A. R. LANE, B.Sc. (Medway College), Ph.D. (Bristol), Postdoctoral Fellow.
I. OGLE, M.A.Sc., Ph.D. (Brit. Col.), Postdoctoral Fellow.
R. S. PATHANIA, B.Eng. (Indian Inst. of Sc.), Ph.D. (Brit. Col.), Post-doctoral Fellow.

Lecturers from another Department

E. PETERS, M.A.Sc., Ph.D. (Brit. Col.), Professor, Department of Metallurgy.
WILLIAM H. WHITE, M.A.Sc. (Brit. Col.), Ph.D. (Toronto), Professor, Department of Geology.
J. A. GOWER, M.A.Sc. (Brit. Col.), Ph.D. (M.I.T.), Associate Professor, Department of Geology.
A. J. SINCLAIR, M.A.Sc. (Toronto), Ph.D. (Brit. Col.), Associate Professor, Department of Geology.
W. R. FLETCHER, B.Sc., D.I.C., Ph.D. (Imperial College), Assistant 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, Master of Engineering or Doctor of Philosophy.

The requirements for entrance to these programmes are set out fully in the Faculty of Graduate Studies section of the calendar. In general it may be stated that acceptance as a candidate for a Master's Degree requires a high level of accomplishment in the undergraduate course. For the M.A.Sc. degree a substantial programme of academic courses and research, occupying at least twelve months, is required. For the M.Eng. degree, additional academic courses are required in lieu of a thesis. 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 General Information.

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.

Required subjects are:

English 100 (Literature and Composition)
Mathematics 100 and 121 or the equivalent. Students offering Mathematics 120 prior to 1968 or its equivalent elsewhere will be required to enrol in a special section of Mathematics 151.
Chemistry 110 or 120
Physics 105, 110, 115 or 120
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.

Students who complete pre-engineering studies at a college or another university will be expected to present a set of courses equivalent to the list given above and obtain satisfactory standing. The required standing, in general, will be met by grades of "C" or better in all courses and a gradepoint average of not less than 2.7 in the science and mathematics courses.

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 after consultation with the Head of the appropriate department.

Candidates who expect to complete the requisite entrance standing through examinations held in August, must apply for admission by June 30 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.

Financial Assistance

A list of Fellowships, Scholarships, Bursaries and Loans open to students in the University will be found in the Awards and Financial Assistance section of the calendar. *In general, application must be made to the Dean of Inter-Faculty and Student Affairs.*

See the General Information section for information on:

(i) general conduct
(ii) attendance
(iii) graduation
(iv) withdrawal
(v) examination results
(vi) review of assigned standing
(vii) transcript of academic record
(viii) fees

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.

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.

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.

FIRST YEAR

Subject	First Term			Second Term		
	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.
Geol. 150 Earth Science for Engineers	2	2*	..	2	2*	..
App. Sc. 152 Engineering Draw.	1	..	3	1	..	3
Chem. 156 Physical Chemistry	..	..	..	3	..	2
Eng. 150 Technical Writing	2	..	..	2	..	..
Math. 151 Linear Algebra	3	..	..	..	..	..
Math. 155 Calculus	3	..	..	3	..	..
Math. 156 Vector Calculus	..	..	..	3	..	..
Phys. 155 Mechanics	2	..	4	2	..	2
Phys. 156 Heat & Thermodynamics	2	3*	1	..	..	..
Phys. 158 Wave Phenomena	..	..	..	2	3*	1

SECOND YEAR

Agricultural Engineering

App. Sc. 250 Biosystems for Engineers	2	..	2	..	..	..
App. Sc. 251 Electrical Circuit Analysis	..	..	..	3	2*	2*
App. Sc. 270 Strength of Materials	2	..	1	2	..	1
App. Sc. 275 Applied Mechanics	2	..	1	2	..	1
App. Sc. 278 Materials Science	2	2*	..	2	2*	..
App. Sc. 281 Fluid Mechanics	2	..	2	2	..	2
Chem. 253 Organic Chemistry	..	..	..	2	..	..
C.E. 250 Plane Surveying	At end of 2nd Term, 1st Year					
C.S. 251 Introd. to Computers and Programming	2	..	1	..	..	..
Math. 255 Differential Equations I	3	..	..	..	..	..
Math. 256 Differential Equations II	..	..	..	3	..	..
Phys. 253 Introd. to Solid-State Physics	2	3*	..	..	..	..

*Alternate weeks.

Chemical Engineering

Subject	First Term			Second Term		
	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.
App. Sc. 251 Electrical Circuit Analysis	3	2*	2*	..	..	..
App. Sc. 278 Materials Science	2	2*	..	2	2*	..
Chem. 230 Organic Chemistry	3	3	..	3	3	..
Chem. 257 Physical Chemistry	2	4*	..	2	4*	..
Ch. E. 250 Introd. to Chemical Engineering	1	2*	1	3	2*	1
C.S. 251 Introd. to Computers and Programming	2	..	1	..	..	..
Math. 251 Elem. Statistics	2	..	..	2	..	..
Math. 255 Differential Equations I	3	..	..	..	..	..
Math. 256 Differential Equations II	..	..	..	3	..	..
Phys. 250 Electric and Magnetic Fields	..	..	..	2	3*	1

*Alternate weeks.

Civil Engineering

App. Sc. 251 Electrical Circuit Analysis	..	..	..	3	2*	2*
App. Sc. 270 Strength of Materials	2	..	1	2	..	1
App. Sc. 275 Applied Mechanics	2	..	1	2	..	1
App. Sc. 278 Materials Science	2	2*	..	2	2*	..
App. Sc. 281 Fluid Mechanics	2	..	2	2	..	2
C.S. 251 Introd. to Computers and Programming	..	..	..	2	..	1
Math. 251 Elem. Statistics	2	..	..	2	..	..
Math. 255 Differential Equations I	3	..	..	..	..	..
Math. 256 Differential Equations II	..	..	..	3	..	..
Physics 253 Introd. to Solid-State Physics	2	3*	..	..	..	..
‡Elective						
C.E. 250 Plane Surveying	At end of 2nd Term, 1st Year					

*Alternate weeks.
‡The elective course will be chosen from a list provided at registration.

Electrical Engineering

C.S. 251 Introd. to Computers and Programming	..	..	..	2	..	1
E.E. 251 Introd. to Circuit Analysis	3	..	2	3	2*	2
E.E. 252 Introd. to Solid State Devices	2	2*	2*	..	..	..
E.E. 254 Digital Electronics	..	..	..	2	2*	2*
E.E. 256 Switching Circuits	2	2*	1	..	..	..
E.E. 261 Engineering Electromagnetics	2	..	2	2	..	2
Math. 255 Diff. Eqns. I	3	..	..	..	..	..
Math. 256 Diff. Eqns. II	..	..	..	3	..	..
Math 350 Complex Variables and application	2	..	1	2	..	1
††Elective						

*Alternate weeks.
††Any 2 or 3 unit course in the University, subject to prerequisites and timetable restrictions.

Geological Engineering

Subject	First Term			Second Term		
	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.
App. Sc. 251 Electrical Circuit Analysis	3	2*	2*	..	..	..
App. Sc. 270 Strength of Materials	2	..	1	2	..	1
App. Sc. 278 Materials Science	2	2*		2	2*	..
App. Sc. 281 Fluid Mechanics	2	..	2	2	..	2
C.E. 250 Plane Surveying	At end of 2nd Term, 1st Year					
C.S. 251 Introd. to Computers and Programming	..	..	..	2	..	1
Geol. 206 Sedimentology	..	..	..	2	2	0
Geol. 210 Mineralogy	2	3	..	2	3	..
Math. 251 Elem. Statistics	2	..	..	2	..	..
Math. 255 Differential Equations I	3	..	..	..	..	....
Math. 256 Differential Equations II	..	..	..	3	..	..
Phys. 250 Electric and Magnetic Fields	..	..	..	2	3*	1

*Alternate weeks.

Mechanical Engineering

Subject	First Term			Second Term		
	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.
App. Sc. 251 Electrical Circuit Analysis	3	2*	2*	..	..	..
App. Sc. 270 Strength of Materials	2	..	1	2	..	1
App. Sc. 275 Applied Mechanics	2	..	1	2	..	1
App. Sc. 278 Materials Science	2	2*	..	2	2*	..
App. Sc. 281 Fluid Mechanics	2	..	2	2	..	2
C.S. 251 Introd. to Computers and Programming	..	..	..	2	..	1
Math. 251 Elem. Statistics	2	..	..	2	..	..
Math. 255 Differential Equations I	3	..	..	..	..	..
Math. 256 Differential Equations II	..	..	..	3	..	..
‡Elective						
M.E. 252 Graphics in Analysis and Design	At end of 2nd Term, 2nd Year					

*Alternate weeks.
‡The elective course will be chosen from a list provided at registration.

Metallurgical Engineering.

Common Core						
App. Sc. 251 Electrical Circuit Analysis	3	2*	2*	..	..	..
App. Sc. 278 Materials Science	2	2*	..	2	2*	..
App. Sc. 281 Fluid Mechanics	2	..	2	2	..	2
C.S. 251 Introd. to Computers & Program.	..	..	..	2	..	1
Math. 251 Elem. Statistics	2	..	..	2	..	..
Math. 255 Differential Equations I	3	..	..	..	..	..
Math. 256 Differential Equations II	..	..	..	3	..	..
and one of the two combinations:						
App. Sc. 270 Strength of Materials	2	..	1	2	..	1
App. Sc. 275 Applied Mechanics	2	..	1	2	..	1
Chem. 253 Organic Chemistry	..	..	..	2	..	..
Chem. 257 Physical Chemistry	2	4*	..	2	4*	..
and any three-unit elective that can be programmed						

Counselling will be provided at the time of registration to assist students in choosing options.
*Alternate weeks.

Mineral Engineering

App. Sc. 251 Electrical Circuit Analysis	..	..	..	3	2*	2*
App. Sc. 270 Strength of Materials	2	..	1	2	..	1
App. Sc. 278 Materials Science	2	2*	..	2	2*	..
App. Sc. 281 Fluid Mechanics	2	..	2	2	..	2
Chem. 253 Organic Chemistry	..	..	..	2	..	..
C.E. 250 Plane Surveying	At end of 2nd Term, 1st Year					
C.S. 251 Introd. to Computers and Programming	..	..	..	2	..	1
Geol. 300 Introd. to Mineralogy	2	2	..	..	..	..
Math. 251 Elementary Statistics	2	..	..	2	..	..
Math. 255 Differential Equations I	3	..	..	..	..	....
Math. 256 Differential Equations II	..	..	..	3	..	..
Min. 250 Introd. to Mineral Engineering	2	2*	..	..	2*	..
Phys. 253 Intro. to Solid State Physics	2	3*	..	..	..	..

*Alternate weeks.

Engineering Physics †

App. Sc. 275 Applied Mechanics	2	..	1	2	..	1
App. Sc. 281 Fluid Mechanics	2	..	2	2	..	2
‡C.S. 251 Introd. to Computers and Programming	..	..	..	2	..	1
E.E. 251 Introd. to Circuit Analysis	3	..	2	3	2*	2
Math. 251 Elem. Statistics	2	..	..	2	..	..
Math. 255 Differential Equations I	3	..	..	..	..	....
Math. 256 Differential Equations II	..	..	..	3	..	..
Phys. 251 Electric and Magnetic Fields	2	3*	..	2	3*	..
and one of:						
††Elective						
App. Sc. 270 Strength of Materials	2	..	1	2	..	1
App. Sc. 278 Materials Science	2	2*	..	2	2*	..

*Alternate weeks.
†Students entering from 2nd year Honours Physics programme, see admission regulations.
††The elective course may be chosen from a list provided at registration.
‡C.S.210 (3-0-1, 3-0-1) may be taken as an alternative to C.S.251.

THIRD AND FOURTH YEARS

Third Year Essays and Reports

All students entering Third Year Applied Science in other than Agricultural Engineering, Chemical Engineering, Civil Engineering and Electrical 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.

1. Agricultural Engineering

For Second Year Curriculum see previous section.

Subject	First Term			Second Term		
	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.
THIRD YEAR						
M.E. 252 Graphics in Analysis & Design	Prior to entry to Third Year					
Eng. 305 Literature of Ideas	1	..	1	1	..	1
Math. 251 Elementary Statistics	2	..	..	2	..	..
M.E. 378 Thermodynamics I	3	..	1	..	..	..
Microbiol 417 Principles of Applied Microbiology	2	1	..	..	..	..
Microbiol. 418 Industrial Microbiology	..	..	..	2	1	..
A.E. 355 Physical Properties of Plant and Animal Materials	2	..	2	..	..	..
A.E. 365 Energy Exchange within Controlled Environments	..	..	..	2	..	2
A.E. 375 Heat Transfer	2	..	3*	2	..	3*
A.E. 385 Engineering Analysis	..	..	2	..	..	3
Plus 6 UNITS ELECTIVES selected in consultation with the department before the end of second year.						
FOURTH YEAR						
E.E. 451 Electrical Circuits	2	2*	2*	2	2*	2*
A.E. 460 Soil and Water Engineering	2	3*	..	2	3*	..
A.E. 471 System Design I	2	2*	2*	..	..	..
A.E. 472 System Design II	..	..	..	2	2*	2*
A.E. 480 Energy and Mass Transport in Food Systems	2	2*	2*	..	..	..
A.E. 490 Agricultural Waste Utilization	..	..	..	2	2*	2*
A.E. 489 Seminar	..	..	2*	..	..	2*
A.E. 499 Thesis	..	3	..	..	3	..
Plus 6 UNITS ELECTIVES selected in consultation with the department before the end of third year.						

*Alternate weeks.

2. Chemical Engineering

For Second Year Curriculum see previous section.

THIRD YEAR

Chem. 352 Modern Analytical Methods	2	..	..	..	4	..
Eng. 305 Literature of Ideas	1	..	1	1	..	1
E.E. 451 Electrical Circuits	2	2*	2*	2	2*	2*
Min. 373 Interfacial Properties	2	..	..	..	..	..
Ch.E. 352 Transport Phenomena	3	..	2*	3	..	2*
Ch.E. 353 Mechanical and Thermal Operations	1	..	1*	1	..	1*
Ch.E. 354 Cascades	1	..	1*	1	..	1*
Ch.E. 355 Applied Thermodynamics	2	..	3*	2	..	3*
Ch.E. 356 Control of Process Variables	..	..	..	2	..	..
Ch.E. 360 Chem. Eng. Laboratory		3			3	

Subject	First Term			Second Term		
	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.
FOURTH YEAR						
Ch.E. 450 Diffusional Operations	2	..	2*	2	..	2*
Ch.E. 453 Economics and Plant Design	3	..	..	1	..	..
Ch.E. 454 Process Design Project	..	..	2	..	..	2
Ch.E. 455 Chem. Eng. Reactor Design	2	..	..	2	4	
Ch.E. 457 Seminar	..	..	1	..	..	1
Ch.E. 458 Properties of Fluids	1	..	..	1	..	..
Ch.E. 460 Chem. Eng. Laboratory	..	6	..	..	6*	..
Ch.E. 498 Summer Essay	Summer task					
Ch.E. 499 Thesis	..	4	..	..	8	..
‡Electives, technical and general	6			6		

*Alternate weeks.

‡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 previous section.

Subject	First Term			Second Term		
	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.
THIRD YEAR						
Math. 357 Industrial Statistics and Linear Programming	..	..	..	2	..	..
C.S. 350 Programming of Numerical Algorithms	2	..	1	..	..	..
C.E. 351 Engineering Surveying	..	..	..	3	..	..
C.E. 353 Elementary Photogrammetry	2	..	2	..	..	..
C.E. 355 Strength of Materials II	3	..	..	..	..	..
C.E. 356 Engineering Materials	1	3*	..	1	3*	..
C.E. 360 Fluid Mechanics I	2	2*	1	2	2*	1
C.E. 365 Municipal Water Supply and Wastewater Disposal	..	..	..	2	..	..
C.E. 367 Soil Mechanics	2	2*	..	2	2*	..
C.E. 371 Structural Theory I	2	..	..	2	..	..
‡C.E. 370 Structural Design	3	..	..	3	..	..
‡C.E. 373 Elementary Design I	2	..	1	2	..	1
†Biol. 311 Man and his Environment	1	..	2	..	..	..

*Alternate weeks.

†Or any substitute non-technical elective, subject to approval of Head of the Department.

‡Students who intend to take the Structures Option in Fourth Year should take C.E. 370 in place of C.E. 373.

In the Fourth Year, selected groups of courses are offered as options representing interest areas in structures, surveying, water and pollution and materials and construction. Each optional program consists of a core which is common to all options, a core and technical electives for the particular option, and free electives. **All elective courses are subject to the approval of the head of the department.**

Subject	First Term			Second Term		
	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.
FOURTH YEAR						
Common Core						
C.E. 450 Engineering Surveys	At the end of 2nd Term			3rd Year		
†C.E. 463 Elementary Design II	2	..	..	2	..	..
C.E. 466 Water Resources Engineering	..	..	..	2	..	..
C.E. 470 Transportation Engineering	2	..	..	2	..	..
C.E. 472 Foundation Engineering I	3	..	..	..	..	..
C.E. 476 Legal Aspects of Engineering	1	..	..	..	..	..
*Free Non-Technical Electives	3	..	..	3	..	..
†Not taken by students in Structures Option.						
Structures Option						
C.E. 455 Structural Theory II	2	..	..	2	..	..
C.E. 459 Strength of Materials III	..	..	..	3	..	..
C.E. 460 Structural Steel Design	2	..	1	2	..	1
C.E. 461 Reinforced Concrete Design	2	..	1	2	..	1
C.E. 462 Conceptual Design	..	..	..	2	..	..
C.E. 467 Fluid Mechanics II	2	..	..	..	..	..
Structural Electives	4	..	..	1	..	..
Core Courses	6	..	..	5	..	2
Structural Electives: C.E. 480, C.E. 501, C.E. 507, C.E. 508, C.E. 515, C.E. 519, C.E. 529, C.E. 531, C.E. 532, C.E. 572, C.E. 582, C.E. 583, M.E. 559.						

Subject	First Term			Second Term		
	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.
FOURTH YEAR						
Surveying Option						
C.E. 451 Spherical and Geodetic Astronomy	2	..	..	..	..	..
C.E. 452 Geodetic Surveying and Computation	3	..	..	2	..	2
C.E. 453 Photogrammetric Surveying	2	..	2	..	..	..
C.E. 454 Theory of Measurements	..	..	..	2	..	..
C.E. 457 Plane Coordinate and Integrated Surveys	..	..	..	3	..	..
Surveying Electives	3	..	..	3	..	..
Core Courses	8	..	..	7	..	2
Surveying Electives: Astro. 320, C.E. 352, C.E. 576, Econ. 301, 302, Geog. 212, 311, 373, Geology 412, Math. 350.						
Water and Pollution Option						
C.E. 464 Hydraulic Engineering	..	..	..	2	..	..
C.E. 465 Water Quality Studies	2	..	..	..	..	..
C.E. 469 Environmental Sanitation	..	..	..	2	..	..
C.E. 478 Hydrology I	2	..	..	..	..	..
Water and Pollution Electives	8	..	2	4	..	..
Core Courses	8	..	..	7	..	2
Water and Pollution Electives: C.E. 461, C.E. 467, C.E. 468, C.E. 544, C.E. 546, C.E. 554, M.E. 492, Min. Eng. 271, Forestry 430, Micro. 417.						
Materials and Construction Option						
C.E. 473 Foundation Engineering II	..	..	..	1	..	1
C.E. 474 Mechanics of Materials	2	..	1	2	..	1
C.E. 475 Concrete Technology	2	..	..	..	..	..
C.E. 490 Construction Engineering	2	..	..	2	..	..
Materials and Construction Electives	4	..	..	5	..	..
Core Courses	8	..	..	7	..	2
Materials and Construction Electives: C.E. 468, C.E. 469, C.E. 500, C.E. 510, C.E. 572, C.E. 576, C.E. 578, C.E. 585, C.E. 586, M.E. 492, Econ. 301, 302, Geol. 412.						

*A non-technical course covering material which is not used directly in the practice of engineering and which is intended to broaden the students' outlook in the general area of the humanities and social sciences; subject to approval of the Head of the Department.

It is possible for qualified students in Civil Engineering, with the permission of the Department Head, and the Dean of Commerce and Business Administration, to choose a sequence of electives as preparation for further study in the general field of construction management. For this purpose, Economics 200 should be taken as the elective in the second year and the materials and construction electives (but not the free, non-technical electives) in the fourth year should be selected to satisfy part of the prerequisites for the M.B.A. program. With appropriate courses as a base, it may then be possible to complete the balance of the prerequisites for the M.B.A. program in one summer session. Students intending to enter this program are urged to consult with the Faculty of Commerce and Business Administration regarding the necessary prerequisites prior to registering in the Fourth Year of Civil Engineering.

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 12 units and shall not exceed 18 units. Details of requisites and prerequisites follow.

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	(1½)	Linear Algebra
Math.	155	(3)	Calculus
Math.	156	(1½)	Vector Calculus
Physics	155	(3)	Mechanics

Course	No.	Units	Title
Physics	158	(2)	Wave Phenomena
*C.E.	250		Plane Surveying (Spring Survey School)
Math.	251	(2)	Elementary Statistics
Physics	250	(1½)	Electric and Magnetic Fields
App. Sc.	251	(1½)	Electrical Circuit Analysis
C.S.	251	(1)	Introduction to Computers and Programming

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 the 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.	450		Engineering Surveys (Prereq. C.E. 351)
C.E.	351	(1½)	Engineering Surveying
C.E.	353	(1½)	Elementary Photogrammetry
C.E.	451	(1)	Spherical and Geodetic Astronomy
C.E.	452	(3)	Geodetic Surveying and Computation
C.E.	453	(1½)	Photogrammetric Surveying
C.E.	454	(1)	Theory of Measurements
C.E.	457	(1½)	Plane Co-ordinate and Integrated Surveys

C.E. 576, Civil Engineering. Uses of Aerial Photographs, is highly recommended and should be included if possible.

C.E. 250 and C.E. 450 are extra-sessional courses and have not been included in the credit count.

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 is $551.00 for the full session.

*Credit for C.E. 250 may be obtained on the basis of suitable surveying experience and a written and oral examination, or in exceptional cases by self study in the first term of the diploma year.

4. Electrical Engineering

For Second Year Curriculum and reference to options see previous section.

Subject	First Term			Second Term		
	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.
THIRD YEAR						
E.E. 352 Elect. Eng. Materials	..	..	..	2	2*	2*
E.E. 353 Elect. Machines	2	3*	2*	1	3*	2*
E.E. 354 Elect. Eng Problems	..	..	..	2	..	1
E.E. 355 Signals and Systems	3	..	2	3	..	2

Subject	First Term			Second Term		
	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.
E.E. 357 Electronics	2	3*	2*	2	3*	2*
E.E. 361 Appl. of Electromagnetic Fields	2	..	2*	2	..	2*
Math. 251 Elem. Statistics	3	...	...	..	..	..
†Free Elective						
OPTION I: ELECTRICAL ENGINEERING						
E.E. 367 Instrumentation and Measurements	2	3	..	..	..	..
OPTION II: ELECTRICAL ENGINEERING SCIENCE						
Math. 360 Real Variable	..	..	..	3	..	..
Math. 362 Linear Algebra	3	..	..	..	..	..
FOURTH YEAR						
Option I						
E.E. 473 Systems Lab.	..	6	..	..	6	..
E.E. 498 Engineering Reports	..	..	..	..	..	..
M.E. 378 Thermodynamics I	3	..	1	..	..	..
M.E. 385 Fluid Dynamics	..	..	..	3	..	1
†Two Free Electives						
‡Three Compatible Electives	6	..	6*	6	..	6*
Option II						
E.E. 473 Systems Lab.	..	6	..	..	6	..
E.E. 498 Engineering Reports	..	..	..	..	..	..
Math. 452 Differential Equations	3	..	..	3	..	..
Phys. 353 Introduction to Atomic Physics	3	..	..	..	..	..
Phys. 475 Introd. to Statistical Mechanics	..	..	..	3	..	..
†Free Elective						
‡Three Compatible Electives	6	..	6*	6	..	6*

*Alternate weeks.

†Any two- or three-unit course in the University, including Electrical Engineering, subject to prerequisites and time-table restrictions.

‡Approved by the Department, and normally Electrical Engineering Courses.

5. Geological Engineering

For Second Year Curriculum see previous Section

Geological Engineering is a completely interdisciplinary program under the jurisdiction of the Dean of Applied Science and administered by a Board of Study.

Members of the Board of Study are: Professors A. Akehurst (Dept. of Geology) Interim Chairman; R. G. Campanella (Dept. of Civil Engineering); H. J. Greenwood (Dept. of Geology); W. F. Slawson (Dept. of Geophysics); I. Weir-Jones (Dept. of Mineral Engineering).

All inquiries regarding the program and student advising should be made through Mr. A. Akehurst at the Geological Engineering Office, Rm. 221, new Geological Sciences Building. Space is also provided by the Geology Department for a Geological Engineering Club Room.

For Second Year Curriculum See Previous Section

Year	Subject	‡Term	OPTION I (General) 1	OPTION I (General) 2	OPTION II (Geophysics) 1	OPTION II (Geophysics) 2	OPTION III (Eng. Geology) 1	OPTION III (Eng. Geology) 2
THIRD	C.E. 350 Applied Plane Surveying	at the end of 2nd term, 2nd year	2,0,2	—	2,0,2	—	2,0,2	—
	C.E. 353 Elementary Photogrammetry							
	Geol. 304 Introduction to Stratigraphy and Structural Geology		2,3,0	2,3,0	2,3,0	2,3,0	2,3,0	2,3,0
	Geol. 309 Hydrogeology		2,0,0	—	2,0,0	—	2,0,0	—
	Geol. 311 Natural Gas and Petroleum Geology		—	2,0,0	—	2,0,0	—	2,0,0
	Geol. 320 Optical Mineralogy and Petrology		2,2,0	2,2,0	2,2,0	2,2,0	2,2,0	2,2,0
	†Geol. 410 Field Geology		—	0,2,0	—	0,2,0	—	0,2,0
	Min. 398 Engineering Report							
FOURTH	††App. Sc. 281 Fluid Mechanics		2,0,2	2,0,2	—	—	2,0,2	2,0,2
	C.E. 367 Soil Mechanics		2,2*0	2,2*0	—	—	2,2*0	2,2*0
	Geophys. 301 Waves and Seismology		—	—	3,0,2*	3,0,2*	—	—
	Geophys. 302 General Geophysics		—	—	3,0,2*	3,0,2*	—	—
	Math. 350 Complex Variables and Application		—	—	2,0,1	2,0,1	—	—
	Min. 356 Rock Properties I		—	2,2,0	—	—	—	2,2,0
	Min. 360 Elements of Mineral Engineering		1,3*0	1,3*0	—	—	1,3*0	1,3*0
	Electives‡‡ to bring total course load to 26 or 27 hours/week, selected in consultation with Departmental Advisor(s).							

*Alternate weeks.

†Includes 3 weeks' field work after lectures in second term.

††1972-1973 only.

‡‡Geology 203 is strongly recommended for students planning careers in mineral exploration.

‡In each term the hours per week assigned for lectures, laboratory and tutorial respectively are designated by number, e.g., 2,2,1.

Year		Subject	†Term	OPTION I A (Mining) 1	OPTION I A (Mining) 2	OPTION I B (Petroleum, Coal) 1	OPTION I B (Petroleum, Coal) 2	OPTION I C (General) 1	OPTION I C (General) 2	OPTION II (Geophysics) 1	OPTION II (Geophysics) 2	OPTION III (Eng. Geology) 1	OPTION III (Eng. Geology) 2
FOURTH	Geol. Geoph.	Thesis	499	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0	0,3,0
	C.E.	Foundation Engineering I	472										
	C.E.	Foundation Engineering II	473									3,0,0	
	C.E.	Legal Aspects of Engineering	476										1,0,1
	E.E.	Electronics	366							2,2* 2*	2,2* 2*	1,0,0	
	Geol.	Principles of Palaeontology	203			2,2,0		2,2,0					
	Geol.	Petrology of Chemical and Bioclastic Rocks	403				2,2,0		2,2,0				
	Geol.	Structural Geology	404			2,2,0		2,2,0					
	Geol.	Petrology	407	2,3,0	2,3,0			2,3,0	2,3,0	3,0,0	3,0,0		
	Geol.	Mineral Deposits	408	3,0,0	3,0,0	3,0,0	3,0,0	3,0,0	3,0,0				
	Geol.	Mineralography	409	1,3,0	0,4,0								
	Geol.	Geomorphology I	412									2,2,0	2,2,0
	Geol.	Stratigraphic Palaeontology	414			2,3,0		2,3,0					
	Geol.	Stratigraphy and Sedimentation	419										
	Geoph.	Applied Physics of the Earth	400	2,3,0	2,3,0	2,2,0	2,2,0	2,2,0	2,2,0			2,3,0	2,3,0
	Geoph.	Applied Geophysics	402			2,3,0	2,3,0	2,3,0	2,3,0				
		Laboratory								0,3,0	0,3,0		
	Math.	Analysis	450							3,0,0	3,0,0		
	††Min.	Introduction to Valuation	351								2,0,2		
	Min.	Introduction to Rock Mechanics	457	2,2*0								2,2*0	
	†Electives									4,0,0	4,0,0		

Electives to bring total course to 26 or 27 hours/week, selected in consultation with Departmental Advisor(s).

*Alternate weeks.

†Selected Geophysics/Physics courses; minimum 8 hours over 2 terms (not necessarily 4 hours each term).

††Options I and III students should consult Advisor(s) regarding other courses in valuation.

Note: In each term the hours per week assigned for lectures, laboratory and tutorial respectively are designated by number, e.g., 2,2,1.

6. Mechanical Engineering

For Second Year Curriculum and reference to options see previous section.

Subject	First Term Lect.	First Term Lab.	First Term Prob.	Second Term Lect.	Second Term Lab.	Second Term Prob.
THIRD YEAR						
E.E. 365 Applied Electronics	3	2*	2*	..	..	..
E.E. 370 Electrical Machines and Power Transmission	..	..	..	3	2*	2*
Eng. 305 Literature of Ideas	1	..	1	1	..	1
Math 450 Analysis	3	..	..	3	..	..
Met. 380 Structure and Properties of Materials	3	..	..	3	..	..
M.E. 358 Machine Tool Laboratory	..	3*	..	..	3*	..
M.E. 363 Mechanics of Materials I	3	..	1	..	..	..
M.E. 364 Design Seminar	..	..	3	..	..	3
M.E. 365 Dynamics I	..	..	..	3	..	2*
M.E. 372 Instrumentation and Measurement Lab.	..	4	..	..	4	..
M.E. 378 Thermodynamics I	3	..	1	..	..	..
M.E. 384 Fluid Dynamics	..	..	..	3	..	1
M.E. 391 Industrial Systems	2	..	..	2	..	..
M.E. 398 Engineering Report	..	..	..	..	..	..

Students pre-register with a faculty adviser towards the end of the Third Year. Each student takes 5 courses (9 units) as a core, and chooses 9 or 10 units of Electives from the list below, with the help of his adviser.

FOURTH YEAR						
M.E. 463 Mechanical Design	2	..	3	2	..	3
M.E. 465 Dynamics II	3	..	1	..	..	..
M.E. 466 Automatic Control	..	..	..	3	..	1
M.E. 472 Project and Design Laboratory	..	3	..	..	3	..
M.E. 476 Heat and Mass Transfer	2	..	1	2	..	1
M.E. 498 Engineering Report	..	..	..	..	..	..
††ELECTIVES						
C.S. 350 Programming of Num. Algorithms	2	..	1	..	..	..
Math. 357 Industrial Statistics and Linear Programming	..	..	..	2	..	..
Met. 470 Structure of Metals II	2	..	..	2	..	..
Met. 474 Metal Fabrication I	2	..	..	2	..	..
M.E. 458 Industrial Engineering	2	..	1	2	..	1
M.E. 467 Advanced Dynamics	..	..	..	3	..	1
M.E. 468 Mechanics of Materials II	..	..	..	3	..	1
M.E. 469 Optical Engineering	..	..	..	3	1	..
M.E. 470 Experimental Stress Analysis	3	..	1	..	..	..
M.E. 473 Thermal Processes	3	..	1	..	..	..
M.E. 479 Thermal Power	..	..	..	3	..	1
M.E. 481 Aerodynamics	3	1*	2*	3	1*	2*
M.E. 484 Dynamics of Real Fluids	3	..	1	..	..	..
M.E. 491 Industrial Management	2	..	1	2	..	1
‡Approved Electives						

*Alternate weeks.

†Some Electives may not be offered in a given year.

‡As electives, suitable undergraduate or graduate courses outside of the Department or graduate courses in the Department may be chosen up to a total of 3 units, subject to the approval of the Department.

7. Metallurgical Engineering

For Second Year Curriculum see previous section.

Subject	First Term Lect.	First Term Lab.	First Term Prob.	Second Term Lect.	Second Term Lab.	Second Term Prob.
THIRD YEAR						
Common Core						
Ch.E. 350 Unit Operations and Heat and Mass Transfer	2	..	2	3	..	2*
Met. 350 Met. Thermodynamics I	2	..	..	2	..	..
Met. 351 Laboratory Methods	..	3*	..	..	3*	..
Met. 352 Process Met. I	2	..	..	2	..	..
Met. 353 Metallurgical Calc. I	..	..	2	..	..	2
Met. 370 Structure of Metals I	2	..	..	2	..	..
Met. 371 Physical Metallurgy Laboratory I	..	3*	..	..	3*	..
Met. 376 Physical Metallurgy	2	..	..	2	..	..
Met. 382 Non Metallic Materials I	1	3*	..	1	3*	..
Met. 390 Seminar I	..	..	1	..	..	1
Met. 398 Engineering Report	..	..	..	..	..	..
Preferred Electives‡ (not less than four units)						
Ch. E. 356 Control of Process Variables	..	..	..	2	..	..
E.E. 370 Electrical Machines & Power Transmission	..	..	..	3	2*	2*
M.E. 367 Applied Mechanics	2	..	3	..	..	..
Met. 377 Welding and Joining	2	..	..	..	..	..
Met. 383 Ceramic Processing	1	2*	2*	1	2*	2*
Min. 371 Principles of Mineral Processing	1	3*	..	1	3*	..

‡Counselling will be provided at the time of registration to aid students in selection of electives.

FOURTH YEAR

Met. 450 Metallurgical Thermodynamics II	2	..	..	2	..	..
Met. 451 Metallurgy Laboratory	..	6*	..	..	6*	..
Met. 452 Process Met. II	2	..	..	2	..	..
Met. 453 Metallurgical Calc. II	..	..	3	..	..	3
Met. 455 Research Project	..	3	..	..	3	..
Met. 470 Structure of Metals II	2	..	..	2	..	..
Met. 471 Physical Metallurgy Laboratory II	..	6*	..	..	6*	..
Met. 474 Metal Fabrication I	2	..	..	2	..	..
Met. 490 Seminar II	..	..	1	..	..	1
Met. 495 Tutorial	..	..	1	..	..	1
Met. 498 Engineering Report	..	..	..	..	..	..
Plus (6) units chosen from the following; not less than (2) units in Met courses.‡						
Met. 456 Hydromet. and Kinetics	2	..	..	2	..	..
Met. 458 Phys. Chem. of Metal Surfaces	1	..	..	1	..	..
Met. 460 Metallurgical Transport Processes	1	..	..	1	..	..
Met. 461 Nuclear Metallurgy	1	..	..	1	..	..
Met. 478 Electron Theory of Solids	2	..	..	..	..	..
Met. 480 Fracture	2	..	..	..	..	..
Met. 482 Non-Metallic Materials II	2	..	..	2	..	..
**Met. 586 Advanced Metallography	2	..	..	2	..	..
Math. 450 Analysis	3			3		

*Alternate weeks.
**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 previous section.

Subject	First Term			Second Term		
	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.
THIRD YEAR						
C.E. 350 Applied Plane Surveying	At end of 2nd Term, 2nd Year					
C.S. 350 Programming of Numerical Algorithms	2	..	1	..	..	..
Geol. 317 Petrology	..	..	..	2	2	..
Geol. 354 Structural Geol.	2	3	..	..	..	..
Geol. 359 Ore Microscopy	1	3	..	..	..	..
Min. 350 Mineral Exploration	2	2	..	..	..	..
Min. 351 Intro. to Valuation	..	..	..	2	..	2
Min. 356 Rock Properties	..	..	..	2	2	..
Min. 358 Rock Fragmentation	2	..	..	..	..	..
Min. 370 Mineral Processing I	2	3*	..	2	3*	..
Min. 372 Flotation	1	3*	..	1	3*	..
Min. 390 Seminar	..	..	1	..	..	1
Min. 398 Engineering Report	..	..	..	..	..	..
†ELECTIVES						
Five units selected in consultation with the department.						
FOURTH YEAR						
Met. 372 Physical Metallurgy	..	..	..	2	..	..
Min. 451 Environmental Control	1	..	2	..	..	..
Min. 452 Valuation	..	..	..	2	..	..
Min. 453 Systems Analysis	2	..	1	2	..	1
Min. 460 Advanced Eng. Problems	..	..	4	..	..	4
Min. 470 Mineral Processing II	2	3*	..	2	3*	..
Min. 480 Research or Design Project	..	3	..	..	6	..
Min. 490 Seminar	..	..	1	..	..	1
Min. 498 Engineering Report	..	..	..	..	..	..
MINING OPTION:						
Min. 455 Rock Properties II	2	..	..	..	..	..
Min. 456 Rock Mechanics	..	..	..	2	..	..
†Electives						
MINERAL PROCESSING OPTION:						
Min. 472 Mineral Stability	2	..	..	1	..	2
†Electives						

*Alternate weeks.
†Six units of electives selected in consultation with the department before the commencement of Fourth Year.

9. Engineering Physics

For Second Year Curriculum see previous section.

Subject	First Term			Second Term		
	Lect.	Lab.	Prob.	Lect.	Lab.	Prob.
THIRD YEAR						
E.E. 366 Electronics Theory and Applications	2	2*	2*	2	2*	2*
Math. 350 Complex Variables and Application	2	..	1	2	..	1
Math. 360 Real Variable	..	..	..	3	..	..
Math. 362 Linear Algebra	3	..	..	..	..	..
Phys. 351 Elec. and Mag.	2	..	..	2	..	..
Phys. 355 Basic Quantum Physics	3	..	..	3	..	..
Phys. 358 Physical Optics	2	3	..	2	3	..
Phys. 398 Essay	..	..	..	..	..	..
†and one of:						
C.S. 302 Numerical Computation I	3	..	1	3	..	1
E.E. 353 Electrical Machines	2	3*	2*	1	3*	2*
Geophys. 302 General Geophysics	3	..	2*	3	..	2*
M.E. 378 Thermodynamics I	3	..	1	..	..	..
M.E. 384 Fluid Dynamics	..	..	..	3	..	1
Met. 370 Structure of Metals I	2	0	0	2	0	0
Met. 371 Physical Metallurgy Lab I	0	3*	0	0	3*	0

*Alternate weeks.
†Other courses, including humanities, etc., with permission from the Head of the Department of Physics.

FOURTH YEAR

E.E. 366 Electronics Theory and Applications	2	2*	2*	2	2*	2*
Math. 452 Differential Equations	3	..	..	3	..	..
Phys. 453 Applied Nuclear Physics	3	..	..	..	..	..
Phys. 454 Applied Solid State Physics	..	..	..	3	..	..
Phys. 455 Therm. and Stat. Mech.	3	..	..	3	..	..
Phys. 456 Classical Mechanics	2	..	..	2	..	..
Phys. 457 Continuum Mechanics	2	..	..	2	..	..
Phys. 459 Experimental Physics	..	6	..	..	6	..
Phys. 480 Seminar			1			1
†and one of:						
E.E. 467 Control Systems	2	..	2*	2	..	2*
Geophys. 415 Geophysical Analysis	3	..	..	3	..	..
M.E. 481 Aerodynamics	3	1*	2*	3	1*	2*
Met. 472 Physical Metallurgy II	2	3*	..	2	3*	..
Ocean. 400 Introd. to Synoptic Oceanography	2	..	..	..	..	..
Ocean. 403 Introd. to Biological Oceanography	..	..	..	2	..	..
Ocean. 404 Introd. to Geological Oceanography	..	..	..	2	..	..

*Alternate weeks.
†Other courses, including humanities, etc., with permission from the Head of the Department of Physics.

In order to qualify for membership in the B.C. Association of Professional Engineers, it will likely be necessary to write some Association examinations, depending on the courses taken.

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]
1 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

355 (1½) Physical Properties of Plant and Animal Materials.— Physical (rheological, thermal, electrical and optical) properties of food, feed and fibre and their relationship to operations occurring during handling, storage, processing and quality evaluation. Textbook: N. N. Mohsenin. *Physical Properties of Plant and Animal Products,* Vol. I, Parts I and II. [2-0-2; 0-0-0]

365 (1½). Energy Exchange Within Controlled Environments.—Energy exchange, psychrometric processes and electro-magnetic radiation relationships in closed environments. Textbook: James L. Threlkeld, *Thermal Environmental Engineering.* References: ASAE Transactions; ASHRAE Fundamentals, Chapters 9 and 10. [0-0-0; 2-0-2]

375 (3). 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. (2) Engineering Analysis.—Analysis of engineering problems encountered in systems for producing, handling, storing and processing of biological materials. Emphasis will be placed on the presentation of oral and written reports, and one comprehensive report will be required in each term. Topics may be selected from assignments, the literature, or from field trips. [0-0-2; 0-0-3]

460. (3) 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]

471. (1½) Systems Design I.—An analytical approach to the design and development of soil-machine systems and biomaterial-machine systems. Textbooks: Mimeographed notes on system design; W. R. Gill and G. E. Vandenburg, *Soil Dynamics in Tillage and Traction.* [2-2*-2*; 0-0-0]

472. (1½) Systems Design II—Design and planning of systems for handling, processing and storing of food, feed and fibre. Textbook: *Agricultural Materials and Handling Manual.* Churchman, *Introduction to Operations Research;* Transactions of the American Society of Agricultural Engineers. [0-0-0; 2-2*-2*]

480 (1½) Energy and Mass Transport in Food Systems.—The unit operations pertaining to processing of food and feed. Size reduction, separation, drying, evaporation, thermal process evaluation, refrigeration. Textbook: Henderson and Perry, *Agricultural Process Engineering.* Reference: Charm, *Food Engineering.* [2-2*-2*; 0-0-0]

489. (1) Seminar.—Papers, and discussions on recent agricultural engineering developments. [0-0-2*; 0-0-2*]

490. (1½) Agricultural Waste Utilization.—Methods of handling and treating wastes from the food production and processing industries. [0-0-0; 2-2*-2*]

499. (3) 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.

554. (1½) Instrumentation for Biomaterial Research.—Instruments, theory, applications, methods and standards for measuring and recording temperature, flow, pressure, humidity, time, color, force, deformation and length. Application to problems in biomaterial research and food engineering. The purpose of this course is to familiarize the student with methods, techniques and problems of measurement.

555. (1½) Load Response of Biomaterials.—The response of biomaterials subjected to static, quasi-static, cyclic and impact loading conditions. Viscoelastic models of biological materials. The relationship between tissue structure and tissue response. Cellular models.

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 Water Supplies.—Criteria of water quality related to its use. Factors affecting water quality due to desirable and undesirable processes.

565. (1) Environmental Control for Food Resource Planning.—Thermal, psychometric and illumination control in food resource systems. Special problems associated with high population densities in plant and animal confined housing.

566. (1) Design of Food Production Systems.—Labour efficiency, material flow, economic criteria, control of natural hazards. Mr. Staley.

571. (1) Bio-Machine Systems.—Theoretical analyses of unit operations performed by various agricultural and processing machines. Consideration of the interaction between machine parameters and biological parameters.

572. (1½) Soil-Machine Systems.—Soil dynamics as applied to tillage and traction. The effect of tillage on soil parameters. Tillage design to create an optimum environment for plant growth.

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.

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.

590. (1-2) Waste Treatment in Agricultural and Food Industries.—Design and evaluation of current agricultural and food processing waste management practice. Effect of physical properties, environmental factors and pollution potential on treatment methodology.

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.

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. (2) Engineering Drawing.—Orthographic projection, technical sketching, engineering geometry, standards and conventions of the graphic language, graphic solution of space and vector problems and presentation of engineering data on graphs. Development of the ability to translate readily between the three-dimensional solid and its various representations. [1-0-3; 1-0-3]

250. (1½) Biosystems for Engineers.—A course designed to acquaint engineering students with the basic concepts of biosystems and how these concepts relate to engineering. The structure and properties of biosystems at the cellular, organismal and population levels, which have an effect on the solution of engineering problems will be stressed. The effect of engineering activities upon various ecosystems will be considered. [2-0-2; 0-0-0]

251. (1½) Electrical Circuit Analysis.—Methods of analysis of lumped electrical circuits. Time response of networks to various excitations. Transfer functions and frequency domain concepts. Applications. [3-2*-2*; 0-0-0] or [0-0-0; 3-2*-2*]

270. (2) 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. (2) Applied Mechanics.—Kinematics and kinetics of particles and rigid bodies in plane motion using analytical and graphical methods; work-energy and impulse-momentum for particles and rigid bodies in plane motion; transient and steady-state response of single degree of freedom systems, including vibration isolation; applications to engineering devices. [2-0-1; 2-0-1]

278. (2) 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. [2-2*-0; 2-2*-0]

281. (2) 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 mometum 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]

Chemical Engineering

250. (3) Introduction to Chemical Engineering.—Material balances; phase equilibria; Chemical Process Technology. [1-2*-1; 3-2*-1]

350. (3) Unit Operations and Heat and Mass Transfer.—For third year metallurgical engineering students. In the first term the course consists of Chemical Engineering 353 and the problem sessions of Chemical Engineering 352. In the second term the metallurgical students take Chemical Engineering 352. [2-0-2; 3-0-2*]

352. (3) 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. [3-0-2*; 3-0-2*]

353. (1) Mechanical and Thermal Operations.—Principals 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. (1) Cascades.—The theory of reversible and irreversible stagewise separations. [1-0-1*; 1-0-1*]

355. (2) 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. [2-0-3*; 2-0-3*]

356. (1) Control of Process Variables.—Theory and application of automatic control in chemical processes; process dynamics; instrumentation. [0-0-0; 2-0-0]

360. (1) 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]

450. (2) Diffusional Operations.—Principles of mass-transfer operations including absorption, distillation, humidification, extraction, drying, and adsorption. [2-0-2*; 2-0-2*]

453. (2) Economics of Plant Design.—Economics of chemical engineering processes, optimisation of operating conditions, and choice of auxiliary equipment. Exercises in plant design. [3-0-0; 1-0-0]

454. (2) Process Design Project. [0-0-2; 0-0-2]

455. (3) Chemical Engineering-Reactor Design.—Chemical reaction, kinetics, catalytic processes, and reactor design. [2-0-0; 2-4-0]

457. (1) Seminar.—Discussion on thesis work in progress. [0-0-1; 0-0-1]

458. (1) Properties of Fluids.—Thermodynamics and kinetic properties of fluids. Relationships useful in engineering. Prediction of properties. [1-0-0; 1-0-0]

460. (2) 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. [0-6-0; 0-6*-0]

470. (2) 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]

475. (2) Process Control.—Theory and design of control schemes for complex chemical plants; introduction to computer and optimal control of chemical processes. Prerequisite: Ch.E. 356 or equivalent. (Elective) [2-0-0; 2-0-0]

498. (2) Summer Essay.—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 before October 15.

499. (4) Thesis.—Research or design under the direction of a staff member. [0-4-0; 0-8-0]

Courses for Graduate Students

M.A.Sc. Degree:

Prerequisites—Graduation or equivalent in Chemical Engineering, or graduation in Agricultural Engineering, Mechanical Engineering, Metallurgical Engineering or Mineral Engineering.

Course—Must include Chemical Engineering 598, and at least 6 units chosen from graduate courses in the Department, a minimum of 3 units of approved courses outside the Department, and an additional 6 units of approved courses chosen from within or outside the Department. An essay of at least 3000 words.

M.Eng. Degree:

Offered primarily for candidates who have a minimum of two years work experience after obtaining the B.A.Sc. degree. Under special circumstances students with less than two years' work experience may be accepted.

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.
(e) Pollution control studies.

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.

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.

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.—Topics to be discussed will vary from year to year. Amongst these will be tensor analysis and Navier-Stokes equations; hydrodynamic stability and turbulence; flow through porous media and filtration; sedimentation, fluidization, spouting, and particle transport; 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) Water Pollution Control.—Water and land pollution; methods of problem assessment from chemical operations, 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.

573. (1-2) Less Common Separation Methods.—New processes, or developments in existing specialized separation methods will be discussed. Topics will vary from year to year and may include advances in chromatographic and absorption processes, cyclic operations such as parametric pumping, membrane separation processes, and interface concentration methods.

574. (1-2) Equilibrium Properties of Non-Ideal Mixtures.—Discussion of various methods of calculating vapor-liquid, liquid-liquid equilibrium and thermal properties, including molecular thermodynamics. Excess free-energy of mixing. Thermodynamic consistency tests. Emphasis on engineering applications and newer approaches.

575. (2) Air Pollution Control.—Characteristics of various air pollutants, their behaviour in the atmosphere, monitoring problems, technology of particle collection and control of pollutant gases. Particular problems of regional interest are discussed.

598. Seminar.—Presentation and discussion of current topics in chemical engineering research. A required course for graduate students in Chemical Engineering which carries no academic credit.

599. (6) Thesis.—For M.A.Sc. degree.

699. Thesis.—For Ph.D. degree.

Chemistry

156. (1½) Physical Chemistry.—Thermochemistry, spontaneous reactions and chemical equilibrium, phase equilibria, crystals, liquids, electrochemistry, kinetics. [0-0-0; 3-0-2]

230. (3) Organic Chemistry.—The fundamental principles of modern organic chemistry including a discussion of the main classes of organic compounds. [3-3; 3-3]

253. (1) 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. (3) Physical Chemistry.—Chemical thermodynamics, electrochemistry, chemical kinetics, elementary statistical thermodynamics. [2-4*-0; 2-4*-0]

352. (2) 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 section of the calendar.

Civil Engineering

250. (2) 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, *Elementary Surveying.*

350. (2) Applied Plane Surveying.—Solar observation for latitude and azimuth. Stellar observation for azimuth at any hour angle. Transfer of azimuth down vertical and steeply inclined shafts. Tunnel survey. Survey of mineral (lode) claims involving fractions. Simple triangulation with repeating instruments. Tacheometry with modern instruments and techniques. Adjustments of transit and level. Demonstration of electronic distance measurement devices, gyrotheodolite, etc. Work commences immediately following close of spring examinations, occupying twelve eight-hour days, or equivalent. Textbook: Brinker, *Elementary Surveying.*

351. (1½) 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. [0-0-0; 3-0-0]

352. (1½) Introduction to Geodesy.—A broad overview of geodesy and its components with special reference to the location of points on the earth's surface for surveying purposes; factors involved in determining the size and shape of the earth and the geometric surface of best fit to an area for purpose of computation; consideration of gravimetric, geometric, astronomic and satellite methods and their interrelation. [0-0-0; 3-0-0]

353. (1½) Elementary Photogrammetry.—Principles of survey cameras; scales and distortions; single and stereo camera methods; determination of three dimensional coordinates involving parallax measurements; elements of photo interpretation; applications to engineering and allied problems. [2-0-2; 0-0-0]

355. (1½) Strength of Materials II.—Beam deformations by area-moment and conjugate beams; composite beams; beam columns; elastic instability. [3-0-0; 0-0-0]

356. (2) Engineering Materials.—Properties and mechanical tests of engineering materials including wood, metals, cement and concrete. Structure of cement, mineral aggregates and the design of concrete mixtures. Experimental design and analysis. [1-3*-0; 1-3*-0]

360 (3) Fluid Mechanics I.—Flow control and flow measurement in pipe systems and open channels. Selection and performance of turbo-machinery. Dynamic similarity and hydraulic models. Unsteady flow in closed conduits. Steady and unsteady flow in open channels, channel design. Basic hydrodynamics, flow nets, lift and drag. [2-2*-1; 2-2*-1]

365. (1) 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. [0-0-0; 2-0-0]

367. (2½) Soil Mechanics.—An introduction to the physical and mechanical properties of soil that govern its behaviour as an engineering material; hydraulic characteristics, seepage and consolidation; shearing resistance, failure criteria, stability analyses, bearing capacity, lateral soil pressures; sub-surface investigation. [2-2*-0; 2-2*-0]

370. (3) 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. [3-0-0; 3-0-0]

371. (2) Structural Theory I.—An introduction to the theory of Structural Analysis. [2-0-0; 2-0-0]

373. (2) Elementary Design I.—An introduction to structural design in steel, timber and concrete; design criteria and methods; structural loads; use of codes and design aids; design of tension members, beams, columns and simple connections. [2-0-1; 2-0-1]

450. (2) Engineering Surveys.—Route surveying; triangulation and precise levelling adjusted by least squares; instrument adjustment; solar and stellar observations for azimuth, latitude and longitude; modern instruments and techniques.

451. (1) Spherical and Geodetic Astronomy.—The celestial sphere; spherical and astronomic coordinate systems and their relations; measurement and computation of times and the relations between them; corrections to observations; ephemerides and star catalogues; interpolations; constellations; observations for azimuth, time, latitude and longitude; convergence of meridians; geodetic and astronomic relations. [2-0-0; 0-0-0]

452. (3) Geodetic Surveying and Computation.—Determination of the parameters of the reference surface; precise angle and electronic distance measurements, reductions to the reference ellipsoid; geodetic triangulation, trilateration, tranversing and levelling; three dimensional geodesy; determination of geodetic position and the inverse problem. [3-0-0; 2-0-2]

453. (1½) Photogrammetric Surveying.—Analogue and analytical methods of surveying, mapping and measuring from photographs. [2-0-2; 0-0-0]

454. (1) Theory of Measurements.—The theory of least squares and its application to the adjustment of survey observations by the methods of condition and observation equations. [0-0-0; 2-0-0]

455. (2) 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]

457. (1½) Plane Coordinate and Integrated Surveys.—Principles of map projections on the sphere; mathematics and computations of plane coordinate survey systems; control and integrated surveys; data banks and retrieval systems; cadastral surveying. [0-0-0; 3-0-0]

459. (1½) Strength of Materials III.—Unsymmetrical-bending; shear centres; beams on elastic foundations; curved beams; torsion of open and closed sections; introduction to theory of elasticity. [0-0-0; 3-0-0]

460. (3) 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. [2-0-1; 2-0-1]

461. (3) 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. [2-0-1; 2-0-1]

462. (1) Conceptual Design.—A study of the relative merits of various structural forms, design projects, optimization. [0-0-0; 2-0-0]

463. (2) Elementary Design II.—Design of simple structures, footings and retaining walls; use of codes and specifications. [2-0-0; 2-0-0]

464. (1) Hydraulic Engineering.—Design of hydraulic structures, lake hydrodynamics, stratified flow, diffusion and mixing processes with design applications. [0-0-0; 2-0-0]

465. (1) Water Quality Studies.—An outline of water quality parameters in natural waters; discussion of possible methods of maintaining or improving existing quality conditions including treatment, flow augmentation, flow regulation, etc. [2-0-0; 0-0-0]

466. (1) 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. (1) 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. (1½) Basic Sanitary Engineering Concepts.—A laboratory course to familiarize the student with the testing procedures used in water quality studies and in the operation of water and wastewater treatment plants. [1-3-0; 0-0-0]

469. (1) 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. (2) Transportation Engineering.—Fundamentals of transportation engineering: development and history of transportation; principles of highway, railroad, water-transport, and airport engineering; engineering aspects of urban transportation problems and planning. [2-0-0; 2-0-0]

472. (1½) Foundation Engineering I.—Retaining structures both land and marine; cribs, bulkheads. Shallow foundations, bearing capacity and settlement, hydrostatic uplift and waterproofing, coefficient of subgrade reaction, vibrating machinery foundations. Pile Foundations: capacity and settlement single pile and pile groups, batter and laterally loaded piles. Caissons and cofferdams, dewatering. Culverts and conduits. Slope stability. [3-0-0; 0-0-0]

473. (1) Foundation Engineering II.—Practical aspects of foundation design and construction illustrated by case histories pertinent to B.C. Topics include: site investigation, piles and pile driving, retaining structures, bracing of excavations, dewatering, underpinning and concepts in earth embankment design and construction. This course will be given by prominent consulting engineers in the Province of B.C. [0-0-0; 1-0-1]

474. (2½) Mechanics of Materials.—Fundamental concepts of stress and strain in 3-dimensions with applications to understanding the behaviour of construction materials. Elastic, plastic, and viscoelastic theories. Failure criteria. [2-0-1; 2-0-1]

475. (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. [2-0-0; 0-0-0]

476. (1) Legal Aspects of Engineering.—Aspects of law encountered in engineering, with emphasis on contracts and specifications. Contract documents, including preparation of an assigned specification. 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.* [1-0-0; 0-0-0]

478. (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. [2-0-0; 0-0-0]

480. (1) Built Environment Studies.—A study of the performance of enclosing envelopes as modifiers of natural climate; user environmental preferences; day-lighting; acoustics; thermal studies. [2-0-0; 0-0-0]

490. (2) Construction Engineering.—Management of construction. Planning the project, use of critical path methods. Selection of equipment. Cost of equipment. Cost of investment. Estimating. Bidding. Progress control. Types of equipment. Formwork. Some case histories of local projects given by construction engineers. [2-0-0; 2-0-0]

Courses for Graduate Students

M.A.Sc. and M.Eng. Degrees:

Prerequisites—Graduation in 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.

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. (1½) 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.—Torsion problems: St. Venant method, stress function solutions, membrane analogy theory, warping restraints. Special buckling problems: lateral buckling of beams, combined torsional-flexural buckling, shallow arches and thin rings, plastic buckling. Stresses in curved beams; thick cylinders. Mr. Olson.

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. Nathan.

535. (1½) Visco-elasticity and Plasticity.—Introduction to the linear theory of visco-elasticity; visco-elastic models; constitutive relations; correspondence principles; numerical techniques; applications to problems. Introduction to plasticity; yield functions; incremental constitutive relations; slip line fields; bounding theorems; strain hardening. 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 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 laminar and turbulent flow with applications to fluid-structure interactions. Mr. Quick.

541. (1) Advanced Fluid Mechanics II.—Laminar and turbulent wakes and jets, stratified flows and diffusion processes with application to problems in lakes and estuaries. (Prereq. C.E. 540 or equiv.) 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. (1) Rivers and Canals.—Morphology of rivers and their characteristics. The consequences of disturbing river regimen by engineering works. River-bed scour around flow obstructions (bridge piers, etc.). River regulation and control for navigation. Fishways and other fish passage devices. Mobile-boundary open channel flow. Sediment transport. Design of unlined silt-stable canals. Tidal discharge computations and convergence of estuaries. Dredging practices. Inland waterways. Hydraulic models.

547. (1) Harbour and Coastal Engineerng.—Wave and tide mechanics and related phenomena. Littoral processes and coastal morphology. Characteristic beach profiles and formations. Stability of inlets. Groins, breakwaters and sea walls. Sand by-passing plants. Wave forces. Wave refraction and diffraction. Storm wave prediction. Anchorages, moorings and navigation markers. Harbour layouts and functional design. Hydraulic models. Bulk cargo terminals and container ports. Vessel types and loadings.

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.

551. (1) Hydrology II.—Advanced applications of statistical methods, hydrograph analysis and routing techniques. Flow forecasting procedures. (Prerequisite: C.E. 478).

554. (1) Water Resource Development I.—Availability of water, quantitative and qualitative requirements for water—municipal, agricultural, industrial, etc.; drainage and flood control. Water resource management.

555. (1) Water Resource Development II.—Application of operations research statistics, economics, and engineering concepts to the development and operation of water resource systems.

558. (1) Water Resource Development Seminar.—Directed case studies. Application of concepts, processes and techniques of water resource planning to specific problems.

560. (1) Sanitary Engineering Design.—Design problems in water and sewage treatment, with emphasis on the hydraulic and sanitary engineering considerations. Mr. Oldham.

562. (1½) Sanitary Engineering Laboratory.—A laboratory course to familiarize the student with laboratory procedures, instrument analysis, sampling techniques, and data analysis. Mr. Oldham.

563. (1½) Unit Operations and Unit Processes in Sanitary Engineering.—Laboratory and field assessments of sanitary engineering operations and processes; effects of parameters thereon. Mr. Benedict.

564. (1) Engineering Management of Solid Wastes.—Characteristics of solid wastes; introduction to solid waste collection, treatment and disposal. Evaluation of current practice and analysis of future potential of landfills, composting, combined treatment, recycle and re-use. Mr. Cameron.

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. Mr. Oldham.

567. (1) Water Pollution Control Engineering I.—Discussion of pollution parameters and sources; effects of pollutants on the water quality of rivers, lakes and estuaries; engineering techniques for handling water quality problems. Mr. Cameron.

568. (1) Water Pollution Control Engineering II.—Industrial waste survey and design problems. Appraisal and analysis of existing water quality management systems. Water quality and effluent standards. Mr. Cameron.

569. (1½) Advanced Studies in Treatment of Waste.—Development of the principles of secondary treatment processes with application to municipal and industrial wastewater treatment. Discussion of tertiary treatment processes with special emphasis on methods of nutrient removal. Laboratory/demonstration sessions will be used to aid in the development of topics covered. Mr. Benedict.

570. (1½) Soil Mechanics I.—Soil composition and basic properties, stress and strain at a point, principle of effective stress, stress-strain relations; seepage, consolidation and settlement; shear testing equipment, stress-strain behaviour of soil, shear strength of soil. Mr. Byrne.

571. (1) Soil Mechanics II.—Plastic equilibrium, active and passive pressures; design of retaining walls, braced cuts, anchored bulkheads, tunnel linings, storage bins and silos; foundation design, spread footings, raft and deep pile foundations; stability analysis and earth dam design. (Prereq. C.E. 570). Mr. Byrne.

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.

573. (1) Numerical methods in Soil Mechanics.—Applications of finite difference and finite element methods of analysis to the solution of stress, seepage, and consolidation problems. Foundation vibrations. Seismic analysis of earth structures. (Prereq. CE. 500 or equiv.) Mr. Byrne.

574. (1½) 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. Textbook: Leuder, *Aerial Photographic Interpretation.* Prerequisite: C.E. 453 or equivalent). 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.*

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.

582. (1) Structure of Hardened Cement Paste.—Examination of the structure of hardened cement paste and of the related calcium silicate hydrates employing the Powers and Brownyard model. Topics will include BET theory of multilayer adsorption and the theory of capillary condensation and their use in determining specific surface areas and pore-size distributions; strength; shrinkage; creep.

583. (1) Experimental Cement Technology.—Laboratory determination of specific surface areas and pore-size distributions for different water-cement ratio pastes; dynamic modulus of elasticity; internal friction; introduction to the use of differential thermal analysis, thermogravimetric analysis and X-ray diffraction techniques for the study of cement—paste structure.

585. (1) Traffic Engineering and Design.—Analysis of highway traffic operation. Traffic flow analysis, traffic capacity analysis, traffic control, geometric design. Mr. Brown.

586. (1½) Urban Transportation System Analysis.—Development and use of urban transportation models, including travel generation models, distribution models, mode choice models and system evaluation. Mr. Brown.

587. (1½) Transit Operations Engineering.—Engineering analysis of public transit operations. Includes technological characteristics of operating systems, scheduling, routing, operating costs, fare structure, techniques of control, mode split analysis and the operational feasibility of new transit modes. Prerequisite: C.E. 470 or consent of instructor. Mr. Brown.

588. (1) Transit Design Engineering.—Design of bus and fixed rail transit facilities including supporting ways, stations, and analysis of system capacity and costs. Mr. Brown.

590. (1-3) Topics in Geodesy.—Geometrical geodesy, electronic distance measurement, map projections, physical geodesy, satellite geodesy, geodetic astronomy, adjustment computations. Mr. de Jong.

592. (1-3) Topics in Photogrammetry.—Analogue photogrammetry, analytical photogrammetry, non-topographic uses of photogrammetry and photo-interpretation. 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. (1) 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. (1) 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. (3) Introduction to Circuit Analysis.—The formulation and solution of the equilibrium equations for lumped linear circuits using classical methods; superposition integrals and transfer functions. [3-0-2; 3-2*-2]

252. (1½) Introduction to Solid State Devices.—Elementary theory of semiconductors and the physics of pn junction diodes and transistors. [2-2*-2*; 0-0-0]

254. (1½) Digital Electronics.—Large signal circuit analysis, analysis and realization of pulse and digital circuits. [0-0-0; 2-2*-2*]

256. (1½) Switching Circuits.—An introduction to Boolean Algebra and logical circuits. Realization of simple sequential machines and their use in digital systems. Elementary computer architecture. [2-2*-1; 0-0-0]

261. (2) Engineering Electromagnetics.—Review of vector analysis; electrostatic and magnetostatic fields in free space and material bodies, voltage-current relations of circuit elements, electromechanics and electromechanical devices, time-varying fields. [2-0-2; 2-0-2]

352. (1½) Electrical Engineering Materials.—Elementary aspects of structure and properties of materials relevant to device applications. Dielectrics, ferrolectrics, ferrites, metals. [0-0-0; 2-2*-2*]

353. (3) Electrical Machines.—Steady-state behaviour of rotating machinery. D.C., induction and synchronous machines. Rectification. [2-3*-2*; 1-3*-2*]

354. (1) Electrical Engineering Problems.—The application of computer methods to electrical engineering problems. [0-0-0; 2-0-1]

355. (3) Signals and Systems.—Transfer functions in systems analysis; signal representations; Fourier and Laplace transforms; modulation theory; statevariable analysis of systems; sampled-data systems; random processes in linear systems; system stability. [3-0-2; 3-0-2]

357. (3) Electronics.—Study of the analysis and design of electronic circuits. The amplification of wideband signals, power amplification, tuned amplifiers. Oscillators and feedback amplifiers. Noise in electronic circuits. Circuits for modulation and control systems. Introduction to electronic systems. High speed logic circuits. [2-3*-2*; 2-3*-2*]

361. (2) Applications of Electromagnetic Fields.—Interaction of charged particles with fields and applications; solution of boundary value problems; time varying fields; plane waves; transmission lines and waveguides; radiation; antenna arrays. [2-0-2*; 2-0-2*]

364. (1½) Electronic Instruments.—A course for those with no previous circuits or electronics background, designed to give students some ability to use electronic equipment such as measuring instruments, transducers, amplifiers and digital processors. [2-2*-2*; 0-0-0]

365. (2) Applied Electronics.—Characteristics of transducers and electronic devices; analysis and realization of electronic circuits such as power supplies, amplifiers and logic circuits. (Prerequisite App. Sc. 251 or consent of instructor.) [3-2*-2*; 0-0-0]

366. (3) Electronics Theory and Applications.—A more detailed treatment of topics in E.E. 365, with emphasis on noise, feedback, and the use of small computers. (Prerequisite: App. Sc. 251, or E.E. 251, or consent of instructor.) [2-2*-2*; 2-2*-2*]

367. (1½) 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. [2-3-0; 0-0-0]

370. (2) Electrical Machines and Power Transmission.—A study of the basic types of electric motors and generators, transformers, rectifiers and inverters; electrical power measurements; distribution of electrical energy. (Prerequisite: App. Sc. 251 or consent of instructor.) [0-0-0; 3-2*-2*]

438. (1½) Building Services (Electrical).—Principles of electrical services and illumination of buildings. For students in Architecture. [0-0-0; 3-0-0]

451. (3) Electrical Circuits and Apparatus.—D.C. and A.C. circuits and machinery; theory and application of electronic devices. [2-2*-2*; 2-2*-2*]

455. (2) 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. (2) Power Systems Analysis.—Components of electrical power systems, generators, transformers, transmission lines, converters and inverters. System performance. [2-0-2*; 2-0-2*]

467. (2) 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. (2) Microwave Engineering.—Advanced theory of transmission lines and waveguides; microwave components; introduction to microwave electronics. [2-0-2*; 2-0-2*]

471. (2) Machine and Power System Dynamics.—General machine theory and machine dynamics; synchronous machine and power system problems; power system stability and control. [2-0-2*; 2-0-2*]

473. (2) Systems Laboratory.—Experiments on integrated engineering systems. [0-6-0; 0-6-0]

475. (2) Electronic Systems.—Large scale electronic analogue and digital system design. Real-time computer programming and interface design. Theory of imaging radar and sonar systems. Examples chosen from contemporary systems. [2-0-2*; 2-0-2*]

477. (2) Solid State Devices.—Theory of operation and technology of fabrication of solid state semiconductor devices of current interest; e.g. silicon IC's, MOS devices, microwave devices. [2-0-2*; 2-0-2*]

483. (2) Radiation and Propagation.—Physical principles of radiation, directive radiation, antenna systems for the various frequency ranges, ionospheric and tropospheric propagation; diffraction of radio waves, other environmental effects on electromagnetic radiation; remote sensing and monitoring of the environment. [2-0-2*; 2-0-2*]

485. (2) Computer Methods in System Design.—Analogue and hybrid simulation techniques. Digital methods for the optimization of objective functions with and without constraints. Applications to system design in Electrical Engineering. [2-0-2*; 2-0-2*]

490. (2) Topics in Electrical Engineering.—Lectures on subjects of current interest by Visiting Lecturers. [2-0-2*; 2-0-2*]

498. (1) Engineering Reports.—Copies of specifications are issued by the Department during registration.

Courses for Graduate Students

Electrical Engineering—Ph.D., M.A.Sc. and M.Eng. degrees

Prerequisites—Graduation in Electrical Engineering, Engineering Physics, Honours Physics or Honours Math-Physics. Some students, particularly those with Honours Science Degrees, 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 12 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 9 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 9 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.

M.Eng. Degree:

The degree of M.Eng. may be obtained on the basis of the completion of 15 units of course work together with an essay or report and a comprehensive examination. This degree is intended mainly for candidates who may wish to extend their knowledge after a period of engineering practice following first graduation.

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. (1) Electric Power Systems.—Methods of analysis of electric power systems with regard to power flow, short -circuit currents and stability; numerical techniques for computer implementation of these methods; HVDC power systems; economical operation of power systems.

555. (1½) 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.

560. (1) Network Analysis.—Topological methods of analysis; functional characterization of linear time-invariant networks; stability and realizability criteria; computer-aided design.

562. (1) Network Synthesis.—Realizability criteria; synthesis of passive networks; synthesis of active networks; network sensitivity; approximation in time and frequency domains.

564. (1½) Detection and Estimation of Signals and Patterns.—Parameter detection and estimation, characterization of signals and message sources, linear mean square estimation of random signals, detection of deterministic signals and patterns in noise, realization of detection and pattern recognition systems.

566. (1½) Communication and Information Theory.—Definition of information, encoding of discrete and continuous message sources, coding for noisy channels, design of modulators and demodulators, optimization of one-way and feedback communication systems.

568. (1) Control Systems.—State-space analysis of continuous and discrete multivariable systems. Controllability and observability. Sensitivity considerations. Stability of linear and nonlinear systems.

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.

570. (1) Optimum Systems Control.—The calculus of variations, maximum principle and dynamic programming and their application to optimization of dynamic systems, optimum open-loop, closed-loop and singular control of lumped parameter and distributed parameter systems.

571. (1-2) Electrical Engineering Seminar and Special Problems.

572. (½-1) Advanced Topics in Control.—Studies in areas of current research interest, with written problem assignments.

573. (1½) Power System Dynamics.—State equations of synchronous machines and controllers; stability analysis; excitation control; optimal control; synchronization and other problems.

575. (1) Signal and Image Processing.—Analysis and characterization of signals, images and random processes; optical and digital filtering of signals and images for enhancement, recognition, storage and transmission.

579. (1) Solid-State Electronics.—Theory and measurement of amplifying properties and noise performance of parametric amplifiers, tunnel diodes, masers, lasers and other solid-state devices of current interest.

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. (1-2) 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. (1½) 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. (1) Engineering Applications of Analogue and Hybrid Computers.—Programming of system equations, optimization techniques, application to the study of control systems.

596. (1) Optical Signal Processing I.—The optical system as a two-dimensional linear system. Component analyses relating the lens, free space, apertures, stops, and film to one-dimensional electronic components. Optical systems for image formation, data processing, data storage and interferometry. Introduction to holography.

598. (1) Optical Signal Processing II.—Introduction to coherence theory. Effects of coherence on the engineering uses of optical systems. Consideration of various light sources from the aspect of coherence. Lasers. Holography and some of its engineering applications.

599. Thesis.—For M.A.Sc. degree.

699. Thesis.—For Ph.D. degree.

English

150. (2) Technical Writing.—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. (2) 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 section of the calendar.

Geology

150. (3) 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. Mr. Kucera. [2-2*-0; 2-2*-0]

203. (1½) Principles of Paleontology.

206. (1½) Sedimentology.

210. (3) Mineralogy.

254. (1½) Introduction to Structural Geology.—This course is the second term of Geology 304. Mr. Ross. [0-0-0; 2-3-0]

300. (1½) Introduction to Mineralogy.

304. (3) Introduction to Stratigraphy and Structural Geology.

309. (1) Hydrogeology.

311. (1) Natural Gas and Petroleum Geology.

312. (1) Environmental Geology.

317. (1½) Petrology.

320. (3) Optical Mineralogy and Petrology.

354. (1½) Structural Geology.—Introduction to descriptive structural geology with applications to ore controls. For students in Mineral Engineering only. [2-3-0; 0-0-0]

359. (1½) Ore Microscopy for Mineral Engineers.—Application of the reflecting microscope to the examination of ores and mill products. For students in Mineral Engineering only. Text: Schouten, *Determinative tables for ore microscopy* and Short, *Microscopic determination of the ore minerals.* Prerequisite: Geology 300. Mr. Sinclair. [1-3-0; 0-0-0]

402. (1½) Stratigraphy of the Western Cordillera.

403. (1½) Petrology of Chemical and Bioclastic Rocks.

404. (1½) Structural Geology.

405. (1) Topics in General Geology.

407. (3) Petrology.

408. (3) Mineral Deposits.

409. (2) Mineralography.

410. (1½) Field Geology.

412. (3) Geomorphology, I.

414. (1½) Stratigraphic Paleontology.

419. (1½)Stratigraphy and Sedimentation.

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. (3) Waves and Seismology.

302. (3) General Geophysics.

400. (3) Applied Physics of the Earth.

402. (1) Applied Geophysics Laboratory.

403. (1) Geochronology.

412. (2) Geomagnetism and Space Plasma Physics.

415. (3) Geophysical Analysis.

499. Thesis.—For B.A.Sc. degree—Topic to be approved by the Department. [0-3-0; 0-3-0]

599. (3-6) Thesis.—For M.A.Sc. degree.

For description of other courses in Geophysics see Faculty of Science.

Mathematics

151 (1½) Linear Algebra.—Vectors and matrices; dot and cross product; 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; Gauss, Green and Stokes theorems. [0-0-0; 3-0-0]

251. (2) Elementary Statistics.—Probability distributions; testing statistical hypotheses; estimation; analysis of variance. [2-0-0; 2-0-0]

255. (1½) Differential Equations I.—Elementary differential equations. Separable equations. Linear first order equations. Linear equations with constant coefficients. Laplace transforms. Power series solutions for second order equations. Special functions. Prerequisites: Math. 151 and Math. 155. [3-0-0; 0-0-0]

256. (1½) Differential Equations II.—Special functions. Fourier series and orthogonal expansions. Introduction to partial differential equations. Separation of variables. [0-0-0; 3-0-0]

350. (2) Complex Variables and Application.—Analytic functions. Cauchy-Riemann equations. Power series and Laurent series. Elementary functions. Contour integrals. Poles and residues. Introduction to conformal mapping. Applications of Analysis to problems in Physics and Engineering. Prerequisites: Mathematics 151 and 155. Students who have credit for Math 364 can not receive credit for Math. 350. [2-0-1; 2-0-1]

357. (1) Industrial Statistics and Linear Programming.—Quality control; acceptance sampling; analysis of variance; linear programming. [0-0-0; 2-0-0]

360. (1½) Real Variable.—Uniform convergence; orthogonal functions; Fourier series; ordinary differential equations; special functions. [0-0-0; 3-0-0]

362. (1½) Linear Algebra.—Vector spaces; linear transformations and matrices; quadratic forms; characteristic values and vestors; canonical forms. [3-0-0; 0-0-0]

450. (3) Analysis.—Complex variables; numerical methods; partial differential equations. Prerequisites: Math. 350 or Math. 255 and 256. [3-0-0; 3-0-0]

452. (3) 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 section of the calendar.

Mechanical Engineering

252. (2) 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. This course is a prerequisite to Third Year Mechanical Engineering.

358. (1) 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. (1½) Mechanics of Materials I.—Analysis of stress; theories of strength; analysis of strain; strain gages and strain gage transducers; elastic energy theorems; statically indeterminate structures; rings; frames; stiffness method of structural analysis; bending and shear in beams; St. Venant's torsion equations; twisting of tubes and non-circular cross-sections. [3-0-1; 0-0-0]

364. (1½) 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. (1½) 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. [0-0-0; 3-0-2*]

367. (1½) Applied Mechanics.—Two dimensional elasticity; theories of failure; fracture; fatigue; introduction to plasticity and rheology. [2-0-3; 0-0-0]

372. (2) 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. (1½) 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. (1½) Fluid Dynamics.—Review of fundamentals, introduction to fluid field theory; boundary layer theory; turbomachine theory; selected topics of current engineering interest. [0-0-0; 3-0-1]

385. (1½) Fluid Mechanics.—Introduction to the principles and engineering applications of fluid mechanics. (Primarily for Electrical Engineering students.) [0-0-0; 3-0-1]

391. (2) 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 in diverse areas of application. Systems orientation, linear programming, dynamic programming, network analysis, queuing theory, simulation, inventory theory, forecasting techniques, replacement theory. [2-0-0; 2-0-0]

398. (2) Engineering Report.—Copies of specifications are issued by the Department near the end of the Spring Term. An outline is to be submitted before registration day. The report is due in mid-October.

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; 0-0-0]

458. (2) 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. (3) Mechanical Design.—Properties and selection of materials; stress concentration and fatigue; screws, fasteners, and joints; mechanical springs; rolling and hydrodynamic bearings; spur, helical, bevel, and worm gears; gear trains; shafts; clutches, brakes, and couplings; hydraulic power transmission; flexible machine elements. [2-0-3; 2-0-3]

465. (1½) Dynamics II.—Transient and steady-state response of single and multiple degree of freeedom linear systems; exact and numerical solutions; introduction to nonlinear systems; human response to air-borne and structure-borne noise; vibration measuring systems and instruments; industrial applications. [3-0-1; 0-0-0]

466. (1½) 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. (1½) Advanced Dynamics.—Advanced topics in vibration analysis, self excited oscillations, satellite librations, theory of stability, analysis of nonlinear systems. [0-0-0; 3-0-1]

468. (1½) Mechanics of Materials II.—The equations of elasticity in three dimensions; equations of motion in terms of the stress tensor; compatibility of displacements; stress-strain relations. Specialization to two dimensions and the solution of the equations for plane stress and plane strain in terms of stress functions. A brief review of the biharmonic equation and its role in the bending of thin plates. Analytic and numerical methods of solution including finite difference equations and the relaxation method. The torsion of bars. The propagation of elastic waves, waves of dilation and distortion, waves in rods. A brief introduction to the visco-elastic and plastic behaviour of materials. [0-0-0; 3-0-1]

469. (1½) 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. [0-0-0; 3-1-0]

470. (1½) Experimental Stress Analysis.—Review of stress-strain formulations and techniques for solving equations of elasticity; computer and numerical methods; physical methods; brittle lacquer techniques; point-wise strain and displacement measurement techniques; rosette calculations; recording instruments. [3-0-1; 0-0-0]

472. (2) Project and Design Laboratory.—Experimental work on projects selected to give research, development, and design experience. [0-3-0; 0-3-0]

473. (1½) 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. (2) 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]

479. (1½) 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. [0-0-0; 3-0-1]

481. (3) Aerodynamics.—Potential flows; complex variable methods; thin airfoils; finite wings; high speed airfoils and wings; supersonic and hypersonic flow; rarefied gas dynamics; unsteady aerodynamics, performance and stability; experimental work in the low speed wind tunnel [3-1*-2*; 3-1*-2*]

484. (1) 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. [3-0-1; 0-0-0]

491. (2) **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]

498. (2) **Engineering Report.**—Copies of specifications are issued by the Department near the end of Spring Term. An outline is to be submitted before registration day. The report is due in mid-October.

Courses for Graduate Students

Prerequisites — Graduation in Mechanical Engineering or Engineering Physics.

M.A.Sc Degree:

Course — Includes at least 6 units chosen from graduate courses in the Department, and other approved courses.

M.Eng. Degree:

Obtained by the completion of 15 units of course work together with an essay or report and comprehensive examination.

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 session since not all courses will be available.

550. (1) **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.

553. (1½) **Advanced Design I.**—Topics to include optimization, reliability theory, decision-making under uncertainty, and computer-aided design. Case studies and design exercises will be used to illustrate and emphasize the various topics and the design process generally. Mr. McKechnie.

554. (1½) **Advanced Design II.**—A consolidation of design skills and techniques through participation in the solution of realistic engineering problems. In addition, each student will write a design-oriented case study. Mr. McKechnie.

555. (1) **Hydrodynamic Lubrication.**—Physical properties of lubricants; basic hydrodynamic theory applicable to lubrication problems; plane sliding bearings; journal bearings subjected to steady and dynamic loads; elastohydrodynamic lubrication. Mr. Brockley.

556. (1) **Boundary Lubrication.**—Mechanisms of metallic friction; lubrication with polar and other compounds; the nature and mechanisms of metallic wear. Mr. Brockley.

558. (3) **Engineering Applications of Statistical Distribution Theory.**—Classical and contemporary theory of the prominent statistical models employed in the Applied Sciences. The Normal, Gamma, Beta, and Extreme Value classes of distributions. Estimation techniques and applications to engineering problems. Mr. Bury.

561. (1) **Advanced Linear Elasticity.**—Equations of elasticity in indicial notation, uniqueness theorems, methods of solution using complex variable techniques and integral transforms. Mr. Vaughan.

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 materials, plastic yield conditions and associated flow rules. Mr. Ramsey.

564. (3) **Space Dynamics I.**—Dynamics of systems with variable mass, optimization of rocket performance; orbital mechanics, transfer of orbit and rendezvous; theory of patched conics for interplanetary travel; geometry of spatial orbit, orbit determination using Gauss, Laplace and Gibbs methods, introduction to gyrodynamics, theory of stabilized platforms. Mr. Modi.

565. (1) **Linear Vibrations I.**—Transient and steady-state response of lumped parameter systems; shock response; integral transform and energy methods; electrical analogies; the analogue computer; mechanical impedance and mobility; vibration measuring instruments and systems. Mr. Hazell.

566. (1) **Linear Vibrations II.**—Response of continuous elastic systems such as rods, beams, frames, plates, shells; exact solutions; Rayleigh and Rayleigh-Ritz approximations; numerical and experimental methods. Mr. Hazell.

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. Mr. Vaughan.

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. Mr. Ramsey.

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. Mr. Brockley.

570. (3) **Space Dynamics II.**—Three body and multibody systems, stability of motion near Lagrange points; orbit perturbations due to earth's oblateness and atmosphere, estimation of satellite lifetime; active and passive stabilization of space vehicles, environmental effects on satellite librations and station keeping. Mr. Modi.

572. (1½) **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. Mass transfer. Mr. Iqbal.

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. Mr. Iqbal.

575. (1½) **Special Topics in Heat and Mass Transfer.**—Topics will be arranged to suit the special interests of students. Mr. Iqbal.

576. (1½) **Advanced Thermodynamics.**—Review of the first and second laws of thermodynamics, the property relations, and the principles of irreversibility and availability. Elements of combustion and thermochemistry with application to power generation devices, incinerators and open fires. Emissions from combustion sources and emission abatement techniques. Combustion engine and flame phenomena are to be covered. Mr. Adams.

577. (1½) **Applied Statistical Thermodynamics.**—Application of the concepts of quantum mechanics, statistical mechanics, and kinetic theory to the evaluation of thermostatic and transport properties and equilibrium constants. Investigation of the combustion phenomena from a microscopic point of view. Use of statistical thermodynamic methods for evaluating the product distribution energy release, temperature and effective properties in high temperature combustion situations. Mr. Adams.

580. (1½) **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. Mr. Parkinson.

581. (1½) **Theory of Low Speed Airfoils.**—Linearized and exact potential flow methods for airfoils in steady and non-steady motion, including methods for separated flows; wind tunnel boundary correction theory. Mr. Parkinson.

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. Mr. Rotem.

583. (1½) **High Speed Gas Dynamics.**—Topics selected from the dynamics of a gas considered as an inviscid continuum; small-disturbance theory; initial and boundary value problems of wave propagation; application to airfoils and wings; slender body theory; characteristics theory and hodograph methods for nonlinear problems; hypersonic flow and wave riders. Mr. Parkinson.

584. (1½) **Mechanics of Rarefied Gases.**—Kinetic theory; Boltzmann's equation; collision processes; elementary models; free molecule flow and applications to satellites and semi-satellites. Mr. Parkinson.

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. Mr. Modi.

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. Mr. Gartshore.

587. (1) **Engineering Acoustics I.**—Acoustic terminology; theory of sound propagation in tubes, ducts, horns; spherical radiation; characteristics of noise sources; theory and design of electro-acoustic transducers. Mr. Siddon.

588. (1) **Engineering Acoustics II.**—Theory of sound in enclosures; subjective assessment of noise; hearing conservation criteria; principles of noise control; case studies; ultrasonic and infrasonic phenomena; underwater acoustics. Mr. Siddon.

589. (1½) Aerodynamic Noise I.—The aero-acoustic equations; theories of Lighthill, Curle, and others; basic multipole sources; relevant concepts from random process theory; theories of jet noise, propeller noise. Mr. Siddon.

590. (1½) Aerodynamic Noise II.—Physical characteristics of the noise of jets, wakes, boundary layers, separated flow, propellers, fans, and compressors; noise suppression techniques. Mr. Siddon.

591. (1½) Industrial Aerodynamics.—The special theoretical and experimental problems and methods of aerodynamics relevant to the nature of winds and their steady and oscillatory effects on buildings and structures. Mr. Parkinson.

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. (2) Metallurgical Thermodynamics I.—Chemistry and electrochemistry of metal separations; thermodynamic basis of metallurgical processes; phase rule, heat of reaction, free energy, activity, thermodynamic equilibrium. [2-0-0; 2-0-0]

351. (1) Laboratory Methods.—Application of chemical principles in pyrometallurgical and hydrometallurgical procedures. [0-3*-0; 0-3*-0]

352. (2) 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. (1) Metallurgical Calculations I.—Stoichiometry, heat and material balances in metallurgical processes; problems in physical metallurgy. [0-0-2; 0-0-2]

370. (2) Structure of Metals I.—Crystallography, X-ray diffraction; defects in metals; properties of dislocations; deformation of single crystal and polycrystalline metals; strengthening mechanisms. [2-0-0; 2-0-0]

371. (1) Physical Metallurgy Laboratory I.—Metallographic technique; photography and analysis of microstructures of ferrous and non-ferrous alloys; studies of heat treatment; deformation behaviour. [0-3*-0; 0-3*-0]

372. (1) Physical Metallurgy.—Alloying of metals; structures, heat treatment and fabrication of ferrous materials. [0-0-0; 2-0-0]

374. (3) 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]

376. (2) Physical Metallurgy.—Constitution, structure, properties, classification, and applications of ferrous and non-ferrous metals and alloys. Principles of heat treatment; working and annealing processes. [2-0-0; 2-0-0]

377. (1) Welding and Joining.—Principles of fusion and solid state welding, brazing, and other joining processes; metallurgy of welding; stresses and distortion in welding. [2-0-0; 0-0-0]

380. (3) 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. (2) Non-Metallic Materials I.—Classification of ceramics, structure of oxides and silicates; refractories, raw materials, manufacture, properties, use, specification and testing. [1-3*-0; 1-3*-0]

383. (2) Ceramic Processing.—Modern methods of processing ceramic raw materials; mass balance in body-glaze formation and matching; glass chemistry and forming methods; special processing techniques in electronic and technical ceramics. [1-2*-2*; 1-2*-2*]

390. (1) Seminar I.—Training and practice in public speaking and presentation of technical papers. [0-0-1; 0-0-1]

398. (2) 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. (2) 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. (2) Metallurgy Laboratory.—Experiments and problems illustrating the principles and practice of extractive metallurgy. [O-6*-0; 0-6*-0]

452. (2) 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. (2) 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. (1½) Research Project.—Study of a selected problem in extractive or physical metallurgy, or ceramics. [0-3-0; 0-3-0]

456. (2) 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. (1) Physical Chemistry of Metal Surfaces.—Thermodynamics of surfaces and interfaces; wetting and contact angles; adhesion and bonding. [1-0-0; 1-0-0]

460. (2) Metallurgical Transport Processes.—Applications of the principles of heat, mass, and energy transfer to metallurgical systems. [1-0-0; 1-0-0]

461. (1) Nuclear Metallurgy.—Survey of principles of reactor operation; metallurgical aspects of fuels, constructional materials, radiation damage, corrosion. [1-0-0; 1-0-0]

470. (2) Structure of Metals II.—Diffusion in Solids; nucleation and growth reactions, diffusionless transformations; solidification. [2-0-0; 2-0-0]

471. (2) Physical Metallurgy Laboratory II.—Electron microscopy; zone-refining; X-ray diffraction; dilatometry; other physical metallurgical techniques. [0-6*-0; 0-6*-0]

472. (3) 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. [2-3*-0; 2-3*-0]

474. (2) 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]

478. (1) Electron Theory of Solids.—Classical and quantum theories of the properties of solids; bonding; transport properties; semiconductors; ionic crystals; magnetic materials and superconductors. [2-0-0; 0-0-0]

480. (1) 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. (2) 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. (1) Seminar II.—Weekly seminar for discussion of current technical topics; written report on production methods and economic reports of one of the metals. [0-0-1; 0-0-1]

495. Tutorial.—Group discussion with Faculty members on problems arising from course material. [0-0-1; 0-0-1]

(This course carries no academic credit.)

498. (2) 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, plus at least 3 units of 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, static fatigue in glass and glass ceramics; abrasives.

550. (2) Metallurgical Thermodynamics.—Application of advanced thermodynamic principles in metallurgical processes. Mr. Samis.

554. (1-2) Hydrometallurgy.—Modern theories of comminution, leaching, purification and precipitation processes. Two units credit will be given when the student undertakes an extra project. Mr. Peters.

555. (1) Statistical Thermodynamics of Metals.—A survey of classical thermodynamics, statistical thermodynamics and irreversible thermodynamics with applications to transport processes and phase transitions in metallic systems. Mr. Coates.

556. (2) Advanced Process Metallurgy.—Topics in advanced process metallurgy including: metallurgy of rarer metals, vacuum and inert atmosphere processing, halide metallurgy, fused salt processes, iron and steelmaking. Mr. Mitchell, Mr. Warren.

558. (2) Corrosion.—Modern theories relating to corrosion and corrosion protection of metals. Thermodynamic and kinetic phenomena, corrosion measurements, inhibition and passivation, design for corrosive environments, stress corrosion cracking theory. Same as Min. 574. Mr. Peters, Mr. Tromans, Mr. Leja, Mr. Poling.

560. (2) Metallurgical Transport Processes.—Principles of heat, mass and momentum transfer applied to metallurgical processes. Analysis of processes using mathematical modelling and numerical analysis. Vacuum refining, continuous casting, blast furnace, gas-solid reactions. Mr. Brimacombe.

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. (2) Phase Transformations in Solids.—Nucleation and growth. Precipitation from solid solution—spinodal decomposition, age hardening, eutectoid decomposition, massive and bainitic transformations. Co-operative shear transformations—martensite. Mr. Brown, Mr. Hawbolt.

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.

583. (1) Non-Crystalline Materials.—The structure and properties of non-crystalline materials. Chemistry of inorganic glasses, phase separation and crystallization of glass, vitreous carbon, amorphous solids, glass-forming liquids. Emphasis on relations between structure and properties. Mr. Nadeau.

584. (1) Advanced X-Ray Diffraction.—Single crystal diffraction; spectrometry; line profile analysis; Fourier analysis; diffractometer and film techniques as applied to problems in metallurgy. Mr. Butters.

586. (2) Advanced Metallography.—The principles of advanced research microscopy; transmission electron miscroscopy, electron diffraction and electron microscopy; minor content of field ion microscopy, interference microscopy, polarized light and phase contrast microscopy, and ellipsometry. Mr. Tromans.

592. (1-3) Special Topics in Metallurgy.—A special advanced course may be arranged on approval of the Head of the Department.

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.

Mineral Engineering

250. (1½) Introduction to Mineral Engineering.—The nature and scope of mineral engineering. [2-2*-0; 0-2*-0]

260. (1) 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]

350. (1½) Mineral Exploration.—Principles underlying the search for and exploration of mineral deposits; introduction to economic geology, applied geophysics, and applied geochemistry. [2-2-0; 0-0-0]

351. (1½) Introduction to Valuation.—Systematic exploration, sampling mineral deposits and estimating ore reserves, elements of valuation. [0-0-0; 2-0-2]

353. (1) 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 make use of mathematical models, and statistical methods. [0-0-0; 2-0-0]

356. (1½) Rock Properties I.—The study of the mechanical properties of rock materials in the laboratory and in the field. The relevance of such studies to common mining problems. [0-0-0; 2-2-0]

358. (1) 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]

360. (1½) Elements of Mineral Engineering.—Mineral product demand patterns, mining methods and practice, mineral processing techniques, economic considerations in the production of saleable products from mineral resources. [1-3*-0; 1-3*-0]

370. (3) Mineral Processing I.—Mineral Processing unit operations—sampling, liberation, crushing, grinding, screening, classification, gravity separation, magnetic separation, electrostatic separation. Flow sheets and milling calculations. References: Gaudin, *Principles of Mineral Dressing;* Taggart, *Elements of Ore Dressing;* Taggart, *Handbook of Mineral Dressing.* [2-3*-0; 2-3*-0]

371. (1½) Principles of Mineral Processing.—Elements of mineralogy; processes and economic principles involved in producing marketable products from primary mineral resources. [1-3*-0; 1-3*-0]

372. (1) Flotation.—Theory of flotation, surface properties, flotation reagents. [1-3*-0; 1-3*-0]

373. (1) 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]

390. (½) Seminar.—Oral presentation of topics by students before the class. [0-0-1; 0-0-1]

398. (2) 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.

451. (1) Environmental Control.—Control of occupational health hazards, mine ventilation and air conditioning. Textbook: Hartman, *Mine Ventilation and Air Conditioning.* [1-0-2; 0-0-0]

452. (1) Valuation.—Valuation of mineral property—reliability of ore reserve estimates, mineral economics, capital budgeting decision criteria. [0-0-0; 2-0-0]

453. (2) 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. (½) Problems.—Mine plant design and practice. Reference: Staley, *Mine Plant Design.* [0-0-0; 0-0-2]

455. (1) Rock Properties II.—The influence of rock properties on investigational techniques—the basic design of such techniques and instruments commonly used—practical case studies. [2-0-0; 0-0-0]

456. (1) Rock Mechanics.—The application of rock mechanics techniques for improvements in safety and efficiency in open pit and underground operations. [0-0-0; 2-0-0]

457. (1) Introduction to Rock Mechanics.—Principles of rock mechanics instrumentation and its use as a design tool. Prerequisite Min. 356. [2-2*-0; 0-0-0]

460. (2) 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. Field trips are required as part of the course. Expenses are the responsibility of the student. [0-0-4; 0-0-4]

470. (3) Mineral Processing II.—(Continuation of Min. 370 & Min. 372)—Solid/liquid separation, chemical extraction, materials transport, flow sheets, instrumentation, mill circuit design and evaluation, coal preparation. References: Taggart, *Elements of Ore Dressing;* Taggart, *Handbook of Mineral Dressing;* Gaudin, *Principals of Mineral Dressing;* A.I.M.E., *Froth Flotation, 50th Anniversary Volume;* current periodicals. [2-3*-0; 2-3*-0]

471. (2) 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. (2) Mineral Stability.—Mineral processing energetics; graphical representation of mineral stability and the application to mineral processing. References: Garrels and Christ, *Solutions, Minerals and Equilibria;* Glasstone and Lewis, *Elements of Physical Chemistry.* [2-0-0; 1-0-2]

480. (3) 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. (½) Seminar.—Oral presentation of topics by students before the class. [0-0-1; 0-0-1]

498. (2) 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 interpretation of data rather than on description. Draft copy to be handed in to the Head of the Department not later than October 15; final typed copy to be handed in on the first day of the second term.

Courses for Graduate Students

M.A.Sc., M.Eng. Degrees:

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.

(d) Applications of surface chemistry to corrosion, emulsification, wetting, lubrication.

550. (1) Mining Methods.—A more advanced study of some aspects of mining methods. Mr. Crouch.

551. (2) Rock Mechanics.—Mathematical development of certain rock mechanics techniques; advanced laboratory investigations into the properties and behaviour of various rocks; the study of investigational techniques. Mr. Weir-Jones.

552. (2) Applied Physical Measurements.—The application of elastic theory and other basic principles to the development of rock mechanics instrumentation systems; planning in situ instrumentation layouts to yield practical design data. Mr. Weir-Jones.

553. (2) Operations Research.—Production engineering, linear programming, queuing theory and applications, simulation, reliability theory, game theory, dynamic programming. Mr. Emery.

554. (1) Mineral Property Evaluation.—Identification of variables pertinent to the assessment of mineral properties, the interrelationship and interdependence of such variables; influence of present value criteria, mining taxation, and sources of available finance. Mr. Evans.

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; methods of characterizing surface complexes—reflection spectroscopy, electron diffraction, electroanalysis, interferometry. Applications of: flotation, corrosion, emulsification, detergency, lubrication, adhesion. Mr. Leja and Mr. Poling.

573. (1) Treatment of Mineral Industry Effluents.—Characteristics of mineral dispersions in gases and in water; dust suppression in mining and in mineral transport facilities; solid-liquid separations; removal of noxious chemicals; waste disposal systems. (Department staff.)

574. (2) Corrosion.—Modern theories relating to corrosion and corrosion protection of metals. Thermodynamic and kinetic phenomena, corrosion measurements, inhibition and passivation, design for corrosive environments, stress corrosion cracking theory. (Same as Met. 558). Mr. Peters, Mr. Tromans, Mr. Leja, 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.

Oceanography

Oceanography 400. (1) Introduction to Synoptic Oceanography.—Survey of oceanic circulation, distribution of temperature and salinity, energy budget. Textbook: Pickard, *Descriptive Physical Oceanography.* [2-0-0; 0-0-0]

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. [2-0-0; 0-0-0]

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. [0-0-0; 2-0-0]

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. [0-0-0; 2-0-0]

Physics

155 (3) 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; 2-0-2]

156. (1½) Heat and Thermodynamics.—Thermometry; thermal properties of matter; radiation laws; kinetic theory of gases and gas laws; the first and second laws of thermodynamics; applications. [2-3*-1; 0-0-0]

158. (1½) Wave Phenomena.—Simple harmonic motion and wave generation; properties of wave motion; superposition; sound waves; geometrical and physical optics. Textbook: Halliday and Resnick, *Physics (Part I).* [0-0-0; 2-3*-1]

250. (1½) Electric and Magnetic Fields.—The laws of electromagnetism in free space, leading to Maxwell's Equations and electromagnetic waves. [0-0-0; 2-3*-1]

253. (1½) Introduction to Solid State Physics.—Introduction to the ideas of statistical mechanics and wave mechanics with applications to the electric and magnetic properties of materials. [2-3*-0; 0-0-0]

353. (1½) Introduction to Atomic Physics.—Electrons, photoelectric effect, Compton effect, the Bohr atom, X-rays, Zeeman effect, De Broglie, Schroedinger equation, the hydrogen atom, electron spin and spectroscopy. Primarily for Electrical Engineering students. [3-0-0; 0-0-0]

475. (1½) Introduction to Statistical Mechanics.—Review of thermodynamics, fundamentals of statistical mechanics and its relation to classical thermodynamics; applications to thermal, magnetic and electrical properties of matter. Primarily for Electrical Engineering students. [0-0-0; 3-0-0]

Primarily for Engineering Physics students.

251. (3) 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. [2-3*-0; 2-3*-0]

351. (2) Electricity and Magnetism.—Electrostatics and magnetostatics, time-varying fields, Maxwell's equations, boundary value problems, wave propagation, scattering and dispersion, special relativity. Textbook: W. J. Duffin, *Advanced Electricity and Magnetism.* [2-0-0; 2-0-0]

355. (3) Basic Quantum Physics.—The experimental basis for quantum mechanics; photoelectric, Comptom and Zeeman effects; the Bohr atom and de Broglie hypothesis leading to the Schrödinger equation. Applications to the Fermi gas model, the hydrogen atom, the periodic table, the Pauli principle and to spectroscopy. Some elementary properties of molecules and solids. [3-0-0; 3-0-0]

358. (3) Physical Optics.—Geometrical and physical optics; optical instruments, interference diffraction, polarization, spectroscopy. [2-3-0; 2-3-0]

398. (2) 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.

453. (1½) Applied Nuclear Physics.—Radioactive decay and radiations, nuclear properties and measurements, nuclear models, nuclear accelerators and nuclear safety. [3-0-0; 0-0-0]

454. (1½) Applied Solid State Physics.—Symmetry of crystal structures, waves in lattices, band theory, statistics, effective mass approximation, electrical

conduction in metals and semiconductors, superconductivity and applications. [0-0-0; 3-0-0]

455. (3) 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. (2) 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 (2) Continuum Mechanics.—Elastic qualities of real materials and propagation of waves therein. Turbulent flow in ocean and atmosphere. Magnetohydrodynamic waves in space physics. [2-0-0; 2-0-0]

459. (3) Experimental Physics.—Advanced laboratory course with a choice of experiments from a variety of fields including solid state, nuclear, low temperature, X-ray and resonance physics. Modern laboratory techniques are employed including the use of an on-line digital computer for both data acquisition and general purpose computing. In the spring term as an alternative to doing the laboratory students may elect to spend equivalent time working on a project in an industrial environment or in a research oriented non-academic organization. Arrangements will be made by the Physics Department. 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]

Courses for Graduate Students

M.A.Sc. Degree:

Prerequisites—Graduation in Engineering Physics or Electrical Engineering.

Course—A minimum of 15 units, with the thesis counting 6, and normally at least 6 units from graduate courses in physics, although students in interdisciplinary fields may with permission reduce the latter number to 4.

599. Thesis.—For M.A.Sc. degree.

For descriptions of other courses in Physics, see Faculty of Science.

THE SCHOOL OF ARCHITECTURE

ACADEMIC STAFF

HENRY ELDER, M.B.E., F.R.I.B.A., F.R.A.I.C., F.I.I.A.L., F.R.S.A., 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.

ABRAHAM ROGATNICK, B.A. Hons., M.Arch. (Harvard), M.R.A.I.C., Professor.

B. PAUL WISNICKI, Dipl. Eng. (Lwow, Poland), P.Eng., M.E.I.C., Professor of Structures.

ROBIN P. A. CLARKE, A.A. Dipl., M.Arch. (Harvard), A.R.I.B.A., M.R.A.I.C., Associate Professor.

RICHARD W. SEATON, B.A. (Columbia), Ph.D. (Chicago), Associate Professor.

ROBERT MCGILL FARRELL, B.Sc. Hons. (Strathclyde), Assistant Professor.

BRUNO B. FRESCHI, B.Arch. (Brit. Col.), 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), Assistant Professor.

ANDREW GRUFT, B.Arch. (Cape Town), M.R.A.I.C., Assistant Professor.

A. JOHN PRICE, B.Sc.Hons. (Liverpool), Ph.D. (Liverpool), Assistant Professor.

DINO P. RAPANOS, B.Arch. (Brit. Col.), M.Arch. (Brit. Col.), 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.

CATHERINE WISNICKI, B.Arch. (McGill), M.R.A.I.C., Assistant Professor.

WOODRUFF W. WOOD, B.Arch. (Oregon), M.R.A.I.C., Assistant Professor.

MARCUS WHIFFEN, B.A., M.A. (Cantab.), Visiting Professor.

MICHAEL ERNEST, B.Arch. (McGill), M.S. (Cornell), Part-time Lecturer.

HENRY G. J. HAWTHORN, B. Arch. (Yale), Part-time Lecturer.

GERHARD SIXTA, Dip.Ing.Arch. (Vienna), M.Arch. (Carnegie), M.R.A.I.C., Part-time Lecturer.

FRIEDRICH PETER, (Academy of Art, Berlin), Part-time Lecturer.

RONALD YUEN, B.Arch. (Brit. Col.), Part-time Lecturer.

ALLEN W. PARKER, B.Arch. (Minnesota), M.Arch. (Penn.), Part-time Instructor.

Lecturers from Other Departments

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.

Visiting Lecturers

B. BABICKI, S. FALISZEWSKI, FRED HOLLINGSWORTH, DAVID A. D. HICKMAN, DONALD HICKLEY, RANDLE IREDALE, ZOLTAN KISS, DONALD LEANEY, RONALD S. NAIRNE, FRANK STANZL, MICHAEL STEBBINGS, DONALD R. TOWERS.

THE SCHOOL OF ARCHITECTURE

Architecture is one of several professions concerned with man's environment: the architect is educated to understand and participate in the design of the built environment. As an academic discipline, architecture relates the humanities, sciences, technology and the creative arts. To create architecture 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. Thus the School selects students from a variety of disciplines upon which to build architectural understanding and competence. The education offered is at a graduate level; the degree awarded is a Bachelor of Architecture.

The School presents opportunities for (a) entrance into the profession of architecture; (b) the pursuit of specialized and related fields of applied knowledge; and, (c) the opportunity for continued education at a graduate level in architecture or an associated discipline.

The tasks undertaken by the architect today embrace areas not previously of professional concern. Thus, as part of his work of design, the architect now assists in the preparation of feasibility studies, programming for building, urban design, the development of building systems and the analysis of the building needs of the community. He is also called upon to predict the efficiency and performance of materials used in building, and he is expected to know the effect of his buildings upon people and social customs. These demands call into being new areas of research in which the physical, social and behavioural sciences and the humanities are involved. Thus, the School brings together in its faculty not only architects, but building scientists, engineers, a social psychologist and others offering courses in architecture and related disciplines.

The course is of three years duration. Students may be advised to interrupt their academic studies at the end of First or Second Year for a prescribed period in order to experience conditions in practice, or to take part in construction work, or to travel in countries outside Canada.

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 Faculty of Gradute Studies section of the calendar.

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, on the appropriate form, 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.

The Admissions Committee of the School is concerned that students entering the programme show promise in the field of architecture, and therefore all students must submit evidence of their interests and accomplishments (not necessarily shown on their transcripts) within the area of the physical sciences, social sciences, humanities, the arts and crafts, creative thinking and/or innovation. It is also desirable that entering students be skilled in visual forms of communication and therefore examples of recently executed sketches, drawings, etc., should be included as part of the application.

Prospective students are encouraged to establish contact with the School during their pre-Architecture years either formally by enrolment in courses available to them in the School or informally by participation in student sponsored 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.

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
2. 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) Schools 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.

BACHELOR'S DEGREE PROGRAMME

Instruction in the School is offered through three types of courses: the TUTORIAL COURSE, wherein the tutor and student work closely together exploring means and methods whereby knowledge and experience may become integrated in a creative manner so as to solve architectural problems; the LECTURE COURSE, in which understanding is developed and knowledge is

built during class situations devised and organized by the lecturer; and the WORKSHOP COURSE, given to incoming students for a period of about four weeks as a prelude to the programme of the School. Each Tutorial course and each Lecture course is designed to occupy one entire term.

The normal academic load to be carried in each term will be one TUTORIAL COURSE (4½ units) and three LECTURE COURSES (each 1½ units). At the completion of an academic year a student will have taken two Tutorial courses and six Lecture courses; a total of 18 units.

The TUTORIAL COURSE, in which the project method is traditionally used, is the foundation of architectual education. At the School the student spends a large proportion of his time upon architectural projects involving the principles of design and the communication of architectural ideas. The projects vary according to the needs of society, knowledge, evolving technology, and problem-solving techniques. In general the Tutorial is concerned with the human use of space and form, light, sound and climate control, as well as programming, production and construction. Considerable expert advice is sought from practising architects and visitors. In the final year the student may continue his work on design problems or upon specific studies of a theoretical or practical nature related to architecture. In each year the student may select his tutor from amongst members of the faculty, providing that at the completion of his studies he has worked with at least three different tutors, and illustrates competence within the area of his choice.

The LECTURE COURSE is supportive of the TUTORIAL. In the first year the student is to select Lecture courses from a prescribed list which represents the subject background of architecture for application in the Tutorial in the form of architectural design. In the second and third years the student will select Lecture courses from within the resource offerings in the School in accordance with advice given by faculty and the needs of the Tutorials to be undertaken, providing that during the period of study the field of architecture is adequately covered. Certain Lecture courses require prerequisites (indicated in the course outline) most of which are offered in the School. Where a student is deficient in a prerequisite offered outside the School, the deficiency will be made good upon the advice of the Lecturer.

Should a course offered outside the School be deemed appropriate to the content of a Tutorial, the student may upon the advice of the Counsellor and the approval of the Director take such a course for credit within the School programme.

Students will arrange their programme with counselling members of faculty. After three terms, or at a point mid-way in the student's programme, the work thus far undertaken will be reviewed, the standards of accomplishments assessed and the adequacy of the field of study undertaken approved. Following the review, advice will be given as to the direction to be followed for future study leading to graduation.

Whenever suitable arrangements can be made, selected second and third year students, accompanied by faculty, may undertake part of their academic programme abroad. Historical architecture will be studied first hand and current architectural problems explored in terms which bear comparison with those at home. No student is to spend more than one term abroad during the School program. A student participating in the Study of Architecture Abroad (Arch. 460), a course which will involve the serious study of local architectural problems as well as a series of lectures related to those normally offered in Vancouver, must register in the appropriate Tutorial course as well as in Arch. 460.

Bachelor's Degree Requirements

To qualify for the degree of Bachelor of Architecture, the student must have completed satisfactorily: one WORKSHOP COURSE (1 unit), six TUTORIAL COURSES (27 units), eighteen LECTURE COURSES (27 units), making a total of 55 units in all taken during the three-year course in architecture. The student may take additional courses in any year, but these will not allow the student to shorten the three-year School programme.

A minimum grade of 50% is required for a LECTURE or TUTORIAL COURSE to be judged complete. To pass his year a student must obtain an average grade of not less than 60%. If he obtains an average of more than 60% in the entire year's programme and has failed not more than two LECTURE COURSES (3 units) he will be allowed to write supplementals. No student will be permitted to proceed to the following year if he has failed a TUTORIAL COURSE, or if he has passed his TUTORIAL COURSES he cannot carry more than two LECTURE COURSES into the next year. Entry into the final year is conditional upon all previous work being completed. The School may direct such work as will be necessary to prepare for the supplemental examination or to pass the laboratory or studio work.

A student who does not meet the above requirements may be asked either to repeat the work of the year or to withdraw from the School for a period of at least a year in order to obtain practical experience in the field of architecture. At no time will a student be allowed to repeat a year more than once.

A student undertaking a partial programme of study must achieve at least 60% in each course he takes, otherwise he will be asked to withdraw from the School for at least one year.

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%.

See the General Information section for regulations governing:

(i) Examination results.
(ii) Review of assigned standing.
(iii) Supplemental examinations.
(iv) Transcript of Academic Record.
(v) Graduation.
(vi) Withdrawal.
(vii) Fees.

Practical Experience

In the summer months students are encouraged to gain practical experience in areas closely related to their interests in the School. Travelling is encouraged, or work in an architect's, engineer's, landscape architect's or planner's office. Alternatively, research is suggested at a university or with a public or private organization. Experience in the field of construction is also recommended. The School will advise the student whenever possible.

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. The School is recognized by the Commonwealth Board of Architectural Education. A graduate of the School of Architecture may become a member of the Royal Institute of British Architects if he so desires, providing he makes application to do so and passes the examination in Professional Practice set by the R.I.B.A.

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.

Students electing to undertake the course 'Study of Architecture Abroad' must be prepared to meet additional expense.

WORKSHOP COURSE (1 unit)

Arch. 406	Workshop	4 weeks before start of Fall Term

TUTORIAL COURSES (4½ units each)

			Fall Term	Spring Term
1	Arch. 400	Architectural Design	X	
	Arch. 401	Architectural Design		X
2	Arch. 420	Architectural Design	X	
	Arch. 421	Architectural Design		X
3	Arch. 440	Architectural Design and Experiment		X
	Arch. 441	Architectural Design and Experiment	X	
	Arch. 460	Study of Architecture Abroad	May be Offered Either Term	

LECTURE COURSES (1½ units each)

		Fall Term	Spring Term
Arch 305	Architecture and Urbanization	X	
Arch 402	Elements of Architecture (Offered both terms)	X	X
Arch 404	Architectural History	X	
Arch 405	Architectural History		X
Arch 407	Social Aspects of Arch. Space		X
Arch 408	Methodology for Social Evaluation of Architecture	X	
Arch 411	Application of Science to Arch.	X	
Arch 412	Building Materials	X	
Arch 413	Building Practice		X
Arch 416	Space, Form & Structure I		X
Arch 418	Systems Analysis in Architecture	X	
Arch 422	Experiments in Space		X
Arch 424	History of Urban Form	X	
Arch 425	History of Urban Planning		X
Arch 430	Acoustical Design in Building Science		X
Arch 431	Light, Colour and Space	X	
Arch 433	Directed Studies I	X	
Arch 434	Directed Studies II		X
Arch 436	Space, Form & Structure II	X	
Arch 442	Housing and Community	X	
Arch 444	Directed Studies III		X
Arch 445	Discipline of Environmental Design in Architecture I	X	
Arch 446	Discipline of Environmental Design in Architecture II		X
Arch 451	Architectural Practice	X	
Arch 455	Thermal Properties of Buildings		X
Arch 456	Structures: Special Topics		X
ME 437	Building Services (Mechanical)		X
EE 438	Illumination in Buildings	X	

COURSES IN ARCHITECTURE

305. (1½) Architecture and Urbanization.—The city as a three dimensional object and its sensible form, its architecture, as a record of a societal process. The physical reality of the city is observed in detail in terms of the structures, selection of sites, architectural styles, divisions of the city, growth patterns, and other data. The study area is Vancouver. Field trips, lectures, student papers, seminar discussions with visitors. Open to students outside the School of Architecture. C. C. Wisnicki

400. (4½) Architectural Design I.—Studies and exercises using the project method as a means of problem-solving in the area of the man-made environment. Stimulation of creative ability and the development of skills important to the architect. Architect Members of Faculty

401. (4½) Architectural Design I.—Description as for Arch. 400. Architect Members of Faculty

402. (1½) Elements of Architecture.—The investigation of movement, space and form as determinants in Architecture. J. Gaitanakis, W. W. Hood

404. (1½) Architectural History.—Origins of contemporary architectural thought. A survey of the theories, technologies and social changes which have influenced architecture and related fields of design since the 18th century. Lectures, seminars and student papers. Open to students outside the School. A. Rogatnick

405. (1½) Architectural History.—Origins of contemporary architectural thought. Critical analyses of the contribution of the 20th century masters of architecture, engineering, and industrial design. Lectures, seminars, and student papers. Open to students outside the School. A. Rogatnick

406. (1) Workshop.—Experiments and adventures in specially selected environmental situations. Usually carried out during an extended field trip in order to emphasize a mutual faculty and student 'living and learning' experience. Architects, artists, and others in related fields are invited to lead a series of discussions and to participate in various projects. Staff

407. (1½) Social Aspects of Architectural Space.—Spatial behaviour of man in social units (diads, families, memberships, teams, groups, collectives, crowds) in the industrialized states is reviewed for design implications. Lectures, graphics. Available to outside students. R. Seaton

408. (1½) Methodology for Social Evaluation of Architecture.—Simulation, scaling, sampling, defining units of analysis, interviewing, reliability, analysis, correlation and like issues are studied in terms of their application to architectural evaluation research. R. Seaton

411. (1½) Application of Science to Architecture.—An introductory course investigating the technological means available for making the built environment effective as a modifier of natural climate to satisfy the needs of human comfort and well being. Lectures, lab work and student presentations. J. Price

412. (1½) Building Materials.—Introduction to the structure and properties of materials. The technology of materials in terms of their characteristics, forms, production, and application in building components and systems. C. Tiers

413. (1½) Building Practice.—Methods and systems of modern construction with emphasis on materials and components forming the principal elements of a building. Architectural details and working drawings. Prerequisite: Arch. 412 or equivalent. C. Tiers

416. (1½) Space, Form and Structure I.—Functional space and related form as determinants of structural systems. Examination of force-fields, materials and their relations important in building structures. Skeleton systems and their elements. Steel and timber as principal materials. Prerequisite: Mathematics and mechanics at post secondary school level. B. P. Wisnicki

418. (1½) Systems Analysis in Architecture.—The investigation and application of systems analysis techniques in architectural design problems including decision theory, simulation, modelling, and mathematical programming. Lectures and problems. Prerequisite: Computer Science 251 or equivalent. M. Ernest

420. (4½) Architectural Design II.—Studies and exercises using the project method as a means of problem-solving in the area of the man-made environment. The stimulation of creative abilities and the further development of skills important to the architect. Architect Members of Faculty

421. (4½) Architectural Design II.—Description as for Arch. 420. Architect Members of Faculty

422. (1½) Experiments in Space.—An examination of man's theories about universal and architectural space as tools in the process of architectural design. Lectures and seminars, staff and visitors. H. Elder

424. (1½) History of Urban Form.—A body of information exists on the form of cities in ancient and modern times. This material is surveyed and organized on a comparative basis to make it usable in other fields of urban studies. Attention is focused on the origin, persistence, and transfer of urban forms. Open to students outside the School. C. C. Wisnicki

425. (1½) History of Urban Planning.—Studies in 20th century planning theories and applications, emphasizing North America and especially Canadian examples. Lectures, seminars, and student papers. Open to students outside the School (see also School of Community and Regional Planning listing). A. Rogatnick, B. Wiesman

430. (1½) Acoustical Design in Building Science.—An introduction to acoustics including basic theory, human response to sound and the use of modern instrumentation. Control of noise and vibration in buildings. Design of rooms for speech and music. The role of acoustics in urban planning. Prerequisite: Arch. 411 or equivalent. A. J. Price

431. (1½) Light, Colour and Space.—A quantitative examination of light and colour in spatial perception. The tools, techniques and quantities used in lighting design together with their application to specific problems. Lectures, labs and seminars. R. Farrell

433. (1½) Directed Studies I.—Lecture courses within which students with particular interests and abilities may pursue in depth a subject(s) related to architecture with a member of faculty competent and willing to organize and direct such a course. Permission to enrol must be secured from the Director and the faculty member concerned, and an outline of the proposed area of study must accompany the request for a Directed Studies course.

434. (1½) Directed Studies II.—Description as for Arch. 433.

436. (1½) Space, Form and Structure II.—Surface systems and their elements; slab, wall, folded plate and shell. Effects of continuity. Reinforced and prestressed concrete as principal materials. Outline of soils and foundations. Prerequisite: Arch. 416 or equivalent. B. P. 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.) Prerequisite: Arch. 411. S. Slinn

E.E. 438 (1½) Illumination in Buildings.—Principles of electrical services and illumination in buildings. For students in Architecture only. Prerequisite: Arch. 411. J. Douglas

440. (4½) Architectural Design and Experiment III.—Studies and exercises of a nature related to problems in man's made environment. Such studies and exercises aim at understanding the environment, of human responses to it and the means the architect may use for defining and solving his problems.
Staff

441. (4½) Architectural Design and Experiment III.—Studies and exercises of a similar nature to those undertaken in Arch. 440. In certain cases, students will be encouraged to continue previous studies as a graduation project in order that the body of knowledge concerned with architecture may be added to in a form for permanent record in the Library of the University.
Staff and Committees

442. (1½) Housing and Community.—Investigations into the inter-relationships between housing and urban form; examination of the relevant theories and their consequences in terms of architecture. D. Rapanos

444. (1½) Directed Studies III.—Description as for Arch. 433.

445. (1½) Discipline of Environmental Design in Architecture I.—An examination of current thought in fields relevant to the formulation of a discipline of environmental design in architecture, to understand and deal effectively with complex environmental processes. Lectures, seminars, discussions, guests and a search of current literature. A. Gruft

446. (1½) Discipline of Environmental Design in Architecture II.—An examination and assessment of current research and design concepts and methods in the environmental and architectural design fields using information from Arch. 445 to enable the student to develop a point of view on which to base his work. Presentations, seminars, discussions. Prerequisite: Arch. 445.
A. Gruft

451. (1½) Architectural Practice.—The nature and scope of professional competence and responsibilities in architectural practice. Seminar discussions concerning the interaction of architect, client, contractor, allied professions and regulatory authorities. The role of the law in the practice of architecture. Office organization and management. Seminars with visiting professionals, student papers and presentations. Prerequisite: Completion of at least one year in the School. C. Tiers

455. (1½) Thermal Properties of Buildings.—An examination of those factors necessary for thermal comfort. Modes of heat transfer, physiology of heat regulation. Thermal properties of building materials, effects of windows, orientation and form on indoor climate. Calculation of heat losses and cooling loads. The techniques available to assist in the evolution of suitable building forms and the selection of materials. Lectures, labs and seminars. R. Farrell

456. (1½) Structures: Special Topics.—Discussion of current trends, developments and methods in structures of buildings. Special types such as suspended and pneumatic systems, space frames, etc. and special methods, e.g. use of models in structural design, will be dealt with. Detailed programme to vary from year to year. Prerequisite: Arch. 416 or equivalent. B. P. Wisnicki

460. (4½) Study of Architecture Abroad.—A pre-arranged course concerned with a particular city or locality in which a unique quality of architecture and specific architectural problems are to be found. The course will cover fields of study, the contents of which would in ordinary circumstances be advanced by the faculty had they remained in Vancouver. The course will consist of lectures, seminars and field trips; the problems to be undertaken will be project-oriented and related to the locale. Students electing to participate in the course must be prepared to meet additional expense. This course will be arranged according to academic need within the School and current opportunities for travel.

THE DEGREE OF MASTER OF ARCHITECTURE

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 twelve full months. In practice however students spend one academic year on course work and in the preparation of their research project, and a further academic year on the completion of the research project. All research will be under the direction of a professor who is a member of the faculty of the School of Architecture.

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.

6. INDUSTRIALIZATION OF THE BUILDING PROCESS
   Mr. R. Clarke
   Systems building—the comprehensive approach to large-scale community and institutional problems. Design management—systems research and benefits—the potential for new design solutions and innovations. Roles of the professional designer.

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. It is expected that students who are returning to complete their research project will again participate in this 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, Mr. Freschi 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, Mr. Freschi
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. 547 (1-3) Directed Studies.

In special cases, and with the approval of the Director of the School of Architecture a student may undertake special individual studies. The student will work with an appointed tutor from the School of Architecture.

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)

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 should be consulted by all students who wish to obtain information or to submit applications. It should be noted that most awards do not require the submission of an application. Applications for bursaries must be submitted by July 15 to the Dean of Inter-Faculty and Student Affairs, on forms obtainable from his office.

Architectural Institute of British Columbia Greater Vancouver Chapter Medal.

The Architectural Institute of British Columbia Scholarship.

The Architectural Institute of British Columbia Prizes.

Bapco Scholarships in Architecture.

The Canadian Pittsburgh Industries Scholarship.

The Ernest Wilby Memorial Scholarship.

George S. Willans Memorial Scholarship and Trophy.

The McCarter, Nairne & Partners Scholarship.

Pan-Abode Scholarship in Architecture.

The Central Mortgage and Housing Corporation Travelling Scholarships in Architecture.

The Royal Architectural Institute of Canada Medal.

The Charles J. Thompson Student Aid Fund in Architecture.

THE SCHOOL OF NURSING

ACADEMIC STAFF

MURIEL UPRICHARD, B.A. (Queen's), M.A. (Smith), Ph.D. (London), Professor and Director of the School.

ELIZABETH K. MCCANN, B.A., B.A.Sc. (Brit. Col.), M.S.N. (Wayne Reserve), R.N., Professor.

ALICE J. BAUMGART, B.S.N. (Brit. Col.), M.Sc. (Applied) (McGill), R.N., Associate Professor and Milbank Associate Faculty Fellow.

MARGARET A. CAMPBELL, B.A., B.A.Sc. (Brit. Col.), M.S. (Western Reserve), Ed.D. (Columbia), R.N., Associate Professor.

PAULINE M. A. CAPELLE, B.A., B.A.Sc. (Brit. Col.), M.A. (Chicago), R.N., Associate Professor.

H. ELIZABETH CAWSTON, B.S.N. (Brit. Col.), M.N. (Washington), R.N., Associate Professor.

HELEN GEMEROY, B.A. (Sir George Williams), M.A. (Columbia), R.N., Associate Professor and Assistant Director of Nursing, Health Sciences Centre Hospital, Psychiatric Unit.

FLORIS E. KING, B.Sc.N. (Toronto), M.P.H. (Michigan), Ph.D. (North Carolina), R.N., Associate Professor.

MARGARET SARAH M. NEYLAN, B.N. (McGill), M.A. (Brit. Col.), R.N., Associate Professor and Director of Continuing Education in Nursing.

MARGARET M. STREET, B.A. (Manitoba), M.S. (Boston), R.N., Associate Professor and Assistant to the Director.

MARY J. CRUISE, B.S. (Fresno), M.N. (Calif., L.A.), R.N., Assistant Professor.

MAUDE L. DOLPHIN, B.N. (McGill), M.N. (Washington), R.N., Assistant Professor.

HELEN ELFERT, B.N. (McGill), M.A. (New York), R.N., Assistant Professor.

MARGARET ROSE FRANCIS, B.S. (Nursing) (Delhi), M.S. (Catholic University, Washington, D.C.), Ed.D. (Maryland), R.N., Assistant Professor.

JESSIE HIBBERT, M.A. (San Francisco State), M.S. (Calif., L.A.), R.N., Assistant Professor.

SYLVIA HOLMES, B.Sc.N. (Alta.), (M.Sc.(A.) (McGill), R.N., Assistant Professor.

M. JUNE HORROCKS, B.S.N. (Brit. Col.), M.S. (Calif., S.F.), Dipl. in Community Mental Health (Calif.), R.N., Assistant Professor.

ELIZABETH ANN LA SOR, B.S. (Calif. State, L.A.), M.N. (Calif., L.A.), R.N., Assistant Professor.

BARBARA J. LEE, B.S.N. (Colorado), M.N. (Calif., L.A.), R.N., Assistant Professor.

ROSE T. MURAKAMI, B.S.N. (Brit. Col.), M.Sc. (A) (McGill), R.N., Assistant Professor.

SHARON L. OGDEN, B.S. (Loma Linda), M.N. (Washington), R.N., Assistant Professor.

HELEN M. OLSEN, B.S.N. (Brit. Col.), M.N. (Washington), R.N., Assistant Professor.

HELEN L. SHORE, B.S.N., M.A. (Brit. Col.), R.N., Assistant Professor.

KIRSTEN WEBER, B.N. (McGill), M.S. (Calif., S.F.), R.N., Assistant Professor.

GISELLE BÉRUBÉ, B.S.N. (Loyola), M.S. (Catholic University, Washington, D.C.), R.N., Instructor.

JEANNE M. L. HURD, B.A. (Ohio Weslyan), M.A. (Columbia), M.N. (Yale), R.N., Instructor.

ETHEL M. SMITH, B.S.N. (Brit. Col.), M.S.N. (Brit. Col.), R.N., Instructor.

RUTH ELLIOTT, B.Sc. (Alta.), M.S. (Calif., S.F.), R.N., Lecturer.

JANET N. GORMICK, B.S. (Syracuse), M.N. (Calif., L.A.), R.N., Lecturer.

LUCINDA HUMPHRY, B.S.N. (Mount St. Mary's, Calif.), M.N. (Calif., L.A.), R.N., Lecturer.

E. SUE ROTHWELL, B.S. (Cornell), M.S. (Calif., S.F.), R.N., Visiting Instructor and Consultant in Continuing Nursing Education.

Part Time Lecturers

BETTY JOHNSON, B.S. (Calif.), M.S. (Calif., L.A.), R.N.

R. JO-ANN WOOD, B.S.N. (Brit. Col.), R.N.

Associates in the Health Sciences:

Department of Health Care & Epidemiology—Jessie MacCarthy, B.A.Sc. (Brit. Col.), M.P.H. (Berkeley), R.N., Assistant Professor; Joan Morison, B.A.Sc. (Brit. Col.), M.A. (Columbia), R.N., Assistant Professor; Elinor Joensen, B.S.N. (Brit. Col.), R.N., Research and Clinical Instructor, Mrs. Patricia Ohashi, B.S.N. (Brit. Col.), R.N., Research and Clinical Instructor.

Health Sciences Centre Hospital, Department of Psychiatry—
Mrs. Aileen Bland, B.N. (McGill), R.N., Head Nurse
Mrs. Kathleen Clark, B.S.N. (Toronto), R.N., Nurse Clinician
Mrs. Beverlee Cox, B.S., M.S. (Hawaii), R.N., Nurse Clinician.
Mrs. Mary Jane Duke, B.Sc.(N) (McGill), R.N., Head Nurse
Miss Shiron Erickson, B.N. (McGill), R.N., Nurse Clinician
Miss Joy Page, B.S.N. (Brit. Col.), R.N., Head Nurse

Health Sciences Centre, Division of Continuing Education in the Health Sciences, Continuing Nursing Education—Clinical Instructors: Mrs. Levona Bell, B.S.N. (Brit. Col.), R.N., Mrs. Edna Borden, B.S.N. (Brit. Col.), R.N., Mrs. Rita Carle, B.S.N. (Brit. Col.), R.N., Mrs. Elizabeth Darragh, B.S.N., (Brit. Col.), R.N., Mrs. Audrey Dumaresq, B.S.N. (Brit. Col.), R.N., Mrs. Rosemarie Fournier, B.S.N. (Brit. Col.), R.N., Mrs. Irene Harvey, Dip.P.H.N. (Brit. Col.), R,N., Mrs. Hedie Hintz, B.S.N. Brit. Col.), R.N., Mrs. Carol Jones, B.S.N. (Brit. Col.), R.N., Mrs. Janelyn Kotaska, B.S.N. (Brit. Col.), R.N., Mrs. Marion Lawder, B.S.N. (Brit. Col.), R.N., Mrs. Olga Rawlinson, B.S.N. (Brit. Col.), R.N., Mrs. Jan Scott, B.S.N. (Brit. Col.), R.N., Mrs. Maureen Wheatley, B.S.N. (Brit. Col.), 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); William J. D. Arnold, B.A., M.D. (Brit. Col.); P. G. Ashmore, M.D. (Toronto), F.R.C.S.(C); Kenneth I. G. Benson, M.B., Ch.B. (Edinburgh), D.P.H. (Toronto), C.R.C.P.(C); John A. Birkbeck, M.B., Ch.B. (Edinburgh); Charlotte David, B.A. (Texas), M.A. (Columbia), Ph.D. (Portland); Indrajit D. Desai, M.Sc. (Gujarat Univ., India), Ph.D. (Calif.); Lloyd F. Detwiller, M.A. (Brit. Col.), M.H.A. (Minnesota); George R. F. Elliot, M.D., C.M. (Queen's), D.P.H. (Toronto), C.R.C.P. (C); George R. Gayman, B.A., M.D. (Toronto); John Gilbert, M.S., Ph.D. (Purdue); Monica Green, B.A., B.A.Sc. (Brit. Col.), M.P.H. (Michigan), R.N.; John C. Griffiths, B.Sc., M.B., Ch.B. (Wales); John E. Halliday, B.S.P. (Sask.), M.S. (Purdue), Ph.D. (Wash.); Archibald F. Hardyment, M.D. (Alta.); Miss W. Jane Hudson, B.P.T. (Manitoba); Miss Margaret J. G. Hunter, Dip.Physiotherapy, Dip. Teaching Physiotherapy (England); Dr. Edward J. Hyde, B.Sc. (Sir George Williams), D.D.S. (McGill), M.S.D. (Indiana); Miss Carolyn Ireton, B.H.E. (Brit. Col.), M.S. (Penn. State); M. R. Kliman, B.A. (Sask.), M.D. (Toronto), F.R.C.S. (England), F.R.C.S. (C), F.A.C.S.; C.J.G. MacKenzie, M.D., C.M. (Queen's), D.P.H. (Toronto); J. Robert MacLean, M.D. (Toronto); Peter McLean, M.A. (Windsor), Ph.D. (London); W.A. McLeod, M.D., F.R.C.P.(C); Anthony M. Marcus, M.A. (Cantab.), L.M.S.S.A. (London), D.Psych. (McGill); J. Glen Moir, B.S.P. (Brit. Col.), M.S. (Michigan); Andrew B. Murray, B.Ss., M.B. (Cape Town), M.R.C.P. (Edinburgh), D.C.H. (London); Hamish Nichol, M.A., M.B., B.Chir. (Cantab.), M.R.C.S. (England), L.R.C.P. (London), D.P.M. (Conjoint); Louis J. Posener, B.Sc. (Cantab.), M.B., B.S. (London), M.C.R.S. (England); H. S. Robinson, B.Sc., M.D., C.M. (McGill); A. M. Runikis, B.Sc. (Pharm.) (Brit. Col.); H. Clyde Slade, M.D., C.M. (Dalhousie), F.R.C.P. (C); Jean Strachan, B.S.R. (Brit. Col.); George Szasz, M.D. (Brit. Col.); John W. Whitelaw, B.A. (Brit. Col.), M.D., C.M. (McGill); Ann J. Worth, M.D. (Brit. Col.).

Clinical and Field Staff in Associated Hospitals and Agencies

Clinical Instructors:

Miss H. Allert, Miss L. M. Anderson, Dr. L. Andrews, Mrs. D. Appleton, Mrs. P. Armstrong, Mrs. R. Arnaud, Miss A. Beattie, Miss E. Beck, Mrs. L. Birkenhead, Mrs. J. Blair, Mrs. M. Blusson, Miss M. Bonner, Mrs. A. Boxer, Miss E. Bradshaw, Miss A. Buchanan, Mrs. A. Campbell, Miss E. Campbell, Miss M. Carmack, Mrs. K. Casselman, Miss C. Charter, Mrs. C. Clarke, Miss L. A. Cook, Mrs. W. Conover, Miss J. Cornish, Miss J. Cosford, Miss L. Crane, Mrs. A. Creighton, Miss M. Cross, Miss D. Curle, Mrs. O. Cutler, Miss J. David, Miss W. Davies, Miss D. Davey, Miss J. Dawes, Mrs. M. Dillon, Miss B. Douglas, Miss T. Duck, Mrs. S. Ellis, Miss J. Fernie, Mr. R. Flatman, Mrs. M. Foster, Miss L. Francis, Mrs. L. Fraser, Miss L. Friesen, Mrs. P. Galloway, Miss H. Garry, Mrs. K. Griffith, Mrs. E. Gowan, Mrs. U. Hammell, Miss L. Hamilton, Miss F. Hayward, Miss M. Hicks,

Miss J. Hill, Miss M. Hoar, Miss G. Holland, Mrs. R. Hoodless, Mrs. A. Hope, Miss M. Houghton, Miss L. Hromek, Miss E. Ingram, Miss A. Jenkins, Mrs. D. Jones, Mrs. W. Justice, Mrs. J. Keays, Miss A. Kelly, Mrs. A. Kerr, Mrs. L. Khairat, Miss M. King, Miss L. Knighton, Miss K. Koop, Miss J. M. Labowdette, Mrs. E. Lafek, Mrs. F. Lee, Miss N. Lee, Miss D. Leslie, Mrs. C. Lim, Mrs. D. Logan, Miss M. Lonergan, Mrs. M. Macklem, Mrs. M. Madu, Mrs. K. Marshall, Miss Mona Martin, Mrs. M. Martin, Miss I. Matheson, Miss C. Maund, Mrs. B. Miller, Miss B. Moll, Mrs. A. Murray, Miss E. Mussell, Mrs. J. McAllister, Miss M. McAuley, Miss R. MacCallum, Miss A. McColl, Mrs. V. MacDonald, Mrs. R.E. McIlrath, Miss J. McIntyre, Miss F. McKay, Miss R. MacKenzie, Mrs. I. Mackey, Mrs. L. Maclean, Mrs. J. MacVay, Mrs. G. Neilsen, Miss A. Neeland, Mrs. P. Nordman, Brigadier E. Owen, Miss S. Petrie, Miss P. Pinnell, Miss L. Randall, Mrs. P. Reber, Miss D. Reed, Mrs. W. N. Reed, Miss L. Rempel, Mrs. N. Richards, Miss M. Richmond, Mrs. L. Richter, Miss M. Riediger, Mrs. C. Rudko, Mrs. Jean Russell, Miss Joan Russell, Mr. J. Sanders, Miss M. Sangster, Mrs. R. Sarles, Mrs. J. Shea, Miss M. Shugg, Miss P. Siddons, Miss T. Siefert, Sister Mary Clare, Sister E. Hurley, Sister P. Kelly, Mrs. D. Slaughter, Miss B. Smith, Miss D. Smith, Miss H. Smith, Mrs. E. Smook, Miss A. Staley, Miss M. Standerwick, Miss A. Stark, Mrs. N. Stevens, Captain I. Stickland, Miss J. Sutcliffe, Miss M. Thiessen, Miss E. Thomas, Miss P. Towler, Mrs. W. Trousdell, Miss F. Trout, Mrs. P. Veregin, Miss D. Vosburgh, Mrs. M. Walmsley, Mrs. M. Warden, Miss A. Webster, Mrs. L. Wegleitner, Mrs. L. Whitmarsh, Mrs. M. Whitney, Miss H. Whittington, Miss A. Williams, Mrs. H. Williams, Mrs. L. Wingelman, Mrs. J. Winter, Mrs. L. Wittke, Mrs. J. Wright.

Council of the School of Nursing:

In addition to members of the teaching staff of the School, the Council has the following membership: President Gage, Deputy President Armstrong, Dean W. D. Finn (Applied Science), Dean McCreary (Medicine), Dean McCrea (Dean of Women), Dean Leung (Dentistry), Dean Riedel (Pharmaceutical Sciences), Dr. M. Lee (Home Economics), Assistant Dean C. C. Gourlay (Commerce and Business Administration), Dr. C. J. G. Mackenzie (Medicine), Dr. C. Brockley (Applied Science), Dr. C. W. Miller (Arts), Dr. A. Rosenthal (Science), Dr. J. J. Stock (Science), M. Tadych (Social Work).

SCHOOL OF NURSING

Philosophy

As an integral part of the University of British Columbia, the School of Nursing believes that it should promote the goals of a university, namely: to preserve and extend knowledge; to develop the individual; and to serve the needs of society.

The School of Nursing shares with other health disciplines the goals of optimal health for individuals, families and communities. It believes that within this larger goal, nursing makes its contribution to society through promotion of health, prevention of illness, and through protection, conservation and support of those who are ill. It also believes that nursing must competently assume its responsibilities on the health team.

The following programmes 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.

II. **For graduate nurses, programme leading to:**
The Bachelor of Science in Nursing, Nursing D.
A Diploma in Community Health Nursing, Nursing B.

III. Part-time study for graduate nurses.

IV. Summer Session.

V. For baccalaureate nurses—a programme leading to the degree of Master of Science in Nursing.

VI. Continuing Nursing Education.

FACILITIES FOR CLINICAL EXPERIENCE

In addition to University facilities, the facilities of the following organizations were utilized to provide students with opportunities for observation and supervised experience:

Amherst Private Hospital.
B.C. Cancer Institute.
B.C. Department of Health Services and Hospital Insurance
Health Branch:
Division of Public Health Nursing.
Division of Tuberculosis Control.
Division of Venereal Disease Control.
Mental Health Services Branch:
Community Mental Health Centres.
Riverview Hospital, Essondale.
The Woodlands School, New Westminster.
Canadian Arthritis and Rheumatism Society, Vancouver.
Carlsbad Private Hospital.
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.
Louis Brier Home and Hospital.
Metropolitan Health Services of Greater Vancouver.
Mount St. Joseph Hospital.
Normandy Private Hospital.
Pearson Hospital, Vancouver.
REACH, 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.
Shaughnessy Hospital, Vancouver.
Sunny Hill Hospital for Children, Vancouver.
Vancouver General Hospital.
Vancouver Neurological Centre, Vancouver.
Victorian Order of Nurses Branches:
Burnaby, North Shore, Surrey, Vancouver-Richmond, Victoria.

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, June 30; Nursing D, March 15 if attendance at Summer Session is intended, otherwise June 30; Nursing B, May 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 General Information section of the calendar, and the specific requirements for each of the Nursing programmes offered.

See the General Information section for regulations governing the following:
Registration
Attendance
Graduation
Withdrawal
Fees
Examination Results
Review of Assigned Standing
Supplemental Examinations
Transcript of Academic Record

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 the Community Health Nursing diploma programme, the fieldwork course is from 6-8 weeks in length and occurs during 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.

Costs Other Than Sessional Fee

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.

Examinations and Advancement

1. 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 section of the calendar.

2. 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.

3. A student in any year taking a full programme of studies who does not pass in at least sixty per cent of it will be required to withdraw from the University for at least a year. A student taking a partial programme of studies who does not pass all of it will be required to withdraw.

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.

BACHELOR OF SCIENCE IN NURSING

Programmes Nursing A—a basic course

Nursing D—a course for registered nurses

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.). 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 nursing 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.

The colour of the hood for the B.S.N. degree is scarlet with twisted cord of university blue and white.

Nursing A and Nursing D

Through clinical, academic, and fieldwork courses a student who completes the baccalaureate programme should:

(i) be able to synthesize knowledge in the humanities, and the natural and behavioural sciences for use in nursing,

(ii) have an understanding of research methods and their application to the development of a definitive body of knowledge in nursing,

(iii) be able to systematically collect relevant data, identify existing or potential nursing problems, select and develop appropriate nursing measures and evaluate nursing care,

(iv) have a continuing awareness of self in order to maintain effective communications as an individual and as a member of a health team,

(v) demonstrate leadership ability in the provision of health care in a variety of settings,

(vi) assume responsibility for furthering her professional knowledge and skills in accordance with her individual interests and potentialities,

(vii) accept responsibility for self-directed activity as a contributing member of her profession and of the society.

Nursing A

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:

English 100

Chemistry 103 or 110 or 120.

Mathematics 130.

Biology 101 or 102 (or the equivalent).

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 section of the calendar.

(b.) Good health.

(c.) Personal suitability.

Application for admission, on forms obtained from the School of Nursing, should be submitted not later than June 30. 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 first year of college, preferably before Easter.

The Programme

The programme is four academic years in length. In three of the years there is a required fieldwork course of four weeks duration following completion of Sessional Examinations.

First Year

Chemistry 230	3 units
Microbiology 201	3 units
Zoology 303	3 units
Nursing 150 Human Behaviour	3 units
Nursing 156 Introduction to Nursing	3 units
Nursing 158 Nursing Laboratory	1 unit
Nursing 189 Fieldwork	
Pathology 375	1 unit

Second Year

*Social Science course	3 units
**English 200 or an alternate course approved by the Director	3 units
Nursing 267 Introduction to the Nursing Profession	1 unit
Nursing 280 Nursing of Adults	8 units
Nursing 281 Introduction to Statistics and Research Method	1 unit
Pathology 375 (for 1972-73 only)	1 unit

Third Year

Nursing 382 Maternal and Newborn Infant Nursing	5 units
Nursing 384 Pediatric Nursing	5 units
Nursing 386 Psychiatric Nursing	5 units
Interdepartmental 400—Preclinical Sessions	3 units

Fourth Year

*Social Science courses	6 units

*Social Science courses to be selected in consultation with Faculty Advisor.

**Preferably at the 200-level or above.

Health Care and Epidemiology 426 ..... 3 units
Nursing 458 Teaching ..... 2 units
Nursing 460 Administration ..... 3 units
Nursing 463 Community Health Nursing ..... 4 units
Nursing 467 The Nursing Profession ..... 1 unit
Nursing 489 Fieldwork

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 section of the calendar. With the exception of 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 Year students is made available by one of the hospitals that provides 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 in which adequate instruction and experience in the major clinical services and an orientation to the public health nursing were included; registration in the province or country from which the applicant comes; work experience or attendance at an appropriate refresher course in nursing within the past five years to ensure knowledge and skills are current.

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.

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:

i. 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;

iii. appropriate post-basic nursing courses completed at this or another university.

The Programme

Total requirements listed below represent three years of study beyond the level of University entrance. Programmes for Nursing D students may need to be planned on an individual basis and applicants are advised to make an appointment for this purpose.

First Year

English 100 ..... 3 units
Mathematics 130 (100 and 121) ..... 3 units
Chemistry 103 (110 or 120) ..... 3 units
Zoology 303 ..... 3 units
Nursing 253 Behaviour in Illness and Health ..... 3 units
Nursing 281 Introduction to Statistics & Research ..... 1 unit

Second Year

*Social Science ..... 3 units
English 200 or an alternate course approved by Advisor ..... 3 units
**Microbiology 201 (or 200) ..... 3 units
Chemistry 230 ..... 3 units
Nursing 357 Perspectives in Nursing ..... 3 units

Third Year

*Social Science ..... 3 units
*Social Science ..... 3 units
Health Care & Epidemiology 426 ..... 3 units
Nursing 458 Teaching ..... 2 units
Nursing 460 Administration ..... 3 units
Nursing 463 Community Health Nursing ..... 4 units
Nursing 467 The Nursing Profession ..... 1 unit
Nursing 489 Fieldwork.

DIPLOMA PROGRAMME

Programme: Nursing B for Registered Nurses

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 community health nursing practice.

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.

The Programme

*Social Science courses ..... 3 units
Agricultural Economics 401 ..... 1½ units
Nursing 220 Core Concepts of Nursing ..... 3 units
Nursing 467 The Nursing Profession ..... 1 unit
Nursing 253 Behavioural Patterns in Illness and Health ..... 3 units
Nursing 343 Community Health Nursing ..... 4 units
Health Care and Epidemiology 426 ..... 3 units
Nursing 346 Fieldwork

Upon satisfactory completion of the above requirements, students receive a Diploma in Community Health 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 the Diploma programme—Nursing B 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 University of British Columbia and the Nursing D programme;

(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.

Under the current policy of the University of British Columbia and this School of Nursing, Registered Nurses enrolled in the Nursing D programme, in order to qualify for the Baccalaureate degree, must have two full years of

*To be selected in consultation with Faculty Advisor.

**Except with special permission of the Faculty, Chemistry 230 must precede or be taken concurrently with Microbiology 201.

study (30 units of work) at the University of British Columbia. This does not preclude some of the courses being taken on a part-time basis, but at least one academic year (preferably the final year) is to be spent in full-time study at the University.

Nurses considering part-time study should arrange for a personal interview.

CONTINUING NURSING EDUCATION

Within the Division of Continuing Education in the Health Sciences, the Continuing Nursing Education Division has five objectives.

1. To provide non-credit offerings to nurses graduated from basic nursing programmes of two or more years in length and presently employed or wishing to be employed in the province of British Columbia;
2. to collaborate with other health professions in the development of inter-professional non-credit courses;
3. to provide consultative services to other agencies or associations offering continuing nursing education;
4. to provide co-ordination for the educational offerings to practicing nurses in British Columbia;
5. to provide leadership in the development of the discipline of continuing education in nursing.

The calendar of the Division of Continuing Education in the Health Sciences which provides information on the non-credit course offerings in the Faculties of Dentistry, Medicine, Phamaceutical Sciences, and the School of Nursing is distributed in September to dentists, health care agencies, physicians, pharmacies, and professional associations. Announcements for nursing courses are distributed to health care agencies, and to chapters and districts of the Registered Nurses' Association of British Columbia six weeks prior to each course. An additional copy of the calendar and course announcement for each twenty-five beds is distributed to hospitals for posting in nursing units. Inquiries may be directed to:

Continuing Education in the Health Sciences,
University of British Columbia,
Task Force Building,
Vancouver 8, B.C.
(Telephone: 228-2626)

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]
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]

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]

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.—Practice to develop basic nursing skills.

253. (3) Behavioural Patterns in Illness and Health.—The study of human development, behaviour and communication as they affect the interaction of nurses with individuals and their families in the pursuit of optimal health; focus is on the application of these behavioural science concepts to patient care in a hospital or community setting. [3-2; 3-2]

267. (1) Introduction to the Nursing Profession.—The evolution of nursing including an introduction to the history of the health sciences, a study of the status of nursing in Canada, 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]

357. (3) Perspectives in Nursing.—A study of nursing within the context of the health-illness continuum and of the factors that determine its nature. Experience is provided in general hospitals and other community agencies. Prerequisite: Nursing 253. [3-2; 3-2]

366. (3) Clinical Nursing.—A supplementary course for students with credit for Nursing 252, Human Behaviour; and Nursing 356, Perspectives in Nursing to provide learning experiences now offered in Nursing 253 and Nursing 357.

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.

458. (2) Teaching.—Principles and planning related to the teaching of patients, nursing personnel, and nursing students. [2-0; 2-0]

460. (3) Administration.—Fundamentals of administration and their application in nursing services. [3-0; 3-0]

463. (4) Community Health Nursing.—The components and process of community health nursing applied to the health supervision of individuals, families, and other community groups. Guided concurrent practice is provided in agencies offering generalized community health nursing programmes.

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

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]

343. (4) Community Health Nursing.—The fundamentals and process of public health nursing applied to individual, family, and community health situations. [4-0; 4-0]

346. Fieldwork.—Planned observation and guided participation in public health nursing.

Courses Required in Nursing Curricula and Offered by Other Faculties:
Courses are listed by the Faculties offering them.

Arts—
- English 100, 200 (or alternate)* ..... 6 units
- Social Sciences ..... 9 units
  Anthropology, Sociology or Psychology

Medicine—
- Pathology 375 ..... 1 unit
- Interdepartmental 400—Preclinical Sessions ..... 3 units
- Health Care and Epidemiology 426 ..... 3 units

Science—
- Biology 101 or 102 (see Faculty of Science section of calendar) ..... 3 units
- Chemistry 103, or 110, or 120, and 230 ..... 6 units
- Microbiology 200 or 201 ..... 3 units
- Zoology 303 ..... 3 units

Agricultural Sciences—
- Agricultural Economics 401 ..... 1½ units

MASTER OF SCIENCE IN NURSING DEGREE

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.

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.

*To be selected in consultation with Faculty Advisor.

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 Faculty of Graduate Studies section of the calendar, under the heading, NURSING—M.S.N. degree.

b) *Specific Requirements related to the Master of Science in Nursing Programme:—*
An applicant for admission to the Master of Science in Nursing Programme 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;**

iii. psychiatric nursing and public health nursing experience are desirable for students electing Nursing 532 and Nursing 533;

iv. an introductory course in statistics.

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) A preliminary application form on academic assessment and an application form for admission to the School of Nursing should be submitted to the Director on or before March 1.

b) Following the receipt of the above forms, the applicant will receive an Application for Admission to the Faculty of Graduate Studies which will be submitted to the Division of Graduate Studies, Registrar's Office, on or before June 1.

c) 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.

d) Personal interviews:—Unless impossible due to distance from the University, a personal interview is expected.

e) A report of an x-ray examination of the chest is required, the x-ray to have been taken within six months of the time of commencement of the University Session.

f) Immunizations:—Smallpox vaccination within the year preceding admission is required for all students entering the University. The School of Nursing also requires that the Master's 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 vaccinated with B.C.G.

g) 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.)

All parts of the admission procedure must be completed before applications are reviewed.

4. **Registration and Programme Requirements**—refer to the General Information section of the calendar.

5. **Examinations and Supplementals**—refer to the General Information section of the calendar.

First Year

N. 520 Core Concepts of Nursing	3 units
N. 521 Methods and Techniques of Research	4 units
Clinical Focus—one of	
N. 530 Nursing in Long-Term Illness	4 units
N. 532 Psychiatric and Mental Health Nursing	4 units
Supportive courses, numbered 300 or above, selected from the offerings of other faculties	6 units
	17 units

Second Year

N. 599 Thesis	3 units
Functional Focus—one of	
N. 560 Nursing Education	4 units
N. 570 Administration and Supervision in Nursing Service	4 units
Two supportive courses, numbered 300 or above, selected from Nursing or other faculties OR	6 units
N. 533 Community Mental Health Nursing	3 units
plus one supportive course, numbered 300 or above	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. Prerequisite: Nursing 281 or equivalent.

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. 532. (4) Psychiatric and Mental Health 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. 533. (3) Community Mental Health Nursing.—Study of the evolution of concepts of Community Mental Health and of the present and future roles of the nurse working in this setting. Seminar and guided practice. Prerequisite: Nursing 532 or equivalent.

N. 560. (4) Nursing Education.—Historical and philosophical foundations of nursing education; 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.

For full information on awards, scholarships, bursaries and financial assistance available to all university students, and for directions regarding applications, eligibility and deadlines for such aid, see "Awards and Financial Assistance" section of the calendar. The items listed on the following pages are available only to nursing students registered in or accepted for the School of Nursing.

AWARDS—to B.S.N. Graduating Class

The Helen L. Balfour Prize.
The Edith M. Rainbow Prize.

SCHOLARSHIPS AND BURSARIES—for Final Year Undergraduates

The Hamber Scholarship in Nursing.
The Mary Graham Holland Scholarship in Nursing.
The Nettie Neudorf Memorial Scholarship in Nursing.
The Provincial Health Branch Scholarship.
The Vancouver Women's Canadian Club Scholarship in School of Nursing.

BURSARIES

The Anna E. Sprott Memorial Bursary in Nursing.

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*Students in the baccalaureate programmes who prefer an alternate to English 200 may select instead another Second Year level Arts Course. For example, Economics 200; Political Science 200; Religious Studies 200; and Second Year course in a foreign language or in History, to be chosen in consultation with Faculty Advisor.

**Not a required course but recommended as elective for first, second or third year students in Nursing "A" upon consultation with advisor.

(For descriptions of the above, see the "Awards and Financial Assistance" section of the calendar.)

Sources other than The University of British Columbia
Special Applications Required

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.

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.

Alumnae Association, Royal Victoria Hospital School of Nursing—Bursary of $1,000 open to all graduates of the Royal Victoria Hospital School of Nursing, accepted in an approved University programme. Application before March 31 to: Alumnae Office, Nurses' Home, Royal Victoria Hospital, Montreal, Quebec.

SCHOLARSHIPS AND BURSARIES—for both Undergraduate and Graduate Students.

Third Year and Second Year and Other.

The University of B.C. Nursing Division Alumni Association Scholarship.

University Scholarship in Nursing and Health.

The Pearl Mackenzie Scheel Scholarship.

BURSARIES

The E. Frances Gunning Memorial Bursary.

The P.E.O. Sisterhood, Chapter F., Bursary.

The Nursing Students' Assistance Fund.

Mabel Johnson Scholarship in Nursing.

(For descriptions of above, see the "Awards and Financial Assistance" section of the calendar.)

The Countess Mountbatten Bursary Fund of Canada—Bursaries of from $200 to $400 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. (Special application required).

The Margaret MacLaren Memorial Fund—For study at the Master's level. One or more bursaries of $1000.00 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.

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. (Special application required).

Alumnae Associations—Many Alumnae Associations offer bursaries and/or loans to their members. (Special application required).

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 Registered Nurses' Association of British Columbia which sponsors applicants for the National Health Grant Bursaries. Information may be obtained by contacting the Association at 2130 West 12th Avenue, Vancouver, B.C. Those interested in preparing for the position 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.

OTHER

The Nursing Students' Assistance Fund.

THE FACULTY OF ARTS

FACULTY OF ARTS

Douglas T. Kenny, M.A. (Brit Col), Ph.D. (Wash), Professor of Psychology, Dean of the Faculty.

Harold C. Knutson, M.A. (Minn.), Ph.D. (Calif.), Associate Professor of French, and Assistant Dean of the Faculty to June 1972.

Robert M. Will, B.A. (Western Ontario), A.M., Ph.D. (Duke), Professor of Economics and Assistant Dean of the Faculty.

Roy Daniells, B.A. (Brit Col), Ph.D. (Toronto), LL.D. (Queen's, Toronto), D.Litt. (McMaster), 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), F.R.S.C., Anthropology.

Professors

David F. Aberle, A.B. (Harvard), Ph.D. (Columbia), Anthropology.

Michael M. Ames, B.A. (Brit Col), Ph.D. (Harvard), Anthropology.

Milton S. Bloombaum, A.B. (Calif.), M.A. (Southern Calif.), Ph.D. (Calif.), Sociology.

Kenelm O. L. Burridge, M.A., B. Litt., Dip. Anth. (Oxon), Ph.D. (Australian National), Anthropology.

Wilson Duff, B.A. (Brit Col), M.A. (Wash.), 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.

William E. Willmott, M.A. (McGill), Ph.D. (London), Anthropology.

Associate Professors

Braxton M. Alfred, B.A. (Houston), Ph.D. (Colo), Anthropology.

Yunshik Chang, B.A. (Seoul), M.A. (Brit Col), Ph.D. (Princeton), Sociology.

Werner Cohn, B.S.S. (City College of New York), Ph.D. (New School for Social Research), Sociology.

Audrey E. Hawthorn, M.A. (Columbia), Curator of the Museum of Anthropology.

Elli-Kaija K. Maranda, M.Phil. (Helsinki), Ph.D. (Indiana), 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.

Richard J. Pearson, B.A. (Toronto), Ph.D. (Yale), Archaeology.

Dorothy Smith, B.Sc. (London), Ph.D. (Calif), Sociology.

Roy Turner, A.M. (Chicago), Ph.D. (Calif), Sociology.

Assistant Professors

Nadia Abu-Zahra, B.A. (Cairo), Dip. Anth., B.Litt., D.Phil. (Oxon), Anthropology.

Brenda E. F. Beck, B.A. (Chicago), Dip. Anth., B.Litt., D.Phil. (Oxon), Anthropology.

Michael J. Egan, B.A., M.A. (Stanford), Ph.D. (Cantab), Anthropology.

Martha S. Foschi, B.A. (Buenos Aires), A.M., Ph.D. (Stanford), Sociology.

George A. Gray, A.B. (Willamette), Ph.D. (Oregon), Sociology.

Helga E. Jacobson, M.A. (London), Ph.D. (Cornell), Anthropology.

Graham E. Johnson, B.Sc. (Econ.) (Southampton), M.A., Ph.D. (Cornell), Sociology.

J. E. Michael Kew, B.A. (Brit. Col.), Ph.D. (Washington), Anthropology.

Blanca Muratorio-Posse, Lic. Soc. (Buenos Aires), Sociology.

John R. O'Connor, A.B. (Holy Cross), M.A,, Ph.D. (Michigan), Sociology.

Robert S. Ratner, A.B. (Columbia), M.A., Ph.D. (Yale), Sociology.

Theodore Ravetz A.B., M.A. (Calif), Sociology.

Robin Ridington, B.A. (Swarthmore), A.M., Ph.D. (Harvard), Anthropology.

David R. Schweitzer, B.A. (North Central College), M.A. (Southern Illinois), Sociology.

Ronald J. Silvers, M.A. (Texas), M.A., Ph.D. (Princeton), Sociology.

Matthew R. Speier, B.A. (Queen's), M.A., Ph.D. (Calif), Sociology.

Thomas C. Taveggia, B.S. (Illinois), M.A. (Oregon), Sociology.

Instructor

Ricardo Muratorio-Posse, M.A. (Calif), Sociology.

Lecturers, Part-time

Gloria C. Webster, B.A. (Brit. Col.), Anthropology, and Assistant Curator of the Museum of Anthropology.

M. Patricia Marchak, B.A., Ph.D. (Brit. Col.), Arts I Programme.

Department of Asian Studies

Professor and Head

Edwin G. Pulleyblank, B.A. (Alberta), Ph.D. (London), M.A. (Cantab).

Professors

Fo-ch'uan Chang, B.A. (Yenching, Peking).

Chia-Ying Chao, B.A. (Peking).

Peter Harnetty, B.A. (Brit Col), A.M., Ph.D. (Harvard).

William L. Holland, M.A. (New Zealand).

Leon Hurvitz, B.A. (Chicago), M.A., Ph.D. (Columbia).

Associate Professors

John F. Howes, B.A. (Oberlin), M.A., Ph.D. (Columbia).

Barrie McA. Morrison, B.A. (Saskatchewan), M.A. (Oxon), Ph.D. (Chicago).

Matsuo Soga, B.Ed. (Tohoku), B.A. (Eastern Mennonite), M.A. (Michigan), Ph.D. (Indiana).

Leon M. Zolbrod, B.A. (Wash.), M.A., Ph.D. (Columbia).

Assistant Professors

Ashok N. Aklujkar, M.A. (Poona), Ph.D. (Harvard).

René Goldman, M.A. (Columbia).

Shreeprakash Kurl, M.A., Ph.D. (Agra).

Senior Instructor

Hsu-tu Chen, B.A. (Tsinghua).

Instructors

Zenryu Shirakawa, B.A. (Calif), M.A. (Harvard).

Jan W. Walls, B.A., M.A. (Indiana).

Lecturers from other Departments

Arthur E. Link, Professor of Religious Studies.

Joseph I. Richardson, Assistant Professor of Religious Studies.

Bernard Saint-Jacques, Associate Professor of Linguistics.

Kernial Singh Sandhu, Associate Professor of Geography.

Edgar Wickberg, Professor of History.

William E. Willmott, Professor of Anthropology.

Department of Classics

Professor and Head

Malcolm F. McGregor, M.A. (Brit Col), Ph.D. (Cincinnati), D.C.L. (Bishop's), D.Litt. (Acadia), F.R.S.C.

Associate Professors

H. G. Edinger, B.A. (Yale), M.A., Ph.D. (Princeton).

James Russell, M.A. (Edinburgh), Ph.D. (Chicago).

Assistant Professors

Anthony A. Barrett, B.A. (Durham, Newcastle), M.A., Ph.D. (Toronto).

Elizabeth A. E. Bongie, B.A. (Brit. Col.), M.A., Ph.D. (Illinois).

W. J. Dusing, M.A. (Toronto).

Phillip E. Harding, M.A. (St. Andrews), Ph.D. (California).

Gerald N. Sandy, M.A., Ph.D. (Ohio State).

ROBERT B. TODD, B.A. (London), M.A., Ph.D. (Princeton).
E. HECTOR WILLIAMS, B.A. (Manitoba), M.A. (Chicago).

Instructor
K. ANN MCCALLUM, B.A. (Brit Col).

Programme in Comparative Literature

Professor and Chairman
Z. FOLEJEWSKI (Slavonic Studies)

Professors
F. J. GROVER (French)
M. A. MANZALAOUI (English)
P. MERIVALE (English)
D. E. SOULE (Theatre)
G. R. TOUGAS (French)

Associate Professors
D. BAUDOUIN (French)
B. CZAYKOWSKI (Slavonic Studies)
H. C. KNUTSON (French)
A. PACHECO (Spanish)
M. G. STANKIEWICZ (German)
L. M. ZOLBROD (Asian Studies)

Assistant Professors
J. BRYANS (Spanish)
M. H. BULLOCK (Creative Writing)
A. BUSZA (English)
C. CHIARENZA (Italian)
G. GOOD (English)
F. B. ST. CLAIR (French)

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. (Washington).

Associate Professor
JACOB ZILBER, B.A. (Wisconsin), M.A. (Washington).

Assistant Professors
MICHAEL BULLOCK.
GEORGE MCWHIRTER, B.A. (Queen's, Belfast), M.A. (Brit Col).

Department of Economics

Professor and Head
A. MILTON MOORE, B.A. (Queen's), A.M. (Chicago).

Professors
G. CHRISTOPHER ARCHIBALD, B.Sc. (London), M.A. (Cantab).
ROBERT M. CLARK, B.A., B.Com. (Brit Col), A.M., Ph.D. (Harvard), Director of Academic Planning.
JOHN G. CRAGG, B.A. (McGill, Cantab), Ph.D. (Princeton).
JOHN F. HELLIWELL, B.Com. (Brit Col), M.A., D.Phil. (Oxon).
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Robert John Gregg, B.A. (Queen's, Belfast), Ph.D. (Edinburgh).

Associate Professor
Bernard Saint-Jacques, L. ès L. (Montreal), M.A. (Sophia, Tokyo), M.Sc. (Georgetown), Docteur de l'Université de Paris.

Visiting Assistant Professor
James E. Hoard, M.A., Ph.D. (Washington).

Instructor
Ingrida Brenzinger, M.A. (Brit Col).

Lecturer
Kenneth F. Reeder, B.A. (Brit Col), M.A. (Essex).

Lecturer from another Department
J. H. V. Gilbert, Assistant Professor of Audiology and Speech Sciences.

Department of Music

Professor and Head
Donald M. McCorkle, B.Mus. (Bradley), A.M., Ph.D. (Indiana).

Professor Emeritus
Harry Adaskin

Professors
Cortland R. Hultberg, B.Sc. (Northern Illinois), M.Mus. (Arizona).
G. Welton Marquis, M.A., (Whitman), Ph.D. (Southern California).
Robert B. Morris, B.Mus. (Capital), M.Mus. (Union Theological Seminary), D.V.Paed. (Indiana).
Hans-Karl Piltz, B.A. (Henderson State), M.Mus. (Northwestern).
Dale Reubart, B.A. (Kansas City), M.Mus., D.M.A. (Southern California).
Elliot M. Weisgarber, M.Mus. (Eastman).

Associate Professors
Terence Bailey, Mus.Bac. (Toronto), M.F.A. (Princeton), Ph.D. (Washington).
John A. Loban, B.A. (San Jose State), M.A. (Catholic Univ. of America).
Hugh J. McLean, B.A., B.Mus., M.A. (Cantab.).
Douglas E. Talney, B.Mus. (Lewis and Clark), M.Mus. (Southern California).
French A. Tickner, M.Mus. (Southern California).
Eugene N. Wilson, B.Mus. (Southern California), M.A., Ph.D. (Washington).

Assistant Professors
Kathryn Bailey, B.Mus. (Pacific), M.Mus. (Indiana).
John S. Chappell, B.Mus. (Brit Col), M.Mus. (Illinois).
Paul M. Douglas, B.M.E. (Central Methodist), M.Mus. (Hartford).
Robert Rogers, B.A. (Brit Col), M.A. (Washington).
John E. Sawyer, B.A., B.Mus. (Brit Col), M.Mus. (Illinois).
James R. Schell, B.A., B.M. (North Texas State), M.Mus. (Yale).
John Swan, Mus.Bac. (Toronto), M.Mus. (Yale), D.M.A. (Miami).

Senior Instructors
Jean Coulthard Adams, A.T.C.M., L.R.S.M.
Donald Brown, L.R.C.T.
Phyllis Schuldt, A.R.C.M., L.R.S.M.

Instructor
David E. Burger, B.A.(Ed.) (Eastern Washington), M.M. (Oregon).

Lecturers
Frances Adaskin.—Piano.
Robert Bricker, B.Mus., M.A. (Wayne State), Vancouver Symphony.—Trombone.
James Coombes, Vancouver Symphony.—Trombone.
Robert Creech, B.A. (Brit Col), Principal Horn, Vancouver Symphony.—Horn.
Conrad Crocker, B.Mus. (Cincinnati), Vancouver Symphony.—Flute.
Harriet Crossland, (Curtis), Principal Flute, Vancouver Symphony.—Flute.
Ronald de Kant, (Juilliard), Principal Clarinet, Vancouver Symphony.—Clarinet.
Glen Geary, B.A. (Brit Col), L.R.S.M., A.R.C.M.—Piano.
Kenneth Helm, Vancouver Symphony.—Flute.
Robert Herriot, (Kneller Hall).—Trumpet.
Kenneth Hopkins, Vancouver Symphony.—Trumpet.
Carol Jutte, A.R.C.T., L.R.S.M., A.R.C.M..—Piano.
Douglas Kent, (Curtis), Vancouver Symphony.—Horn and Tuba.
Judith Marxer, B.M. (Wheaton), M.M. (Nebraska).—Piano.
Robert Meyer, A.R.C.M., Principal String Bass, Vancouver Symphony.—String Bass.
Henry Ohlman, Vancouver Symphony.—Clarinet.
Edward Parker, B.Mus. (Brit Col), L.R.S.M., F.T.C.L.—Piano.
Elaine Reid, Vancouver Symphony.—Oboe.
Marie Schilder, Vienna.—Voice.
Hans Siegrist, B.M. (Heidelberg), Vancouver Symphony.—Cello.
Helen E. Silvester, A.T.C.M., L.R.S.M.—Piano.
Roland R. 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 Musical College).—Piano.
Mary J. Tickner, B.Mu.Ed. (Evansville), M.Mus. (Southern California).—Piano.
Beth Watson, A.R.C.T..—Voice.
Sherie M. Wilson, B.A. (Washington).—Cello.

Lecturers from the Faculty of Education
Allen Clingman, B.M.E., M.M.E. (Drake), M.A., Ed.D. (Columbia), Professor of Music Education.
Sandra J. Davies, B.Sc., M.Sc. (Illinois), Assistant Professor of Music Education.
Frank Gamble, B.F.A. (Nebraska), M.A. (Catholic Univ. of America), Ed.D. (Columbia), Associate Professor of Music Education.
Donald C. Gibbard, M.A. (Washington), Professor of Music Education.
Theo Goldberg, M.A. (Western Washington), Assistant Professor of Music Education.
John Murray, B.A. (Brit Col), M.M., D.Ed. (Oregon), Assistant Professor of Music Education.
Nancy Schell, B.M., B.M.E. (North Texas State), Lecturer in Music Education.
Lloyd H. Slind B.Sc. (Saskatchewan), B.Mus. (Montreal, Saskatchewan), Ed.D. (Florida), L.R.S.M., Professor of Music Education.
Campbell Trowsdale, B.Mus., M.Ed., D.Ed. (Toronto), A.R.C.T., Associate Professor of Music Education.

Department of Philosophy

Professor and Head

Peter Remnant, M.A. (Brit Col), Ph.D. (Cantab).

Professors

Jonathan Bennett, M.A. (Canterbury), B. Phil. (Oxon).
Donald G. Brown, M.A., D.Phil. (Oxon).
Samuel C. Coval, M.A. (Man), Ph.D. (N. Carolina), D.Phil. (Oxon).
Thomas E. Patton, B.A. (Oberlin), M.A., Ph.D. (Harvard).
Robert J. Rowan, M.A., Ph.D. (Calif).

Associate Professors

James C. Dybikowski, B.A. (Amherst), Ph.D. (London).
Warren J. Mullins, M.A., Ph.D. (Calif).
Richard E. Robinson, B.A. (Puget Sound), M.A. (Syracuse, Calif), Ph.D (Calif).

Assistant Professors

Howard Jackson, B.S. (Illinois), Ph.D. (Calif).
Andrew Levine, A.B., Ph.D. (Columbia).
Edwin Levy, Jr., B.S. (N. Carolina), A.M., Ph.D. (Indiana).
Alan B. Loveland, B.S. (Utah).
Elbridge N. Rand, A.B. (Harvard).
Steven F. Savitt, A.B. (Columbia College), Ph.D. (Brandeis).
Richard I. Sikora, A.B. (Harvard), Ph.D. (Calif). Part-time.
John P. Stewart, B.S., M.S. (Penn).
Gary A. Wedeking, B.A. (San Diego State College), M.A., Ph.D. (Washington University).
Earl R. Winkler, B.A. (Los Angeles State), M.A., Ph.D. (Colorado).

Lecturer from another Department

Fo-ch'uan Chang, Professor of Asian Studies.

Department of Political Science

Associate Professor and Head

Walter D. Young, B.A. (Brit Col), M.A. (Oxon), Ph.D. (Toronto).

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).
Frank C. Langdon, A.B., A.M. (Harvard), Ph.D. (Calif).
Jean A. Laponce, Dipl.I.E.P. (Paris), Ph.D. (Calif).
R. S. Milne, M.A. (Oxon).
W. J. Stankiewicz, M.A. (St. Andrews), Ph.D. (London).

Associate Professors

G. A. Feaver, B.A. (Brit Col), Ph.D. (London).
Mark W. Zacher, B.A. (Yale), M.A., Ph.D. (Columbia).

Visiting Associate Professor

Paul L. Smoker, M.Sc., Ph.D. (Lancaster).

Assistant Professors

Donald E. Blake, B.A., M.A. (Alberta), Ph.D. (Yale).
Heath B. Chamberlain, B.A. (Princeton), M.A., Ph.D. (Stanford).
David J. Elkins, B.A. (Yale), M.A., Ph.D. (Calif).
Robert H. Jackson, B.A., M.A. (Brit Col), Ph.D. (Calif).
Martin B. Levin, B.A., M.A. (Manitoba), Ph.D. (Cornell).
Paul J. Marantz, B.A. (Cornell), M.A., Ph.D. (Harvard).
Philip Resnick, M.A. (McGill).
Paul R. Tennant, B.A. (Brit Col), M.A., Ph.D. (Chicago).
Michael D. Wallace, B.A., M.A. (McGill), Ph.D. (Michigan).
John R. Wood, B.A. (Toronto), M.A., Ph.D. (Columbia).

Department of Psychology

Professor and Acting Head

Edro Signori, B.A. (Alta), M.A., Ph.D. (Toronto).

Professors

Robert D. Hare, M.A. (Alta), Ph.D. (Western Ontario).
Douglas T. Kenny, M.A. (Brit Col), Ph.D. (Wash), Dean of the Faculty.
Romuald Lakowski, M.A. (Glasgow), Ph.D. (Edinburgh).
Louis J. Moran, M.A., Ph.D. (Texas).

Associate Professors

David J. Albert, B.A. (Kansas), M.A., Ph.D. (McGill).
E. S. W. Belyea, M.A. (Toronto).
Raymond S. Corteen, M.A., Ph.D. (Edinburgh).
Kenneth D. Craig, B.S. (Sir George Williams), M.A. (Brit Col), Ph.D. (Purdue).
Robert E. Knox, M.A. (Occidental), Ph.D. (Ore).
Donald C. G. MacKay, M.A. (Queen's), Ph.D. (Stanford), F.R.S.A., Associate Professor Emeritus, Part-time.
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).
Richard C. Tees, B.A. (McGill), Ph.D. (Chicago).
Roderick Wong, B.A. (Brit Col), M.A. (West Mich), Ph.D. (Northwestern).

Assistant Professors

D. Susan Butt, M.A. (Brit Col), Ph.D. (Chicago).
William G. Davenport, B.Sc., Ph.D. (Newcastle).
Donald G. Dutton, M.A., Ph.D. (Toronto).
Dennis L. Foth, M.Sc., Ph.D. (Alberta).
Guy J. Johnson, M.A., Ph.D. (Texas).
Meredith M. Kimball, B.A. (Macalester), Ph.D. (Michigan).
Claude R. de Martino, B.S. (New York City College), Ph.D. (New York).
Annetta McBurney, B.A. (London), M.A. (Columbia), Ph.D. (Queen's, Belfast). (Part-time Paediatrics).
Anthony G. Phillips, M.A., Ph.D. (Western Ontario).
John P. J. Pinel, M.A. (Calgary), Ph.D. (McGill).
Gerald E. Plum, B.A. (Wayne State), Ph.D. (Chicago).
Reva Potashin, M.A., Ph.D. (Toronto).
Christie J. Tragakis, A.B. (Brown), M.A., Ph.D. (Iowa).
Christopher J. S. Tuppen, B.A. (Cantab), M.A. (London), Ph.D. (Berkeley).
Frederick P. Valle, A.B. (Calif), Ph.D. (Michigan).
Donald M. Wilkie, M.A., Ph.D. (Western Ontario).
John C. Yuille, M.A., Ph.D. (Western Ontario).

Part-time Lecturers

Gloria Gutman, B.A. (Brit Col), M.A. (Alta), Ph.D. (Brit Col).
John Huberman, M.A., Ph.D. (Brit Col).

Lecturers from Other Departments

John B. Collins, M.A. (Brigham Young), Ph.D. (Utah), Part-time. Academic Planning.
J. Eugene B. Ryan, B.A. (Brit Col), M.A., Ph.D. (Toronto), Student Services.
Alexander F. Shirran, M.A. (Brit Col), Student Services.
Richard Simpson, M.A. (Brit Col), Student Services.

Department of Religious Studies

Professor and Head

C. G. William Nicholls, M.A. (Cantab).

Professors

Leon Hurvitz, B.A. (Chicago), M.A. Ph.D. (Columbia).
Arthur E. Link, M.A., Ph.D. (Calif).

Associate Professors

Charles P. Anderson, A.B. (Willamette), B.D. (Union Theological Seminary), Ph.D. (Columbia).
Hanna E. Kassis, B.A. (American University of Beirut), Ph.D. (Harvard).

Assistant Professors

N. Keith Clifford, B.A. (Manitoba), B.D. (United), Ph.D. (London).
Shotaro Iida, M.A. (Tohoku), Ph.D. (Wisconsin).
Joseph I. Richardson, B.A., B.D. (McMaster), S.T.M. (Union Theological Seminary).

Lecturer

William J. Martin, M.A. (Trinity College, Dublin), B.Th. (Princeton Theological Seminary), Ph.D. (Leipzig).

Department of Slavonic Studies

Associate Professor and Acting Head

Bogdan Czaykowski, B.A. (Dublin), M.A. (London).

Professors

Cyril Bryner, A.B. (Stanford), Ph.D. (Prague).

ZBIGNIEW FOLEJEWSKI, M.A. (Wilno), Ph.D. (Uppsala).
MICHAEL H. FUTRELL, B.A., Ph.D. (London).
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
VALERIAN REVUTSKY, M.A. (Toronto), Dipl. in Drama (Moscow).
JAN J. SOLECKI, B.Com. (London), M.A. (Brit Col, Washington).
ALEXANDER W. WAINMAN, M.A. (Oxon).

Assistant Professors
FRANK BEARDOW, B.A. (Manchester), F.I.L.
ALEX P. HARSHENIN, M.A. (Brit Col).
NICHOLAS POPPE, B.A. (London), Ph.D. (Indiana).
IRINA M. REID, M.A. (Brit Col), L.R.S.M., A.R.T.C.
CHRISTOPHER J. G. TURNER, M.A., Ph.D. (Cantab), M.A., B.Phil. (Oxon).

Instructors
CATHERINE S. LEACH, M.A. (Calif).
ARAM H. OHANJANIAN, B.A. (Toronto), M.A. (Brit Col).
IRINA REBRIN, B.A. (Fu Jen).
VERA T. RECK, B.S. (Cornell), M.A. (Calif), Ph.D. (London).

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).

Associate Professors
A. JOAN REYNERTSON, M.A. (Calif), Ph.D. (Stanford).
KLAUS G. STRASSMANN, Ph.D. (Stanford).

Assistant Professors
PETER LOEFFLER, D.Phil. (Basel, Switzerland).
JOHN S. NEWTON, M.A. (Berkeley, San Francisco State).
IRENE PROTHROE, B.A., B.Ed. (Alberta).
STANLEY A. WEESE, B.A. (Minn), M.A. (Illinois).
RICHARD KENT WILCOX, A.A. (Santa Ana), A.B. (Calif), M.F.A. (Yale).

Instructors
MOYRA K. MULHOLLAND, B.A. (Brit Col), M.A. (Cornell).
CORALYN SHELDON, N.C.S.D., L.R.A.M., L.U.D.D.A. (London).
KURT WILHELM, Diploma (Goodman Memorial Theatre).
M. NORMAN YOUNG, B.A. (Brit Col), Technical Director.

Lecturer
IAN C. PRATT, Associate Technical Director.

Lecturer from another Department
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, Bachelor of Fine Arts, Master of Arts and Doctor of Philosophy.

The Department of Music of the Faculty of Arts offers programmes of study that lead to the degree 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 respectively to the degrees of Bachelor of Home Economics, Bachelor of Library Science, and Master of Social Work.

THE DEGREE OF BACHELOR OF ARTS

General Requirements of the Faculty:

A student who enters the Faculty of Arts lays the foundation for his advanced 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* (a further thirty units of work)

OR

The *Honours Programme* (a further thirty-six 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.

Students should note that the Majors and Honours programmes in most fields require that certain prerequisite courses be taken in the first and/or second years. See the regulations of the individual departments, as given later in this section of the Calendar.

With special permission, a student may complete the required number of units in less than the normal four years of the degree programme, by combining credit obtained in Summer Session with that obtained in Winter Session.

SCIENCE REQUIREMENT

To qualify for the degree of Bachelor of Arts a student must satisfactorily complete three units of work in the Faculty of Science (which includes Mathematics) *or* 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 that are specially designed for third- and fourth-year students in the Faculty of Arts. Forestry 300 (3 units) also fulfils the science requirement.

Honours students, especially those in English, should make a special effort to satisfy the science requirement within the first two years of study.

LITERATURE REQUIREMENT

To qualify for the degree of Bachelor of Arts, a student must satisfactorily complete three units of work in literature in addition to English 100. He may meet this requirement by taking English 200 (normally in the second year) or a course in literature (including literature in translation) offered by another department of the Faculty. The following courses are acceptable as alternatives to English 200:

Asian Studies 302, 335, 345; Classical Studies 310, 315, 316; English 210; French 400; German 201; Italian 310; Slavonic Studies 306; as well as all 300- and 400-level courses in Chinese and Japanese, with the permission of the Department of Asian Studies; all 300- and 400-level courses in Greek except Greek 325 and 410; all 400-level courses in Latin except Latin 410; all 300- and 400-level courses in German except German 323, 439 and 449; all 300- and 400-level courses in Italian except Italian 300, 302, 449; all 300- and 400-level courses in Spanish except Spanish 300, 320, 400, 408, 409, 420, 449; French 220 and all 400-level courses in French except 420, 449; Polish 445; Russian 331, 430, 431, 432, 433; *except that such literature courses may not be offered to fulfil this requirement by those students who are majoring in the language.*

LANGUAGE REQUIREMENT

To qualify for the degree of Bachelor of Arts, a student must have attained, in French or a foreign language, Grade 12 standing or the equivalent. If he has completed a Grade 12 course in such a language at secondary school, he is not required to take further work in language. If he enters the Faculty with only Grade 11 in French or a foreign language, he must satisfactorily complete *either* three units of work in the same language *or* six units of work in another language other than English. If he enters the Faculty with less than Grade 11 standing in French or a foreign language, he must satisfactorily complete six units of work in one such language. This requirement should normally be satisfied within the first two years of the degree programme, and third-year standing will not be granted until it has been met. (Students taking a Major or Honours in Mathematics are referred to **Faculty of Science**, as there are special requirements.)

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 University.

First Year

1. English 100
2. Language other than English (if required—see above)
3. Elective
4. Elective
5. Elective

Courses 2, 3, 4 and 5 must normally be chosen from List A.

Special arrangements apply to students who take Arts One in their first year.

LIST A

(Figures in parentheses indicate unit value.)

Anthropology 100(3), 201(3), 202(3).
Arts One (9).
Asian Studies 105(3), 115(3), 206(3).
Biology 101(3) or 102(3)
Chemistry 103(3) or 110(3) or 120(3).
Chinese 100(6).
Classical Studies 100(3).
Creative Writing 201(3), 202(3).
Economics 101(3); or 130(1½) and 140(1½); or 200(3); or 202(3), for those with second-class standing or better in previous year.
Fine Arts 125(3), 171(3), 181(3).
French 100(3), 110(3), 115(3), 120(3).
Geography 100(3), 101(3), 200(1½), 201(1½). (Geography 200 and 201 available to First-Year students on a restricted basis; consult Department of Geography.)
Geology 105(3).
German 100(3), 110(3), 120(3), 123(6).
Germanic Studies 101(3).
Greek 100(3).
Hebrew 100(3).
History 100-199(1½-3).
Italian 100(3), 105(6).
Japanese 100(6).
Latin 100(3), 110(3), 120(3).
Linguistics 100(3).
Mathematics 100(2), 120(1), 121(1), 130(3).
Music 100(3), 107(3), 120(3).
Philosophy 100(3).
Physics 105(3), 110(3), 115(3), 120(3).
Polish 110(3).
Psychology 100(3).
Religious Studies 100(3).
Russian 100(3), 110(6).
Slavonic Studies 105 (3).
Sociology 100(3).
Spanish 100(3), 105(6), 110(3).
Theatre 120(3).

Second Year

1. Language other than English (if required).
2. (Normally) English 200 or equivalent (see above).
3. Elective
4. Elective.
5. Elective.

All courses must normally be chosen from Lists A and B.

LIST B

(Figures in parentheses indicate unit value.)

Anthropology 200(3), 201(3), 202(3).
Asian Studies 206(3), 302(3), 335(3), 345(3).
Biology 200 (1½), 310* (1½), 311*(1½), 321(1½), 322(1½), 334(1½).
Botany 302(3), 303(3), 305(3), 306(1½), 307(1½), 310(1½).
Chemistry 203(3), 205(3), 210(3), 220(3), 230(3).
Chinese 200(3), 201(3).
Classical Studies 310(3), 315(3), 316(3), 330(3), 331(3).
Economics 301 (½) and 302(1½) or 306 (3) and 307 (3); 325 (1½) and 326 (1½, or 327 (1½) and 328 (1½). (Check prerequisites.)
English 200(3), 210(3), 300(3).
Fine Arts 251(3), 261(3), 281(6).
French 202(3), 215(3), 220(3).
Geography 212(1½), 213(1½), 370(1½), 371(1½), 372(1½), 373(1½), 374(1½), 375(1½).
Geology 203(1½), 206(1½), 210(3).
German 200(3), 210(3), 223(3), 230(3).
Germanic Studies 201(3).
Greek 200(3), 325(3).
Hebrew 200(3).
Italian 200(3), 223(3).
Japanese 200(6).
Latin 200(3), 205(6), 220(3).
Linguistics 200(3), 205(3).
Mathematics 200(2), 205(2), 220(1), 221(2), 222(1).
Microbioligy 200(3) or 201(3).
Music 200(3), 207(3).
Philosophy 200(3), 201(3), 212(3).
Physics 200(2), 204(3), 209(1), 210(2), 219(1), 220(2).
Polish 210(3).
Political Science 200(1½), 201(1½), 202(1½), 203(1½), 204(3).
Psychology 200(3), 206(3).
Religious Studies 202(3), 204(3).
Russian 200(3), 210(6).
Sanskrit 305(3).
Slavonic Studies 205(3), 306(3), 310(3), 340(3).
Sociology 200(3), 250(3), 260(3).
Spanish 200(3), 223(3).
Theatre 230(3), 300(3).
Zoology 203(1½), 204(1½), 303(3).

*No prerequisite required.

Third and Fourth Years

At the beginning of the Third Year a student must enter

EITHER

The Major Programme, which requires a measure of specialization. In his third and fourth years, a student in this programme must take *at least* fifteen units of work (in courses numbered 300 or above) in one subject or field of concentration. For a candidate graduating from the Major Programme, the degree of Bachelor of Arts will be granted when sixty units of work (of which thirty have been taken in the third and fourth years), approved by the Faculty of Arts, have been completed.

OR

The Honours Programme, which requires intensive work in one subject or field of specialization. The departments that offer Honours Programmes design their own programmes. Such a programme is open only to students who, in the opinion of the department of specialization, have shown special aptitude and have the capacity to profit from working intensively in this subject or field. For a candidate graduating from the Honours Programme, the degree of Bachelor of Arts, with First or Second Class Honours, will be granted when sixty-six units of work, approved by the candidate's department and by the Faculty of Arts, have been completed.

In the third and fourth years, a Major or Honours student must satisfactorily complete *at least* six units of work in courses outside his subject or field of specialization.

In the third and fourth years, a Major student must earn *at least* twenty-four units and an Honours student must earn *at least* thirty units of credit in courses numbered 300 or above.

On entering the Major Programme or the Honours Programme, a student must draw up a plan of study for his third and fourth years in consultation with a departmental adviser: at the beginning of the fourth year, a student must have his programme of study reviewed by a departmental adviser.

Typical Major Programme:

3rd Year:

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.
4. Elective.
5. Elective.

4th Year:

1. Course in Major subject or field of concentration.
2. Course in Major subject or field of concentration.
3. Course in Major subject or field of concentration.
4. Elective course outside Major subject or field.
5. Elective.

NOTE: A student in the Major Programme who, after obtaining the degree of Bachelor of Arts, plans to enter the secondary programme (fifth year) of the Faculty of Education should consult the **Faculty of Education** or the office of the Secondary Division of that Faculty.

For selection of courses in the Honours Programme, consult the individual departments of the Faculty.

In addition to the Major Programmes and Honours Programmes described, special Major and 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. For special programmes, students should consult the Senior Faculty Adviser before approaching the Departments concerned.

GUIDE FOR STUDENTS

In this section of the Calendar, an attempt is made to describe some of the procedures which guide the Faculty of Arts in administering its degree programmes. *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.

ENTERING THE FACULTY OF ARTS

For admission requirements see section on ADMISSION in the General Information section.

Registration

Once he has registered, a student must report in person to Room 165 in the Buchanan Building if he wishes to make any change in his programme of study.

A student may take only those courses for which he has registered.

A student, except an Honours student in the Third or Fourth Year, requires special permission to register for less than fifteen units (granted for medical reasons) or for more than fifteen units (granted when academic standing is high).

When a student drops a course without obtaining permission to do so, a standing is recorded which is interpreted as a failure.

All changes in a programme of study must be made before the end of the third week.

Fees — See General Information section

Financial Help — See Awards and Financial Assistance section

Faculty Advisers

The Faculty Advisers are professors in the Faculty of Arts who are responsible for administering regulations of the Faculty (but not of the individual Departments) concerning programmes of study; they assist students of the first and second years in planning their programmes; they approve course changes, withdrawals, etc., for all students, and may be consulted about academic problems by students in any year. The Senior Faculty Adviser is consulted by Departments in difficult cases. Inquiries about appointments should be directed either by telephone to the Buchanan switchboard (228-4028) or by mail to the Senior Faculty Adviser, c/o the Dean of Arts, the University of British Columbia, Vancouver 8, B.C.

RESIDENCE AND STUDY 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 own.

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 12 will normally spend four Winter Sessions at the University of British Columbia to qualify for a degree. 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 and colleges *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, and no later than the 30th of that month, 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 Senior Faculty Adviser.

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 Senior Faculty Adviser.

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* and (in the case of courses terminal at Christmas) not in the same academic year, any course for which he failed to obtain credit; but the restriction does not apply to English 100 nor to students in the graduating year.

Unsatisfactory Standing

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 First or Second Year who gets passing marks in fewer than nine units of work may not return to the University to repeat the same programme of study. He may be re-admitted 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 the University year previously failed. He need not repeat studies in which he was successful previously.

When he has obtained 30 units of credit in the University, a student will not receive credit for any courses he may subsequently complete in a college.

A student in the Third or Fourth Year who gets passing marks in fewer than nine units may not return to the University in the session immediately following. He may be re-admitted at a later date if his appeal for readmission is approved by the Faculty.

A student in any year who fails for the second time will be required to withdraw permanently.

Supplemental Examination Conditions:

A student may be granted the privilege of supplemental examinations for not more than 3 units of course work 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.

See the General Information section for regulations concerning:

Supplemental examinations
Review of assigned standing
Graduation
Transcript of student record

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.

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.

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

Students registered in a Majors or Honours programme in a Department of the Faculty of Arts may, in certain circumstances, take courses offered by other faculties if the Department concerned accepts these as forming part of the Major or Honours concentration. The Senior Faculty Adviser should be consulted on the appropriateness of non-Arts courses for credit in this Faculty.

TERMS AND ABBREVIATIONS

Numbering of courses: In general the number of a course indicates the *earliest year* in which it may be taken: 100—first years; 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.

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 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.

[3-0] — three lecture-hours each week, for one term. (Consult the department concerned to find out whether the course is offered in both terms.)

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 **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

Anthropology 400 or 450 or 460 or 470

Six units in Anthropology or Sociology chosen in consultation with a departmental adviser

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

Anthropology 400 or 450 or 460 or 470

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.

Students are advised to consult the department *course bulletin,* which provides more up-to-date and complete course descriptions, since course content changes from year to year.

Courses Offered:

1. General Courses

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. [3-0; 3-0]

201 (3) Ethnic Relations.—A study of the relations between ethnic groups and the interplay between these and other social variables. Ordinarily the course will deal with ethnic groups in British Columbia, and students will be expected to carry out elementary research projects. [3-0; 3-0]

202. (3) Contemporary Social Problems in an area selected from Africa, Latin America, or East Asia.—Cultural background to contemporary events; problems of nationalism and tribalism, economic and social development, religion and revolution. The area will ordinarily change each year. [3-0; 3-0]

206. (3) Introduction to Southeast Asia.—See Asian Studies 206.

301. (3) Indians of British Columbia.—An examination of the relations between Indian and non-Indian cultures, with special reference to current Indian situations and their anthropological background. [3-0; 3-0]

330. (3) Peasants and the Third World.—A comparative study of peasant society; relation of peasants to the national policy; social and cultural inhibition of development programmes; the cultural bases of revolutionary action in the Third World. [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. [3-0; 3-0]

440. (3) Applications of Anthropology to Modern Life.—Examples will be drawn from contemporary problems. For each year the department will issue a list of topics to be covered. [3-0; 3-0]

2. Majors Courses

These are open to non-Majors with appropriate prerequisites, except 300 and 499. **Anthropology 200 is a prerequisite to all courses listed below,** unless specific permission of the Department is obtained.

200. (3) Introduction to 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. This course is prerequsite to all courses listed below. [3-0; 3-0]

300. (6) Course and Seminar in Social Organization.—For Majors only. [6-0; 6-0]

302-3. (1½-3) Comparative Ethnography of Special Areas.—A specialized study of ethnographic and theoretical problems in one area. Different culture areas or regions from Asia, Africa, South America, Australasia or Polynesia may be selected each term. Students should consult the department for this year's offerings. [3-0; 3-0]

304. (3) Ethnography of the Northwest Coast.—Specialized study of ethnographic and theoretical problems of the region. [3-0; 3-0]

305. (3) Theory in Archaeology.—Explores models of culture change and culture used by pre-historians, with the emphasis on formulation of research designs in order to work on specific problems in culture history, settlement, ecology, evolution, and technological change. The course views archaeological theory in relation to anthropological theory in general. [3-0; 3-0]

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) Primitive Art.—The social and technological basis of art; theories of origin, development and interpretation. Major plastic and graphic arts, music and dance of tribal and early societies. For Majors in Anthropology and Honours in Fine Arts only. [3-0; 3-0]

332. (3) The Analysis of Myth.—Relationships between myth and social structure; comparative study of myth; formal structures of myth. [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]

401. (3) Indians of North America.—Native cultures of the United States and Canada; linguistic and cultural relationships; the culture of reserves and the reserve systems in both countries. [3-0; 3-0]

402-9. (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]

410. (3) Prehistory of a Special Area.—Detailed analysis of the prehistory of a given area, including an exhaustive summary of the literature and the discussion of the relevant problems in order to prepare the student for future work. The course will provide background for students in area studies such as Oceania and the Far East. [3-0; 3-0]

413. (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]

414. (1½-3) Economic Anthropology.—Comparative analysis of primitive and tribal systems of production and distribution; relationships between economic and social systems, particularly in the context of modernization. [3-0; 3-0]

415. (1½-3) Religion and Society.—Comparative study of religious beliefs and practices; relations between religious, social and political institutions; religion as a force for stability and change; anthropological theories of religion. [3-0; 3-0]

416. (1½-3) Political Anthropology.—Comparative study of primitive and tribal political organization; leadership and non-centralized and centralized political systems. [3-0; 3-0]

417. (1½-3) Language and Culture.—The relationships between linguistic and cultural phenomena; how language affects normative and cognitive systems of thought and behaviour. [3-0; 3-0]

418. (1½-3) Social Statistics.—Primary emphasis on applications of non-parametric statistical techniques to quantitative and qualitative data in both Anthropology and Sociology. [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. Prerequisite: 320, or the instructor's permission. [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]

449. (3) Honours Tutorial.—Will usually require the presentation of at least one research paper.

450. (3) Formal 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]

460. (3) Cultural Ecology and Cultural Evolution.—Social organization in the context of the theoretical approaches of cultural evolution and cultural ecology with particular emphasis upon primitive societies: kinship, political organization, warefare, economic organization, peasant societies, religious movements, underdevelopment, and social change. [3-0; 3-0]

470. (3) Structural Theory in Anthropology.—Principles of structural analysis of social action; historical development of structural points of view; examination of current structural theories. [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.
525. (3) Semantic Analysis of Myth.
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.

ARTS ONE PROGRAMME

Students entering the first year may enroll in Arts One, a nine-unit programme of liberal education. Arts One is organized in teaching groups, each consisting of 120 students and six faculty from various university departments, who address themselves to a year's study of themes of basic human concern. The aim of the curriculum is to provide a coherent focus for the student's attention throughout the year. The impact of the programme, made possible by the ratio of faculty to students, comes through weekly lectures, seminars, tutorials, individual conferences, and a variety of activities such as week-end symposia, field trips, visits to plays, films, and art exhibitions. A sense of membership in a community of learners is created through use of the Arts One Building, located near the centre of the campus.

For the students enrolled, Arts One satisfies the Faculty of Arts requirement for first-year English and also meets the departmental requirements for first-year History and Philosophy.

Students enrolled must also take six units of regular course work. On successful completion of Arts One and the two regular courses, students receive second-year standing in the university. Owing to the nature of the course, supplemental examinations will not be given in Arts One.

Students who enroll in Arts One are expected to remain in it for the complete session, but they may drop the programme without penalty during the period officially allowed for course changes.

Information about Arts One and appointments for counselling concerning the programme can be obtained from the Secretary, Arts One (228-3430). Students wishing to enroll in Arts One should complete the application form for the programme mailed out with registration materials. The form should be returned to the Arts One Office by 28 August. During registration week the student proceeds in the usual manner, after checking to see that he has been admitted into Arts One.

ASIAN STUDIES

The Department offers programmes of study that lead to the degrees of Ph.D. (Chinese and Japanese only), 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 Indic languages 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 joint 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**

Major in Chinese

First and Second Years:

Chinese 100, 200 and **either** 201 **or** 301. Asian Studies 105 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 105 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 or Second Class Standing in Chinese (Japanese) 200. Asian Studies 105 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 as Asian Studies courses for Majors or Honours in Chinese and Japanese, subject to the approval of the Department:

Anthropology 302, 303, 402: Comparative Ethnography of Special Areas (South and East Asia), and 410: Prehistory of a Special Area.

Economics 343: Economic Development of Asia.

Fine Arts 351: Chinese Art.
Fine Arts 353: Japanese Art.
Fine Arts 355: Indian Art.
Geography 481: Geography of Japan.
Geography 482: Geography of China.
Geography 483: Geography of South Asia.
Political Science 314: Japanese Government and Politics.
Political Science 315: Communist Chinese Government and Politics.
Political Science 413: South Asian Government and Politics.
Political Science 414: Contemporary Japanese International Politics.
Political Science 415: Contemporary Chinese International Politics.
Political Science 419: Selected Problems of Contemporary Chinese Politics.
Political Science 424: Selected Problems of Japanese Politics.
Religious Studies 352: Modern Hinduism.
Religious Studies 360: Indian and Tibetan Mahayana Buddhism.
Religious Studies 361: Chinese Mahayana Buddhism.
Religious Studies 362: Japanese Buddhism.
Religious Studies 463: Contemporary Buddhist Thought and Practice.
Theatre 340: History of the Oriental Theatre.

Note: A brochure describing in more detail the offerings of the Department of Asian Studies is available from the departmental office.

(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.

105. (3) Introduction to East Asia.—Geographical, ethnic and historical backgrounds of China, Japan and Korea. Survey of twentieth-century East Asian History. [3-0; 3-0]

115. (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. [3-0; 3-0]

206. (3) Introduction to Southeast Asia.—Geographical, cultural, and historical backgrounds of Indonesia, Malaysia, Singapore, Brunei, Burma, Thailand, Cambodia, Laos, Vietnam and the Philippines. Problems of nationalism, foreign policy, economic and social development since 1941. Open to First Year students. [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 323.

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. (3) Intermediate Chinese.—Further study of the grammar and syntax of modern Chinese. Prerequisite: Chinese 100 or equivalent. [3-1; 3-1]

201. (3) Intensive Modern Chinese.—To be taken in conjunction with Chinese 200. [3-1; 3-1]

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. May be taken in conjunction with Chinese 200 by permission of the Department. 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 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.—Primarily for graduate students.

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.—Primarily for graduate students.

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

300. (3) Introductory Hindi.—An introduction to spoken and written Hindi. [3-1; 3-1]

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]

400. (3) Intermediate Hindi.—Further study of the grammar and introduction to the literature of Hindi. [3-1; 3-1]

414. (3) Intermediate Sanskrit.—Advanced grammar and selected readings. [3-0; 3-0]

440. (3-6) Supervised Study in Indic Languages.

Graduate Courses:

501. (3) Research Methods and Source Material in Chinese Studies.
503. (3) Problems in the History of the Chinese Language.
508. (3) Topics in Pre-modern Chinese History and Institutions.
513. (3) Topics in Chinese Literature.
521. (3) Research Methods and Source Material in Japanese Studies.
523. (3) Topics in the History and Structure of the Japanese Language.
528. (3) Problems of Japanese Intellectual History.
533. (3) Topics in Japanese Literature.
541. (3) Research Methods and Source Material in Indic Studies.

543. (3) Topics in the History and Structure of Indian Languages.
546. (3) Topics in Indian Literatures.
553. (3) Topics in Early Indian Civilizations.
561. (3) Problems of Modernization in Eastern and Southern Asia.
599. (3-6) Master's Thesis.
699. Ph.D. Thesis (in Chinese or Japanese Studies only).

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 and Second Years:

One of Asian Studies 105, 115, 206

Other recommended courses:

Anthropology 100, Economics 130, 140, Fine Arts 251, History 100-199, Political Science 203 (1½ units), Religious Studies 204.

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
Chinese 201
Japanese 200 (6)
Asian Studies 302
Asian Studies 335
Philosophy 323
Religious Studies 361 (1½)
Religious Studies 362 (1½)
Religious Studies 463 (1½)
Fine Arts 351 (1½-3)
Fine Arts 353 (1½-3)
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, 303 (1½-3) (by permission)
Anthropology 402, 403 (1½-3) (by permission)
Anthropology 410 (3) (by permission)
Economics 343
Political Science 314 (1½)
Political Science 315 (3)
Political Science 414 (1½)
Political Science 415 (1½)
Political Science 419 (1½)
Political Science 424 (1½)
Geography 481 (1½)
Geography 482 (1½)

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

Students must take 6 units of work in one Indic language (Indic Languages 300 and 400; or 305 and 414).

3-6 units from:
Asian Studies 345
Indic Languages 440
Religious Studies 350 (1½)
Religious Studies 351 (1½)
Religious Studies 352 (1½)
Religious Studies 360 (1½)
Religious Studies 450 (1½)
Religious Studies 451 (1½)
Fine Arts 355 (1½-3)
Theatre 340

3-6 units from:
History 410
Asian Studies 340

3-6 units from:
Anthropology 302, 303 (1½-3) (by permission)
Anthropology 402-9 (1½-3) (by permission)
Asian Studies 420
Economics 343
Geography 396 (1½)
Geography 483 (1½)
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:
Fine Arts 359 (1½-3)
Theatre 340

3-6 units from:
History 309
History 311
History 411
History 434

3-6 units from:
Anthropology 302, 303 (1½-3) (by permission)
Anthropology 402-9 (1½-3) (by permission)
Anthropology 410 (3) (by permission)
Economics 343
Geography 396 (1½)
Geography 484 (1½)
Political Science 316
Political Science 412
Political Science 425 (1½)

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 Wickberg (History) for East Asia; and Willmott (Anthropology) and Milne (Political Science) for Southeast Asia.

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 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, 332, 333, 433 and 435. Three units of credit in Fine Arts will be given for each of courses 330 and 429. Courses 310, 315, and 316 are acceptable alternatives to English 200 except for students majoring in Classical Studies.

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. Not offered in 1972-1973. [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. (Also listed as 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]

332. (3) The Roman Republic.—A detailed study of Rome from the foundation to the Augustan settlement. The development of the constitution; the political system; acquisition and growth of Empire; the political, social and economic consequences; the failure of the Republican system. Prerequisite: Classical Studies 331. [2-0; 2-0]

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. Not offered in 1972-1973. [2-0; 2-0]

429. (1½-3) Studies in the Art of Greece and Rome.—Prerequisite: Classical Studies 330 or permission of instructor. (Also listed as Fine Arts 429.) [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. Not offered in 1972-1973. [2-0; 2-0]

433. (3) Greek History to 404 B.C.—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]

435. (3) Greek History from 403 B.C. to Roman Times.—The failure of the *polis;* Demosthenes and Philip; Alexander and Hellenism; the Successors; monarchy and federalism; literature and art; the great scholars. Prerequisite: Classical Studies 331. Not offered in 1972-73. [2-0; 2-0]

436. (3) Classical Thought.—Intensive study of the development of thought in the Greek and Roman world in the areas of moral and political theory, science, religion, and metaphysics and epistemology. Prerequisite: a course in Classical Studies or Philosophy, 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. Not offered in 1972-1973. [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. Not offered in 1972-1973. [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. Not offered in 1972-1973. [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. Not offered in 1972-1973. [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) Studies in Greek Literature.
525. (3) Seminar in Greek Literature.
530. (3) Studies in Greek Archaeology.
535. (3) Seminar in Greek History.
540. (3) Seminar in Greek Palaeography.
545. (3) Seminar in 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. [5-1; 5-1]

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 in 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. A major work 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, 403, or 521 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. Not offered in 1972-1973. [3-0; 3-0]

402. (3) Drama.—Plautus, Terence and Seneca. Not offered in 1972-1973. [3-0; 3-0]

403. (3) Lyric and Elegy.—Catullus, Horace and the elegiac poets. Not offered in 1972-1973. [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. Not offered in 1972-1973. [3-0; 3-0]

407. (3) The Roman Historians.—Livy, Tacitus and the *Letters* of Cicero. Not offered in 1972-1973. [3-0; 3-0]

408. (3) Latin Literature in Prose.—The orations and the rhetorical works of Cicero; the Letters of Seneca and Pliny; Quintilian. [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) Studies in Latin Literature.

525. (3) Seminar in Latin Literature.

530. (3) Studies in Roman Archaeology.

535. (3) Seminar in Roman History.

540. (3) Seminar in Latin Palaeography.

545. (3) Seminar in Latin Epigraphy.

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.

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 Adviser 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, attention should also be paid to such courses as Asian Studies 302, 335, and 345, Classical Studies 310, 315 and 316, Creative Writing 405, English 310 and 440, French 400, Germanic Studies 310 and 411, Slavonic Studies 306 and 431, and Theatre 320. The graduate seminars in Comparative Literature are open to suitable qualified fourth-year undergraduates by permission of the instructor. The Chairman of the Programme is Professor Z. Folejewski of the Department of Slavonic Studies.

Graduate Courses:

500. (3) Introduction to Comparative Literature.

501. (1½-3) Studies in Genre.

502. (1½-3) Studies in Literary Movements and Periods.

503. (1½-3) Studies in Myth, Theme and Tradition.

504. (1½-3) Topics in Comparative Literature.

505. (1½-3) New Problems in Comparative Literature.

506. (1½-3) Comparative Studies in Oriental and Occidental Literatures.

547. (3-6) Reading Course.

549. (3-6) Master's Thesis.

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 201 or 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 magazine of current writing, *Prism International.* 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 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; 3-0]

407. (3) Writing of Stage-Plays.—Studio work is required, and some plays may be given workshop-production. [3-0; 3-0]

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.—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]

494. (3) Tutorial in Radio, Screen and Television.—For students who receive departmental permission to do special, advanced work in writing for radio, screen and television. [3-0; 3-0]

495. (3) Tutorial in Translation.—For students who receive departmental permission to do special, advanced work in translation. [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 this genre.

Graduate Courses:

506. (3) Advanced Writing for Radio, Screen and Television.

507. (3) Advanced Writing of Drama for the Stage.

509. (3) Advanced Writing of Fiction.

510. (3) Advanced Writing of Poetry.

515. (3) Advanced Workshop in Translation.

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

Mathematics 100; 121 is recommended.
Economics 200 or 202
Economics 301 *and* 302; or 306 *and* 307*
Economics 325 *and* 326; or 327 *and* 328
Economics 334 or 336, or 434, or 438 *and* another 1½ units in Economics at the 300- or 400-level.
Economics 490
Another 3 units in Economics at the 400-level
Another 3 units in Economics at the 300- or 400-level (except for those taking 306 and 307);
Mathematics 121, 200 and 221; and Economics 306 and 307* are recommended but not required. Economics 420 is especially recommended for students planning to do graduate work in Economics.

*For those with second-class standing or better in Economics 200 or 202.

Students should note the prerequisites for the more senior courses and plan their programme accordingly. Mathematics 100 should normally be taken in the first year. Economics 200 may be taken in the first or second year. Courses at the 400-level are not normally offered outside the regular winter session; thus Economics 301, 302, 325, and 326 (or their equivalents), which may be taken in second year, must be successfully completed *before* the beginning of the student's final year.

Honours

Mathematics 100 *and* 121
Economics 202 or 200
Economics 306 *and* 307 (or 301 *and* 302 with departmental permission)
Economics 325 *and* 326; or 327 *and* 328
Economics 334 or 336 or 434, or 438 and another 1½ units in Economics at the 300- or 400-level.
Economics 495 *and* 499
Another 3 units in Economics at the 400-level
Another 3 units in Economics at the 300- or 400-level
Mathematics 200 and 221, Economics 327 and 328, and Economics 420 are strongly recommended.

To continue in the Honours programme, students must maintain second-class standing or better in their second year and in Economics 202 or 200, and in Economics 306 and 307; in their third year they must attain at least a second-class average in all courses taken in Economics. Students considering taking the Honours Economics programme should consult the Department's advisor for Honours students.

Courses Offered:

Students are referred to the Department of Economics *Undergraduate Handbook* for updated information on courses to be offered in 1972-73.

101. (3) Political Economy.—An introduction to current economic issues. For detailed description, see the *Undergraduate Handbook* of the Department of Economics. [3-0; 3-0]

130. (1½) Introduction to Economic History.—The beginnings of growth in industrially advanced nations; conditions leading to sustained growth. [3-0; 0-0]

140. (1½) An Introduction to Economic Development.—An introduction to economic development emphasizing problems in the emergence and growth of industrial economies. [0-0; 3-0]

200. (3) Principles of Economics.—The institutions and processes involved in the production and distribution of wealth: the functioning of the market, monetary and fiscal policy, and international trade theory. The course also provides an introduction to Canadian economic institutions and policy (e.g., labor unions, marketing boards, the Bank of Canada, anti-combines policy, tariffs, the Government's budget taxation). The presentation is non-mathematical except in sections 30-32 which use some calculus.

Economics 200 is a required course for all students taking a Major or Honours in Economics except those who have completed 202. Students in their third or fourth year who want a survey course in Economics are advised to take Economics 309. Prerequisites: for sections 1-29: none; for sections 30-32: Mathematics 100.

202. (3) Principles of Economics.—To be taken instead of Economics 200 by prospective Honours students; open to others by permission. Prerequisite: Second Class standing in the previous year. [3-0; 3-0]

301. (1½) Intermediate Microeconomic Analysis.—The theory of consumer behaviour, production, the equilibrium of the firm, market structure and forms of competition. Prerequisite: Economics 200 or 202. Section 20 also requires Mathematics 100; section 30 is reserved for graduate students. (Credit may not be obtained for both Economics 301 and 306). [3-0; 0-0]

302. (1½) Intermediate Macroeconomic Analysis.—Income and employment theory, the national accounts, economic fluctuations and economic growth. Prerequisite: Economics 200 or 202. Section 20 also requires Mathematics 100; section 30 is reserved for graduate students. (Credit may not be obtained for both Economics 302 and 307.) [0-0; 3-0]

306. (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. (Credit may not be obtained for Economics 306 and either 301 or 406.) [3-0; 3-0]

307. (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. (Credit may not be obtained for Economics 307 and either 302 or 407.) [3-0; 3-0]

309. (3) Principles of Economics.—The scope of this course is approximately the same as that of Economics 200. It differs in that it deals with fewer topics at a somewhat greater depth, relating theory to contemporary economic issues. It is open only to Third- and Fourth-Year students. Prerequisite: Third or Fourth Year standing. (Credit may not be obtained for both Economics 309 and Economics 200 or 202.) [3-0; 3-0]

312. (3) Political Economy of Capitalism.—An intellectual history of the evolution of the capitalist system and its institutions; a selection of defenses and criticisms of alternatives to capitalism from the writings of leading social and political philosophers of the 18th century through their critics and defenders in the 20th century. Prerequisite: Economics 200 or 202. [3-0; 3-0]

319. (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. Prerequisite: Economics 200 or 202. [3-0; 3-0]

325. (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: Economics 200 (may be taken concurrently) and Mathematics 100. [3-2; 0-0]

326. (1½) Empirical Problems in Economics.—Formulation and investigation of hypotheses in economics; students will be required to undertake applied work. Prerequisite: Economics 325. [0-0; 3-2]

327. (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 200. Students may not receive credit for both Economics 327 and Economics 325 or Mathematics 305. [3-1; 0-0]

328. (1½) Statistical Inference in Economics.—Principles of statistical inference, estimation, hypothesis testing, prediction, up to simple regression and correlation. Prerequisite: Economics 327. Students may not receive credit for both Economics 328 and Economics 326 or Mathematics 305. [0-0; 3-1]

334. (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. Prerequisite: Economics 200 or 202. (Credit may not be obtained for both Economics 334 and 434.) [3-0; 3-0]

336. (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. Prerequisite: Economics 200 or 202. [3-0; 3-0]

343. (3) Economic Development of Asia.—The role of agriculture. Industrialization and planning. Foreign trade and investment. Domestic finance and the mobilization of capital. Population growth and the labour force. Consideration of market and non-market alternatives. (Country coverage will normally include China, Japan and S. E. Asia.) Prerequisite: Economics 200 or 202. [3-0; 3-0]

345. (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. Prerequisite: Economics 200 or 202. (Credit may not be obtained for both Economics 345 and 477.) [3-0; 3-0]

350. (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. Government borrowing and fiscal policy. Prerequisite: Economics 200 or 202. [3-0; 3-0]

355. (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. Prerequisite: Economics 200 or 202. (Credit may not be obtained for both Economics 355 and 455 or 456.) [3-0]

360. (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. Prerequisite: Economics 200 or 202. (Credit may not be obtained for both Economics 360 and 460.) [3-0]

361. (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. Prerequisite: Economics 200 or 202. (Credit may not be obtained for both Economics 361 and 461.) [3-0]

365. (1½) Industrial Organization.—Stresses mergers, bigness, monopoly; firm behaviour under changing structural conditions; public policy. Prerequisite: Economics 200 or 202. (Credit may not be obtained for both Economics 365 and 465 or 466.) [3-0; 0-0]

370. (1½) The Economics of Project and Programme Evaluation.—Techniques and problems in benefit-cost analysis. Optimization in imperfect market conditions. Emphasis on actual and hypothetical case studies of natural resource projects. Prerequisite: Economics 200 or 202. (Credit may not be obtained for both Economics 370 and 470.) [3-0; 0-0]

371. (1½) Problems in Natural Resource Use.—Efficiency criteria in various resource-based industries. Analysis of market failures. Environmental effects and conservation policies. Choice of industries for intensive study will depend on student interest. Prerequisite: Economics 200 or 202. (Credit may not be obtained for both Economics 371 and 470.) [0-0; 3-0]

374. (1½) Land Economics.—Economic analysis applied to problems of land use. Rent theory. Land valuation. Land conservation. Techniques for assessing economic efficiency of land use. Effects of institutions and public policies on land use. Prerequisite: Economics 200 or 202. [3-0]

378. (3) French Canada.—An interdepartmental seminar on the history, economics, and literature of French Canada. Limited to 20 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 202 or equivalent proficiency in French; background knowledge of French Canadian history and literature not required but highly desirable. For details of registration, consult Mr. Kubesh, Department of History. Students who want to use this course to fulful the minimum requirements in either the major or honours programme in Economics must obtain the consent of the Department. [2-1; 2-1]

384. (1½) Economic Analysis of Health Services.—Microeconomic theory of resource allocation with emphasis on the applications of optimizing models of health service markets. Analysis of Canadian problems in health service supply. Models of the consumer/patient, the physician/entrepreneur, the not-for-profit hospital/firm, and the third party regulatory and payment agency. (For students in health service administration. Open to others by arrangement.) Prerequisite: Economics 308. [0-0; 3-0]

388. (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 economics. War-time controls and planning. The mechanics of industrialization. Prerequisite: Economics 200 or 202. [3-0; 3-0]

406. (1½) Advanced Microeconomic Analysis.—Methodology; general equilibrium; welfare economics; micro distribution theories; real theories of capital and interest; the theory of the firm. Prerequisite: Economics 300: or 301 and 302. Credit may not be obtained for both Economics 306 and 406. [3-0; 0-0]

407. (1½) Advanced Macroeconomic Analysis.—General equilibrium macroeconomic models; the economics of inflation; stabilization policy; economic growth; macro theories of distribution. Prerequisites: Economics 300; or 301 *and* 302. Credit may not be obtained for both Economics 307 and 407. [0-0; 3-0]

417. (1½) Welfare Economics.—Social welfare functions; pareto-optimality; the problem of the second-best. Social indifference curves; externalities, and the methodology of normative economics. Prerequisite: Economics 300 or 301 or 306. [0-0; 3-0]

420. (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. Prerequisites: Economics 300, or 301 *and* 302, or 306 *and* 307; Mathematics 200 *and* 221, or permission of the instructor. [3-0; 3-0]

429. (1½) Introduction to Econometrics.—The multiple regression model, applications and extensions. Prerequisite: Economics 328. [3-0]

434. (3) Modern European Economic History. Problems and Methodology.—Economic analysis applied to various historical situations to illuminate the causes of economic growth. Prerequisites: Economics 300, or 301 *and* 302, or 306 *and* 307. (Credit may not be obtained for both Economics 334 and 434.) [3-0; 3-0]

438. (1½) Themes in Western Economic History.—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 301 *and* 302, or 306 *and* 307. [3-0; 0-0]

439. (1½) Problems and Methodology in Economic History.—Changing methods of historical analysis in relation to changes in economic structure. Prerequisite: Economics 300, or 301 *and* 302, or 306 *and* 307; 334 or 336 or 434 or 438. [0-0; 3-0]

440. (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 301 *and* 302, or 306 *and* 307. [3-0]

447. (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. Prerequisites: Economics 300, or 301 *and* 302, or 306 *and* 307. (Students may not receive credit for both Economics 447 and Economics 345.) [3-0]

455. (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. Prerequisite: Economics 300, or 301, or 306. Students may not receive credit for both Economics 355 and 455. [3-0; 0-0]

456. (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. Prerequisites: Economics 300 or 302 or 307. Students may not receive credit for both Economics 355 and 456. [0-0; 3-0]

460. (1½) Economics of Labour Markets.—Economic analysis of the labour market, occupational wage structure; industrial wage structure and the effects of unionization; participation rates and hours of work. Prerequisites: Economics 300, or 301 *and* 302, or 306 *and* 307. (Credit may not be obtained for both Economics 360 and 460.) [3-0; 0-0]

461. (1½) Economics of Labour Policies.—Wage adjustment and incomes policy; demand adjustment; labour mobility and structural unemployment; investment in education and manpower training. Prerequisite: Economics 300, or 301 *and* 302, or 306 *and* 307. (Credit may not be obtained for both Economics 361 and 461.) [0-0; 3-0]

465. (1½) Market Structure.—Identifying and comparing market structures; oligopoly and entry; business concentrations and pricing behaviour. Prerequisite: Economics 300, or 301 or 306. Students may not receive credit for both Economics 365 and 465. [3-0; 0-0]

466. (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 trade-practices. Prerequisite: Economics 306 or 465. Students may not receive credit for both Economics 365 and 466. [0-0; 3-0]

470. (3) Economics of Natural Resources.—Application of economic analysis and welfare economics to problems in managing natural resources. Special attention is given to criteria for optimizing the use of specific resources (forests, fisheries, minerals and petroleum, water, and land) and to issues of market failure and public policy affecting environmental quality, conservation, preservation of nature, and exploration. Prerequisite: Economics 300 or 301 or 306. (Credit may not be obtained for both Economics 470 and 370 or 371.) [3-0; 3-0]

475. (1½-3) Regional Economics.—The concept of a region; location theory; impact analysis; growth theory; regional accounts. Canadian regional economic policy and development. Prerequisites: Economics 300, or 301 *and* 302, or 306 *and* 307. [3-0] or [3-0; 3-0]

480. (1½) Transportation.—Economic characteristics of the provision of transportation services, both passenger and freight, for the various modes; the market structure of the industry and the economic impact of the varying degrees of public regulation and promotion within the industry; the role of economic analysis in resolving problems of Canadian policy. Prerequisite: Economics 300 or 301 or 306. [3-0]

490. (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. Prerequisites: (which may *not* be taken concurrently) Economics 300, or 301 *and* 302, or 306 *and* 307; 325 *and* 326, or 327 *and* 328. [3-0; 3-0]

492. (1½-3) Directed Reading.

495. (3) Honours Seminar.—Reports and group discussions of selected topics. Open only to Honours students. [2-0; 2-0]

499. (3) Honours Essay.—Essay on some theoretical or institutional problem. Open only to Fourth-year Honours students.

In addition to those courses listed on page 91, students in the Economics Major or Honours programmes may take up to three units from the following for credit towards the B.A.: Agricultural Economics 310, 311, (see Agricultural Sciences section for description of courses); and, with the permission of the Department of Economics, courses listed in the Faculty of Commerce and Business Administration.

Graduate Courses:

500. (1½) Micro-Economics I.
501. (1½) Micro-Economics II.
502. (1½) Macroeconomics.
503. (1½) Economic Fluctuations and Growth.
519. (3) History of Economic Analysis.
520. (1½) Mathematical Economics I.
521. (1½) Mathematical Economics II.
525. (3) Applied Statistics and Econometrics.
530. (3) Economic History.
540. (3) Economic Development.
545. (3) Money and Banking.
550. (1½) Government Finance: Expenditures.
551. (1½) Government Finance: Revenues.
555. (1½) International Economics I.
556. (1½) International Economics II.
560. (1½) Economics of Labour.
561. (1½) Topics in Industrial Relations.
565. (1½) Market Structure and Business Behaviour.
566. (1½) Business Performance and Public Policy.
570. (3) Economic Analysis and Natural Resources.
590. (1-3) Special Advanced Course.
592. (1-3) Directed Reading.
594. (3) Research Seminar.
599. (3-6) Master's Thesis.
615. (1½) Special Topics in Economic Theory.
629. (3) Advanced Econometrics.
641. (1½) Problems and Policies in Economic Development.
642. (1½) Workshop in Economic Development and Planning.
645. (3) Banking Processes and Policies.
652. (1½) The Economics of Federalism.
653. (1½) The Economics of Income Security.
654. (1½) Current Issues in Public Finance.
655. (1½) Topics in International Economics.
660. (1½) Topics in the Economics of Labour.
661. (1½) Topics in Industrial Relations.
670. (1½-3) Workshop in Natural Resource Economics.
699. Ph.D. Thesis.

ENGLISH

This Department circulates at the end of each session its own mimeographed pamphlet giving detailed information about the courses to be given in the next academic year. Interested students should write to the Department for a copy of this sub-calendar.

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:
English 200

Major

Third and Fourth Years:
At least 15 units in courses numbered 300 or above, which must be chosen in consultation with a member of the English Majors Committee. English 300 is required of all majors, and certain other courses do not carry major credit.

Honours

Admission
First or Second Class in English 200; or First or high Second Class in *both* English 210 *and* English 300. For admission requirements to English 210 see course listing.

Third and Fourth Years:
English 309, 350, 351 or 352
English 355 or 356
English 365, 366 or 367.
English 375 or 376.
English 491 (Tutorial).
English 492 (Seminar) or 497 (Reading course).
English 499 (Graduating essay). (Creative Writing 499 may be substituted by permission).

Up to 13½ additional units in English courses numbered above 300
6 units in courses outside the department

Third Year standing 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 accepted by the English Honours Committee. Students permitted to take this course must take English 300 concurrently. [3-0; 3-0]

211. (3) Seminar for English Honours.—An introduction to practical criticism; required of and open only to students of English 210. A limited number of texts from a range of genres and periods will be chosen for close critical analysis. [3-0; 3-0]

300. (3) Seminar for English Majors.—Exercises in criticism involving various critical approaches to literature. A limited number of texts will be examined closely. Enrollment is restricted to students accepted by the English Majors Committee. [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]

325. (3) Studies in Major Authors.—The works of no more than two significant writers will be examined; content will vary from year to year. [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 to Thomas Hardy.—The major novelists of the eighteenth and nineteenth centuries. [3-0; 3-0]

341. (3) The English Novel from Joseph Conrad to the Present.—Major developments in the genre in the late nineteenth century and twentieth century. [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 eight plays. [3-0; 3-0]

366. (3) Shakespeare.—Lectures on various aspects of Shakespeare's art. Detailed study of eight plays. (Not offered in 1971-72) [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]

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]

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) Modern Drama.—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:

352. (1½) History of the English Language. [3-0]

356. (1½) Chaucer. [3-0]

367. (3) Shakespeare.—A study of Shakespeare in his historical and cultural context. [3-0; 3-0]

376. (1½) Milton. [3-0]

480. (1½) Studies in Medieval English Literature. [3-0]

481. (1½) Studies in Renaissance English Literature. [3-0]

482. (1½) Studies in Eighteenth Century. [3-0]

483. (1½) Studies in the Nineteenth Century. [3-0]

484. (1½) Studies in British Literature of the Twentieth Century. [3-0]

485. (1½) Studies in American and Canadian Literature of the Twentieth Century. [3-0]

486. (1½) Studies in Criticism. [3-0]

487. (1½) Studies in Drama. [3-0]

488. (1½) Studies in Poetry. [3-0]

489. (1½) Studies in the Novel. [3-0]

491. (3) Third Year Honours Tutorial. [3-0; 3-0]

492. (3) Fourth Year Honours Seminar. [3-0; 3-0]

496. (3) Readings in English Literature.

497. (3) Readings in English Literature.

499. (3) Honours Essay.

Graduate Courses:

500. (1) Research Tools and Methods.—Required of all graduate students lacking the equivalent.

501. (3) Studies in Bibliography.

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) Studies in Old English.

511. (3) Chaucer.

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.

541. (3) Studies in American Literature Since 1890.

545. (3) Studies in Canadian Literature.

546. (3) Studies in Commonwealth Literature.

547. (1-3) Directed reading in fields in which no courses are offered, Part 1.

547. (2) M.A. General Examination, Part 2.

549. (3-6) Master's thesis.

649. Ph.D. Thesis.

FINE ARTS

The Department offers programmes of study that lead to the degrees of M.A., B.A., B.F.A.

Requirements for the degree of Bachelor of Arts:

Major

First and Second Years:

Any 6 units in Fine Arts, of which at least 3 units must be in art history.

Third and Fourth Years:

At least 15 units in Fine Arts courses numbered above 300 and not less than 6 units in courses outside the Department. The student must choose one of the following programmes:

a) Major programme with emphasis on Western Art, which must include:

9 units from Fine Arts 329-347, 365, 429-439, 461, 465, 497.
6 other units.

b) Major programme with emphasis on Asian Art, which must include:

9 units from Fine Arts 351-359, 451-459.
3 units from Fine Arts 329-347, 365, 429-439, 461, 465, 497.
3 other units.

Honours

First and Second Years:

Any 6 units in Fine Arts, of which 3 units must be in art history and in which First or Second Class standing must be obtained.

Third and Fourth Years:

At least 21 units in Fine Arts courses numbered above 300 and not less than 6 units in courses outside the Department. The student must choose one of the following programmes:

a) Honours programme with emphasis on Western Art, which must include:
12 units from Fine Arts 329-347, 365, 429-439, 461, 465, 497.
Fine Arts 375 (must be taken in Third Year).
Fine Arts 499.
3 other units.

b) Honours programme with emphasis on Asian Art, which must include:
9 units from Fine Arts 351-359, 451-459.
3 units from Fine Arts 329-347, 365, 429-439, 461, 465, 497.
Fine Arts 375 (must be taken in third year)
Fine Arts 499
3 other units

A reading knowledge of two of the following languages is strongly recommended: French, German, Italian.

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.

A broadsheet giving details of the B.A. programme and indicating which courses will be offered in any one year will be available from the departmental office.

Requirements for the degree of Bachelor of Fine Arts:

The programme leading to the B.F.A. degree normally consists of four years of study. The first year is in fact the first year of the B.A. programme. Application to enter the B.F.A. programme proper is to be made by 1 April of the student's first year. The number of places available in the programme is strictly limited, hence entry into the programme is by selection. Unsuccessful applicants will be able to continue into the second year of the B.A. programme. In exceptional circumstances, candidates will be considered at the end of the second year of the B.A. programme. Students who have been admitted to the B.F.A. programme may revert to the B.A. programme if this is advisable at the end of the second year.

Prospective candidates may obtain details concerning the principles and procedures governing the selection of students from the Department of Fine Arts.

First Year:

Requirements of First Year B.A., including Fine Arts 181 and 3 units of art history with Second Class standing.

Second Year:

Requirements of Second Year B.A., including Fine Arts 281 (6 units).

Third Year:

At least 18 units in courses in the Faculty of Arts numbered 300 and above, including Fine Arts 381 (9 units) and Fine Arts 339 (3 units).

Fourth Year:

At least 18 units in courses in the Faculty of Arts numbered 300 and above, including Fine Arts 481 (12 units).

Courses Offered:

NOTE: No prerequisite is required for any course unless otherwise noted.

All courses listed below as possible 1½-3-unit courses will be 3-unit courses in 1972-73.

125. (3) History of Western Art.—The history of architecture, sculpture and painting of the Western World from Ancient Egypt and Mesopotamia to the present. [2-1; 2-1]

171. (3) Introduction to the Visual Arts.—An introduction to the study of painting, sculpture and architecture, which will discuss concepts and problems in style, iconography, criticism and aesthetics. Although the course will in part consider historical material, it is not a chronological survey. [2-1; 2-1]

181. (3) Studio I.—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 to prospective Fine Arts majors and B.F.A. students. [2-6; 2-6]

251. (3) History of Asian Art.—A survey of the major art traditions of India, China and Japan. [3-0; 3-0]

261. (3) History of the Art of the Americas.—A general introduction, with particular emphasis on the indigenous arts of the Americas centering on the pre-Columbian civilizations of Mexico, Guatemala and Peru, but also embracing the arts of the Northwest Coast Indians and Eskimos and of Latin America to the present day. [3-0; 3-0]

281. (6) Studio II.—Special course reserved to students enrolled in the B.F.A. programme. [0-12; 0-12]

329. (1½-3) Greek and Roman Art.—Emphasis on the architecture, sculpture, painting and decorative arts of Greece and Rome. (Also listed as Classical Studies 330.) [3-0; 3-0]

331. (1½-3) Early Christian and Byzantine Art. [3-0; 3-0]

333. (1½-3) Romanesque and Gothic Art. [3-0; 3-0]

335. (1½-3) Renaissance and Mannerist Art.—The painting, sculpture and architecture of Italy and Northern Europe from 1400 to 1600. [3-0; 3-0]

337. (1½-3) 17th and 18th Century Art.—The painting, sculpture and architecture of Western Europe from 1600 to 1800. [3-0; 3-0]

339. (1½-3) 19th and 20th Century Art.—Painting and sculpture in Europe and America from 1800 to the present. [3-0; 3-0]

347. (1½-3) 19th and 20th Century Architecture.—Architecture in Europe and America from 1800 to the present. [3-0; 3-0]

351. (1½-3) Chinese Art. [3-0; 3-0]

353. (1½-3) Japanese Art. [3-0; 3-0]

355. (1½) Art of India.—Not offered 1972-73. [3-0; 3-0]

359. (1½) Art of Southeast Asia.—Not offered 1972-73. [3-0; 3-0]

365. (1½-3) Art of North America.—The art and architecture of Canada and the United States of America from the 17th century to the present. [3-0; 3-0]

371. (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. Not offered 1972-73. [3-0; 3-0]

373. (3) Theory and Practice of Art Criticism.—An examination of general questions and problems in art criticism, and the history of art criticism from the 17th century to the present, studied through primary texts. Prerequisite: Fine Arts 339 or the permission of the instructor. Enrolment restricted. Not offered 1972-73. [3-0; 3-0]

375. (3) The Literature of Art (Bibliography).—Required of Honours students (in Third Year) and graduate students. [0-3; 0-3]

381. (9) Studio III.—Special course reserved for students enrolled in the B.F.A. programme. [0-18; 0-18]

383. (3) Studio: Historical Techniques.—The materials and techniques of painting, with special reference to their development and historical importance. Prerequisite: Fine Arts 125 and 181. [0-3; 0-3]

385. (3) Studio: Contemporary Media.—A studio course introducing the student to both the creative procedures and the possibilities of various forms of painting and graphics (drawing and printmaking), 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 181. Open only to students concentrating in Fine Arts, and restricted to 15 students. [0-3; 0-3]

387. (3) 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. Prerequisite: Fine Arts 125 and 181. [0-3; 0-3]

393. (3) History of the Film.—(Also listed as Theatre 330.) [2-2; 2-2]

395. (3) Film Aesthetics and Criticism.—The nature and principles of film as an art and the development and problems of film criticism. Detailed analysis of particular films, and reading and discussion of a considerable number of writings on and related to film. Prerequisite: Theatre 330 and the consent of the instructor. (Also listed as Theatre 431.) [3-0; 3-0]

429. (1½-3) Seminar in the Art of Greece and Rome.—(Also listed as Classical Studies 429.) [0-3; 0-3]

431. (1½-3) Seminar in Early Christian and Byzantine Art. [0-3; 0-3]

433. (1½-3) Seminar in Medieval Art. [0-3; 0-3]

435. (1½-3) Seminar in 15th and 16th Century Art. [0-3; 0-3]

437. (1½-3) Seminar in 17th and 18th Century Art. [0-3; 0-3]

439. (1½-3) Seminar in 19th and 20th Century Art. [0-3; 0-3]

451. (1½-3) Seminar in Chinese Art. [0-3; 0-3]

453. (1½-3) Seminar in Japanese Art. [0-3; 0-3]

455. (1½-3) Seminar in the Art of India. [0-3; 0-3]

459. (1½-3) Seminar in the Art of Southeast Asia. [0-3; 0-3]

461. (1½-3) Seminar in the Art of the Americas. [0-3; 0-3]

465. (1½-3) Seminar in Canadian and American Art. [0-3; 0-3]

471. (1½-3) 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. [2-1; 2-1]

473. (3) Art, Science and Humanism.—The developments of the sciences and the arts from 1600 to the present day. Not offered 1972-73. [3-0; 3-0]

477. (3) Theory and Practice of Art Gallery Administration.—A theoretical and practical study of the nature and functioning of galleries and museums with emphasis on curatorship as a creative decision-making process. For Fourth Year and graduate students who are considering careers in museums and art galleries. Enrolment restricted. [0-3; 0-3]

481. (12) Studio IV.—Special course reserved for students enrolled in the B.F.A. programme. [0-24; 0-24]

497. (3) Directed Study Abroad.

499. (3) Graduating Essay.

Graduate Courses;

529. (3) Studies in Ancient Art.

533. (3) Studies in Medieval Art.

535. (3) Studies in the Art of the Renaissance.

537. (3) Studies in 17th and 18th Century Art.

539. (3) Studies in 19th and 20th Century Art.

541. (3) Special Advanced Course.

551. (3) Studies in Asian Art.

565. (3) Studies in Canadian Art.

571. (3) Problems in the Criticism and Methodology of Fine Arts
Not offered 1972-73

575. (3) Theory and Criticism of Asian Art

591. (3) Directed Study in the Visual Arts

599. (3-6) Master's Thesis.

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 with permission of the Department).

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. (In exceptional circumstances and with permission of the Department, French 220 may be taken in the Third Year.)

One year of university-level Latin or another Romance language is highly recommended

Third and Fourth Years:

French 301, 302, 401, either 402 or 403.

12 additional units in French numbered above 300, including a graduating essay (French 449, 3-6 units)

French 202 or its equivalent is prerequisite to all French language courses numbered 300 and above. French 220 or its equivalent is prerequisite to all French literature courses numbered 401 and above.

Courses offered:

100. (3) Beginning French. [4-2; 4-2]

110. (3) First-Year French.—Prerequisite: French 11. (Not available for credit to students with French 12 or French 100). [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. (May be taken for credit in 2nd Year.) [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 Programme. 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 or 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, corrective phonetics; phonemics, intonation, and training in reading aloud. Prerequisite: French 202 or 220. [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 20 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; background knowledge of French Canadian history and literature not required but highly desirable. For details of registration, consult Department of History. [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]

403. (3) French and Comparative Stylistics.—Techniques and methodology of translation; introduction to French stylistics and its application to textual analysis. Prerequisite: French 302. [3-0; 3-0]

407. (3) Mediaeval French Literature.—Representative literary texts from the eleventh to the fifteenth century. [3-0; 3-0]

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. [3-0; 3-0]

413. (3) Currents of Thought in Nineteenth-Century Literature.—Criticism, history, and other relevant material. [3-0; 3-0]

414. (3) Twentieth-Century Drama.—Representative works and significant trends. [3-0; 3-0]

415. (3) The Twentieth-Century Novel.—Representative works and significant trends. [3-0; 3-0]

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.

449. (3-6) Honours Essay.

Graduate Courses:

500. (1½) Methods of Bibliography and Literary Criticism.

501. (1½-3) Studies in the Literature of Mediaeval France.

502. (1½-3) Studies in Sixteenth-Century Literature.

503. (1½-3) Studies in Seventeenth-Century Literature.

504. (1½-3) Studies in the Seventeenth-Century Novel.

505. (1½-3) Studies in Seventeenth-Century Drama.

506. (1½-3) Studies in the Eighteenth-Century Novel.

507. (1½-3) Studies in the French Enlightenment.

508. (1½-3) Studies in French Romantic Literature.

509. (1½-3) Studies in Post-Romantic Nineteenth-Century Literature.

510. (1½-3) Baudelaire and the Symbolists.

511. (1½-3) Studies in Contemporary French Literature.

512. (1½-3) Studies in Literary Criticism.

513. (1½-3) Studies in French-Canadian Literature.

514. (1½-3) Problems relating to the French Novel.

515. (1½-3) Studies in Romance Philology.
516. (1½-3) Studies in the History of the French Language.
517. (1½-3) Literatures of the French-Speaking World.
519. (1½-3) The Language and Literature of Old Provençal.
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., B.Sc. See **Faculty of Science** for B.Sc.

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 200, 201 (or 102), and at least 3 units from 101, 212 and 213. (Students who have taken Geology 105 are not required to take Geography 101 *provided that* they take Geography 212). Students intending to major in Geography with an emphasis on physical geography must take 212 and 213. Note that 101 is normally a prerequisite for these courses.)

Students intending to major in Geography with an emphasis on physical geography must take *either* Mathematics 100 and 121, *or* Mathematics 130; students intending to emphasize economic or urban geography are normally required to take one of these alternatives.

Students who take Geography 101, 200 **and** 201 in their first year may take up to 3 units from list A (see below) in their second year. (They must still take a total of 15 units of upper year Geography courses during their third and fourth years.)

Third and Fourth Years:

15 units of Geography courses numbered 300 or above, and 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. Geography 345 and 445 are recommended for students intending to do graduate work.

Honours

First and Second Years:

As for Major.

Third and Fourth Years:

21 units of Geography courses numbered 300 or above and selected as follows:

3 units from List A

9 units from List B

3 units from List C

Geography 345, 445 and 449.

15 additional units, normally outside the department.

The Honours programme in Geography differs from the Majors programme in two respects; (a) degree of specialization, and (b) standing, which must be **at least** second class. Students who are interested in the Honours programme should consult with the Department before the end of their second year, or during the pre-registration or registration periods at the beginning of their third year. All Honours programmes require approval by the Department's undergraduate advisers.

Courses Offered:

Note: The designation [3-0; *or* 3-0] means that the course may be taken in either term.

INTRODUCTORY

100. (3) Introduction to Geography.—Discussion of principles and methods of geographical inquiry in physical, cultural and economic geography in the context of a particular region. [2-2; 2-2]

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]

200. (1½) Human Geography.—An introduction to themes, approaches and techniques of human geography, in the context of topics of current concern. [2-1; *or* 2-1]

201. (1½) Locational Analysis.—An introduction to the analysis of the location of population and economic activities and of patterns of circulation. [2-1; *or* 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, and for B.Sc. students in geography. (see Faculty of Science.) Not credited towards the B.A. Programme in geography. [2-1; 2-1]

MAJORS AND HONOURS SEMINARS AND HONOURS ESSAY

345. (1½) Seminar.—Development of contemporary geographical methodology; geography as a professional field. For geography majors, normally in third year, with at least second-class standing. [2-2; 2-2]

445. (1½) Seminar.—Geographical methodology and its relations to allied fields. Students taking this course should normally be in fourth year. Prerequisite: Geography 345. [0-0; 1-2]

448. (1½) Directed Studies in Geography.

449. (3) Honours Essay.—(For B.Sc. students this course is offered only for 1½ units. See Faculty of Science.)

LIST A — Technique Courses

Students from other fields who have a special interest in the courses listed below should consult the departmental advisers if they do not have the prerequisites. These courses are primarily intended for Third Year students.

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 or equivalent. [2-3; 0-0]

371. (1½) Research Techniques in Geography.—Methods for observing, recording and analysing data; research methodologies. For geography majors only. [0-0; 2-2]

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 or equivalent. [0-0; 2-2]

373. (1½) Cartographic Design.—Historical cartography; projection systems; design problems; map evaluation. For geography majors only. (Not offered in 1972-73. Geography 373 and 470 will normally be offered in alternate years.)

374. (1½) Statistics in Geography I.—Introduction to statistical techniques and their application to geographical problems. Taught in two sections: first-year mathematics is prerequisite in Section A; there is no prerequisite in Section B. [3-2; 0-0]

375. (1½) Statistics in Geography II.—Intermediate statistical techniques and their application to geographical problems. Prerequisite: Geography 374. [0-0; 3-2]

379. (1½) Physical Geography Field Course.—Field practice, surveying techniques, field instrumentation and mapping of elements of the physical environment. The course will include two hours of lectures per week during the Spring Term of the student's third year and two weeks' residence at a field camp prior to the commencement of the student's fourth year. A fee of $75.00 will be charged to cover the cost of accommodation and food; students will be responsible for transportation to and from the field camp and for liability insurance. Students should pre-register with the Department of Geography during the first term of their third year; they will not obtain credit until their fourth year. Prerequisites: Geography 212 or 213. [0-0; 2-2]

470. (1½) Aerial Photographs in Geographical Enquiry.—Conventional aerial photographs and their applications in mapping; remote sensing; characteristics and interpretation of multi-spectral imagery; sample applications in land inventory and resource management. Prerequisite: Geography 370 or instructor's permission. [0-0; 2-2]

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 do not have the prerequisites.

212. (1½) Introduction to Climatology.—An introduction to the atmospheric variables and the processes governing their distributions in the Earth-Atmosphere system. Atmospheric energy, moisture and motion. Weather disturbances and the climate of North America. Prerequisite: Geography 101 or instructor's permission. [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 or instructor's permission. [0-0; 2-2]

214. (1½) Climatology and Forestry.—(Mainly for students in the Faculty of Forestry)—An introduction to the fundamental processes and concepts of climatology. Atmospheric energy, moisture and motion. Microclimate of forests, clearings, shelterbelts. Air pollution. [2-2; 0-0]

310. (1½) Atmosphere and Environment.—The relation of the principles of climatology to environmental interactions. Large- and small-scale interactions between the atmosphere and soils, vegetation, water, cities and man. Topics in applied climatology including air pollution, weather modification, physiologic climatology. Prerequisite: Geography 212. [0-0; 3-0]

311. (1½) Climatology.—Spatial and temporal variations of the heat and water balances in the Earth-Atmosphere system. Especially solar and infrared radiation and their measurement. Air pollution climatology including atmospheric controls and effects. Air pollution models. Prerequisite: Geography 212 or instructor's permission. [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. [0-0; 2-2]

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 or equivalent. [0-0; 2-2]

316. (1½) Trace Elements and the Human Environment.—Physical environmental factors in human ecology with emphasis upon the role of trace elements in environmental epidemiology. Laboratory work on water, soil and vegetal sampling to enable students to carry out studies of trace elements in relation to agriculture, forestry, mining or epidemiology. Prerequisite: Permission of instructor. [2-2; 0-0]

324. (1½) Cultural Geography.—Geographic aspects of culture; culture areas and cultural landscapes; patterns and processes of cultural change; cultural ecology. Prerequisite: Geography 200. [2-1; 2-1]

327. (3) Historical Geography of Canada.—A discussion of the evolving settlements, landscapes, and regional patterns of Canadian life before the 20th century. [2-1; 2-1]

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 200 or 201 (102); open to majors and honours students in history and political science. [3-0; or 3-0]

350. (1½) Introduction to Urban Geography.—Theories of urban location; aspects of the urban economy; internal structure of cities; urban trends, problems and public policy. Prerequisite: Geography 200 or 201 (102). [3-0; *or* 3-0]

351. (1½) Geography of Urbanization.—Geographic perspectives on the growth of urban regions: pre-industrial cities, urban growth during industrialization, anti-urban reaction, problems of the modern metropolitan region. Prerequisite: Geography 200 or 201 (102). [3-0; or 3-0]

360. (1½) Geography of Manufacturing.—Major themes in the geographic study of manufacturing activities, with emphasis on location theory. Prerequisite: Geography 200 or 201 (102). [0-0; 2-1]

361. (1½) Introduction to Regional Analysis.—Theoretical and technical aspects of the analysis of regional economies. Prerequisite: Geography 200 or 201 (102). [2-1; 0-0]

366. (1½-3) Geography and Natural Resources.—Concepts of natural resources, environment and conservation; the geographical and other approaches to the study of resources; case-studies of selected man-land systems at various areal scales, geographical analysis of energy, agricultural, mineral and forest raw materials and their significance in national and world affairs. Prerequisite: Geography 101 or equivalent. [2-1; 2-1]

411. (1½-3) Microclimatology.—Microscale balances of energy and mass. Solar and infra-red radiation, soil heat flux and the turbulent transport of heat, water vapour and momentum in the lower atmosphere. The microclimate of snow, water, soil, plant and urban surfaces. Instrumentation and field techniques. Prerequisite: Geography 311 or instructor's permission. [3-0; 3-0]

412. (3) Geomorphology I.—See Geology 412 in **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). [2-2; 0-0]

417. (1½) Permafrost and the Arctic and Alpine Environments.—An analysis of permafrost, periglacial forms, underground ice, and related physical features of the environment in the arctic, subarctic and alpine areas of Canada. Importance of environmental factors in northern development. Prerequisite: Geography 101 or equivalent. Not given 1972-73.

423. (1½) Attitudes Towards the North American Environment.—A discussion of attitudes, from the first discoveries to the present day, that have influenced the land use of the continent. Prerequisite: Geography 327 or consent of instructor. [1-2; 0-0]

424. (1½) Problems in Historical and Cultural Geography.—Detailed analysis of selected themes in various cultural realms. Prerequisite: Geography 324. [2-1; 0-0]

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, resources, and transportation. Prerequisite: Geography 360, and one of 350, 351, 361. [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. [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. [2-1; 0-0]

464. (1½) Spatial Interaction.—The concepts of distance and accessibility; theories relating to diffusion, commodity flow and human travel behaviour, and their application to economic activity analysis. Prerequisites: two of Geography 350, 351, 360, 361. [0-0; 2-1]

LIST C — Regional Courses

Students from other fields who have a special interest in the courses listed below should consult the departmental advisers. The 400-level courses are primarily intended for Fourth Year students.

396. (1½) Introduction to the Geography of Monsoon Asia.—A comparative regional analysis stressing the historical development and changing cultural, economic and political patterns of the area. Special reference to India, Malaysia, China and Japan. [3-0; 0-0]

481. (1½) Geography of Japan.—A critical analysis of significant human adaptations to changing ecological conditions in the Japanese archipelago. Prerequisite: Geography 396 or instructor's permission. [0-0; 2-2]

482. (1½) Geography of China.—A critical analysis of significant human adaptations to changing ecological conditions in the Chinese cultural realm. Prerequisite: Geography 396 or instructor's permission. [2-1; 0-0]

483. (1½) Geography of South Asia.—A critical analysis of significant human adaptations to changing ecological conditions in the Indian subcontinent. Prerequisite: Geography 396 or instructor's permission. [0-0; 2-1]

484. (1½) Geography of Southeast Asia.—A critical analysis of significant human adaptations to changing ecological conditions in the region, with particular reference to the Malay World. Prerequisite: Geography 396 or instructor's permission. (Not offered in 1972-73)

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. Field trips required. [2-1; 2-1]

492. (3) Regional Geography of the United States.—(Only offered in Summer Session)

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 diseussion of selected Spanish American regions. Emphasis on developmental problems. [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. [3-0; 0-0]

498. (3) Geography of Europe.—A regional analysis of diversity in the landscapes, cultures, and traditional political fragmentation, and of the contemporary trend towards economic and political unity in Europe. [2-1; 2-1]

499. (3) Geography of Canada.—Selected aspects of six regions of Canada; physical environment, natural resources, primary industries, urban patterns. Course will stress the regional method of study. [3-0; 3-0]

Graduate Courses and Seminars:

First Year:

500. (1½) Physical Geography.

501. (1½) Economic Geography.

502. (1½) Cultural and Historical Geography.
503. (1½) Political Geography.
504. (1½) Geomorphology II.
505. (1½) Climatology and Hydrology.
506. (1½) Economic Geography.
507. (1½) Urban Geography.
508. (1½) Political Geography.
509. (1½) Cultural and Historical Geography.
510. (1½) Cartographic and Quantitative Analysis.
511. (1½) Modelling Techniques in Geography.
512. (1½) Techniques of Spatial Analysis.
513. (1½) Research Sources for Regional Study.
514. (1½) Contemporary Geographic Methodology.
515. (1½) History of Geographic Methodology.
516. (1½-3) Heat and Water Balance Climatology.
521. (1½) Permafrost.

Second Year and above:

560. (1½-3) Geomorphology III.
570. (1½-3) Economic Geography.
571. (1½-3) Urban and Transportation Geography.
572. (1½-3) Spatial Interaction.
580. (1½-3) Canada.
581. (1½-3) Western Arctic.
582. (1½-3) Monsoon Asia.
583. (1½-3) U.S.S.R.
584. (1½-3) Latin America.
600. Doctoral Research Seminar

Readings and Theses:

550. (1½-3) Directed Reading.
599. (6) M.A. Thesis.
699. Ph.D. Thesis.

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, and 223. (German 223 may be taken in Third Year)

Third and Fourth Years:

15 units in courses numbered 300 or above, including:
German 310, 350, 400

Honours

Third and Fourth Years:

German 310, 350, 400, 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:

(i) Courses in GERMAN

NOTE: Courses numbered 400 and above are normally given in alternate years. The department should be consulted as to whether courses with 1½ units of credit will be given in the first or second term.

100. (3) First-Year German.—Introduction to the language. (See also German 123.) [3-1; 3-1]

101. (3) See under Germanic Studies.

110. (3) First-Year German.—Review of grammar; extensive reading. Prerequisite: German 11. [4-0; 4-0]

120. (3) First-Year German.—Grammar, composition, extensive reading. Prerequisite: German 12 or First Class in German 11. [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]

301. (3) See under Germanic Studies.

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. (3) Survey of German Literature to 1700. [3-0; 3-0]

402. (1½-3) Currents of Thought in Eighteenth-Century Literature. [3-0]

403. (3) Studies in the Classical Period. [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. (1½-3) Studies in Nineteeth-Century Drama.—Intensive study and critical interpretation of major dramatists. [3-0]

407. (1½-3) German Poetry from Goethe to Nietzsche.—The work of representative poets against the background of changing literary values. [3-0; 3-0]

408. (3) The Novel in the Twentieth Century. [3-0; 3-0]

409. (3) Twentieth-Century Drama.—Critical interpretation of representative dramas from Naturalism to the present. [3-0; 3-0]

410. (1½-3) Twentieth-Century Poetry.—The lyric of the twentieth century with special emphasis on interpretation. [3-0; 3-0]

430. (3) German Technical Translation.—This course aims to develop a reading knowledge of German, sufficient to enable students to understand scientific and scholarly material. It provides basic grammar and practice in the translation of texts in the natural sciences, the social sciences and the humanities into English. [4-0; 4-0]

439. (3) Fourth Year Honours Seminar. [0-2; 0-2]

449. (3) Honours Essay.

(ii) Courses in GERMANIC STUDIES

101. (3) Contemporary German Literature in Translation.—Reading and discussion of major works of literature since 1945, illustrating the influence primarily of Kafka and Brecht, experimentalism in the novel and lyric poetry, documentary literature and the absurdist and political theatre. The course will stress the relationship between the writer and society and works will therefore be read not only in terms of their literary significance but also for their social, political or historical relevance. [3-0; 3-0]

201. (3) Great German Literary Works in Translation.—A study of individual great works from the medieval period to the twentieth century. Lectures on literary movements and reading and class discussion of individual texts, including works by such figures as Goethe, Hesse and Thomas Mann. [3-0; 3-0]

301. (3) History of German Civilization.—Development of German culture from its beginnings to the nineteenth century. Lectures and discussions. [3-0; 3-0]

411. (3) Introduction to Scandinavian Literature.—An outline of the general scope of the literature of Sweden, Norway and Denmark in modern times with emphasis on the reading of works (in English translation) by Strindberg, Ibsen, and Hamsun and their influence on European and American literature. [3-0; 3-0]

Graduate Courses:

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.
507. (1½-3) Studies in Literary Criticism.
508. (1½-3) Gothic and Comparative Germanic Linguistics.
509. (1½-3) The Enlightenment.
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) 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.

HISPANIC AND ITALIAN STUDIES

The Department offers programmes of study that lead to the degrees of Ph.D., 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 400, 499
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.—An accelerated course. Grammar, reading, composition, with special emphasis on the spoken language. This course is equivalent to Italian 100 and 200. [6-0; 6-0]

200. (3) Second-Year Italian.—Reading, writing and oral practice, with constant and systematic reference to the grammatical structure of the language. Prerequisite: Italian 100. [3-0; 3-0]

223. (3) Advanced Conversation. [4-0; 4-0]

300. (3) Introduction to Italian for Senior Students.—An intensive course aiming to impart a reasonable degree of proficiency in spoken and written Italian. Basic grammar, conversation, progressive reading of literary texts. Prerequisite: a good knowledge of another Romance language or Latin. [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) Advanced Studies in Italian Language and Style.—Required for Honours students. [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.—Bruno, Campanella, 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, 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.

(ii) Courses in PORTUGUESE

300. (3) Introductory Portuguese.—Prerequisite: Completion of a course in Latin or a Romance language numbered 200 or above. [3-0; 3-0]

400. (3) Advanced Portuguese.—Studies in Portuguese and Brazilian literature and history. [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.—An accelerated course. Grammar, reading, composition, with special emphasis on the spoken language. This course is equivalent to Spanish 100 and 200. [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 standing in Spanish 100. [3-0; 3-0]

300. (3) Advanced Language 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. [3-0; 3-0]

409. (3) Latin-American History. [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) Hispanic 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.

(iv) Courses in ROMANCE STUDIES

420. (3) Studies in Romance Languages and Literature. [3-0; 3-0]

520. (3) Studies in Romance Languages and Literature.

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, 206, or 212, 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 and 333

3 units in History

6 units selected from the following:

History 309, 422, 424, 435
Political Science 308, 311, 409, 411
Economics 301, 302, 355, 388, 440, 455, 456
Anthropology 412, 430
Asian Studies 405, 420
Slavonic Studies 441
Geography 337, 437
Sociology 461

Fourth Year:

History 421, 449

One of History 332, 430, 432

A comprehensive written examination

An oral examination on the graduating essay and the field of specialization

The following courses outside the Department may be counted toward the Major:

One of:

Classical Studies 331, 332, 333, 431, 433, 435

One of:

Asian Studies 405, 417, 420
Anthropology 330
Economics 334, 336, 434, 438, 439
Geography 327
Greek 306
Latin 407
Political Science 300, 400, 408, 414, 415
Sociology 464, 468

Courses Offered:

Brochures are available from the departmental office describing in detail the courses offered each year under History 100-199 and under History 300-499.

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]
308. (3) Economic History of Europe, 1350-1750. [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 course should precede History 405 if both are planned. [3-0; 3-0]
324. (3) History of East Central Europe in the 19th and 20th Centuries. [3-0; 3-0]
325. (3) German-Slav Relations from the Ninth-Century to 1945. [3-0; 3-0]
331. (3) Diplomatic History of Early Modern Europe. [3-0; 3-0]
332. (3) Diplomacy of the Great Powers from the Napoleonic Era to the 20th Century. [3-0; 3-0]
400. (3) Intellectual History of Modern Europe. [3-0; 3-0]

402. (1½) Problems in International Relations: Diplomacy and the Origins of Wars.—A study of the relationship of the diplomatic factor to other factors in the origins of the First and Second World Wars. (This seminar is open only to 4th Year students in the Majors Programme in International Relations.) [3-0; 0-0]

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]
431. (3) Population in History. [3-0; 3-0]
432. (3) Diplomacy of the Great Powers from the Early 20th Century. [3-0; 3-0]
435. (3) Communist Movements in Eastern Europe since 1900. [3-0; 3-0]

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 Area. [3-0; 3-0]
314. (3) History of West Africa and Southern Africa. [3-0; 3-0]
411. (3) History of Australia and New Zealand. [3-0; 3-0]

Canadian History

303. (3) History of the Canadian West. [2-1; 2-1]
307. (3) French Canada in the 17th and 18th Centuries. [3-0; 3-0]
326. (3) British North America, 1763-1867. [3-0; 3-0]
329. (3) The Social Development of Canada. [3-0; 3-0]
401. (3) French Canada from the End of the 18th Century to the Present. [3-0; 3-0]

403. (3) French Canada.—An interdepartmental seminar on the history, economics, and literature of French Canada. Limited to 20 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; background knowledge of French Canadian history and literature not required but highly desirable. For details of registration, consult Department of History.

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 Confederation. [3-0; 3-0]
437. (3) The American Impact on Canada. [2-1; 2-1]

American History

327. (3) American Colonial and Revolutionary History. [3-0; 3-0]
328. (3) The United States, 1789-1877. [3-0; 3-0]
414. (3) Latin-American History.—See Spanish 409. [3-0; 3-0]
427. (3) The United States since 1877. [3-0; 3-0]
428. (3) Intellectual History of the United States from the Colonial Period to the Present Day. [3-0; 3-0]
429. (3) History of the American West. [3-0; 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; 3-0]
410. (3) History of India since 1526. [2-1; 2-1]
422. (3) Modern Japanese History Since 1868. [3-0; 3-0]
424. (3) Modern Chinese History Since 1840. [3-0; 3-0]
434. (3) History of Southeast Asia Since 1800. [3-0; 3-0]

See also Asian Studies 320 (History of Chinese Civilization), Asian Studies 330 (History of Japanese Civilization), and Asian Studies 340 (History of Indian Civilization). These courses count for credit towards a History major.

Honours Courses (For Honours students only)

321. (6) Tutorial. [0-2; 0-2]
322. (6) Tutorial. [0-2; 0-2]
333. (3) Third-Year Honours Seminar. [0-2; 0-2]
421. (6) Tutorial. [0-2; 0-2]
433. (3) Fourth-Year Honours Seminar. [0-2; 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. (3) Readings in Comparative Asian History.
571. (3) Readings in Chinese History.
572. (3) Readings in Japanese History.
573. (3) Readings in Southeast Asian History.
574. (3) Readings in South Asian History.
575. (6) Seminar in Comparative Asian History.
576. (6) Seminar in Chinese History.
577. (6) Seminar in Japanese History.
578. (6) Seminar in Southeast Asian History.
579. (6) Seminar in South Asian History.
580-581. (3) Readings in Intellectual History.
584-585. (3) Readings in Economic and Social History.
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:
Anthropology 202.
Asian Studies 105, 115, 206.
Economics 200.
Geography 200, 201 (1½ units each).
Political Science 200, 201, 202, 203 (1½ units each)
Slavonic Studies 205.

Students who plan to concentrate in the Economics group in the Third and Fourth Years must take Economics 200 in First or Second Year. *Either* Economics 301 and 302 *or* Economics 306 and 307 are 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:

16½ units including:

Either Political Science 445 Economics 359 (1½) *or* Psychology 475 (1½) (Open to Fourth-Year students only)

One of History 331, 332, 430, 432

One of Political Science 308, 311, 409, 411

9 units from one or two of the following groups:

Asian Relations

Anthropology 302-3
Anthropology 403-9
Anthropology 430 (Prerequisite: Anthropology 200 and permission of the Department)
Asian Studies 405
Asian Studies 420
Economics 343
Geography 396 (1½)
Geography 481 (1½)
Geography 482 (1½)
Geography 483 (1½)
Geography 484 (1½)
History 309
History 410
History 422
History 424
History 434
Political Science 412
Political Science 413
Political Science 414 (1½)
Political Science 415 (1½)

Economics

Anthropology 330
Anthropology 430 (Prerequisite: Anthropology 200 and permission of the Department)
Economics 334
Economics 343
Economics 355 (1½) or *both* 455 (1½) *and* 456 (1½)
Economics 388
Economics 434
Economics 440

General International Politics

Anthropology 430 (Prerequisite: Anthropology 200 and permission of the Department)
Geography 337 (1½)
Geography 437 (1½)
Geography 495
Geography 498
History 310
History 331
History 332
History 407
History 425
History 430
History 432
History 436
Political Science 308
Political Science 311
Political Science 409
Political Science 411
Political Science 417 (1½)
Political Science 444
Psychology 308
Sociology 460
Sociology 461 (Prerequisite: a Second-Year Sociology course)

Soviet and Eastern Europe

Geography 494
History 405
History 435
Political Science 408
Political Science 409
Slavonic Studies 340
Slavonic Studies 412
Slavonic Studies 441

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 (History), Minghi (Geography), Holland (Asian Studies), Holsti and Zacher (Political Science).

LINGUISTICS

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:

Two years of a language other than English.

Second Year:

Linguistics 200 and 205.

Third and Fourth Years:

15 units of Linguistics or cognate courses.

Courses offered:

100. (3) Introduction to General Linguistics.—The nature of language; the major language families of the world. Linguistic change: languages and dialects; history of language. Universal features of language: typology and the comparative study of languages. Sound systems; writing systems; theories of grammar; dictionaries; the study of meaning. Language and the individual; language and society. Applications of linguistics. [3-0; 3-0]

200. (3) General Linguistics: Part I.—Introduction to phonetics and phonology. Training in the identification and production of speech sounds through articulatory phonetics. Principles and methods for describing and writing the sound system of a language. Phonological theory and practice with reference to examples from selected languages. Laboratory practice. Prerequisite: one year of a language other than English at the first year level or its equivalent. [2-1; 2-1]

205. (3) General Linguistics: Part II.—Introduction to grammatical analysis: morphology and syntax. A general introduction to the techniques of synchronic language analysis and description. Illustrations from various languages. Prerequisite: one year of a language other than English, at the first year level or its equivalent. [3-0; 3-0]

300. (3) Studies in Linguistics.—Linguistic analysis and description: Phonology, morphology, syntax, semantics. Prerequisite: Linguistics 200 and 205. [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. Prerequisite: Linguistics 200 and 205 or permission of the Department. [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. This course deals with some of the basic processes in the speech chain including a review of psycho-physical methods, the anatomy of the speech mechanism, review of articulatory theories and an outline of speech perception research. A brief introduction to instrumentation in experimental phonetics is included. [3-0; 3-0]

435. (3) Contrastive Linguistics.—Introduction to the contrastive study of languages at all levels of analysis—phonological, morphological, syntactic and semantic; the theoretical aspects of linguistic interference from substratum, superstratum or adstratum sources, as well as from the mother tongue in second-language learning. From these theoretical comparisons between languages, models will be constructed to illustrate the differences and similarities between the languages under study. [3-0; 3-0]

440. (3) Regional Linguistics.—Introduction to the diatopic study of language: linguistic surveys, linguistic atlases. [3-0; 3-0]

445. (3) Sociolinguistics.—The systematic study of language as a social phenomenon: language in its social setting; language and social change; the social context of speech and the function of language varieties from the

speakers' point of view; language use, language attitudes, and language norms in small group interactions as well as in large speech communities, including multilingual situations. The material will, of course, be treated primarily from a linguistic point of view. [3-0; 3-0]

Graduate Programme

510. (1½-3) Problems in Phonology.
519. (1½-3) Problems in Comparative and Historical Linguistics.
520. (1½-3) Problems in Grammatical Analysis.
525. (1½-3) Problems in Semantics.
530. (1½-3) Linguistic Problems in a Special Area.
532. (1½-3) Field Methods in Linguistics.
535. (1½-3) Contrastive Linguistics.
540. (1½-3) Problems in Dialectology.
549. (3-9) Master's Thesis.

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.
Computer Science 503: Computational Linguistics No. I.
Computer Science 523: Computational Linguistics No. II.
Education 478: Teaching English as a Second Language.
Education 489: Linguistics for Teachers.
English 309: Modern English and its Background.
English 351: History of the English Language.
English 508: Studies in the History and Structure of the English Language.
French 308: History of the French Language.
French 515: Romance Philology.
French 516: Studies in the History of the French Language.
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.
Philosophy 450: Philosophy of Language.
Psychology 521: Psycholinguistics.
Russian 303: Introduction to Russian Linguistics.
Russian 501: History of the Russian Language.
Russian 503: Russian Linguistics. Phonemics.
Russian 504: Russian Linguistics. Morphophonemics.
Russian 505: Russian Linguistics. Lexicology.
Russian 506: Russian Linguistics. Syntax.
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 **Faculty of Science.** Students should also consult **Faculty of Science** for information on language requirements and course prerequisites and for all course descriptions.

Requirements for the degree of Bachelor of Arts:

The first digit in the number of a course is intended to convey the level of mathematical maturity at which the course is conducted rather than the year in which it must be taken. However, students should consult an adviser in the Department of Mathematics as soon as possible in their First Year, to make up a programme to suit their interests and ability.

Major

Mathematics 100, 120, 121; 200, 221, 222; and 15 units of Mathematics courses numbered 300 or above. (3 of these units may be in a related area, to be selected in consultation with the Head of the Mathematics Department.)

Although students are advised to take Mathematics 100, 120 and 121 in their First Year and Mathematics 200, 221 and 222 in their Second Year, they are free to delay some of these courses until later. However, they should note that Mathematics 120, 121 are prerequisites for some second year courses. Accordingly, they should consult an advisor in the Department of Mathematics as soon as possible in their first year.

Honours

First Year:
Mathematics 100, 120, 121.

Second Year:
Mathematics 200, 220, 221, 222.

Third Year:
Mathematics 320, 322 and *either* 300 *or* 321.

Fourth Year:
Two of the following: Mathematics 400, 420, 421, 422, 423, 424, 425. 6 additional units of Mathematics courses numbered 300 or above.*

To permit them the maximum range of choice in their Fourth Year, students are advised to take the sequence indicated above in their first three years. However, they are free to take courses in any order they may wish, subject only to meeting the prerequisites of the various courses.

*In the 1972-73 session, mathematics credit will be given for Computer Science 402.

For a description of the courses offered by the Department of Mathematics see **Faculty of Science.**

MUSIC

General Information

The Department of Music offers programmes of study that lead to the degrees of M.Mus., B.Ed., B.Mus., B.A.

Requirements for the degree of Bachelor of Music:

Admission:

1. The entering class may be limited to seventy 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.

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 lecture-concerts 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 and colleges 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 institutions; (3) whether a student will be permitted to continue on 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; études, 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 believes 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.

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
(146)	PIANO	3	(247)	PIANO	4
	[1]Large Ensemble	1		Large Ensemble	1
(100)	English	3	(200)	English	3
	[2]Elective in Arts	3		Elective in Arts	3
		16			17
Third Year			*Fourth Year*		
(300)	Theory of Music III	3	(440)	Piano Techniques	2
(347)	PIANO	4	(448)	PIANO (Recital)	5
(149)	Accompanying I	1	(249)	Accompanying II	1
(161)	Piano Chamber Ensemble	1	(161)	Piano Chamber Ensemble	1
(422)	History of Keyboard Music	3		Electives in Arts	6
	Music Elective	3			15
	Electives in Arts	3			
		18			

[1] *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.

[2] *Electives in Arts:* Courses outside Music carrying credit in the Faculty of Arts, elected after consultation with the Department of Music.

Major in Organ

Students who plan to pursue a career as a recitalist, teacher of organ or church organist should enrol in this course.

All students will be auditioned in *piano* during fall registration week and will be expected to have reached the level of Grade X for the Western Board or the Toronto Conservatory. As is the case for piano performance, however, the mere possession of a diploma is no guarantee of entrance.

Each organ student will be reexamined toward the end of each year of study to determine if sufficient progress has been made to allow for continuing in this field.

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
(146)	ORGAN	3	(247)	ORGAN	4
(144)	Piano	1	(244)	Piano	1
	[1]Large Ensemble	1		Large Ensemble	1
(100)	English	3	(200)	English	3
	[2]Liberal Arts Elective	3		Liberal Arts Elective	3
		17			18
Third Year			*Fourth Year*		
(300)	Theory of Music III	3	(400)	Theory of Music IV	3
(347)	ORGAN	4	(448)	ORGAN (Recital)	5
(149)	Accompanying I	1	(249)	Accompanying II (Organ)	1
(306)	Conducting	2	(440)	Keyboard Techniques (Organ)	2
(422)	History of Keyboard Music	3		Liberal Arts Electives	6
	[3]Religious Studies	3			17
		16			

[1] *Large Ensemble.* Students will enrol in either Music 153 (University Singers) or Music 154 (Choral Union) with the permission of the Department.

[2] *Liberal Arts Electives.* Non-music courses gaining credit in the Faculty of Arts, elected after consultation with the Department of Music.

[3] *Religious Studies.* To be elected after consultation with the Department of Religious Studies and Music. Students are also advised to take one or more non-credit courses from one of the religious colleges on campus after consultation with the Department of Music and the college concerned.

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)	[1]Piano	1	(244)	Piano	1
	[2]Large Ensemble	1		Large Ensemble	1
(100)	English	3	(200)	English	3
	[3]French	3		[3]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		[4]Chamber Ensemble	1
(424)	History of Vocal Music	3		Music Elective	3
	Large Ensemble	1		[5]Electives in Arts	6
	[4]Chamber Ensemble	1			15
	[3]Italian	3			
		17			

(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
	[3]Italian	3		Electives in Arts	6
	[5]Electives in Arts	3			17
		17			

[1] *Piano:* A minimum of two years of study regardless of entering level.

[2] *Large Ensemble:* Students will enrol in either Music 153 (University Singers) or Music 154 (University Choral Union).

[3] *Languages other than English:* In certain cases students may concentrate on one or two of the languages required, and the indicated sequence may be altered.

[4] *Chamber Ensemble:* Students will elect either Music 155 (Chamber Singers) or Music 156 (Collegium Musicum: Vocal Ensemble).

[5] *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

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.

MAJOR IN AN ORCHESTRAL INSTRUMENT

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
(146)	CONCENTRATION INSTRUMENT	3	(247)	CONCENTRATION INSTRUMENT	4
(144)	[1]Piano	1	(244)	Piano	1
	[2]Large Ensemble	1		Large Ensemble	1
	[3]Chamber Ensemble	1		Chamber Ensemble	1
(100)	English	3	(200)	English	3
	[4]Elective in Arts	3			16
		18			

Third Year			*Fourth Year*		
(300)	Theory of Music III	3	(448)	CONCENTRATION INSTR. (Recital)	5
(347)	CONCENTRATION INSTRUMENT	4		Large Ensemble	1
(306)	Conducting	2		Chamber Ensemble	1
(309)	Orchestration	2		Music Elective	3
	Large Ensemble	1		Electives in Arts	6
	Chamber Ensemble	1			16
	Elective in Arts	3			
		16			

[1] *Piano:* A minimum of two years must be studied regardless of entering level.

[2] *Large Ensemble:* String students will enrol in Music 150 (Orchestra). Wind students will enrol in Music 152 (Wind Ensembles).

[3] *Chamber Ensemble:* String students will enrol in Music 160 (String Chamber Ensembles). Wind students will enrol in Music 152 (Wind Ensembles).

[4] *Electives in Arts:* Courses outside Music carrying credit in the Faculty of Arts will be elected after consultation with the Department of Music.

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 this course also elect one non-musical area for a teaching major in addition to 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 **Faculty of Education** for requirements.)

Graduates in General Music will be qualified to direct orchestras, bands and choruses in all grades, and to develop instrumental and choral programmes in elementary and secondary schools. The course is so planned as to train each student 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 student is required to study for three or four years with the Faculty in a concentration of his or her own choice (excluding piano): voice, strings, woodwinds or brasses.

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)	[1]Concentration Field	2	(245)	Concentration Field	2
(144)	[2]Secondary Field	1	(244)	Secondary Field	1
	[3]Large Ensemble	1	(140)	Class Strings	2
(100)	English	3		Large Ensemble	1
	[4]Elective in Arts	3	(200)	English	3
		16		[4]Elective in Arts	3
					18

Third Year			*Fourth Year*		
(300)	Theory of Music III	3	(309)	Orchestration	2
(306)	Conducting	2	(445)	Concentration Field	2
(345)	Concentration Field	2	(444)	Secondary Field	1
(344)	Secondary Field	1	(141)	Class Brasses—Percussion	2
(142)	Class Woodwinds	2		Large Ensemble	1
	Large Ensemble	1		Chamber Ensemble	1
	[5]Chamber Ensemble	1		Music Elective	3
	Music Elective	3		Electives in Arts	6
	Elective in Arts	3			18
		18			

[1] *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.

[2]*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.

[3]*Large Ensemble:* Students whose instrument is woodwind or brass will enrol 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 enrol in Music 150, University Orchestra; students in voice will enrol in either Music 153 or Music 154.

[4]*Electives in Arts:* Courses outside Music chosen after consultation with the Department of Music.

[5]*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)	[1]Applied Music	2	(245)	Applied Music	2
	[2]Large Ensemble	1		Large Ensemble	1
(100)	English	3	(200)	English	3
	[3]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
	[4]Chamber Ensemble	1		Music History Electives	6
	[5]Music History Electives	6		[7]Electives in Arts	6
	[6]Political History	3			17
		17			

[1]*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.

[2]*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.

[3]*Languages other than English:* If one of these languages was studied in high school, it is recommended that the other be elected in the University.

[4]*Chamber Ensemble:* To be elected depending upon the student's performing field.

[5]*Music History Electives:* Music 323, 324, 325, and 425 must be elected.

[6]*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.

[7]*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.

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.

MAJOR 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)	[1]Applied Music	2	(245)	Applied Music	2
	[2]Large Ensemble	1	(107)	Composition I	3
(100)	English	3		Large Ensemble	1
	[3]Elective in Arts	3	(200)	English	3
		15		Elective in Arts	3
					18
Third Year			*Fourth Year*		
(300)	Theory of Music III	3	(400)	Theory of Music IV	3
(207)	Composition II	3	(307)	Composition III (Recital)	3
(345)	Applied Music	2	(445)	Applied Music	2
(306)	Conducting	2	(309)	Orchestration	2
	Large Ensemble	1		Large Ensemble	1
	Music Elective	3		Music Elective	3
	Elective in Arts	3		Elective in Arts	3
		17			17

[1]*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.

[2]*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.

[3]*Electives in Arts:* Courses outside Music chosen after consultation with the Department of Music and carrying credit in the Faculty of Arts.

Note: For courses in Theory and Composition and the History of Music see latter part of Music section of Calendar.

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]

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. [2-3; 2-3]

144. 244. 344. 444. (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]

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 Ensembles. [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 Ensembles.

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.

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 end of **Faculty of Arts.**

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) Fifteenth- and Sixteenth-Century Music.—Detailed study of sacred and secular music, vocal and instrumental, from ca. 1400 to ca. 1600. Prerequisite: Music 120 or permission. [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 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 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 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

3 units from Philosophy 302, 303, 304, 305, 333, 343, 353, 363

9 additional 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 an oral examination at the end of each year's tutorials.

Courses Offered:

Introductory Courses:

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]

201. (3) Problems in Ethics and Social Philosophy.—Problems selected for their general interest with readings from both classic and contemporary sources. Prerequisite: Philosophy 100 or Arts I. [3-0; 3-0]

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]

408. (3) Philosophy of History.—A study of the concepts of history and historical explanation, in which the ideas of historical progress, purpose, necessity, law and causation will be considered. Major thinkers such as Hegel, Marx, Vico, Spengler, Pareto, Collingwood, Croce and Toynbee, as well as contemporary figures, will be dealt with in depth. Students admitted to the course will be expected to have an adequate knowledge of ancient or modern history as determined in consultation with the instructor. (Not given 1972-73.) [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 Arts or 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]

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 classic and contemporary texts. This course is intended primarily for prospective Honours and Majors students in Philosophy. It is also open to students with a special interest in the subject. [3-0; 3-0]

Third and Fourth Years

301. (3) Ethics. [3-0; 3-0]

302. (1½) Deductive Logic.—Introduction to symbolic or formal logic. Sentential and predicate logic. The development of a system of deduction based on natural deduction or semantic tableau techniques. Translations of natural languages into a formal language. [2-1; 0-0]

303. (1½) Intermediate Logic.—Continuation of 302. A system of a deduction for predicate logic is selected for further study. Completeness of this system and the Löwenheim-Skolem theorem are proved. The elementary theory of recursive functions is developed and used to prove Godel's incompleteness result and Church's undecidability theorem. Prerequisite: 302. [0-0; 3-0]

304. (1½) Probability and Induction.—Problems of induction: Hume's problem and Goodman's problem. Relationships between probability, utility and induction. Rational behaviour and inductive inference. Subjective and objective theories of probability. Development of the notions of probability and utility within a formal theory of preference. Prerequisite: 302. [0-0; 3-0]

305. (1½) Philosophy of Logic.—A study of the fundamental concepts and methods of logic. The logistic method, syntax and semantics. The conditional; entailment; consequence; modal logic; problems concerning extensionality and intensionality. Frege's distinction between sense and reference; Russell's theory of definite descriptions; Tarski's definition of truth. The relations between logic and mathematics. Prerequisite: 302. [0-0; 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. (Not given 1972-73.) [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]

333. (1½) Ancient Philosophy: A.—Intensive study of a major ancient philosopher, such as Plato or Aristotle, or a major ancient school or movement, such as the pre-Socratics or the Stoics. Topics vary from year to year and interested students should consult the department. [3-0; 0-0]

343. (1½) Ancient Philosophy: B.—For description, see Philosophy 333. [0-0; 3-0]

353. (1½) History of Modern Philosophy: A.—Intensive study of a major modern philosopher, such as Descartes, Hume or Kant, or a major school or movement, such as empiricism or phenomenology. Topics vary from year to year and interested students should consult the Department. [3-0; 0-0]

363. (1½) History of Modern Philosophy: B.—For description, see Philosophy 353. [0-0; 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]

405. (1½) Philosophy of Mathematics.—Such questions as: would mathematics exist if there were no human beings? how does one decide whether a mathematical proposition is true? how is it that mathematics can be applied to the physical world? Readings from Frege, Russell, Hilbert, Gödel, Wittgenstein, Quine, and others. (Not given 1972-73.) [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]

420. (1½) Philosophy of Mind.—The concepts of the mental and the physical; problems of the relation between minds and bodies; problems of determining the meaning of statements about mental events. Prerequisite: Philosophy 200 or permission of the instructor. [3-0]

421. (3) Philosophy of Law.—The concepts of law, constitution and sovereignty; law and morality; natural law theories and legal positivism; obligation, responsibility and punishment. (Not given 1972-73.) [3-0; 3-0]

434. (1½) Topics in Philosophy of Science.—Consideration of one of the following: probability and induction; foundations of measurement; theory construction. The topic will be announced in advance. Prerequisite: Philosophy 212, 302 or 414 or the permission of the instructor. (Not given 1972-73.) [3-0]

440. (1½) Space and Time.—Examination of some of the philosophical consequences of scientific development for our conception of space and time. Such topics as: Are space and time continuous? Is motion always relative to another body? Does time flow? Is time irreversible? Prerequisite: Philosophy 200 or the permission of the instructor. [3-0]

450. (1½) Philosophy of Language.—Such topics as: predication, definite descriptions, performative utterances, semantic theory and philosophical implications of recent developments in linguistics. Prerequisite: Philosophy 200 or the permission of the instructor. [3-0]

453. (1½) History of Modern Philosophy: C.—For description, see Philosophy 353. [3-0; 0-0]

460. (1½) Philosophy of Knowledge.—Analysis of the concept of knowledge; problems of justifying our ordinary and basic empirical beliefs. Prerequisite: Philosophy 200 or the permission of the instructor. [3-0]

463. (1½) History of Modern Philosophy: D.—For description see Philosophy 353. [0-0; 3-0]

470. (1½) Philosophy of Perception.—The contribution of the senses to knowledge of the external world; problems about scepticism. Prerequisite: Philosophy 200 or the permission of the instructor. Not given 1972-73. [3-0]

480. (1½) Philosophy of Action.—Such topics as: the explanation of human actions; the conditions of responsibility; freedom of the will; the domains of rational and moral appraisal; the category of action and the individuation of actions. Prerequisite: Philosophy 200 or permission of the instructor. Not given 1972-73. [3-0]

498-499. (1½-3) Directed Reading.

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. (1½-3) Metaaphysics and Epistemology.
501. (1½-3) Moral Philosophy.
502. (1½-3) Logic.
503. (1½-3) Ancient Philosophy.
505. (1½-3) Philosophy of Mathematics.
506. (1½-3) Philosophy of Mind.
511. (1½-3) Aesthetics.
513. (1½-3) Mediaeval Philosophy.
514. (1½-3) Philosophy of Science.
521. (1½-3) Political Philosophy.
524. (1½-3) Philosophy of Social Science.
530-539. (1½) Problems.
549. (6) Master's Thesis
573. (1½-3) Plato.
583. (1½-3) Aristotle.
593. (1½-3) Kant.
649. Ph.D. Thesis.

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:

Political Science 200 (1½), and two from 201 (1½), 202 (1½), 203 (1½), 204 (3)

Third and Fourth Years:

3 units from Political Science 300 (3), 309 (3), 310 (3), 312 (1½), 321 (1½), 322 (1½), 402 (1½)
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 1½-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 311 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 355 (1½), 388, 440, 455 (1½) and 456 (1½)
Anthropology 412, 430 (Note prerequisites; by Anthropology Department permission only)
Geography 337 (1½) and 437 (1½)
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.

Political Theory

202. (1½) Contemporary Ideologies.—An examination of some of the major political ideologies: communism, socialism, fascism, conservatism, liberalism. [3-0]

300. (3) Development of Political Theory: Basic Concepts and Issues.—Evolution of political ideas and various basic concepts of government including 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]

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]

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]

500. (3) Political Theory.
550. (3) Political Thought.

Public Administration

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]

502. (3) Public Administration.

Canadian Government

200. (1½) The Government of Canada.—An examination of the institutions and processes of Canadian government. [3-0]

312. (1½) British Columbia Government and Politics.—An examination of the party system, and other institutions and processes of the British Columbia political system. Prerequisite: Political Science 200 or departmental permission. ([3-0]

321. (1½) Quebec Government and Politics.—The nature of politics and the conduct of government in contemporary Quebec. The course is open to students from fields other than political science. Prerequisite: Political Science 200 or departmental permission. [3-0]

322. (1½) Federalism in Canada.—Theory and practice of federalism; cultural duality, social stresses, and problems of flexibility. The constitution and role of the courts. Prerequisite: Political Science 200 or special permission. [3-0]

333. (3) French Canada.—An interdepartmental seminar on the history, economics and literature of French Canada. Limited to 20 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 background knowledge of French Canadian history and literature not required but highly desirable. For details of registration, consult Mr. Kubesh, Department of History. [2-1; 2-1]

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]

404. (1½) Local Government.—A comparative study of local and regional political institutions and processes, with special reference to Canada. [3-0]

418. (1½) Selected Problems of Canadian Politics.—A study in depth of some important issues in Canadian politics. Restricted to Majors and Honours students. [3-0]

420. (3) The Political Economy of Canada.—The analysis of the interplay of economic and social factors in the shaping of Canadian politics: the major issues and strains in the functioning of the Canadian Polity. [3-0; 3-0]

470. (3) Public Policy and Its Administration.—Political and administrative aspects of public policy, particularly in Canada, generally concentrating on resource utilization with an interdisciplinary approach. [3-0; 3-0]

501. (3) Seminar in Canadian Government and Politics.

International Relations

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 311. [3-0; 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]

311. (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]

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]

411. (1½) 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]

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. [3-0]

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. [3-0]

417. (1½) Selected Problems in Peace Research.—The causes of war and the conditions of peace studied from a scientific point of view. Prerequisites: Political Science 204 or 311 and 309 or 310. [3-0]

444. (3) Problems in Strategy, National Security and Arms Control.—An analysis of the major debates surrounding defence doctrines in the United States, other major powers, and Canada; strategic planning in NATO and the Warsaw Pact; the doctrine of deterrence and its critics; problems of arms control and disarmament; U.N. peace-keeping forces and their military and political problems. (To be offered only between 1971 and 1974.) [3-0; 3-0]

445. (1½) Problems in International Relations: The Law of the Sea.—Problems of uniformity in marine law, international fishing disputes, navigation problems, problems arising from resource exploitation and competition, seaward extension of jurisdiction, pollution control, arms testing, and security. (This seminar is open only to 4th year students in the Majors Programme in International Relations.) (Term to be decided in January.) [3-0]

504. (3) Theory of International Relations.

509. (3) International Organization.

511. (1½) International Law Problems.—Prerequisite: Political Science 308 and 411.

Political Behaviour

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]

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]

503. (3) Techniques of Political Analysis and Research.

Comparative Government

201. (1½) Foreign Governments.—A comparative analysis of foreign governments, e.g., Britain, France, United States, U.S.S.R., and Japan. [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. [3-0; 3-0]

306. (1½) Parties and Movements.—A comparative examination of political parties and protest movements. [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. [3-0; 3-0]

315. (3) Chinese Government and Politics.—The political system of China, approached from a number of perspectives; as a continuing development within the framework of Chinese history and culture, as a case study of political modernization; in the context of world communist movements; as an object of comparison with other political systems. Prerequisite: Political Science 200 or 201. [3-0; 3-0]

316. (3) Southeast Asian Politics.—The political systems of contemporary Southeastern Asia. [3-0; 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. Prerequisite: Political Science 201. [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]

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]

419. (1½) Selected Problems of Contemporary Chinese Politics.—Readings and research on aspects of the internal political process and policy-formulation in China. Prerequisite: Political Science 315. [3-0]

421. (3) Communist Movements in Eastern Europe since 1900.—See History 435.

424 (1½) Selected Problems of Japanese Politics.—Problems of Japanese government and internal politics in areas such as political modernization, parties, government operations, and foreign policy. Prerequisite: Political Science 314. Not offered 1972-73. [3-0]

427. (3) Comparative Political Development.—Political development of the new states covering processes and stages of development, problems of developing states; and the philosophies and approaches attempted. Students are expected to have a grounding in the politics of some non-Western state or area. Prerequisite: one of Political Science 314, 315, 412, 413. [3-0; 3-0]

428. (3) Comparative European Politics.—An advanced comparative examination of Western European political systems utilizing recent theoretical contributions to comparative analysis. [3-0; 3-0]

431. (3) Chinese Political Thought and Institutions.—See Asian Studies 417.

439. (1½) Totalitarian and Authoritarian Governments.—An examination of various non-democratic forms of government; including an attempt to clarify distinctions between alternative models and an empirical analysis of their relevance to the understanding of specific régimes. Prerequisite: At least one course in the history of politics of communist or fascist régimes. [3-0]

505. (3) Political Parties and Political Movements.

506. (3) Political Development.

507. (3) Comparative Western Government.

508. (3) Comparative Non-Western Governments.

General Courses

341. (3) Honours Seminar.—An examination of the dimensions of Political Science and the major debates within the discipline. [2-0; 2-0]

441. (3) Honours Seminar.—Research seminar in specific areas in Political Science related to the students' interest and current faculty research. [2-0; 2-0]

449. (3) Honours Essay.

510. (3) Directed Studies.
540. (3) Master's Seminar.
549. (3-6) Master's Thesis.
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 is recommended
Psychology 200

Third and Fourth Years:
Psychology 316
12 additional units in courses numbered 300 and above

Honours

First and Second Years:
Psychology 100 is recommended
Psychology 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
3 units of a psychology laboratory course numbered above 400

Note: Psychology 200 is prerequisite to: Psychology 307, 311, 316, 340, 402, 403, 404, 405, 406, 407, 408, 409, 411, 413, 414, 416, 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.—Selected topics in general psychology. Emphasis on current research and the psychologist's approach to problems in the context of representative theories and issues in psychology. [3-0; 3-0]

200. (3) Experimental Psychology.—A detailed introduction to experimental and theoretical aspects of sensation, perception, learning and motivation. The emphasis is upon content rather than method but with some attention to elementary statistics. [3-0; 3-0]

206. (3) Dynamics of Behaviour.—An experimental, dynamic and social approach to behavioural adjustment with special reference to applications. [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]

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]

316. (3) Methods in Research.—A detailed coverage of basic research methods. The design of experiments and statistical analysis. Methods will be applied in laboratory and project work. [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.—Examination of the sensory capacities, learning capacities, motivational mechanisms, development and social relationships of animals. 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]

413. (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]

414. (3) Research Methods in Child Psychology.—Review of principal research methods and designs in developmental psychology. Supervised research experiences on child behaviour in controlled laboratory situations and naturalistic settings. Prerequisite: Psychology 301 and consent of instructor. [3-3; 3-3]

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]

416. (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]

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.

475. (1½) Problems in International Relations: Psychological Approaches.—Examination of psychological research and application in relevant areas: cultural identification and socialization, cooperation and competition in human groups, group conflict and resolution, theories of aggression, perception and defense, leadership, cross cultural study. (This seminar is open only to fourth-year students in the Major programme in International Relations and is offered only in 1972-1973). [3-0; 0-0]

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.
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

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:

6 units selected from Religious Studies 100, 202, 204

Third and Fourth Years:

15 units in Religious Studies numbered 300 and above; six of these units to be in courses outside the area of concentration.

Honours

Admission:

High second class standing in six units from Religious Studies 100, 202, 204. Continuation in Fourth Year Honours is contingent upon maintaining at least a second class average.

Reading knowledge of Chinese, Sanskrit, 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 and including a graduating essay. Six of these units must be from courses outside the area of concentration.

Note: Attention is called to the following courses in language:

Indic Languages (Sanskrit) 305, 414

Chinese 100, 200

Greek 100, 200, 325

Hebrew 100, 200

Latin 100, 110 or 120, 200, 205, 220

100. (3) Introduction to the Study of Religion.—An introduction to the study of religion including a survey of the origins, ideas and practices of the major religions. [2-1; 2-1]

202. (3) Introduction to the Study of Western Religious Traditions.—The origins and development of Judaism, Christianity, Islam. [3-0; 3-0]

204. (3) Introduction to the Study of Eastern Religious Traditions.—The religions of India, Hinduism, Jainism, Buddhism, and also the interaction of Buddhism with Bon systems of Tibet and with Taoism and Confucianism in China, and the development of Japanese religious traditions. [3-0; 3-0]

300. (3) Archaeology of the Ancient Near East. [0-2; 0-2]

301. (1½) Literature of the Pentateuch. [0-2; 0-0]

302. (1½) Prophetic and Wisdom Literature. [0-0; 0-2]

310. (1½) The Gospels and the Historical Jesus.—Prerequisite: Religious Studies 100 or 202. [0-2; 0-0]

311. (1½) The Pauline Epistles.—Prerequisite: Religious Studies 202. [0-0; 0-2]

323. (3) Christianity in the Modern World.—The interaction between Christianity and the major intellectual, social and cultural developments since 1648 with special attention to the expansion of Christianity and its encounter with urban industrial society. [0-2; 0-2]

324. (3) Religion in America.—The development of religion in the United States from the colonial period to the present. The transfer of the religious heritage from Europe to America; the response of religious groups to the new world environment and the emergence of indigenous forms of religious expression. [0-2; 0-2]

341. (3) Islamic Art & Architecture.—Non-literary sources for the understanding of Islam. A study of the architecture and artifacts of Islam in the Near East, North Africa and Spain from the 7th century to the fall of the Abbasid Califate as source material for understanding Islamic doctrines. [0-2; 0-2]

350. (1½) Religion of the Vedas and Upanishads.—Prerequisite: Religious Studies 100 or 204. [0-2; 0-0]

351. (1½) Hinduism of the Epics, Puranas and Agamas.—Prerequisite: Religious Studies 204 or 350. [0-0; 0-2]

352. (1½) Modern Hinduism.—Prerequisite: Religious Studies 204 or 350. [0-2; 0-0]

360. (1½) Indian and Tibetan Mahayana Buddhism.—Prerequisite: Religious Studies 100 or 204. [0-2; 0-0]

361. (1½) Chinese Mahayana Buddhism.—Prerequisite: Religious Studies 100 or 204. [0-2; 0-0]

362. (1½) Japanese Buddhism.—Prerequisite: Religious Studies 100 or 204. [0-2; 0-0]

400. (3-6) Seminar in Phenomenology of Religion.—Open to Majors and Honours in Religious Studies or by permission of Instructor. Prerequisite: Religious Studies 100 and one of 202 or 204.

405. (3) Religious Thought of the Ancient Near East. [0-2; 0-2]

406. (3) Biblical (Old Testament) Exegesis.—Reading and exegesis of selected texts. Knowledge of Hebrew recommended but not required. Prerequisite: Religious Studies 202. [0-2; 0-2]

410. (1½) Biblical (New Testament) Exegesis.—Reading and exegesis of selected texts. Knowledge of Greek recommended but not required. Prerequisite: Religious Studies 202. [0-2; 0-2]

411. (1½) Problems in Christian Origins.—A seminar on selected problems, e.g., Jewish-Christian relations in the 1st century; diversity and uniformity in the early Church; formation of the New Testament canon; etc. Prerequisite: Religious Studies 310 or 311. [0-0; 0-2]

412. (3) Problems in the Study of Religion.—Open only to senior and graduate students who have not taken a previous course in religious studies. No prerequisites. [3-0; 3-0]

420. (3) Religion in Canada.—A critical examination of the various approaches to the study of Canadian religious development with special reference to the major problems which have influenced Canadian religious thought and institutions in the 19th and 20th centuries. [0-2; 0-2]

421. (1½) Contemporary European Christian Thought. [0-2; 0-0]

422. (1½) Contemporary American Christian Thought. [0-0; 0-2]

450. (1½) Advaita Vedanta.—A study of the monistic tradition in India especially Sankara and his successors. Prerequisite: Religious Studies 204 or 350. [0-2; 0-0]

451. (1½) Hindu Theism.—The theistic tradition in Indian religion culminating in Ramanuja and his successors. Prerequisite: Religious Studies 204 or 350. [0-0; 0-2]

463. (1½) Contemporary Buddhist Thought and Practice.—Prerequisite: Religious Studies 100 or 204. [0-0; 0-2]

470. (1½) Research methods and bibliography.—Open to majors and honours and graduate students. [0-2; 0-0]

Graduate Courses

500. (3) Reading and Research.
531. (3) Graduate Seminar.
549. (3-6) Master's Thesis.

(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]

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

Russian

First and Second Years:

Russian 110, 210 (or Russian 100, 200)

Third and Fourth Years:

Russian 310

Russian 400

9 additional units (6 for students who have taken Russian 301) in Russian courses numbered 300 and above. (Students who have taken Russian 200 *must* take Russian 301 instead of 310).

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]

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. Sections are provided for students in the social sciences and the humanities and 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 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]

280. (6) Intensive Summer Workshop in Russian: Intermediate Level.—Equivalent to Russian 210. Prerequisite: Russian 110 or 180.

300. (3) Third-Year Russian.—For students other than Russian majors. Emphasis on reading. 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: Russian 200 (first or high second class) or equivalent. [6-1; 6-1]

303. (3) Introduction to Russian Linguistics.—Required for honours students in Russian and recommended for majors. Prerequisite: Russian 200 (or 210 or equivalent). [3-0; 3-0]

310. (3) Third Year Russian (Intensive Programme).—Prerequisite: Russian 210. [3-1; 3-1]

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 301 or 310. [3-0; 3-0]

408. (3) Seminar in Translating Technical Material.—Prerequisite: Russian 200. [3-0; 3-0]

430. (3) Russian Poetry: Pushkin, Lermontov, Nekrasov.—Lectures given in Russian. [3-0; 3-0]

431. (3) The Russian Novel.—Goncharov, Tolstoy, Dostoyevsky and Saltykov-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.—Close textual analysis of selected post-1917 literature. Specific features and problems of literature in the Soviet state. [3-0; 3-0]

449. (3) Honours Essay.

480. (6) Intensive Summer Workshop in Russian: Drama.—Prerequisite: Russian 400 or equivalent.

Note: The Department runs non-credit conversation groups for students who have two years or more of Russian.

Graduate Courses:

500. (1½) Bibliography and Methods.

501. (3) History of the Russian Language.

503. (1½) Russian Linguistics: Phonemics.

504. (1½) Russian Linguistics: Morphophonemics.

505. (1½) Russian Linguistics: Lexicology.

506. (1½) Russian Linguistics: Syntax.

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]

Graduate Course:

502. (3) Comparative Slavonic Philology.

(iv) SERBO-CROAT

325. (3) An Introductory Reading Course.—Prerequisite: Two years of another Slavonic language or equivalent. [3-1; 3-1]

425. (3) An Advanced Reading Course.—Prerequisite: Serbo-Croat 325 or equivalent. [3-0; 3-0]

(v) Courses in SLAVONIC STUDIES

Note: A knowledge of Russian is not required for the courses listed below.

105. (3) Introduction to Russia and Eastern Europe.—Although the course deals primarily with the cultural heritage and major historical events, students will also be introduced to the geography, ethnic composition, and social and economic structure of the area. [3-0; 3-0]

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 twentieth-century Russian writers. [3-0; 3-0]

307. (3) Modern East European Literatures in Translation.—An introduction to the major modern East European writers (e.g. Czech, Polish, Yugoslav) with emphasis on the interaction between politics and literature. [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. [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]

441. (3) Problems of Soviet Economic Growth.—Soviet planning of production, distribution, formation of capital, investment and consumption. Prerequisite: Economics 388. [3-0; 3-0]

449. (3) Honours Essay.

Graduate Courses:

504. (3) Seminar in Russian History.

505. (3) Seminar in Soviet History.

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 441

3 units from: Slavonic Studies 306
Russian 331
Russian 430
Russian 431
Russian 432
Russian 433
Polish 445

Notes: Students taking Russian 100 and 200 are urged to enrol for a third year of Russian.

SOCIOLOGY

The Department offers programmes of study that lead to the degrees of Ph.D., M.A., B.A.

General courses for non-majors. Students who do not intend to major in sociology are encouraged to enrol in the following courses, which are *not available for major credit:* Sociology 210, 220, 320, 410, 420.

Requirements for the degree of Bachelor of Arts:

Major

Second Year:

3 units from Sociology 250, 260, 270.

Third and Fourth Years:

15 units of sociology, but not including courses intended for students who do not major in sociology.

Honours:

Second Year:

3 units from Sociology 250, 260, 270.

Third and Fourth Years.

21 units of sociology, including Sociology 449 and one of Sociology 450, 451, 468, 480.

Admission and Continuation to Third and Fourth Year:

A high second-class average in the previous year.

Note: 3 units of second-year sociology are prerequisite to third and fourth year sociology courses. This prerequisite does not apply to courses identified as intended for students who do not major in sociology.

Courses numbered in the 400 series are open to fourth-year and graduate students only, except by permission of the instructor.

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.

210. (3) Canadian Social Issues.—Sociological perspectives on social problems in modern Canadian society; issues of current social conflict and controversy in such areas as race and ethnic relations, social disorganizations, politics and national identity. **For second-year non-majors only.** [3-0; 3-0]

220. (3) Sociology of Life-Styles.—A study of living styles in terms of the on-going organization of gestures, activities, and modes of dress into identifiable patterns which members of society recognize, label, and locate in moral terms. Special attention is given to the influences which lead people to adopt different patterns. **For second-year non-majors only.** [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. [3-0; 3-0]

260. (3) Introduction to Socio-Cultural and Socio-Ethnographic Studies.—Study of reality-construction and of the processes crucial to the formation of social selves; approaches surveyed include symbolic interaction, socio-linguistics, ethnomethodology, and the sociology of knowledge. [3-0; 3-0]

270. (3) Introduction to Comparative Social Institutions.—A general introduction to sociological analysis using a comparative approach. Primary social institutions—kinship, stratification, religion, political, economic, and educational—are examined in cross-social perspective. [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; 3-0]

320. (3) Studies in Mass Society.—Sociological literature on elite-mass relationships, mass culture and mass media; special emphasis on the relationship between technology and the social order, and on the problems of alienation and anomie in post-industrial society. **For non-majors only.** [3-0; 3-0]

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]

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]

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]

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.—Analyses of different types of behaviour in public space: both normal, everyday routines as well as events such as riots, demonstrations, and festivals. Non-institutional change will be examined in terms of fads, fashions, and mass movements.

363. (3) Issues in Sociological Theory.—Contemporary sociological thought with respect to fundamental topics in theory.

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. [3-0; 3-0]

410. (3) Applied Sociology.—Sociological concepts, methods, and findings will be introduced to explore the social dimensions of everyday practical problems and their possible solutions; focus on the relevance of analytical problems addressed in sociology to the practical problems encountered in various occupations and professions, with attendant emphasis on related ethical and political considerations. For non-majors only. [3-0; 3-0]

420. (3) Sociology of Modernization.—An examination of the processes of social change in developing countries. Major themes of the course will stress the relationship between urbanization and industrialization; modernization and ethnic conflict; imperialism, neo-colonialism, and foreign aid; and intranational modernization problems such as regional under-development in industrial societies. For non-majors only. [30; 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]

430. (3) Visual Sociology.—The study of visual aspects of social behaviour; examination of visual cultural experience and organization in everyday social activity and interaction; role of non-verbal behaviour in relation to the organization of talk. [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]

453. (3) Work and Leisure.—The conditions under which men and women make a living—organization of work; technology of production; control of the means of administration. Consequences of work organization for activities at work and at leisure—communication and cooperation at work; composition of daily activities; participation in voluntary associations. Problems of individual choice and social constraint. Research literature from several countries.

460. (3) Sociology of Special Geographical Areas.—The description of areas to be covered will be announced each year. [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. [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. [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. [3-0; 3-0]

464. (3) Social Movements.—A study of the sources, stages, and effects of social movements in developing and modernized societies. [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. [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. [3-0; 3-0]

468. (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]

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. [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. [3-0; 3-0]

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. [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. [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.

475. (3) Social Conflict.—A self-analytic seminar for the study of group interaction and social conflict processes; interdisciplinary reading materials and assignments complement analysis of on-going group and individual behaviour.

480. (1½-3) Methods and Techniques in Sociological Research.—A survey of the tools and perspectives of quantitative sociology, socio-ethnographic studies, and comparative analysis; research logic and design, content analysis, participant observation, interviewing, experimental techniques, survey techniques, will be included. [3-0; 3-0]

Graduate Courses: (Consult Department for seminar titles in 1971-72)

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.
- 533. (1-3) Directed Studies.
- 534. (1-3) Seminar.
- 535. (1-3) Seminar.
- 540. (1-3) Graduate Seminar.
- 545. (1-3) Graduate Research Seminar.
- 549. (3-6) Master's Thesis.
- 649. Ph.D. Thesis.

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 200

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 200

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]

200. (3) Theatre Practice.—Speech and acting. (Open to all students, in 2nd year and above.) (Formerly Theatre 300.) [2-2; 2-2]

230. (3) Introduction to Film and Television.—An introduction to the development, the techniques, and the social and artistic functions of film and television. Lectures, demonstrations and discussions of the technology, history and criticism of these media and of selected films and television productions. [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 230 and Instructor's consent. [2-3; 2-3]

334. (3) Animation.—History, theory, technique, and design of animated films. Prerequisite: Theatre 230 and consent of the instructor. [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]

361. (3) The Role: Interpretation and Characterization.—Emphasis will be on externalizing the inner character in conjunction with work in textual analysis, improvisation and internal techniques. Prerequisite: Theatre 200 and consent of instructor. Must be taken with Theatre 362. [2-3; 2-3]

362. (3) Advanced Speech and Movement.—The course is designed to develop the student's awareness of the expressive qualities of the voice and body and to begin learning techniques of control. Prerequisite: Theatre 200 and consent of instructor. Must be taken with Theatre 361. [1-4; 1-4]

400. (3) Direction and Staging.—Prerequisite: Theatre 200. [3-2; 3-2]

405. (3) Design for the Theatre.—The history, theory and practice of theatrical design. [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]

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]

431. (3) Film Aesthetics and Criticism.—The nature and principles of film as an art and the development and problems of film criticism. Detailed analysis of particular films and reading and discussion of a considerable number of writings on and related to film. Prerequisite: Theatre 330 and consent of instructor. [3-0; 3-0]

433. (3) Projects in Film and Television.—Advanced research, design, and analysis of film and television projects. Prerequisite: Theatre 333 and consent of instructor. [2-3; 2-3]

434. (3) Studies in Film and Television.—A seminar devoted to a topic of current interest in film and television. Topic will change from year to year. May be repeated for credit when topics differ. Prerequisite: consent of the instructor. [3-0; 3-0]

449. (3) Supervised Study and Honours Essay.

450. (3) Stage Lighting.—The study of the art of lighting for the theatre, including optics, colour, equipment and control. Theoretical and practical problems of light plots. Prerequisite: Theatre 350 or consent of instructor. [2-3; 2-3]

455. (3) Advanced Technical Theatre and Stage Management.—Prerequisite: Theatre 350. [2-2; 2-2]

461. (3) Styles in Acting.—An introduction to styles of acting in various historical periods and contemporary media, along with continued work on characterization in leading and supporting roles in full-length plays. Prerequisite: Theatre 300 or 361 and consent of instructor. [2-3; 2-3]

462. (3) Styles in Speech and Movement.—The student will study speech and movement as they relate to social and theatrical history. Comparisons will be drawn between the styles of literature, costume, furniture and speech and movement. Prerequisite: Theatre 362 and consent of instructor. [1-4; 1-4]

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.

521. (3) Styles in Directing.—An advanced course in directing; detailed study of the major styles in the history of production. Prerequisite: Theatre 520.

525. (3) Seminar: Study of a Major Dramatist.

530. (3) Seminar: Relationships Between Theatre and the Other Arts.—Studies in a selected area of theatre in relation to one or more of the other arts.

547. (3) Directed Studies in Theatre and Drama.

549. (3-6) Master's Thesis.

550. (3) Seminar: Advanced Problems in Design and Theatre Architecture.—A study of recent trends in theatre architecture and technical equipment and their inter-relationship with the problems of production.

Programme in Urban Studies

The Urban Studies programme offers a focus for students who have a keen interest in the urban field and who will be majoring in the social sciences. It is not a degree programme leading to a B.A.

Course of Studies: A student will normally take Urban Studies 200 in the second year, along with the prerequisite courses for his major. In his third and fourth years, in addition to the major requirements, 12 units of courses focusing on urban questions (including those offered in his major department) are required.* In the winter term of the fourth year a student would register for Urban Studies 400.

Urban Studies 200. (3) Cities.—An introduction to urban patterns and processes, from the perspectives of various disciplines, primarily of the social sciences. Intended for students planning to major in one of the social sciences; others by permission of the instructor. [2-1; 2-1]

Urban Studies 400. (1½) Seminar in Urban Studies.—A seminar for students majoring in one of the social sciences who are anxious to explore some common topics of importance to urban studies from the view points of several disciplines. The seminar will focus either upon a particular problem within the city (i.e. changing nature of the urban core) or deal with a series of important papers on urban topics. Examples might be a special issue of **Daedelus** (fall 1968), or J. Q. Wilson (ed), **Metropolitan Enigma** (Harvard/MIT, 1969). Enrollment by permission of the instructor. (Not offered 1972-73). [0-0; 0-2]

Urban-oriented courses:

A tentative (and not necessarily exhaustive) list of existing undergraduate courses that can be defined as "urban oriented". (Some of the titles will be modified in next year's calendar.)

Architecture 305. (1½).—Architecture and Organization.
Architecture 424. (1½).—History of Urban Form.
Architecture 425. (1½).—History of Urban Planning.
Agricultural Economics 403. (3).—Organisation of Rural Society.
Civil Engineering 469. (1½).—Environmental Sanitation.
Civil Engineering 470. (1½).—Transportation Engineering.
Commerce 307. (1½).—Urban Land Economics.
Commerce 309. (1½).—Real Estate Finance.
Commerce 409. (1½).—City Growth and Structure.
Economics 374. (1½).—Land Economics.
Economics 475. (1½-3).—Regional Economics.
Economics 480. (1½).—Transportation Economics.
Geography 350. (1½).—Introduction to Urban Geography.
Geography 351. (1½).—Geography of Urbanization.
Geography 360. (1½).—Geography of Manufacturing.
Geography 361. (1½).—Regional Analysis.

Geography 450. (1½).—Urban Analysis.
Geography 464. (1½).—Spatial Interaction.
Political Science 404. (1½).—Local Government.
Sociology 354. (1½).—Communities.
Sociology 356. (1½).—Social Ecology.
Sociology 425 (3).—Urban Sociology.

Advisers for the programme in Urban Studies are Dr. R. Collier (Community and Regional Planning) and Dr. W. G. Hardwick (Geography).

COURSES FROM OTHER FACULTIES AND SCHOOLS

The courses listed below are designed primarily for third- and fourth-year students in the Faculty of Arts; three units of any of them, or any combination of them, satisfy the Science Requirement in the Faculty of Arts.

School of Home Economics

Home Economics 351. (1½) Human Physical Growth and Development.—

Faculty of Forestry

Forestry 300. (3) Principles of Forestry and Wood Sciences.—

Faculty of Science

The following courses have no special prerequisites in Science. Each course provides an elementary understanding of some particular area of science and, wherever possible, emphasizes matters of social concern. The courses are designed to help non-scientists understand scientific matters and make decisions where science is involved.

Biology 310 (1½). Human Heredity and Evolution.
Biology 311 (1½). Ecology and Man.
Biology 313 (1½). Elementary Molecular Biology.
Botany 310 (1½). Plants and Man.
Geophysics 310 (3). Exploring the Universe.
Physics 330 (3). Elements of Physics.
Zoology 310 (1½). Comparative Biology of Reproduction.
Zoology 400. (3). Principles and History of Biology.

Note: For courses in the School of Home Economics and the Faculties of Forestry and Science, see the appropriate sections of the Calendar.

THE SCHOOL OF HOME ECONOMICS

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.

INDRAJIT D. DESAI, I.D.D. (Govt. of India), B.Sc., M.Sc. (Gujarat Univ., India), Ph.D. (Calif.), (on leave 1972-73).

Assistant Professors

JOSEPH F. ANGEL, B.Sc. (Hons.), (Ain Shams, Cairo), M.Sc. (Am. Univ. of Beirut), Ph.D. (Toronto).

MARGARET ARCUS, B.Sc. (Nebraska), M.Ed. (Utah State), Ph.D. (Iowa State).

JOHN A. BIRKBECK, M.B., Ch.B. (Edinburgh), and Markle Scholar in Medical Science, (on leave 1972-73).

WINIFRED J. BRACHER, B.Sc. (H.Ec.) (McGill), A.M. (Columbia).

GWENDOLYN L. DALEY, B.Ed. (Alta.), M.A. (Michigan State).

EVERETT HAGERTY, B.S., M.S. (Brigham Young), Ed.D. (Columbia).

JOSEPH LEICHTER, B.S. (Cracow College, Poland), M.S., Ph.D. (Berkeley).

IRENE L. MCALLISTER, B.H.Sc. (Sask.), M.A. (Columbia).

ELEANORE R. VAINES, B.Sc. (Wash.), M.S. (Cornell).

Instructors

CLARE N. DAEM, B.H.E. (Brit. Col.).

JOANNA STANISZKIS, B.F.A. (Art Institute of Chicago).

CAROL IRETON, B.H.E. (Brit. Col.), M.S. (Penn. State).

Postdoctoral Fellow

C. RAYCHAUDHURI, B.Sc., M.Sc., D. Phil. (Calcutta).

Lecturers from Other Institutions and Departments

N. J. ANTIA, B.Sc., B.Sc. Tech. (Bombay), D. Phil. (Zurich), Fisheries Research Board of Canada, Vancouver Laboratory.

R. COPLEY, B.A. (Iowa), M.A. (Calif.), Department of Geography.

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, through the Division of Family Sciences and the Division of Human Nutrition, offers three undergraduate programmes: general, foods and nutrition (including specializations in nutrition and dietetics), an honours programme in nutrition; and a graduate programme in human 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 involve 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. Graduates of the general programme may be employed in teaching, extension services, community agencies, and business and industry.

Admission

British Columbia secondary school students with an average grade between C and C+ (or better) will be considered for admission in order of their academic performance. Applicants will be selected on the basis of their overall secondary school records, on the results of Department of Education examinations where applicable, on possible other tests (in which case applicants will be so notified), and on a general assessment of their capacity for success in university studies as made by the Admissions Committee.

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 First and Second Year following 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.

DIVISION OF FAMILY SCIENCES

General Programme

Entrance Requirements from Secondary School Programme:

Mathematics 11
Chemistry 11
Math 12, suggested
Physics 11, suggested
Biology 11, suggested

As many Home Economics courses at the "11" and "12" level as possible.

First Year

	Units
English 100	3
Chemistry 103 (or 110, or 120)	3
*Mathematics 130	3
**Biology 101 or 102	3
Social Science	3
Home Economics Orientation	0
	15

Second Year

	Units
Economics 200	3
Chemistry 230	3
***Required Home Economics courses and electives	9
	15

Third Year

	Units
***Required Home Economics courses and electives	15

Fourth Year

	Units
***Required Home Economics courses and electives	15

Notes:

*Not required if Mathematics 12 has been completed.

**See note under Biology 101 and 102, Faculty of Science section.

***Required Home Economics courses: H.E. 201, 202, 203, 205, 210, 220, 240, 312, 341, 342, 343, 360, 362, 400, 450.

I. A minimum total of 24 units of Home Economics courses is required.

II. Minimum number of units required for the B.H.E. degree is 60 units.

DIVISION OF HUMAN NUTRITION

Foods, Nutrition and Dietetics Programme

Entrance Requirements from Secondary School Programme:

Mathematics 12
Chemistry 11
Physics 11
Chemistry 12, suggested
Biology 11

As many Home Economics courses at the "11" and "12" level as possible.

First Year	Units	Second Year	Units
Chemistry 110 or 120	3	Chemistry 230	3
Mathematics 100	2	Microbiology 200	3
Mathematics 121	1	Home Economics 205	1½
English 100	3	Statistics	1½
**Biology 101 or 102	3	Home Economics 201	3
Physics 110	3	Home Economics 240	1½
H.Ec. Orientation 100	0	Elective	1½
	15		15

FOODS AND NUTRITION MAJOR PROGRAMME

Third Year	Units	Fourth Year	Units
Biochemistry 410	3	Home Economics 401	1½
Biochemistry 411	1½	Home Economics 403	1½
Zoology 303	3	Home Economics 405	1½
Home Economics 305	1½	Home Economics 450	1½
Electives	6	Home Economics 466	1½
		Electives	7½
	15		15

NUTRITION HONOURS PROGRAMME

Third Year	Units	Fourth Year	Units
Biochemistry 410	3	Home Economics 403	1½
Biochemistry 411	1½	Home Economics 405	1½
Physiology 301 OR Zoology 303	3	Zoology 204	1½
Chemistry 205	3	Thesis	3
Home Economics 305	1½	Electives	10½
Electives	6		18
	18	Total	66

DIETETICS PROGRAMME

Third Year	Units	Fourth Year	Units
Biochemistry 410	3	Home Economics 401	1½
Biochemistry 411	1½	Home Economics 403	1½
Zoology 303	3	Home Economics 405	1½
Home Economics 301	1½	Home Economics 407	1½
Home Economics 305	1½	Home Economics 421	3
Home Economics 341	1½	Home Economics 450	1½
Elective	3	Commerce 359	2
		Elective	3
	15		15½

**See note under Biology 101 and 102 in the Science section of the calendar.

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 Chemistry (Chemistry 103, 110, 120), Chemistry 230, and Economics 200.

Second Year—
- Home Economics 201 (3)
- Home Economics 202 (1½)
- Home Economics 210 (1)
- Home Economics 220 (1½)

Senior Years—
- Home Economics 203 (1½)
- Home Economics 205 (1½)
- Home Economics 312 (1½)
- Home Economics 360 (1½)
- Home Economics 362 (1½)
- Home Economics 450 (1½)

(2) Home Economics—Major

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 202 (1½)
- Home Economics 203 (1½)
- Home Economics 205 (1½)
- Home Economics 210 (1)
- Home Economics 220 (1½)
- Home Economics 312 (1½)
- Home Economics 342 (1½)
- Home Economics 343 (1½)
- Home Economics 360 (1½)
- Home Economics 362 (1½)
- Home Economics 450 (1½)

19 units

plus at least 3 additional units of Home Economics.

Academic Regulations

See Faculty of Arts section and General Information section.

Financial Assistance

See Awards and Financial Assistance section.

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. 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 non-thermoplastics 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 and 405. Prerequisite: Chemistry 230. [0-0; 3-0]

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. [3-0; 0-0]

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.

220. (1½) 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]

240. (1½) Human Growth and Development I.—The process of human growth and development throughout the life cycle; the process of socialization from the point of view of the individual. [3-0; 0-0]

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: H.E. 201 and 203 or 205. [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. [3-0; 0-0]

305. (1½) Human Nutrition I.—Nutrition is approached from a basic cellular and organismal point of view, with an emphasis on the biochemical and physiological roles of nutrients such as carbohydrates, lipids, proteins, minerals, and water in maintaining normal health and in the prevention of diseases. Includes a laboratory. Credit cannot be obtained for both 203 and 305-405. Prerequisites: Biochemistry 410 and 411 and a course in Physiology. [0-0; 3-3]

310. (1½) Clothing: Relationship to Human Needs and Behaviour.—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 behaviour of an individual, as a unique being and as a member of a group. Prerequisite or concurrent: 6 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. [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]

341. (1½) Human Growth and Development II.—The development of self, emphasizing creative personal behaviour and personal styles in human relationships. [0-0; 3-0]

342. (1½) The Contemporary Family I.—Dating and courtship patterns; marriage as a personal relationship. [3-0; 0-0]

343. (1½) The Contemporary Family II.—The study of contemporary families as they exist in an environment and as they create an environment. Emphasis will be placed on Canadian families. [0-0; 3-0]

351. (1½) Human Physical Growth and Development.—The course provides a review of the field of Human Biology from the aspects of physical development, covering pre- and post-natal growth and development and the concepts of maturation and aging. Emphasis will be placed on normal variations in these factors, and their consequence in the population. Not available to students in Home Economics; not available for students for B.Sc. degree. Such students should refer to Paediatrics 351. [3-0; 0-0]

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 or equivalent. [3-0; 0-0]

400. (1½) Contemporary Issues in Home Economics.—Application of concepts from all areas of Home Economics to current problems and issues facing the profession. Fourth year Home Economics students only. Required of Family Sciences majors. [0-0; 0-3]

401. (1½) Advanced Foods.—Detailed considerations of selected food processing and preservation methods from the point of view of nutritive value and acceptability (colour, flavour, texture). Emphasis will be placed on changes at the cellular and molecular levels. Laboratory will treat various aspects of objective testing and subjective evaluation of foods and will include projects in experimental foods. Prerequisite: H.E. 201. [3-3; 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. Prerequisite: H.E. 202 [0-0; 3-2]

403. (1½) Foods or Nutrition Seminar.—Presentation and discussion of current developments in the area of foods and nutrition. Prerequisite: H.E. 201 and a course in nutrition. [0-0; 0-3]

404. (1½) Family Sciences Seminar.—Presentation and discussion of current developments in selected areas of Home Economics. Open to 3rd and 4th year students. [0-3; 0-3]

405. (1½) Human Nutrition II.—A continuation of course 305 to include discussions on the role of vitamins, their function and interrelationships in metabolic processes. Regulatory mechanisms governing food intake, nutrient utilization and metabolic balances will be presented. Emphasis will be placed on the fundamental concepts of the nutritional needs of the body during various stages of the human life. Laboratory included. Prerequisites: Biochemistry 410 and 411 and a course in Physiology. [3-3; 0-0]

407. (1½) Nutrition and Disease.—A review of disease processes in which nutritional factors play an important part. The principles of nutritional management in these conditions will be outlined, and opportunities made for students to come in contact with practical therapeutic problems. Prerequisites: H.E. 305 and 405. [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: H.E. 305 and 405. (Not offered 1972-73.)

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 courses would aid the student in this course.) [2-0; 0-0]

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. [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. [3-1; 3-1]

450. (1½) Communications.—One term; an overview of communications as it relates to Home Economics, with special emphases on group processes, oral expression, nonverbal language, and levels of human interaction. Some implications of mass communication. The alternate term the student will participate in a demonstration and interview section which stresses specific skills that relate to their professional outlets. Opportunities to express ideas orally, both extemporaneously and in planned presentations will be provided. Students must have Fourth-Year standing. [2-0; 0-3]

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. [0-0; 3-0]

464. (1½) 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. (Not offered in 1972-73.)

466. (1½-3) Special Problems.—Presentation and discussion of current topics in a specific area of Home Economics, based on original laboratory or field research. Prior permission required.

476. (1½) Directed Study in Home Economics.—Directed investigation of a problem, requiring a written or oral report of findings. Prerequisite: satisfactory standing and permission of faculty member supervising the investigation. Fourth year Home Economics students only.

Courses in Human Nutrition for Graduate Students.

511. (1) Current Topics in Protein and Amino Acid Nutrition.—A combined lecture and seminar course dealing with recent advances in protein and amino acid nutrition. Alternate years. [2-0; 2-0]

513. (1) Current Topics in Lipid Nutrition.—A combined lecture and seminar course dealing with recent advances in lipid nutrition. Alternate years. [2-0; 2-0]

515. (1) Current Topics in Vitamin Nutrition.—A combined lecture and seminar course concerned with advanced topics in vitamin metabolism and function. Alternate years. [2-0; 2-0]

517. (1) Current Topics in Mineral Metabolism.—A combined lecture and seminar course dealing with recent advances in mineral and trace element metabolism. Alternate years. [2-0; 2-0]

531. (1) Nutrition Seminar.—Attendance required of all graduate students in Nutrition. Student will present papers on topics of current interest in Nutrition. Can be taken more than one time for credit.

547. (1-3) Directed Studies.—In special cases, directed studies on certain aspects of Nutrition may be arranged for graduate students in attendance.

549. (3-6) M.Sc. Thesis.

THE SCHOOL OF LIBRARIANSHIP

ACADEMIC STAFF

Professor and Director of the School:
ROY STOKES, M.A. (Nottingham), F.L.A.

Professors:
GEORGE PITERNICK, A.B., B.L.S. (Calif.).
SAMUEL ROTHSTEIN, M.A. (Brit. Col.), B.L.S. (Calif.), Ph.D. (Ill.), D.Litt. (York).

Associate Professors:
MISS SHEILA 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).

Assistant Professors:
RICHARD BERNARD, B.A. (U.C.L.A.), M.A., B.L.S. (Berkeley).
MRS. LOIS M. BEWLEY, B.A. (Brit. Col.), B.L.S. (Toronto), M.S. in L.S. (Illinois).
MRS. ANNE B. PITERNICK, B.A. (Manchester), A.L.A.
PETER SIMMONS, A.B. (San Francisco State College), M.S. (Pratt Institute).

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).
ROBERT M. HAMILTON, B.A., B.L.S. (McGill).
MISS ANNA LEITH, B.A. (Brit. Col.), M.S. in L.S. (Wash.).
R. D. HILTON SMITH, F.L.A.

Visiting Lecturers, 1971:
MR. PAUL AZAROFF, Director, Centre for Media Study, Harry Smith & Sons.
MR. BRYAN BACON, Librarian, Burnaby Public Library, Burnaby, B.C.
MISS RHODA BAXTER, Head, Fine Arts Division, Vancouver Public Library.
MR. REINDER BRONGERS, Head, Science Division, U.B.C. Library.
MR. JOHN CARTER, United Educational Book Supply Ltd., Vancouver.
MR. JOHN CHURCH, Assistant Director of Professional Development, British Columbia Teachers' Federation.
MRS. SUZANNE DODSON, Head, Government Publications, U.B.C. Library.
MR. W. J. DUTHIE, Bookseller.
MR. M. ENDLEMANN, Systems Analyst, Vancouver Public Library.
MR. ALAN FRASER, Librarian, Centennial Community Library, Coquitlam, B.C.
MR. GARTH GRAHAM, Librarian, Yukon Region Library Service, Whitehorse.
MR. WALTER GRIBA, Director, Audio-Visual Centre, Simon Fraser University.
MISS AMY HUTCHESON, Librarian, New Westminster Public Library.
MR. MORTON P. JORDAN, Director, Vancouver Public Library.
MR. WILLIAM LITTLE, Canadian Kodak Company.
MR. PETER LOFTS, Okanagan Regional Library, Kelowna, B.C.
MR. SEYMOUR LUBETZKY, Professor Emeritus, U.C.L.A.
MR. ROBIN MACDONALD, Coordinator of Technical Processes, U.B.C. Library.
DR. HANS MÖLLER, Director of Learning Media, Visual Education Centre, Toronto.
MISS VIOLET MYER, Enoch Pratt Free Library, Baltimore.
MR. WILLIAM NEMTIN, National Film Board.
MR. LEWIS OLDS, Dharma Publications.
MR. NICHOLAS OMELUSIK, Head, Acquisitions Division, U.B.C. Library.
MR. T. SHORTHOUSE, Law Librarian, U.B.C. Library.
MRS. ALICE SIMPSON, Consultant, Library Development Commission.
MR. ALLEN SOROKA, Assistant Law Librarian, U.B.C. Library.
MR. BASIL STUART-STUBBS, University Librarian, U.B.C. Library.
MISS AILEEN TUFTS, Head, Business and Economics Division, Vancouver Public Library.
MRS. MARGARET VATCHER, Coordinator, Vancouver Public Library.
MR. ROBERT WATT, City Archivist, Vancouver, B.C.
MR. DAVID WILLIAMS, Librarian, Douglas College, New Westminster, B.C.
MISS MAUREEN WILSON, Head, Maps Division, U.B.C. Library.
MR. GORDON WRIGHT, Director, College Bibliocentre, Toronto.
MRS. ANNE YANDLE, Head, Special Collections, U.B.C. Library.

Council of the School of Librarianship
WALTER H. GAGE, M.A., LL.D., President of the University of B.C., Professor of Mathematics and Dean of Inter-Faculty and Student Affairs.
DOUGLAS T. KENNY, M.A. (Brit. Col.), Ph.D. (Wash.), Professor, and 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.
PETER GROSSMAN, B.A. Lib. Cert., LL.D., Consultant, Harry Smith & Sons.
DEAN W. HALLIWELL, M.A., B.L.S., Head Librarian, University of Victoria.
W. E. IRELAND, B.A., M.A., LL.D., 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 programme of 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 self-education, and indispensable for scholarship and research. The task of librarians is to translate the library's potential into effective educational service. Librarians promote education by making available a careful selection of printed and audio-visual 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

*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.

information. Librarians must know books and other learning resources and they must know how to make such materials of maximum usefulness to patrons individually and to society in general.

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 necessary for effective library service.

Teaching Programme—Master of Library Science

From September 1971 the School of Librarianship offers a two-year course for students who already hold an acceptable Bachelor's degree. This course leads to the degree of M.L.S. (Master 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 principles and problems. The instructional pattern employs a wide variety of approaches including lectures, laboratories, discussions, seminars, directed study, colloquia, field trips and field work. Students are encouraged to work closely with faculty members and each student has his own advisor available for consultation and specific assistance.

Admission Requirements

Candidates for admission will be of two types for the first few years of the programme: (1) those beginning study in librarianship for the first time, and (2) those who have already earned the B.L.S. degree or its equivalent but desire additional specialized education.

1. Admission requirements for new entrants are as follows:
   (a) the candidate must hold a Bachelor's degree from a recognized university;
   (b) he must have achieved at least second class standing in the last two years of his undergraduate study;
   (c) he must show promise of superior professional performance as attested by letters of reference and a personal interview;
   (d) he must give satisfactory evidence of a reading knowledge of a language other than English, and, where his native language is not English, demonstrate facility in the use of English.
2. Admission requirements for students already having professional qualifications are as follows:
   (a) the candidate must have a B.L.S. degree from a library school whose programme is accredited by the American Library Association, or the equivalent thereof.
   (b) he must have demonstrated superior professional performance as attested by letters of reference and a personal interview.
   (c) language requirement as in 1 (d) above.

3. 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 requirements 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.

4. 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.

5. 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.

6. 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.

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 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 major languages other than English.

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.

Requirements for the Degree of M.L.S. and Organization of the Course

The School of Librarianship requires an acceptable Bachelor's degree as a prerequisite to admission. The curriculum in librarianship itself is a two-year graduate programme which calls for the completion of at least thirty units of credit courses plus such non-credit studies (e.g. field work) as may be also required. Satisfaction of these requirements qualifies candidates for the degree of M.L.S. (Master of Library Science).

The first year of the programme requires attendance on a full-time basis. The second year of the programme may be taken on a part-time basis and need not begin immediately after completion of the first year. However, all degree requirements must be met within a period of five years after initial registration in the case of the new entrant, and within a period of four years after registration in the M.L.S. programme in the case of a student already holding the B.L.S. degree.

The programme for each student is to be arranged in consultation with his advisor. The normal programme for the M.L.S. degree calls for the plan of studies shown below. The first year emphasizes the core curriculum and consists almost wholly of required courses. In the second year students have, subject to approval of their advisors, free choice among courses offered.

A degree candidate must successfully complete 30 units of course work, but only fifteen units are required if the candidate already holds the B.L.S. degree. Six units of this work should, where possible, be taken in courses offered by other departments of the university. Where the candidate has already taken postgraduate work in another department, he may be permitted to complete degree requirements for the M.L.S. with a twenty-four unit programme, providing such previous work is relevant to his studies in librarianship.

A student already holding the B.L.S. is admitted to the Second Year of the programme and ordinarily takes the usual plan of work for that year. He may, however, be required to take more than the normal fifteen units if more than five years have elapsed since award of the B.L.S. or if his B.L.S. courses did not adequately encompass the subject matter of the first year curriculum.

The following is the usual plan of studies:

The work of the First Year consists of eight required courses (15 units) representing the knowledge that should be common to all librarians and providing a foundation for the specialized studies of the Second Year. In the Second Year the student, by choice of courses, seminars, directed studies and individual research projects, concentrates his work in one or more of the four main areas of specialization. He is required to take the course in Research Methods; the other courses (making a total of 15 units) are chosen under the guidance of his adviser from courses offered in the School and by other departments of the University.

The usual plan of work for the Second Year will encompass the following:

(a) three courses (4½ units) in one of groups A-D;
(b) one course from group E designed to relate his specialization to a given type of library (1½ units);
(c) four courses from other departments of the University, designed to relate his library interests to a given subject field (6 units);
(d) one course from Group F - advanced seminar, directed study or individual research project - in addition to 654 (required), (1½ units).
(e) Research Methods in Librarianship - required - (1½ units).

The above plan of work may be modified in the light of the student's background and interests.

Group A—Bibliography and Information Services

601. (1½) Resources in the Arts and the Humanities.
602. (1½) Resources in the Social Sciences.
603. (1½) Resources in the Sciences and Technology.
604. (1½) Services for Adult Readers.
605. (1½) Services for Children.
606. (1½) Services for Young People.
607. (1½) Services to the Disadvantaged.

Group B—Library Materials

611. (1½) Literature for Children.
612. (1½) Literature for Young People.
613. (1½) Non-Book Materials.
614. (1½) Archives and Manuscripts.
615. (1½) Rare Books and Special Collections.
616. (1½) Government Publications.

Group C—Documentation and Technical Services

621. (1½) Documentation.
622. (1½) Special Problems in Documentation.
623. (1½) Advanced Cataloguing and Classification.
624. (1½) Special Classification Systems.
625. (1½) Organization of Library Technical Services.
626. (1½) Automation of Library Systems.
627. (1½) Planning and Design of Libraries.

Group D—Foundations

631. (1½) History of Librarianship.
632. (1½) History of the Book.
633. (1½) Canadian Libraries and Librarianship.
634. (1½) Comparative Librarianship.
635. (1½) Education for Librarianship.

Group E—Library Administration—Types of Libraries

641. (1½) College, University and Research Libraries.
642. (1½) Public Libraries.
643. (1½) School Libraries.
644. (1½) Special Libraries and Information Centers.
645. (1½) Medical Libraries.

Group F—Research and Individual Study

651. (1½) Advanced Seminar.
652. (1½) Directed Study.
653. (1½) Individual Research Project.
654. (1½) Research Methods in Librarianship.

Description of Courses.

First Year

500. (2) Sources of Information.—Introduction to basic reference works and to bibliography, both general and subject-oriented.

505. (2) Organization of Materials.—The basic processes of developing library collections; bibliographical arrangement of library materials.

510. (1½) The Library and its Public.—Reading and the library in relation to mass media of communication; clientele of libraries and their nature, needs, and interests.

515. (2) Introduction to Librarianship.—The place of the library in society; organization, trends, and problems of library service; librarianship as a profession.

520. (2) Information Services.—Principles and practice of reference work; organization of information services in libraries of all types.

525. (2) Classification and Cataloguing.—Principles and practices of bibliographical description and subject analysis of library materials.

530. (1½) Publishing and the Book Trade.—Economic and cultural factors in the physical production and distribution of books and other library materials; the role of the book in communication.

535. (2) Introduction to Automation.—Introduction to applications of computers and related equipment in library management and bibliographical analysis.

Second Year (All courses will not necessarily be offered each year; some will probably be available only on an alternate year basis.)

601. (1½) Resources in the Arts and Humanities.

602. (1½) Resources in the Social Sciences.

603. (1½) Resources in the Sciences and Technology.—The literatures of the several large branches of knowledge viewed in the light of their structure and types of publication; bibliographical control of the literatures; characteristics of research use of the subject literature.

604. (1½) Services for Adult Readers.—Guidance to individual adult readers and to groups using library collections and facilities; reading habits and interests of the public library's clientele.

605. (1½) Services for Children.—Book selection and services for the child reader in public libraries; story-telling, book talks, and dramatic presentations; administration of libraries for children.

606. (1½) Services for Young People.—Special services to the adolescent; book selection and reference work; advisory services and planned reading activities.

607. (1½) Services to the Disadvantaged.—Problems of the physically, economically, or educationally disadvantaged person in his use of libraries; advisory and remedial services.

611. (1½) Literature for Children.—Survey and analysis of children's books, classic and modern; criteria for evaluation; current trends and issues relating to children's reading.

612. (1½) Literature for Young People.—Survey of books of special appeal to adolescents; factors affecting reading interests and habits.

613. (1½) Non-Book Materials.—Selection, administration, storage, and use of films, filmstrips, phonorecords, television tapes, and other similar materials in libraries.

614. (1½) Archives and Manuscripts.—Organization and indexing of non-printed library materials; selection, maintenance, and preservation of historical and administrative records.

615. (1½) Rare Books and Special Collections.—Administration of collections of rare books and other special library materials; special physical and bibliographical problems posed by rare or fragile materials.

616. (1½) Government Publications.—Bibliography, acquisition, and organization of government publications, with emphasis on those of Canada, Great Britain, the United States, and international organizations; the place of government publications in research.

621. (1½) Documentation.—Literature search by means of specialized manual and electronic indexing and retrieval methods; comparisons of methods in respect of efficacy, speed of retrieval, and costs.

622. (1½) Special Problems in Documentation.—Special topics in documentation: subject analysis, specification and control; indexing; abstracting.

623. (1½) Advanced Cataloguing and Classification.—Organization for use of special library materials, with emphasis on non-book materials such as music, phonorecords, maps, etc.; emphasis on Library of Congress classification and descriptive cataloguing.

624. (1½) Special Classification Systems.—Systems other than Dewey and Library of Congress used in the classification of books and other library holdings: Bliss, Colon, U.D.C., and others.

625. (1½) Organization of Library Technical Services.—Management of library operations involving acquisition, preparation, cataloguing and circulation of books, periodicals and other materials.

626. (1½) Automation of Library Systems.—Analysis of library operations within the systems concept; application of computer and unit record equipment to acquisition, cataloguing, serials handling, and circulation.

627. (1½) Planning and Design of Libraries.—Programming of library buildings for efficient utilization; planning space requirements for new buildings and alterations; selection of library equipment.

631. (1½) History of Librarianship.—Development of libraries from their earliest appearance to the present time; their changing role in the development of social and educational institutions.

632. (1½) History of the Book.—The development of the printed book from its origins to the present day; the book as an art form and as a technical product.

633. (1½) Canadian Libraries and Librarianship.—Special aspects of librarianship in Canada; national, cultural and economic determinants of the library scene in Canada.

634. (1½) Comparative Librarianship.—Librarianship throughout the world; practices and theories of librarianship in different national and linguistic contexts.

635. (1½) Education for Librarianship.—Theories and practices in the training of professional librarians; special trends in library education.

641. (1½) College, University and Research Libraries.—Purpose and organization of academic libraries; problems of service and collection building; the role of the academic librarian.

642. (1½) Public Libraries.—Activities of municipal, regional, and provincial libraries; their relation to their administrative jurisdictions; the public librarian and the community.

643. (1½) School Libraries.—Principles and practices in school library services; the library in the educational programme of the elementary and secondary school; relationships to students, teachers, and the community.

644. (1½) Special Libraries and Information Centres.—Design, planning, and operation of libraries and information centres serving industry and research; the role of the special librarian as information officer.

645. (1½) Medical Libraries.—Functions of libraries serving medical schools, medical societies, and regional medical services; medical information services to researchers and practitioners; hospital library service.

651. (1½) Advanced Seminar.—Consideration of special problems in library service; student preparation of analyses for presentation and group discussion.

652. (1½) Directed Study.—Individual programmes of reading under faculty direction.

653. (1½) Individual Research Project.—Studies, directed by a faculty member, culminating in a research paper prepared by the student.

654. (1½) Research Methods in Librarianship.—Basic principles of research; description and application of research methods appropriate to the various types of library research problems.

Examinations, Credit and Standing

1. Examinations in the School of Librarianship are obligatory for all students.

2. A student, in order to qualify for the M.L.S. degree, must obtain an overall average of not less than 65% in the courses for each of the two years. Courses will be graded as follows: 1st class: 80% or over; 2nd class: 65% to 79%; Pass: 60% to 64%; Fail: below 60%.

3. Any student whose average in the examinations of the first year is less than 65% 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. 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.

5. Field trips and field work, as may be called for, are considered integral parts of the M.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.

See General Information section for regulations governing:

(i) fees
(ii) graduation
(iii) withdrawal
(iv) transcript of academic record

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:

Fees	$503.00
Books	75.00
Field trips	30.00
*Field work	
Incidentals	25.00
Librarianship Student Society Fee	5.00
	$638.00

Attendance

A student who cannot attend his classes should notify his instructors in writing.

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. 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 on 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.

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 M.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 year emphasizes the core curriculum and consists almost wholly of required courses. In the second year 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 British Columbia.

The University of British Columbia Library is the largest in Western Canada. Its total resources comprise over 2,000,000 volumes and microfilms, with special strength in bibliographies, reference works and serials. The collection in the field of library science alone now numbers over 10,000 titles, and children's books are available in three other special collections. The library is also one of the most highly automated in North America, having used computers extensively since 1965.

The University of Victoria Library and the Simon Fraser University Library and the Library of the B.C. Institute of Technology in Burnaby present excellent examples of fast-developing academic and technological 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.

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 B.C. Research. The Vancouver Schools' System provides an opportunity for a practical look at school libraries.

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. 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

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".

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. Application forms may be obtained from the Scholarship Officer, Awards Office, National Research Council of Canada, Ottawa 7. Other scholarships, loans and

*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.

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

The Fryer Book Binding, Ltd. Bursary

The Helen Gordon Stewart Bursary

Applications for bursaries should be addressed to the Scholarship Office, Room 207, Buchanan Building.

Loans

British Columbia Library Association Student Loan Fund—This loan fund is available to British Columbia residents currently enrolled in the librarianship programme at The University of British Columbia or elsewhere, or to any out-of-province student accepted by the U.B.C. School of Librarianship. It will function as an emergency fund for students who have successfully completed the first term of their programme and will require funds to finance the second term. Several awards may be made, repayable by recipients upon graduation.

Prizes and Medals

Alcuin Society Prize

Ruth Cameron Medal for Librarianship

Marian Harlow Prize in Librarianship

Neal Harlow Book Prize

The Gladys Ledingham Award

Scholarships

The H. W. Wilson Scholarships

THE SCHOOL OF SOCIAL WORK

Administrative Staff

Director of the School	Dr. George M. Hougham
Coordinator of Field Instruction	Mr. Harold G. Goodwin
Administrative Assistant - Admissions	Miss Judith F. Davis
School Librarian	Mr. George Freeman

ACADEMIC STAFF

Professors

John A. Crane, B.A. (Manitoba), M.S.W. (McGill), Ph.D. (Minnesota)
George M. Hougham, B.A., M.A. (Toronto), Ph.D. (Pennsylvania)
Henry S. Maas, M.S. (Columbia), Ph.D. (Chicago)
Mrs. Helen McCrae, B.A. (Toronto), M.S.W. (Brit. Col.)

Associate Professors

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.), D.S.W. (Southern California)
William M. Nicholls, B.A. (Toronto), M.Sc. (Springfield)

Assistant Professors

Mrs. Estelle Chave, B.A., M.S.W. (Brit. Col.)
Ben Chud, B.A. (Queen's), M.S.W. (Brit. Col.)
John Deakins, B.A. (London), M.A. (Chicago)
Miss Glenda Gentleman, B.A., M.S.W. (Brit. Col.)
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Harold G. Goodwin, B.A. (Mount Allison), M.S.W. (Brit. Col.)
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John A. MacDonald, B.A., LL.B., B.S.W. (Brit. Col.), M.S.W. (Washington)
Mrs. Christiane McNiven, B.A. (Lille), M.S.W. (Ottawa)
Richard Nann, B.A., B.S.W. (Brit. Col.), M.S.W. (Columbia), D.S.W. (Berkeley)
Mrs. Elaine Stolar, M.A., M.S.W. (Brit. Col.)
Mrs. Mary Tadych, B.A. (Manchester), M.S.W. (Brit. Col.)

Instructors

Bryce Babcock, B.S. (Milton College), M.S.W. (Fresno State)

Part-Time Faculty

Mrs. Marilyn J. Callahan, B.A., M.S.W. (Brit. Col.)
Mrs. Nancy Dickson, B.A. (Acadia), M.S.W. (Toronto)
Norman Gibbons, B.A., M.S.W. (Brit. Col.)
Paul Kirmmse, B.A. (Harper), M.S.W. (Adelphi)
Mrs. Phyllis Robinson, B.A. (Ohio Wesleyan), M.Sc. (Western Reserve)

Agencies Offering Field Instruction

B.C. Mental Retardation Institute
Miss Glenda Gentleman (Faculty)

B.C. Youth Development Centre (The Maples)
A. Horvath
D. Ricketts
Miss V. Whitman

Browndale, B.C. Division
Miss L. Woodward

Canadian Arthritis and Rheumatism Society
Mrs. A. Campbell

Catholic Family and Children's Service
Main Branch
Miss D. Guse
Miss N. Lo
Miss A. Luckyj
Miss G. Madden
Miss M. Salutin
Mrs. A. Stuart
Miss M. Wong

Children's Aid Society of Vancouver
Youth Section
Dr. A. Furness (Faculty)
Miss J. Vernon
Broadway Branch
Mrs. A. Fahrig
Receiving Home
J. Geddes
Corbett Reception Centre
Mrs. M. Phelps

Children's Foundation
G. Rothwell

Community Mental Health Project
B. Chud (Faculty)

Community Social Services
P. Kirmmse (Faculty)

Dunbar Community Centre
P. Kirmmse (Faculty)

Faculty of Medicine, UBC
Family Practice Unit (at Vancouver General Hospital)
Miss L. Cregheur
Forensic Clinic, Department of Psychiatry (at Vancouver General Hospital)
R. Whitelaw

Family Service Centres of Greater Vancouver
Mrs. E. Chave (Faculty)
T. Pyper
Miss B. White
North Shore
J. Deakins (Faculty)

Federal Corrections Project
J. MacDonald (Faculty)

G. F. Strong Rehabilitation Centre
Mrs. M. Tadych (Faculty)

Home Care Psychiatric Project
Miss J. McDermott

Killarney-Fraserview Project
B. Babcock (Faculty)
Mrs. M. Callahan (Faculty)
R. McClelland (Faculty)

Mental Health Centre (Adult)
Miss E. Kolodinski
J. Quinn

Matsqui-Sumas-Abbotsford Area Council
P. ADRIAN
W. PAETKAU

Moberley School Sunset Park Project
MRS. N. DICKSON (Faculty)

Narcotic Addiction Prevention Project
W. MOY

National Parole Board
R. GILLILAND (Faculty)

Neighbourhood Services Association
N. GIBBONS (Faculty)

New School
MRS. P. ROBINSON (Faculty)

North Shore Neighbourhood House
MRS. P. ROBINSON (Faculty)

Shaughnessy Hospital
MISS S. JOKANOVICH

Squamish Band Indian Project
R. NANN (Faculty)

Surrey School Board
J. LEE

United Church Home for Girls
MISS A. HOME

United Community Services (Richmond Branch)
BASIL ROBINSON
D. MCCONNEY
W. NICHOLLS (Faculty)

Vancouver General Hospital
B. BROWN
MISS M. CARLYLE
G. FREEBORN
MISS S. GHAED
K. HODDINOTT
MISS P. OLDHAM
MISS M. RUSSELL

Vancouver Neurological Centre
MRS. G. ERRINGTON

Voluntary Association of Health and Welfare (B.C.)
MRS. M. HILL (Faculty)
A. LLOYD (Faculty)

Volunteer Bureau of Greater Vancouver
MRS. J. COINNER

Willingdon School for Girls
MRS. U. DOBSON

Young Women's Christian Association (North Shore)
MISS S. PEDDIE

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 a member of the Canadian Association of Schools of Social Work, the policy and standards-setting organization for social work education in Canada.

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.
3. To lay the foundation for graduates to enter advanced programmes of social work education.

Admission to the School

1. Persons may consult the School of Social Work concerning social work as a career, undergraduate preparation, or admission to the programme. Whenever possible, such consultation should be by appointment.
2. Application for entrance should be made on forms obtained from the School and addressed to the Admissions Secretary, School of Social Work, U.B.C. *The deadline for the submission of applications is March 15.* Two copies of official transcripts (interim where a degree is in process; otherwise, final) must accompany all applications. On occasion it is useful to submit transcripts with enquiries.
3. Selection of applicants is based on the following factors:
   (a) Academic Preparation
      i. *Course Content.* A BA degree or the equivalent is required. Preference is 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 outweigh the lack of courses in the humanities and/or the social sciences. A basic knowledge of statistics is highly desirable.
      ii. *Academic Standing.* The minimum standing required for admission to the School is Second Class standing of this University (65% average) or the equivalent, based on the final two years of the undergraduate degree programme. Better academic standing will enhance the possibility of admission. Where letter grades are given, a B standing is usually required. Where grade points are awarded on a 4-point system, 2.5 may be considered but 2.65 or better is preferred.
      iii. In exceptional circumstances, the School may waive the above requirements concerning course content and/or academic standing.

   (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 is assessed through: the applicant's personal statement attached to his application; review of references; review of relevant work experience, both volunteer and/or paid. Positive references are not a substitute for inadequate undergraduate grades. A personal interview is required in some cases.
4. The School of Social Work has a limited enrolment. Since the number of qualified applicants usually exceeds the number of places available, fulfilment of the above requirements is not a guarantee of admission.

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.

Social Work Students' Association

Through this organization, all social work students participate directly in the affairs of the School through membership on many policy committees. In addition, the Association maintains a roster of its own committees, conducts curriculum reviews, arranges for visiting speakers and social gatherings, and participates in social action projects. The Association has established liaison with the B.C. Association of Social Workers, which welcomes students at its functions.

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 social work method(s).

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 *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 policy, or in social work research related to one of the three direct service methods.

The School Year—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 block placements 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 one method: 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 in research.

Introductory Programme

The School provides a brief introductory programme immediately following registration. Detailed information will be provided at the time of registration. Participation in the programme is required for all first year students.

Degree Requirements

The degree of M.S.W. requires the successful completion of a two-year programme of postgraduate studies. It is expected that students will complete the programme in consecutive years. Completion of the degree requirements through part-time study extending over more than two years may be permitted in special circumstances. A Second Class average (65%) in classroom courses and Second Class standing in field instruction are required for promotion from first to second year, and for graduation at the end of second year.

First year courses at the School are numbered in the range 500-599; second year courses are numbered in the range 600-699 (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* direct method course (601, 602 or 603). All second year students are required to take the courses numbered 604, 605, 606, 608, 609 and 612. Selected students are permitted to take advanced work in social research as an alternative to second year field instruction in a direct method; such students are required 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 from 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 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.

COURSES IN SOCIAL WORK

Except by arrangement between the School and other University Departments, the following courses are open only to students who 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.

500. Introductory 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 significance 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 and Social Policy (Part I).—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.

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) The Social Services and Social Policy (Part II).—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.

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 research paper or project. *One 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.

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. Students may substitute for S.W. 612 a second "method" course or an approved course (undergraduate or graduate) in another department of the University.

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. (Not offered 1972-73.)

625. (1) Methods and Use of Supervision.—An advanced course for students with appropriate experience and qualifications. (Not offered 1972-73.)

626. (1) Social Work Methods, IV.—Advanced study in casework, group work or community organization, for senior or special students. (Not offered 1972-73.)

627. (1) Human Growth and Behavior, V.—Advanced study of developmental theory applied to specialized material. (Not offered 1972-73.)

628. (1) Problems of Social Welfare Administration.—For appropriate students with experience or special needs in this area. (Not offered 1972-73.)

629. (1) Contemporary Issues in Corrections.—Advanced course on contemporary trends in correctional treatment and administration. (Not offered 1972-73.)

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

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.

ARTHUR BEEDLE, B.Com. (London), F.C.A., Professor.

LARRY L. CUMMINGS, A.B. (Wabash), M.B.A., D.B.A. (Indiana), Visiting Professor.

DONALD B. FIELDS, B.Com. (Brit. Col.), M.B.A. (Toronto), F.C.A., Professor.

HAROLD E. GRAY, B.S., M.S. (Denver), Ed.D. (Stanford), Honorary Professor and Director of Executive Programmes.

NOEL A. HALL, B.Com. (Brit. Col.), M.B.A. (Calif.), D.B.A. (Harvard), Professor and Director of the Institute of Industrial Relations.

RALPH R. LOFFMARK, M.L.A., B.A. (Toronto), M.B.A. (Pennsylvania), C.A., Graduate Osgoode Hall, Professor.

PETER A. LUSZTIG, B.Com. (Brit. Col.), M.B.A. (Western Ontario), Ph.D. (Stanford), Professor and Chairman of the Finance Division.

KENNETH R. MACCRIMMON, B.S., M.B.A., Ph.D. (Calif.), Professor.

JAMES C. T. MAO, B.S. (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.P.A., C.A., Professor.

C. L. MITCHELL, B.Com. (Toronto), M.B.A. (Brit. Col.), C.A., Professor and Chairman of the Division of Accounting and Information Systems.

LORING G. MITTEN, B.S. (Drexel Inst. of Technology), M.S. (M.I.T.), Ph.D. (Ohio), Professor and Chairman of the Management Science Division.

RICHARD U. RATCLIFF, B.A. (Wisconsin), M.B.A., Ph.D. (Michigan), Professor.

KARL M. RUPPENTHAL, A.B. (Kansas), LL.B., M.B.A. (Berkeley), Ph.D. (Stanford), Professor.

CARL E. SARNDAL, M.B.A. (Michigan), Ph.D. (Lund, Sweden), Professor.

WALLACE F. SMITH, B.A. (Yale), M.A. (Conn.), Ph.D. (Washington), Professor and Chairman of the Division of Urban Land Economics.

DOYLE L. WEISS, B.S. (Kansas), M.S., Ph.D. (Carnegie), Visiting Professor.

R. EARL 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), F.C.G.A., **Associate Professor.**

GERALD A. FELTHAM, B.Com. (Sask.), Ph.D. (Berkeley), C.A., Associate Professor.

JAMES D. FORBES, B.S. (Wash. State), M.B.A. (Harvard), Ph.D. (Calif.), Associate Professor.

MICHAEL A. GOLDBERG, B.A. (Brooklyn College), M.A., Ph.D. (Berkeley), Associate Professor.

TREVOR D. HEAVER, B.A. (Oxon.), M.A., Ph.D. (Indiana), Associate Professor and Chairman of the Division of Transportation (on leave of absence).

J. F. HELLIWELL, B.Com. (Brit. Col.), M.A., D.Phil. (Oxon.), Associate Professor (Research).

ROBERT H. HEYWOOD, M.B.A. (Brit. Col.), Associate Professor and Chairman of the Division of Teacher Education (Commercial).

ROBERT F. KELLY, B.S. (Auburn), M.B.A. (Tulane), D.B.A. (Harvard), Associate Professor.

VANCE F. MITCHELL, B.S. (Maryland), M.B.A. (George Washington), Ph.D. (Calif.), Associate Professor and Chairman of the Division of Policy, Organizational Behaviour and Industrial Relations.

LARRY F. MOORE, B.S. (Wyoming), M.B.A., D.B.A. (Colorado), Associate Professor. (On leave of absence).

STANLEY M. OBERG, B.Com. (Brit. Col.), M.B.A., D.B.A. (Washington), Associate Professor and Chairman of the Division of Marketing.

RICHARD W. POLLAY, B. Mgt. Eng. (Rensselaer Polytechnic Inst.), M.B.A., Ph.D. (Chicago), Associate Professor.

BERNHARD SCHWAB, B.S., M.S. (Tech. U. of Munich), M.B.A., Ph.D. (Calif.), Associate Professor.

J. WILLIAM C. TOMLINSON, B.A., M.A. (Oxon.), S.M., Ph.D. (M.I.T.), Visiting Associate Professor.

JAMES B. WARREN, A.B. (Wash.), M.B.A. (Calif.), Associate Professor.

HUGH C. WILKINSON, B.Com. (Brit. Col.), M.B.A. (Wash.), Dip. A.E. (College of Aeronautics, Cranfield), P.Eng. (B.C.), Associate Professor.

WHATARANGI WINIATA, B.Com. (Victoria U. of Wellington), M.B.A., Ph.D. (Michigan), Associate Professor.

MERLE E. ACE, B.S. (St. Lawrence), M.A. (Columbia), Assistant Professor.

RICHARD T. BARTH, B.S. (Kansas), M.S. (Stanford), M.I.A. (Yale), Ph.D. (Northwestern), P.Eng. (B.C.), Assistant Professor.

MICHAEL J. BRENNAN, B.A., B.Phil. (Oxon.), M.B.A. (Pittsburgh), Ph.D. (M.I.T.), Assistant Professor.

FREDERICK J. BROOKS-HILL, B.A. (Western Ontario), Assistant Professor.

SHELBY L. BRUMELLE, B.S. (California Institute of Technology), M.S., M.A., Ph.D. (Berkeley), Assistant Professor.

JOHN BUTTERWORTH, B.A., M.A. (Cantab.), M.B.A., Ph.D. (Berkeley), Assistant Professor and Director of the Graduate Studies Division.

ALBERT S. DEXTER, B.A. (Calif.), M.B.A. (Harvard), Ph.D. (Columbia), Assistant Professor.

GERALD M. DICKINSON, B.A. (Manchester), Ph.D. (Sussex), Assistant Professor.

JOHN L. EVANS, B.A. (Central Washington State), M.B.A., D.B.A. (Wash.), Assistant Professor.

BRUCE C. FAUMAN, B.Sc., M.Sc. (M.I.T.), Ph.D. (Stanford), Visiting Assistant Professor.

ROBERT J. GAYTON, B.Com. (Brit. Col.), C.A., Assistant Professor.

LAURENCE L. GEORGE, B.S., M.B.A. (Calif., Los Angeles), M.S. (Berkeley), Assistant Professor.

GEORGE GORELIK, B.Com. (London), M.B.A. (Brit. Col.), Ph.D. (Berkeley), C.G.A., Assistant Professor.

RICHARD W. GRAYSTON, B.Com. (Brit. Col.), Ph.D. (Chicago), Visiting Assistant Professor.

STANLEY W. HAMILTON, B.Com. (Sask.), M.B.A. (Brit. Col.), Ph.D. (Berkeley), Assistant Professor.

PETER A. LAWRENCE, B.S., M.S., Ph.D. (Stanford), Visiting Assistant Professor.

CHARLES A. PRENTICE, B.Com. (Brit. Col.), Ph.D. (Berkeley), Assistant Professor.

JEFFREY B. SIDNEY, B.A. (Yale), M.A., M.S.E., Ph.D. (Michigan), Assistant Professor.

FRED SILLER, B.S. (Sask.), M.B.A. (W. Ontario), Assistant Professor.

WILLIAM T. STANBURY, B.Com. (Brit. Col.), M.A. (Berkeley), Assistant Professor.

WILLIAM J. SWANSON, A.B. (Knox, Illinois), M.B.A. (Indiana), Assistant Professor.

CARY SWOVELAND, B.S. (Berkeley), M.S. (Calif.), Ph.D. (Calif., L.A.), Assistant Professor.

RONALD N. TAYLOR, B.A. (Westminster College), M.A. (Omaha), Ph.D. (Minnesota), Assistant Professor.

IRWIN TEPPER, B.E.E. (Rensselaer Polytechnic Inst.), M.Sc. (Maryland), Ph.D. (Penn.), Assistant Professor.

PETER Z. W. TSONG, M.S. (Chicago), Ph.D. (Berkeley), Assistant Professor.

DEAN H. UYENO, B.S., M.Sc. (Wash.), Ph.D. (Northwestern), Assistant Professor.

ILAN VERTINSKY, B.A. (Hebrew), Ph.D. (Berkeley), Assistant Professor.

GORDON A. WALTER, B.S. (Wash.), M.S., Ph.D. (Berkeley), Assistant Professor.

WILLIAM WATERS, B.A. (Missouri), M.A., Ph.D. (Wisconsin), Assistant Professor.

JOHN K. WELSBY, B.A. (Exeter), M.Sc. (London School of Economics), Assistant Professor. (On leave of absence).

HARMUT J. WILL, Bacc.B.A., M.B.A. (Free University of Berlin), Ph.D. (Illinois), Assistant Professor.

WILLIAM F. J. WOOD, B.Com., M.B.A. (Brit. Col.), D.B.A. (Wash.), Assistant Professor.

WILLIAM T. ZIEMBA, B.S.Ch.E. (U. of Mass., Amherst), M.B.A., Ph.D. (Berkeley), Assistant Professor.

IRWIN DAVIS, B.A. (Toronto), Barrister-at-Law, Lecturer and Real Estate Coordinator.

H. L. PURDY, B.A. (Brit. Col.), M.A. (Washington), M.A. (Hon.) (Dartmouth College), Ph.D. (Chicago), Lecturer.

PETER D. WATTS, B.Com., LL.B., M.B.A. (Brit. Col.), Lecturer.

JAMES A. OHLSON, F.K., F.P.M. (Stockholm), M.B.A., Ph.D. (Berkeley), Postdoctoral Fellow.

JAMES P. RAKOWSKI, B.A. (Princeton), Ph.D. (Columbia), Postdoctoral Fellow.

Division of Accounting: C. L. Mitchell, Chairman; A. Beedle, R. E. Blaine, B. E. Burke, J. Butterworth, A. S. Dexter, G. A. Feltham, D. B. Fields, R. J. Gayton, G. Gorelik, R. V. Mattessich, J. A. Ohlson, C. A. Prentice, H. J. Will.

Division of Urban Land Economics: W. F. Smith, Chairman; R. U. Ratcliff, M. A. Goldberg, S. W. Hamilton.

Division of Finance: P. A. Lusztig, Chairman; M. J. Brennan, F. J. Brooks-Hill, G. M. Dickinson, J. L. Evans, R. W. Grayston, J. C. T. Mao, I. Tepper, W. Winiata, W. F. J. Wood.

Division of Policy, Organizational Behaviour and Industrial Relations: V. F. Mitchell, Chairman; M. E. Ace, R. T. Barth, L. L. Cummings, C. C. Gourlay, R. H. Heywood, L. F. Moore, H. L. Purdy, W. T. Stanbury, R. N. Taylor, P. Z. W. Tsong, G. A. Walter, H. C. Wilkinson.

Division of Marketing: S. M. Oberg, Chairman; B. C. Fauman, J. D. Forbes, R. F. Kelly, R. W. Pollay, F. Siller, W. J. Swanson, J. B. Warren, D. L. Weiss.

Division of Teacher Education (Commercial): R. H. Heywood, Chairman.

Division of Transportation & Utilities: T. D. Heaver, Chairman; P. A. Lawrence, J. P. Rakowski, K. M. Ruppenthal, W. G. Waters, J. K. Welsby.

Division of Management Science: L. G. Mitten, Chairman; S. L. Brumelle, J. Butterworth, L. L. George, C. A. Prentice, C. E. Sarndal, B. Schwab, J. B. Sidney, C. Swoveland, D. H. Uyeno, I. Vertinsky, W. T. Ziemba.

Executive Programmes: H. E. Gray, Director.

Lecturers — Non-Faculty:

A. Abramson, B.Com., LL.B.; G. Anderson, C.G.A., M.C.I., A.C.I.S.; G. Ashby, C.A.; R. D. Brown, B.Com., M.Ed., C.G.A.; V. H. Chadwick, C.A.; T. S Chambers, B.A., C.A.; M. Clay, C.A.; J. Cochrane, C.A.; B. Cook, B.Com., M.B.A.; A. L. Dartnell, B.Com., M.A., Ph.D.; W. P. Daye, B.Com., C.A.; D. Dolphin, B.A.Sc., M.B.A., P.Eng.; E. A. Downey, C.A.; J. M. Duncan, C.G.A.; F. Dunn, B.Com., C.A.; D. Elder, B.Com.; J. Ensor, B.Com., M.B.A.; K. Godfrey, P.Eng.; D. R. Grannis, B.A., M.A.; J. D. Grant, B.Com., M.B.A., C.A.; J. Hagen, B.Com., M.Com.; N. Horsman, B.A., M.A.; V. Jones, B.A., M.B.A.; J. D. Kell, C.G.A.; D. A. King, B.E., M.Sc.; J. Kosiak, B.A.Sc., M.B.A.; A. Lee, B.Com., M.B.A.; H. M. Loomer, B.Com., LL.B.; W. B. Mathieson, B.Com., M.B.A.; J. D. Matkin, LL.M.; T. D. Nicholls, B.Com., LL.B.; R. Pearson, C.G.A.; C. Pines, LL.B.; J. E. Rowcroft, B.Sc., M.Sc.; N. Rudden, B.Com., C.A.; W. Smith, B.Com., M.B.A.; N. Sommers, B.Com., M.B.A.; W. Telford, B.Com., C.A.; R. Tulk, B.Com., C.A.; T. Turner, B.A., M.B.A.; J. Waldman, C.A.; D. Wallace, C.A.; K. F. Weaver, B.Com., C.G.A.; C. D. Weyman, M.A., C.A.; W. H. White, B.A.Sc., M.B.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. Licentiate in Accounting (Lic. Acct.).
3. Bachelor of Commerce, Bachelor of Laws (B.Com., LL.B.), combined degree with Faculty of Law, option 7. See Faculty of Law.
4. Master of Business Administration (M.B.A.).
5. Master of Science in Business Administration (M.Sc.(Bus.Admin.)).
6. 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; the Licentiate hood is light grey with white cord.

Courses Leading to the Degree of B.Com.

After First Year Arts or Science 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. Required courses in a particular option may be replaced by other courses with the approval of the Dean and the appropriate division head.

Admission to B.Com. Courses

(1) The general requirements for admission to the University are given in the General Information section.

(2) 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.

(3) 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.

(4) 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 and Management Information Systems
2. Marketing
3. Industrial Administration
4. Finance
5. Transportation and Utilities
6. Commerce and Economics
7. Commerce and Law (for combined degrees)
8. Organizational Behaviour and Industrial Relations
9. Urban Land Economics

LICENTIATE IN ACCOUNTING

The Senate of the University has approved a programme of study for university graduates leading to the degree of Licentiate in Accounting.

1. Students Eligible for the Programme

The Licentiate Programme will be open to graduates of any recognized university providing they have obtained in their baccalaureate degree an average of not less than 60% in the courses in which they were registered in their final two years.

Applicants who hold a Bachelor of Commerce Degree from U.B.C. (except those in the Accounting and Management Information Systems Option) or the equivalent will be exempt from the first year of the programme.

Those who hold a baccalaureate degree and who in the last two years achieved a standing acceptable for entrance to the Faculty of Graduate Studies are advised to consult the Director of Graduate Studies regarding the Master of Business Administration Degree.

2. Course requirements for the Licentiate of Accounting programme

First Year

Economics 200 (3 units) — Principles of Economics; Commerce 221 (2 units) — Organizational Behaviour; Commerce 261 (2 units) — Fundamentals of Marketing; Commerce 271 (2 units) — Business Finance; Commerce 318 (3 units — Quantitative Methods I; Commerce 331 (3 units) — Commercial Law; Commerce 350 (3 units — Accounting Information Systems.

Second Year

Commerce 353 (3 units) — Financial Accounting, Intermediate; Commerce 354 (1½ units) — Cost Accounting Systems; Commerce 356 (3 units) — Management Information Systems; Commerce 418 (1½ units) — Quantitative Methods II; Commerce 450 (1½ units) — Advanced Accounting and Information Systems Topics I *or* Commerce 451 (1½ units) — Advanced Accounting and Information Systems Topics II; Commerce 453 (1½ units) — Financial Accounting, Advanced; Commerce 454 (3 units) — Planning and Control Systems; Commerce 492 (3 units) — Policy and Administration.

3. Admission to the Programme

Students planning to register for the Licentiate in Accounting should apply to the Registrar's Office.

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 (of which the last two years must be spent in residence) in the Faculty of Commerce and Business Administration, and of three complete years in the Faculty of Law 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.

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) Students are advised to plan summer work, for at least part of their course, in the field of their option.

(6) 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.

(7) 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 section of the calendar)

(b) Other students who wish to take a course in Commerce should apply to the Dean in writing.

(8) Students who have obtained a first class average in their third year may elect, in the fourth year, up to 3 units of 500-level courses chosen in consultation with the Chairman of the Division.

OPTION REQUIREMENTS

Pre-Commerce

Students who apply to enter the Faculty of Commerce and Business Administration 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. Students are advised that alternative streams of Commerce 110 are provided; the appropriate stream depending on the student's background in mathematics.

Second Year Commerce

The Second Year programme will consist of Commerce 210, 221, 252, 261, 271; Economics 301, 302; and 3 units of electives. All students are required to complete a non-credit course in Public Speaking.

Third and Fourth Year Option Programmes

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 and Management Information Systems

Option 1

Third Year	Fourth Year
Commerce 322, 331, 353, 354, 356 **6 units of electives**	Commerce 453, 492, 494 6 units from Commerce 351, 355, 370, 450, 451, 454, 455 6 units of electives

Com. 291 or the equivalent must be taken in the fall term of the third year unless previously completed.

Students are referred to "Professional Associations" below for the requirements of the professional accounting associations. Students wishing to gain the maximum exemptions from the course modules of the B.C. Institute of Chartered Accountants must include Com. 455 in their elective courses.

Marketing

Option 2

Third Year	Fourth Year
Commerce 322, 331, 362, 365, Commerce 363 and/or 364 9 units of electives	Commerce 467, 492, 494 1½ units from Commerce 462, 463, 465, 466, 468 9 units of electives

Industrial Administration

Option 3

Third Year	Fourth Year
Commerce 320, 321, 322, 331, 383 7½ units of electives	Commerce 421, 422, 483, 492, 494 7½ 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.

Finance

Option 4

Third Year	Fourth Year
Commerce 322, 331 **4½ units from Com. 371, 374, 376, 378, or 379** 9 units of electives (not to include Economics 345)	Commerce 471, 492, 494 3 units from Com. 472, 475, 476, 477 9 units of electives

Transportation and Utilities

Option 5

Third Year	Fourth Year
Commerce 322, 331, 341, 343 Economics 480 **7½ units of electives**	Commerce 446, 492, 494 3 units from Commerce 444, 445, 447 9 units of electives

Commerce and Economics

Option 6

Third Year	Fourth Year
Commerce 322, 331 9 units of Economics including Economics 345 **4½ units of electives**	Commerce 492, 494 6 units from any 300- or 400-level Commerce courses 7½ units from Economics 300- or 400-level courses

Commerce and Law
Option 7

Third Year	Fourth Year and Fifth Year
Commerce 322, 492, 494 3 units from any Political Science 300-level courses 9 units of electives (Commerce 331 and 337 are not allowed for credit)	Courses prescribed for First and Second years in the Faculty of Law of the University of British Columbia (See Faculty of Law for admission requirements.)

Organizational Behaviour and Industrial Relations
Option 8

Third Year	Fourth Year
Commerce 320, 321, 322, 324, 325, 331 7½ units of electives	Commerce 421, 422, 425, 492, 494 7½ units of electives

Students planning to choose this option are encouraged to elect Political Science 200, Psychology 100 and 200 and Sociology 200 during the first and second years of Commerce to permit maximum flexibility in electing 300- and 400-level courses in these fields. Economics 356, 357 may not be elected by students in this option.

Urban Land Economics
Option 9

Third Year	Fourth Year
Commerce 307, 309, 322, 337 Commerce 376 or Economics 447 9 units of electives	Commerce 407, 408, 409, 492, 494 Architecture 425 7½ 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 the appropriate section of the calendar.

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. [3-0; 0-0]

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. (1½) 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. [0-0; 3-0]

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]

Quantitative Methods

110. (3) Quantitative Methods I.—A course covering some basic mathematical methods in the fields of analysis and algebra. Theory will be developed and applications to business problems will be illustrated. Students are advised that alternative streams of Commerce 110 are provided; the appropriate stream depending on the students' background in mathematics. [3-0; 3-0]

210. (3) Quantitative Methods II.—A basic course covering probability and statistics. Theory will be developed and applications to business problems will be illustrated.

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]

313. (1) Quantitative Methods—Analysis.—(For Graduate Students only). Theory and applications of basic mathematics and calculus to business problems. [2-0; 0-0]

314. (1) Quantitative Methods—Probability.—(For Graduate Students only). Theory and applications of probability and stochastic processes to business problems. [2-0; 0-0]

315. (1½) Statistics.—(For Graduate students only.) Theory and applications of statistics to business problems. [0-0; 3-0]

316. (1) Quantitative Methods—Algebra.—(For Graduate students only.) Theory and applications of algebraic methods to business problems. [0-0; 2-0]

317. (1½) 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.

318. (3) Quantitative Methods (I).—(For Licentiate Students only.) Theory and application of calculus, linear algebra, probability and stochastic processes to business problems. [2-1; 4-2]

410. (1½) Methods of Management Science.—A study of the methods of management science including formulation of models from a variety of areas. Attention will be given to the analysis of deterministic models of inventory, allocation (linear and non-linear programming), competition (game theory), and scheduling. Case studies will be used to illustrate the applications of of the models. [3-0; 0-0]

411. (1½) Topics from Management Science.—A study of the methods of management science as applied to problems involving randomness or uncertainty. Particular attention will be given to statistical problems which arise in problem formulation and to decision making under uncertainty. Stochastic models of inventory, queueing, and allocation will be considered. The techniques of dynamic programming and simulation will be discussed in relation to the above models. Case studies will be used to illustrate the applications of the models. [0-0; 3-0]

418. (1½) Quantitative Methods (II).—(For Licentiate Students only.) Theory and application of statistics to business problems. [3-1; 0-0]

Organizational Behaviour and 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. [4-0; 0-0]

320. (1½) Behaviour in Organizations.—A study of individual and group behaviour in organizations. The course will examine problems of work environment, communication, leadership and group dynamics. [3-0; 0-0]

321. (1½) Motivation and Reward Systems.—An examination and appraisal of models of motivation and performance improvement. Determination of objectives, implementation and evaluation of programmes for motivation, compensation and reward administration in organization. [0-0; 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]

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 dynamics.

324. (1½) Manpower Administration I.—A study of the nature, design and application of national and regional manpower plans and policies and their implications for the management of organizations. Emphasis will be placed on integrating economic, social and legal considerations. [3-0; 0-0]

325. (1½) Manpower Administration II.—An analysis of problems and analytical tools involved in maintaining an effective work force with particu-

lar emphasis on manpower planning and policy, employee selection, job analysis and evaluation, performance appraisal and manpower research methodology. [0-0; 3-0]

421. (1½) 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. [3-0; 0-0]

422. (1½) Topics in Labour Relations.—A detailed analysis of the more important current problems in labour management relations at the provincial, federal and international levels. [0-0; 3-0]

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 1972-73.) [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.—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 Policy in Transportation and 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 transportation and the relationship of shipping to Canadian problems in trade and port development. [3-0; 0-0]

446. (1½) Transportation in Economic Development.—The role of transport in economic development with special emphasis on the application of cost-benefit analysis to the evaluation of private and public investments in transport facilities. [0-0; 3-0]

447. (1½) Urban Transportation.—Economic issues involved in providing transport services in urban communities; study of demand; cost of alternate systems; public and private financing problems. [0-0; 3-0]

Accounting and Management Information Systems

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]

350. (3) Accounting Information Systems.—(For Licentiate students only.) The analysis and communication of financial events, including discussion of financial instruments associated with various types of business organizations, and an examination of the accounting postulates underlying the preparation and presentation of financial statements. The role of accounting information systems in the creation and application of the historical and projective data used by decision makers in the management of an 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, and budgeting. [3-2; 3-2]

353. (3) Financial Accounting.—Intermediate. An examination of accounting as a means of measurement and as an information system for external reporting purposes. [3-0; 3-0]

354. (1½) Cost Accounting Systems.—Cost accounting as a management tool and means of cost control within economic entities. [3-0; 0-0]

355. (1½) Income Taxation.—A study of income tax from the standpoint of the individual and of business enterprise. [3-0; 0-0]

356. (3) Management Information Systems.—Accounting information processing as part of data collection, storage, retrieval, and processing functions within administered entities. [3-0; 3-0]

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 1973-74 and alternate years. [2-0; 2-0]

450. (1½) Advanced Accounting and Information Systems Topics I.—The design and implementation of advanced computerized information systems. [0-0; 3-0]

451. (1½) Advanced Accounting and Information Systems Topics II.—Selected areas in accounting and information systems. [0-0; 3-0]

453. (1½) Financial Accounting: Advanced.—An examination of specialized topics of advanced financial accounting. [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. [3-0; 3-0]

455. (3) The Audit of Information Systems.—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]

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]

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]

361. (1½) 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. (1½) 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 research; the formulation of a research design. [3-0; 0-0]

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]

462. (1½) 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. [0-0; 3-0]

465. (1½) Marketing Research Problems.—The application of research methods to problems in marketing; a study of selected techniques of measure-

ment 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 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 governmental regulation of marketing processes. [3-0; 3-0]

468. (1½) 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

271. (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 including mergers. [0-0; 4-0]

370. (1½) 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, mergers and acquisitions; public policy. [0-0; 3-0]

373. (1½) Business Finance.—(For Graduate students only.) The major financial decisions that businesses face; the analytical approaches that are available to assist with these decisions; and the links between these decisions; and the financial community.

374. (1½) 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. [3-0; 0-0]

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 insurance, real estate. Special project assignments. Field trips. [3-0; 3-0]

376. (1½) Financial Institutions I.—The financial systems in Canada; the practices of the major financial institutions; and theories of financial processes. [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. (1½) 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. (1½) 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 modern quantitative techniques to the formulation of financial decisions under conditions of both certainty and uncertainty. [3-0; 0-0]

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; 3-0]

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]

291. (1½) Introduction to Computers in Business Administration.—An introductory course in the uses of computers in business administration. Areas covered will include the basic concepts of computer and management information systems, an introduction to programming languages, and elementary applications of computers to business problems. [2-2; 0-0]

490. (3) Essay.—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. (1½) 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, investment theory and urban growth, investment behavior in the real estate market, applications of investment decision theory, feasability studies, 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.

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. (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.

524. (1½) Organization Development.—A course in Organization Behaviour which emphasizes tactics and strategies for introducing constructive modifications in organizations. Organization structures and intra-organization patterns or relationships provide the focus for this course which intends to prepare the student for the exposure he will confront in his early years in most organizations.

525. (1½) The Measurement and Evaluation of Individual Behaviour in Work Organizations.—A course in the development and use of instruments such as questionnaires, to assess human and organizational variables, aimed at preparing students to evaluate critically behavioural research found in the literature and to engage in research activities themselves.

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 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 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 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 and Management Information Systems

551. (1½-3) Advanced Accounting Seminar.—The examination of selected areas in accounting.

552. (1½) Seminar in Income Determination.—A study, from the standpoint of senior management, of some of the varying concepts of business income and some of the underlying reasons for issues in its measurement and consideration of their implications for managerial decision-making and society.

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 Management of Information Systems.—The place of the manager of information systems in the business enterprise and his responsibility for the operation of the management information system.

555. (1½) Seminar in Computerized Information Systems.—Modern conceptual and technical developments in data processing and computerized information systems.

556. (1½) Seminar in Management Information Systems.—Studies in the nature and use of the the managerial tools of budgeting, and costing for decision-making.

557. (1½) Seminar in Taxation.—A study of taxation as it affects business entities.

651. (1½) Advanced Accounting Seminar.—An examination of the scientific aspects of the accounting model. Attempts to formulate accounting postulates and testable accounting hypotheses. Special emphasis is given to the problems of measurement and valuation and the discussion of various systems of micro- and macro-accounting.

658. (1½) Research Seminar in Accounting.—Presentation of papers and research reports by graduate students in accounting, as well as by visitors and faculty members. Special permission for participation to be obtained from the instructor.

659. (1½) Directed Studies in Accounting and Information Systems.—Studies of special areas of accounting, information systems and related fields not offered in the regular curriculum. These studies, under tutorial guidance, are designed primarily for Ph.D. students.

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. (1½-3) 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 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

571. (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.

572. (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.

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. (1½) 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. (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. (1½-3) Seminar in Business Applications of Management Science.—A seminar in the use of mathematical methods in business problems. The applicability of the major techniques of operations research such as mathematical

programming, queuing theory, etc., to the solution of business problems in various functional areas will be discussed. Emphasis will be on the formulation of mathematical models which can then be solved by standard techniques.

582. (1½-3) Computer Application in Management Science.—A course dealing with the computer as a tool for implementing management science techniques in business. Simulation, computer as a tool for implementing management science techniques in business. Simulation, various search techniques, etc., will be discussed.

583. (1½-3) Statistical Methodology.—A range of applied statistical techniques is studied and appraised: non-parametric methods, multiple correlation and regression analysis, analysis of variance and design of experiments, factor analysis, discriminant analysis, and other multivariate methods.

584. (1½-3) Mathematical Programming.—A basic course in the theory and methods of mathematical programming. Review of linear programming and classical optimization methods. Development of theoretical results for convex programmes. Main computational approaches.

585. (1½-3) Applied Stochastic Processes.—The elements of stochastic processes from the state-space viewpoint, in discrete and continuous time with and without deliberate control, dynamic programming for control processes. Applications to queuing, inventory, marketing and other business systems.

681. (1½) Seminar on Theoretical Developments in Management Science.—A study of new theoretical developments in the field of Management Science. Areas investigated may include Stochastic Models, Mathematical Programming, Inventory Theory, and Sequential Decision Processes, among others. Emphasis will be on the elucidation of the underlying theoretical framework for some area of areas.

682. (1½) Seminar in Optimization Methods.—A study of optimization methods utilized in a variety of business and systems contexts. Emphasis will be placed on new methods as reported in the current literature, and on general theoretical developments in the field. Students will normally be required to prepare and present a research paper of professional standards.

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. (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.

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.

595. (1½-3) Seminar in Computer Applications in Business.—Current topics in data processing and computer applications in business.

596. (1½) Managerial Decision-Making.—This course surveys the basic concepts and theories of individual decision making from a number of disciplines. Applications to many different managerial areas are studied. The topics covered include: problems diagnosis, alternatives, uncertainty, information, preferences, risk, multi-objectives, criteria, and choice.

FINANCIAL ASSISTANCE

See Awards and Financial Assistance section.

PROFESSIONAL ASSOCIATIONS

1. Institute of Chartered Accountants of B.C.

(a) Graduates of the Accounting and Management Information Systems Option will complete selected (normally four out of fifteen) course modules of the Institute and are required to complete not less than two years of registered employment.

(b) Graduates with the degree of B.Com. other than in the Accounting and Management Information Systems Option are required to serve three years of registered employment. They will normally be required to complete eight of fifteen course modules of 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 registered employment in 1(a) and (b) above will be allowed for up to 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) The minimal educational requirement for admission into registered employment with a firm of chartered accountants in B.C. is an undergraduate degree from a recognized University with certain specified courses. Effective September 1, 1973 registered students will be required to hold one of the following degrees or their equivalent: B.Com. (A.M.I.S.), M.B.A. (Accounting major), Licentiate in Accounting.

(e) Licentiate in Accounting programme.

2. Certified General Accountants Association of B.C.

(a) Graduates of the 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 and Management Information Systems 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 and Management Information Systems 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 the Accounting and Management Information Systems), 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 9), 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.

1. **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 three-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.
5. **Administrative Management Society.** A three-year programme, designed to meet the academic requirements for the C.O.A. Certificate of British Columbia. Lectures.
6. **Real Estate and Appraisal.** A four-year programme given by correspondence and lectures.
7. **Sales Management.** A three-year programme. Lectures.

THE FACULTY OF DENTISTRY

FACULTY OF DENTISTRY
ACADEMIC STAFF

S. WAH LEUNG, B.Sc., D.D.S. (McGill), Ph.D. (Rochester), F.A.C.D., F.I.C.D., F.R.C.D.(C), Professor of Oral Biology and Dean of the Faculty.

Department of Oral Biology

LEON KRAINTZ, A.B. (Harvard), M.A., Ph.D. (Rice Inst.), Professor and Head of the Department.
S. WAH LEUNG, B.Sc., D.D.S. (McGill), Ph.D. (Rochester), F.A.C.D., F.I.C.D., F.R.C.D.(C), Professor.
JOSEPH TONZETICH, B.S.A. (Brit. Col.), Ph.D. (Cornell), Associate Professor and M.R.C. Research Associate.
ALAN G. HANNAM, B.D.S. (Adelaide), F.D.S., R.C.S. (Eng.), Ph.D. (Bristol), F.A.C.D.S., Assistant Professor.
C. PAUL OSMANSKI, D.D.S. (Buffalo), M.S., Ph.D. (Illinois), Assistant Professor.
CARL F. CRAMER, B.Sc., M.S. (New Mexico), Ph.D. (Calif.), Honorary Associate Professor.
RICHARD H. PEARCE, B.Sc., M.Sc., Ph.D. (Western Ont.), Honorary Associate Professor.
BARRY C. MCBRIDE, B.Sc., M.Sc. (Brit. Col.), Ph.D. (Illinois), Honorary Assistant Professor.
CRANLEIGH O. PARKES, B.Sc., M.Sc. (Cardiff), Ph.D. (Alta.), Honorary Assistant Professor.
EDWIN K. FUKUSHIMA, D.M.D. (Brit. Col.), 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.
JOHN D. SPOUGE, M.D.S. (Sheffield), F.D.S., R.C.S. (Eng.), M.R.C.S. (Eng.), L.R.C.P. (London), F.R.C.D.(C), Professor.
FRED W. MUSAPH, "Tandarts" (Utrecht), D.M.D. (Tufts), Assistant Professor.
ROBERT W. T. MYALL, F.D.S., R.C.S. (Eng.), B.D.S. (Lond.), Assistant Professor.
JOHN G. SILVER, B.D.S. (Lond.), L.D.S., R.C.S. (Eng.), Assistant Professor.
PHILIP B. EASTEP, D.M.D. (Kentucky), 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 Associate Professor.
DOUGLAS A. ANDERSON, D.D.S. (Alta.), M.Sc. (Columbus, Ohio), Part-time Assistant Professor.
G. ROY THORDARSON, D.M.D. (Man.), Part-time Assistant Professor.
F. KYLE BERRY, B.S.A. (Brit. Col.), B.Sc., D.M.D. (Oregon), Part-time Instructor.
G. BROOK GARDNER, D.M.D. (Brit. Col.), Part-time Instructor.
GORDON G. HUNTER, D.M.D. (Man.), Part-time Instructor.
WILFRED A. JEFFRIES, D.M.D. (Oregon), Part-time Instructor.
DONALD E. MACFARLANE, D.M.D. (Man.), Part-time Instructor.
DONALD G. MARSHALL, D.M.D. (Oregon), Part-time Instructor.
MALVIN PANAR, D.D.S. (Minnesota), Part-time Instructor.
HESTER B. RUMBERG, R.D.H. (Man.), Part-time Instructor.
EDWARD I. SLAKOV, D.M.D. (Oregon), 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.
VIRENDRA K. SETH, B.Sc. (Banaras), B.D.S. (Lucknow), D.D.S. (Toronto), M.S. (Loyola, Chicago), Assistant Professor.
R. KEITH LINDSAY, D.D.S. (Toronto), M.S. (Michigan), F.R.C.D.(C.), Part-time Assistant Professor.
PERRY H. TRESTER, D.M.D. (Man.), Part-time Assistant Professor.
STANLEY J. FISHER, D.D.S. (Toronto), F.R.C.D.(C.), Part-time Instructor.
EUGENE MARKS, D.M.D. (Man.), Part-time Instructor.
PAUL L. RONDEAU, B.A. (Sask.), D.D.S. (Toronto), Part-time Instructor.
EDWARD Y. M. YEUNG, B.Sc. (Man.), D.D.S. (McGill), 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.
VIRGINIA M. DIEWERT, D.D.S. (Alta.), M.S. (Northwestern), Assistant Professor.
W. MICHAEL WAINWRIGHT, B.D.S. (Adelaide), D.D.S. (Toronto), M.S.D. (Indiana), Assistant Professor.
CHARLES E. CRAIG, D.D.S. (Toronto), M.S. (Illinois), F.R.C.D.(C), Part-time Assistant Professor.
ROBERT N. HICKS, D.D.S. (Alberta), M.S. (Northwestern), Part-time Assistant Professor.
YALE G. MALKIN, D.D.S (Wash.), M.S. (Northwestern), Part-time Assistant Professor.
JOHN G. RYAN, D.D.S. (Toronto), M.S. (Michigan), F.R.C.D.(C), Part-time Assistant Professor.

Department of Public and Community Dental Health

DOUGLAS J. YEO, D.D.S. (Toronto), M.P.H. (Michigan), Professor and Head of the Department; Director, Programme of Dental Hygiene.
EDWARD J. HYDE, B.Sc. (Sir George Williams), D.D.S. (McGill), M.S.D. (Indiana), Assistant Professor and Director, Continuing Dental Education.
JOAN S. VORIS, R.D.H., B.S. (Washington), Assistant Professor and Supervisor, Programme of Dental Hygiene.
DOROTHY F. MAYERS, R.D.H. (Oregon), B.Sc. (Wash.), Instructor.
MARJORIE J. WEICH, R.D.H. (Alta.), Instructor.
STEPHANIE M. BRAWN, B.A. (Brit. Col.), R.D.H. (Alta.), Part-time Instructor.
W. JOSEPHINE GARDNER, R.D.H. (Oregon), Part-time Instructor.
J. C. LEWIS, D.D.S. (Alta.), Part-time Lecturer.
KARIN E. SIPKO, R.D.H. (Alta.), Part-time Instructor.
W. J. WALLACE, Q.C., LL.B. (Osgoode, Toronto), Honorary Lecturer.
MEREDITH A. WILSON, R.D.H. (Oregon), Part-time Instructor.

Department of Restorative Dentistry

TREVOR J. HARROP, L.D.S. (Glasgow), D.D.S. (Dalhousie), M.S., Ph.D. (Iowa), Associate Professor, and Head of the Department.
RICHARD H. ROYDHOUSE, B.D.S. (New Zealand), M.S. (Rochester), D.D.Sc. (Otago, New Zealand), Associate Professor.
ALEX BOWMAN, B.Sc. (Sir George Williams), D.D.S. (McGill), M.Sc. (Indiana), Assistant Professor.
THERESA P. CHIANG, B.Sc., D.D.S. (Dalhousie), M.Sc. (Harvard), Assistant Professor.
DAVID DONALDSON, B.D.S. (St. Andrew's), F.D.S., R.C.S. (Edinburgh), M.D.S. (Dundee), Assistant 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.
BRUCE E. SQUIRE, B.D.S., L.D.S. (Melbourne), D. Orth., R.C.S. (London), F.D.S., R.C.S. (England and Scotland), M.S.D. (Indiana), Assistant Professor.
CLIFFORD AMES, D.D.S. (Alberta), F.R.C.D.(C), Part-time Associate Professor.
MATTHEW J. WATERMAN, B.Sc. (Sask.), D.D.S. (McGill), Part-time Associate Professor.
NORMAN C. FERGUSON, D.M.D. (North Pacific), Part-time Assistant Professor.
MICHAEL BALANKO, D.M.D. (Oregon), Part-time Instructor.
LUDLOW W. BEAMISH, B.A. (Brit. Col.), D.M.D. (Oregon), Part-time Instructor.
CLAUDE W. GARDNER, D.M.D. (Oregon), Part-time Instructor.
EARL V. GOWDA, B.Sc., D.D.S. (Alta.), Part-time Instructor.
HAROLD W. HELM, B.Sc., D.D.S. (Alta.), Part-time Instructor.
RICHARD B. KRAMER, D.D.S. (McGill), M.S.D. (Boston), Part-time Instructor.
DONALD R. LEWIS, D.M.D. (Brit. Col.), Part-time Instructor.
ALBERT J. MALNARICK, D.M.D. (Brit. Col.), Part-time Instructor.
R. BRUCE MCALPINE, D.D.S. (Wash.), Part-time Instructor.
JOSEPH H. MERRELL, D.D.S. (Toronto), Part-time Instructor.
MAX NACHT, D.D.S. (Toronto), Part-time Instructor.
MATTHEW PANAR, D.M.D. (Brit. Col.), Part-time Instructor.
ROBERT E. PATTON, B.Sc., D.D.S. (McGill), Part-time Instructor.
ROBERT B. TELFORD, D.M.D. (Oregon), Part-time Instructor.
WILFRED C. WEINSTEIN, D.M.D. (Man.), Part-time Instructor.
RALPH I. YORSH, B.A. (Sask.), D.D.S. (Toronto), Part-time Instructor.

Departments of Anatomy, Biochemistry, Pathology, Pharmacology and Physiology—See Faculty of Medicine.

Lecturers from Other Departments

JOHN A. BIRKBECK, M.B., Ch.B. (Edinburgh), Assistant Professor, Department of Paediatrics.

RALPH M. CHRISTENSEN, B.A., M.D. (Brit. Col.), Assistant Professor (Part-time), Department of Surgery.

JAMES R. MILLER, B.A., M.A. (Toronto), Ph.D. (McGill), Professor and Head of the Division of Medical Genetics.

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 of Child Psychiatry.

JOHN E. NIXON, M.D. (Western Ont.), Clinical Instructor, Department of Anaesthesiology.

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. The deadline for applications each year is April 30.

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) OR Mathematics 130 (Finite Combinatorial Mathematics); Chemistry 103 (General Chemistry) or Chemistry 110 (Principles of Chemistry) or Chemistry 120 (Principles of Chemistry), Chemistry 205 (Physical - Inorganic and Analytical Chemistry) or Chemistry 210 (Physical Inorganic Chemistry) or Chemistry 220 (Physical Inorganic Chemistry), Chemistry 203 (Organic Chemistry) or Chemistry 230 (Organic Chemistry); Physics 105 (Elementary Physics) or Physics 110 (Mechanics, Electricity and Atomic Structure) or Physics 115 (Wave Motion, Mechanics and Electricity) or Physics 120 (Matter and Mechanics); Biology 101 or 102 (Principles of Biology). If a student has been granted exemption from Biology by the Faculty of Science he will have met the Biology requirement of the Faculty of Dentistry.

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 within 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 deposit 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 the 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 15 units of course work in 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 on the combined degree programme registered in the first year of the Faculty of Dentistry who have already obtained satisfactory standing in Biochemistry 410 (or the equivalent) and Physiology 400 (or the equivalent) may with approval of the Dean of Dentistry and the Dean of Science substitute equivalent units of other appropriate 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.

All students in Dentistry wishing to qualify for the B.Sc. degree on the combined degree programme, must file a copy of their programme in First Year Dentistry with the Dean of Science by September 15 in the Fall of the year *preceding* the year of the Congregation at which they plan to qualify for the B.Sc. degree.

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 may be required to take special examinations or tests as determined by the Admissions Committee.

2. The application must be supported by official transcripts, proof of graduation, or such other documents as may be requested by the Admissions Committee, with certified English translations.

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 Admissions 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.

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 execpt under special circumstances.

5. A student in any year taking a full programme of studies who does not pass in at least sixty per cent of it will be required to withdraw from the University for at least a year. A student taking a partial programme of studies who does not pass all of it will be required to withdraw.

6. A student who fails for a second time in University studies is required to withdraw.

See General Information section for regulations concerning:

(i) examinations results
(ii) supplemental examinations
(iii) review of assigned standing
(iv) transcript of academic record
(v) fees

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	$ 10.00
Laboratory coats (4)	$ 20.00
Dental Instruments—First Year	$ 200.00
—Second Year	$ 650.00
—Third Year	$ 600.00
—Fourth Year	$ 50.00

Graduation (Requirements for the degree of D.M.D.)

1. A candidate for the D.M.D. degree must have fulfilled all the require-

ments 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.

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

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 202 or 230.

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. (Elective).

412. (1½) Biochemistry Conferences.—A series of conferences correlating Biochemistry with selected topics in Medicine and Dentistry (Elective). Prerequisite: Biochemistry 410 (may be taken concurrently). One three-hour session per week in second term.

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. Statistics in the Health Sciences.—A seminar organized to study the fundamentals, functions and limitations of statistical methods as applied to the health science discipline. Permission of the instructor must be obtained before registration. (First Term—Elective.)

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. This is an elective course for certain students on the combined B.Sc.-D.M.D. degree programme but is considered part of the regular dental school curriculum.

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.

418. Cranial Facial Development and Growth I.—An introductory series of lectures and seminars dealing with the normal ante- and post-natal growth and development, with special emphasis on the cranio-facial structures. Students will be assigned child patients whose specific patterns of growth will be studied by the students over a four-year period.

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. Given only in conjunction with Physiology 425.

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. During the second term microbiology of the oral cavity will be presented.

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.

428. Cranial Facial Development and Growth II.—A continuation of Restorative Dentistry 418. Emphasis will be on the environmental and hereditary factors which influence growth and development. Consideration will be given to both the normal and the deviations from normal. Lectures and seminars will be supplemented by clinical sessions.

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.

438. Cranial Facial Development and Growth III.—Seminars and clinical sessions designed to familiarize the student with current research in the field.

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.

448. Cranial Facial Development and Growth IV.—Student seminars and presentation of cases which were assigned to the student in Restorative Dentistry 418 for study during the succeeding three years.

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 at another university or college. Required subjects are English, Chemistry and Biology. Recommended subjects are Mathematics, Physics (if Physics 11 not taken previously) or Psychology. (3 units or 6 semester hours or 9 quarter hours in each).

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 30, 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. 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.

Instruments and Supplies

	Approximate Price
1. *Uniforms (3), caps, laboratory coats (2), white stockings, white Oxfords	$ 75.00
2. Instruments	225.00
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 Calendar.

Courses of Instruction

The following subjects are required of students in the First Year:

Dental Hygiene

201. (3) 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 and techniques of Dental Health Education.

205. (1) Dental Materials and Methods.—A lecture and laboratory course dealing with the properties and uses of selected materials in restorative dentistry.

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 in radiography as well as one designed to familiarize dental hygiene students with the various phases and specialties of dentistry.

208. (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.

Psychology

100. (3) Introductory Psychology.—Selected topics in general psychology. Emphasis on current research and the psychologist's approach to problems in the context of representational theories and issues in psychology.

Education

301. (1½) Introduction to Education Psychology.

The following subjects are required of students in the Second Year:

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.

Dental Hygiene.

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 along with instruction in the fundamentals of oral communication.

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.

Awards and Financial Assistance

(Subject to change)

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 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 College of Dental Surgeons of B.C. Bursaries
The Robert D. Sheret Memorial Scholarship (College of Dental Surgeons of B.C.)
Vancouver B'nai B'rith Hillel Foundation Scholarship
American College of Dentists Scholarship
The C.U. & C. Health Services Society Scholarship in Dentistry
The C. V. Mosby Company Scholarship Book Award in Dentistry
The College of Dental Surgeons of B.C. Scholarship
International College of Dentists Scholarship
The Margaret Merrell Memorial Scholarship
The Professional Affairs Division of the College of Dental Surgeons of B.C. Scholarships
The Dr. Lorin O. Lind Memorial Scholarship
The Max M. Waterman Prize
The Matthew J. Waterman Dental Hygiene Clinical Award
The College of Dental Surgeons of British Columbia Gold Medal
The College of Dental Surgeons of British Columbia Gold Medal in Dental Hygiene
The B.C. Dental Hygienists' Association Clinical Award
The B.C. Dental Hygienists' Association Prize
The Canadian Society of Dentistry for Children Award
The B.C. Dentists' Wives Association Book Award
The B.C. Dentists' Wives Association Bursary
Fraser Valley Dental Society Bursary
Interior Dental Society Bursary
The E. S. H. Winn Memorial Bursary in Dentistry
The M. M. Waterman Memorial Bursary
Prince George and District Dental Society Bursary
The Robert D. Sheret Memorial Bursary
The W. K. Kellogg Foundation Loan Fund (Dentistry)
American Dental Trade Association Student Loan Fund
The College of Dental Surgeons of B.C. Loan Fund for Dental Hygiene

Honour Societies

Omicron Kappa Upsilon Honor Dental Society—Omicron Kappa Upsilon is an honor dental society established to promote and recognize scholarship and character among students of dentistry in Canada and the United States. The Eta Theta Chapter was founded at the U.B.C. Faculty of Dentistry in June, 1970. Membership in the Society is by invitation only. In the case of undergraduates, membership is limited to not more than 12% of the entire graduating class, to be selected from among the 20% of the class who ranked highest in scholarship for the entire period of their attendance at dental school. Students who have been elected to membership will be notified in the Spring of the year of their graduation.

FACULTY OF EDUCATION

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J. MURRAY, B.A. (Brit. Col.), M.Mus., D.Ed. (Oregon), Assistant Professor.
MISS SHIRLEY NALEVYKIN, B.A. (Sask.), B.Sc. (McGill), M.S. (Mich.), Assistant Professor.
P. G. OLLEY, B.A., M.Ed. (Brit. Col.), Assistant Professor and Assistant Director of Student Teaching.
MISS CECILY OVERALL, Dip. Phys. Ed. (London), M.Ed. (W. Wash.), Assistant Professor.
D. OWENS, B.S. (Troy), M.Ed. (Auburn), Assistant Professor.
MRS. NANCY C. PAPPAS, B.A. (San Fernando), M.L.S. (U.C.L.A.), Assistant Professor.
A. V. PARMINTER, B.A., M.A. (Brit. Col.), M.A., Ph.D. (Stanford), Assistant Professor.
G. PENNINGTON, B.A. (Seattle), M.Sc. (Wash.), Assistant Professor.
C. PENNOCK, B.A. (Sir George Williams), M.A. (Syracuse), Ph.D. (Illinois), Assistant Professor.
ROBERT M. POUTT, B.A., M.Ed. (Central Washington), Assistant Professor
D. PRATT, B.S., M.S. (St. Cloud), Ph.D. (Wash.), Assistant Professor.
MRS. M. RALSTON, B.Ed. (Brit. Col.), M.Ed. (W.Wash.), Assistant Professor.
D. ROBITAILLE, B.A. (Montreal), M.A. (Detroit), Ph.D. (Ohio), Assistant Professor.
MISS MARTHA RODEHEFFER, B.S. (Wheaton), M.A., Ph.D. (Arizona State), Assistant Professor.
DENIS C. ROGERS, B.A., B.Ed. (Acadia), M.Ed. (Alberta), Ph.D. (Toronto), Assistant Professor.
MRS. SALLY ROGOW, B.A. (Wisc.), M.A. (Columbia), M.A. (Mich.), D.Ed. (Brit. Col.), Assistant Professor.
M. ROSE, B.S.A. (Brit. Col.), M.A. (Western Washington), Assistant Professor.
L. A. ROUSSEAU, B.A., M.Ed. (Brit. Col.), Ph.D. (Washington State), Assistant Professor.
I. SHAW, B.S. (New York), M.A. (Denver), Ph.D. (Wayne), Assistant Professor.
J. M. SHERRILL, B.S., M.A., Ph.D. (Texas), Assistant Professor.
KENNETH SLADE, B.A., M.Ed. (Brit. Col.), Ph.D. (Oregon), Assistant Professor.
MISS GAIL J. SPITLER, B.Sc., M.Ed., Ph.D. (Wayne), Assistant Professor.
MISS J. STEVENSON, L.R.A.M., A.L.A.M., L.G.S.M., Assistant Professor.
MISS WENDY SUTTON, B.A. (Brit. Col.), M.A. (Calif.), Assistant Professor.
W. SZETELA, A.B. (Mass.), M.S. (Michigan), Ed.D. (Georgia), Assistant Professor.
W. L. TETLOW, B.G.E. (Omaha), M.A., Ph.D. (Cornell), Assistant Professor.
MRS. M. THOMSON, B.A. (Alta.), M.S.W. (Brit. Col.), Assistant Professor.
JAMES E. THORNTON, B.A., B.S. (West Mich.), M.A., Ed.S. (Mich.), Ph.D. (Michigan State), Assistant Professor.
C. UNGERLEIDER, B.A. (San Francisco), M.A. (Columbia), Ed.D. (Mass.), Assistant Professor.
MRS. F. VEY, B.Ed. (Brit. Col.), Assistant Professor.
G. WALSH, B.A. (Sheffield), B.Ed., M.Ed., D.Ed. (Brit. Col.), Assistant Professor.
MISS JEAN MARIE WEAKLAND, B.S., M.A. (Colorado State), M.F.A. (Indiana), Assistant Professor.
R. B. WHITE, B.Ed., M.Ed. (Brit. Col.), Assistant Professor.
R. D. WILD, B.Sc., M.Ed. (Brit. Col.), Assistant Professor.
MRS. C. I. WILLIAMS, B.P.E., M.P.E. (Brit. Col.), Assistant Professor.
D. M. WILLIAMS, B.Ed., M.Ed. (Brit. Col.), Assistant Professor.
MRS. CLARICE WILLS, B.A. (San Francisco), M.A., Ed.D. (Stanford), Assistant Professor.

MRS. J. E. WOODROW, B.Sc., M.Sc. (Brit. Col.), Assistant Professor.
MISS ANNE M. ANTHONY, Instructor.
MRS. MARY ANN BIBBY, B.A. (Mt. Allison), M.A. (Smith), Instructor.
S. BUTLER, B.A., M.Ed. (Alberta), Instructor.
D. CASPERSON, B.Ed. (Brit. Col.), Instructor.
MISS CHARMIAN JOHNSON, B.Ed. (Brit. Col.), Instructor.
L. KOROLUK, B.A., B.Ed. (Sask.), M.Sc. (Wisconsin), Instructor.
MRS. MOIRA LUKE, Dip. Phys. Ed. (London), Instructor.
R. F. MERRIAM, B.Ed. (Brit. Col.), Instructor.
MRS. THERESA McDONOUGH, B.A., M.Ed. (Brit Col.), Instructor.
J. SMITH, B.A.Sc. (Brit. Col.), Instructor.
IAN THOMAS, B.Ed., M.Ed. (Brit. Col.), Instructor.
P. TRANT, B.Ed. (Brit. Col.), Instructor.
MRS. JANET BUSH, B.P.E. (Brit. Col.), Lecturer.
K. BUTCHART, B.A. (Brit. Col.), Lecturer.
MRS. SHERLE COUFAL, B.Ed., M.Ed. (Brit. Col.), Lecturer.
G. COWELL, B.Sc., M.Ed. (Brit. Col.), Lecturer.
MISS FLORINE KATAI, B.Ed. (Brit. Col.), Lecturer.
J. PARRY, Dip. P.E. (Cardiff.), Lecturer.
C. RUTHERFORD, B.Ed. (Brit. Col.), Lecturer.
MRS. NANCY SHELL, B.M., B.M.E. (North Texas State), Lecturer.
D. C. WILSON, B.A., M.A. (Brit. Col.), Lecturer.
MRS. MHORA ZELTER, B.Ed. (Brit. Col.), Lecturer.
MRS. E. NESBITT, B.A. (Brit. Col.), Assistant to the Dean.
J. H. WALLIS, M.A. (Brit. Col.), Academic Assistant to the Dean.

Lecturers from other Faculties, etc.
MRS. E. FAVARO, B.H.E. (Brit. Col.), Lecturer.
A. P. HARSHENIN, M.A. (Brit. Col.), Assistant Professor, Arts.
R. H. HEYWOOD, M.A. (Brit. Col.), Associate Professor, Commerce.
A. B. LAITHWAITE, D.D., Dip. in Physical Education (Carnegie Physical Training College), M.S. (Oregon), Associate Professor, Physical Education.
H. TONNE, B.A. (Brit. Col.), M.A. (Oregon), (Vancouver City College).

Assistants, 1971-72:
Bruce Andrews, Audrey Anthony, David Bain, Helen Breeze, Gary Bunch, Vera E. Burnham, Susanne Burrow, Rhoda Chaklader, Judith Coleman, Catherine Davison, John G. Davy, Marilyn Dumaresq, Gaalen Erickson, Edna Gear, Allan Graham, Patricia Gray, Helen Grier, Myra Haroldsen, Billy Housego, Dawn Hunt, Claire Hurley, Ingunn Kemble, Betty Kuenzli, Beverley Leinster, Parry Leslie, Anna M. Lowe, Isabel Lyttle, Louise McAlister, Jean McCutcheon, Victoria MacDonald, David McKinley, Ray McNabb, Joan Macpherson, William Marlin, Graham Mason, Odilia M. Mason, Frances H. Mitchell, Joan Mitchell, Elizabeth Morris, Monika Oldershaw, Claire Oppenheim, Viola G. Parker, Hannah Polowy, William Rabow, Dorothy Sharrock, Dorothy Shaver, Hope R. Smith, Dagny Swanson, Patricia Tarr, Bernard W. Taylor, Myrtle F. Thorne, Patricia Vertinsky, Penny Walker, Dorothy Wallis, Dorothy Washington, Gerald Weinstein, Marian Weinstein, Kenneth Williamson, Margaret Wilton.

Members of Faculty representing other Departments:
Dean G. M. Volkoff, Dean M. Shaw, Dean P. White, Dr. K. L. Erdman, Dr. L. G. Harrison, Dr. R. F. Scagel, Dr. R. S. Rowan, Mr. E. S. W. Belyea, Dr. J. L. Robinson, Dr. D. C. Murdoch, Dean I. McTaggart-Cowan, Dr. M. Lee. Dr. R. A. H. 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, Miss Frances Worledge, Mr. J. Cairnie.

The Joint Board of Teacher Education of the Province of British Columbia

Representing the University of British Columbia:
The President or his nominee, DR. D. L. LIVESEY.
The Dean of the Faculty of Education, N. V. SCARFE (Chairman).
The Senate nominee, S. BLACK.

Representing the University of Victoria:
The President or his nominee, DR. F. MARTENS.
The Dean of the Faculty of Education, DR. H. E. FARQUHAR.
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Representing Simon Fraser University:
The President, or his nominee, DR. J. ELLIS.
The Dean of the Faculty of Education, DR. D. BIRCH.
The Senate nominee, DR. A. L. TURNBULL.

Representing the Provincial Department of Education:
The Deputy Minister, J. PHILLIPSON.
The Registrar, E. A. KILLOUGH.
The Coordinator of Teacher Recruitment, P. J. KITLEY.
Superintendent of Educational Administration—Instructional Services, J. R. MEREDITH.

Representing the B.C. School Trustees' Association:
G. J. HARRY.
F. M. REDER.

Representing the B.C. Teachers' Federation:
C. D. OVANS.
J. W. KILLEEN.

Secretary: MR. E. CHERRINGTON,
Assistant Registrar, Department of Education.

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.

Note: The courses offered in Education in the 1972-73 calendar may be subject to considerable change in subsequent years as a result of innovations recommended by the Commission on the Future of the Faculty of Education.

All programmes outlined by the Faculty will be subject to revision in the light of current requirements if not completed within ten years. As a consequence of review the programme may, on occasion, be lengthened.

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. 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 in British Columbia.

(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 in British Columbia.

(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 in British Columbia.

Diploma Programmes.

1. Diploma Programme in Adult Education

The Faculty of Education and the Centre for Continuing Education 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 twenty-four 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 (a minimum of 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 Graduate Division and by the Department of Special Education. (See under the heading "Diplomas in Education".)

4. Diploma in Education of Children with Learning and Behaviour Disorders

The Faculty of Education offers a one-year programme for teachers of children with learning and behaviour disorders. This programme is directed towards the preparation of teachers of children who are mentally retarded, emotionally disturbed, culturally disadvantaged, or have primary learning disorders or cerebral dysfunction. Students will take a common core of professional courses but practice will be arranged to further their preparation in their areas of interest. 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 (a minimum of 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 Graduate Division and by the Department of Special Education. (See under the heading "Diplomas in Education".)

5. Diploma in Education of Young Children

The Faculty of Education offers a one-year programme for teachers of 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 year of full-time study (a minimum of 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 Graduate Division and by the Department of Education for Young Children.

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 teacher education 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 but not all fully qualified applicants will be accepted if the number of applicants exceeds the number provided for in each year or programme of studies. The Faculty reserves the right, moreover, to reject applicants for admission on the grounds of physical or health disabilities, 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 considered 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 considered 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, Guidance* (Sociology or Psychology) (see Note IV), 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.*

or

have completed an Honours or a Master's degree, or a degree with one major of at least 15 units of senior work 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: *It is the responsibility of the applicant to see that his application and all official transcripts of University credits are in the hands of the Registrar not later than June 30 for graduates living in Canada and May 1 for graduates living in other countries.*

Note I: *Students planning to enter teaching would be well advised to consult the section on "Academic Concentrations and Majors for Secondary Teachers."*

Note II: Re: Subjects marked with an asterisk.—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 one of the subjects listed in (a) *not* marked with an asterisk.

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.*

Note IV: (a) *Students offering Guidance as a teaching subject are advised that the Guidance Department may use selection procedures as deemed desirable.*

(b) *The 1972-73 session is the last one when Guidance will be accepted as a teaching subject. Preparation for Guidance teaching in the Secondary Schools is part of the GRADUATE programme in Counselling.*

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. Because of the accelerating rate of change in subject matter, students may not be granted credit toward the degree on the basis of course work taken more than ten years prior to the time of transfer.

(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 Elementary programme unless the candidate has completed all qualifying work for the Standard Certificate at the time of transfer.

(f) A student who has completed courses at another university must 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.

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*Note: The university, under present conditions, is not able to accept all qualified students.

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. With the prior written approval of the Committee on Admissions, Standings and Courses, a course may be taken through a college for credit by a student studying in the upper years of a degree programme. Direct enquiries to the Dean or to the University Registrar. 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 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 under Admission Requirements.) 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 for an **Application for Admission** form to the Registrar, The University of British Columbia, Vancouver 8, B.C. This form must be completed fully and returned to the Registrar **before June 30.** The application must carry a statement as to the Division (Elementary or Secondary) desired. Where this involves the upper years of the Elementary Division the majors (academic and 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.

Also required: a "transfer of credits" statement from the Registrar, Department of Education, Victoria, B.C., if applicant holds a B.C. Teacher's Certificate.

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 the Wednesday of the first week of lectures in September.

(b) 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.

See the General Information section for regulations governing:

Fees
Graduation
Supplemental Examinations
Attendance
Withdrawal
Re-Admission
Examinations and Advancement
Examination Results
Review of Assigned Standing
Transcript of Academic Record

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 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 have their standings reported to the B.C. Department of Education for teacher certification only after achieving satisfactory standing both in teaching practice and in the academic and professional courses.

2. (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. To be eligible for a Diploma in Education the candidate must normally have earned an average of not less than 65% in the senior courses which constitute the candidate's programme.

7. 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 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.

8. Except in special cases, no student may repeat a course more than once.

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 student 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.

Student Teaching, Laboratory and Seminar Requirements

All students in Education who are engaged in observation and student 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.

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 or pass a supplemental examination 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.

Teacher Qualification Service

The Teacher Qualification Service, sponsored jointly by the B.C. Teachers' Federation and the B.C. School Trustees' Association as an advisory service to teachers and school boards, evaluates teacher qualifications.

The Service acts only upon application and only after the individual has been granted a British Columbia teaching certificate by the Provincial Department of Education.

Qualifications are evaluated and categories assigned on the basis of complete years of professional preparation; partial years are not evaluated. At present the Service recognizes six categories, each corresponding to the number of years of training acceptable to the Teacher Qualification Board. One of the years must be a professional year.

Broadly speaking, the B.C. Teaching Licence qualifies for T.Q.S. category 1 or 2, the Standard Certificate for category 3 or 4, and the Professional Certificate for category 4, 5 or 6. T. Q. S. category 6 requires a minimum of six years of training and a Master's degree.

The Service at the present time deals only with teachers who are newly certificated or who are new to a school district or who are up-grading their certificate. "Request for Evaluation" forms are available from the Teacher Qualification Service Office, #200 - 1070 West Broadway, Vancouver 9. Forms are also available at the Records Office, Room 103, Education Building.

ELEMENTARY DIVISION

A (1)—The Bachelor of Education (Elementary) Degree Programme

Beginning September 1970, all students entering the undergraduate programme either as freshmen or as transfer students will be required to complete the full degree programme before qualifying to teach.

Students may enter this programme from Grade Twelve, first or second year in a college or another faculty. All programmes outlined by the Faculty will be subject to revision in the light of current requirements if not completed within ten years. As a consequence of review the programme may, on occasion, be lengthened.

First Year*	Units
English 100	3
A course in History or Geography	3
A first year laboratory science; such as Biology 101 or 102, Chemistry 103 or 110 or 120, Physics 105, 110, 115, or 120, Geology 105,* Geography 101, or General Science 190.** (Students planning to major in Elementary Science Education should refer to the course outline of this Major (see under the heading, "Science Education") before selecting their first year laboratory science.)	3
Two of: F.A. 100, Music 320, Music 101, or any offerings from the Faculty of Arts or Science or the School of Physical Education	6
(F.A. 100, 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 and orientation.)	0
	15

*The Geology Department is arranging for one section of Geology 105 especially for Education students.

**Note: General Science 190 is offered in the Faculty of Education for credit only to students who have no science courses beyond Grade 11. Permission of the Department of Science Education is required to take this course.

Second Year*	Units
English 200	3
Prerequisite for Academic major (or elective if no prerequisite needed)	3
An academic elective, preferably in History, Geography or General Science 190	3
Education 303 or 304—Curriculum and Instruction in the Language Arts	3
***Education 370 (Mathematics)	1½
Education 371	1½
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	Units
English 303—Composition (As of September, 1972, students who have had a first or second year composition course may substitute a senior English course for English 303.)	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 Professional 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

Fourth Year	Units
****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

***A student who has successfully studied mathematics well beyond the Mathematics 11 level may request, at the time of registration, to take Ed. 372 instead of Ed. 370. The request will be granted if the student can satisfy the Mathematics Education Department that his best interests will be served by not taking Ed. 370. Such a student would still take Ed. 371 in the Spring term.

****Students taking the major in Young Children (Kindergarten) should take Ed. 331. Students taking the Primary Major may substitute Ed. 331 for 310/311.

Programmes for Students Transferring From Other Faculties

Students may transfer to the four-year B.Ed. programme not later than the completion of their second year in another college or faculty.

Transferring to Second Year

Students with full first year in another faculty or college or the equivalent 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 and must complete the final two years before teaching:

Education 321/322	3
Education 303 or 304	3
Education 323 ,324, 325	3
***Education 370 (See previous page)	1½
Education 371	1½
Education 310/311 (See note **** under Third and Fourth year A1.)	3

English 303 (See note after English 303 under Third Year A1.) or Education 400 or Education 430	3
Education 297, 397 (Seminars, two in-term practica)	0
	18

To complete their degree they would take in Fourth Year

English 303, if not taken in third year (See note after English 303 under Third Year A1.); if taken, one of Education 400 or Education 430	3
Completion of one major, professional or academic	9
Electives (Senior academic if major is professional; senior Education if major is academic. Students who have not taken a first year laboratory science must take General Science 309 or an approved science course.)	6
Education 497 (Seminar and post-sessional practicum.)	0
	18

Students who are graduates of a recognized Canadian, British or other Normal School or Teachers College, who also have first year or equivalent standing recognized by the Registrar's Office of this university for transfer to a degree programme at this institution, will be granted credit as transfer students toward the B.Ed. degree as follows:

	Units
First year university or equivalent, to a maximum of	15
Professional training: Education 297/397/497, Education 321, 322, 303 or 304, 323, 324, 325, 310, 311, 370, 371 to a maximum of	15

Note: Students may not transfer to the elementary B.Ed. programme later than completion of second year in another Faculty or College.

A (3)—Programme in Elementary Education for graduates of other faculties.

Students with a Bachelor's degree from another faculty who desire to become elementary teachers will take the following programme:

	Units	Total
Education 310 and 311	3	
One of Education 400 or 430 or 470 or 519	3	
Education 370 and 371 (see *** on previous page)	3	
Education 497 (Seminars; in-term and post-sessional practica.)	0	
For the remaining units students may choose **one** of the following options: A, B, or C		
(A) *Recommended for students who have taken considerable undergraduate work in the sciences:*		
Education 304	3	
Education 322	1½	18½
Two of Education 323, 324, 325	2	
Education 409 (Graduate Section)	3	
(B) *Recommended for students who prefer teaching the Primary Grades (Kindergarten to Grade 3):*		
Education 303	3	
Education 321	1½	
Education 322	1½	
Education 323, 324, 325—or for students with suitable backgrounds, *one* of Education 307, 308 or 425. (Consent of Department is required.)	3	18
(C) *Recommended for students who prefer teaching the Intermediate Grades (Grades 4-7):*		
Education 304	3	
Education 321	1½	
Education 322	1½	
Education 323, 324, 325—or for students with suitable backgrounds, *one* of Education 307, 308 or 425. (Consent of Department is required.)	3	18

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 count from 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 under the heading "Graduate Programmes in Education".) 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 Graduate Division and by the Department of Special Education or of Education of Young Children. Each of the Diploma Programmes has a limited enrolment. The Diploma will normally be awarded upon successful completion of one of the following programmes:

(a) **Education of the Deaf**—Minimum of twelve units from: Education 403, 422, 423, 431, 436, 437, 441, 442, 443, 444, 445, 446, 447, Linguistics 300, 319. Practicum—Education 399 (minimum of 180 hours practical teaching.) Prerequisite: Education 407 or consent of instructor.

(b) **Education of Children with Learning Behaviour Disorders**—Minimum of twelve units from: Education 403, 417, 418, 420, 429, 431, 436, 437, 472, 477, 509, 513, 561, 568. Practicum—Education 399 (minimum of 180 hours practical teaching.) Prerequisite: Education 407 or consent of instructor.

(c) **Education of Young Children**—Minimum of twelve units from: Education 303, 331, 333, 334, 405, 438, 473. Practicum—Education 399 (minimum of 180 hours practical teaching). Prerequisite: Education 336 or consent of Department.

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, Mathematics 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.

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

This major requires that students take the courses in the sequence described below. Students hoping to transfer into this programme must qualify by (1) showing work of an acceptable standard* and (2) making up any deficiencies in their programme. These qualifying courses may have to be done extra-sessionally or at summer school.

Enrolment in all studio courses limited to 20.

First Year—Fine Arts 100—Students must obtain at least a second class standing in this course to be considered for an art major.

Second Year—Fine Arts 201 and 101.

Third Year—One of Fine Arts 302, 303, 305, 307.

Fourth Year—Education 425 (in lieu of Education 310/311) and the advanced course of the Third Year elective: e.g. Fine Arts 401, 403, 405, 407.

*Transfer students should arrange an interview and present a folio for adjudication during the last two weeks of April. Any inquiries and appointment arrangements must be made with the Chairman, Art Department, Faculty of Education.

Intermediate Education

Education 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

Education 473; one of Education 478, 480, 489; one of English 311, 321, Linguistics 300, Theatre 301.

Librarianship

Third Year—Education 390.
Fourth Year—Education 492.
Third or Fourth Year—Education 491. Also recommended as an elective: Education 414, Education 490 or English 311.

Mathematics Education

Mathematics 100 (2), 121 (1), Education 372 (1½), 373 (1½), 482 (1½), 488 (1½) and 3 units of electives to be chosen from Mathematics 120 (1), 140 (1), 205 (2), 221 (2), 222 (1), 312 (1).

Music Education

1st year
Music 101. Students must obtain at least a second class standing in this course to be considered for a Music Education Major.

2nd year
Music 201.

3rd and 4th years
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	Units
*Physical Education 230: see Note 2	1
*Physical Education 201 or 202	1
Physical Education 240 or 241	1
One course from Area V (See Physical Education section of the calendar)	1
One course from Area IV or VI (See Physical Education section of the calendar	1
	5

Theory Courses	Units
Second Year	
Physical Education 260	1½
Physical Education 262	1½
Third & Fourth Years—One other required	1½
Elective Courses	
Physical Education Theory or Activity	3
	7½
	12½

Notes:

1. Registration in programmes conducted by the School of Physical Education and Recreation is limited. This restriction applies to all students intending to major in physical education on the B.Ed. degree programmes (Elementary and Secondary), and who are enrolling in physical education courses for the first time.
   Information regarding application procedure and notification for an appointment will be forwarded by the Registrar at the time of application.
2. *These courses should be taken in First or Second Year.
3. Swimming—Physical Education 230; Students who can demonstrate satisfactory standards in swimming may select an optional course in lieu of Physical Education 230 provided written permission has been obtained from the Director of the School of Physical Education and Recreation.
4. 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.

Primary Education

Education 405; English 311; one elective from Education 306, 307, 308, 333, 336, 402, 407, 414, 419, 425, 473, 489, Theatre 301, General Science 309.

Reading Education

3rd Year
Education 473.

4th Year
Three units from Education 472, 475, 477. Experienced teachers may elect Education 476.

3rd or 4th Year
One of English 311, Education 480, Education 489.

Special Education

Education 407; 6 units of Education 403, 408, 417, 419, 420, 421, 422, 423, 424, 429, 431, 436, 437.

Science Education

First 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.

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.

Double Majors in Art, Mathematics, Music, or Science

Art Education

This major requires that students take the courses in the sequence described below. Students hoping to transfer into this programme must qualify by (1) showing work of an acceptable standard*, and (2) making up any deficiencies in their programme. These qualifying courses may have to be done extra-sessionally or at summer school.

Enrolment in all studio courses limited to 20.

First Year—Fine Arts 100—Students must obtain at least a second class standing in this course to be considered for an art major.

Second Year—Fine Arts 201 and 302.

Third Year—Fine Arts 101; and ONE of: Fine Arts 401, 307; plus ONE of: Fine Arts 303, 305.

Fourth Year—Education 425 plus and advanced course of each of the third year electives, e.g., Fine Arts 402, 403, 405, 407.

*Transfer students should arrange an interview and present a folio for adjudication during the last two weeks of April. Any inquiries and appointment arrangements must be made with the Chairman, Art Department, Faculty of Education.

Mathematics Education

First and Second Years—Mathematics 100 (2), 120 (1), 121, (1), 200 (2), 221 (2), 222 (1).

Third and Fourth Years—Education 372 (1½), 373 (1½), 482 (1½), 488 (1½); Mathematics 310 (3), 311 (3) and 6 units of electives to be chosen from Mathematics 312 (1), 318 (3), 322 (3), 412 (3) or other course approved by the Mathematics Education Dept.

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.
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.
3. *The Bachelor of Education (Secondary) Honours Programme* indicating that the graduate has completed an honours course in the subject named in the degree.

All programmes outlined by the Faculty will be subject to revision in the light of current requirements if not completed within ten years. As a consequence of review the programme may, on occasion, be lengthened.

First Year	Units
English 100	3
Electives and courses required for academic concentrations or major	12
Education 198 (Counselling and orientation)	0

Note: Students may elect the Arts I programme and be credited with 9 units including English 100. (For further information see Arts section of the calendar.)

Second Year	Units
Education 200	3
English 200	3
Electives or courses required for academic concentrations or major	9
Education 298 (Seminar, classroom experience)	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	6
Academic or Professional Elective*	3
Education 498 (Seminar and post-sessional practicum)	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 (1½+1½) or major (1½)	1½–3
Education 413	1½
One of Education 401, 435, 481, 482, 483	1½
6-7½ units chosen from Education 400, 401, 407, 408, 412, 414, 416, 418, 426, 427, 430, 435, 460, 470, 472, 474, 478, 479, 481, 482, 483, 490, 493, 494, 495, 496; or 3 units of the above Education courses and 3 units of appropriate senior academic work which must be approved in advance by the Director. (See note below.)	6-7½
Education 499* (Seminar and in-term and post-sessional practica)	0
Total for the Fifth Year	15

*Education 499 is weighted one-third in determining overall standing.

NOTE: The student planning to proceed to a Master's degree in Education following completion of his undergraduate degree work is advised to elect one of the following from the above list according to his intended field of specialization:

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 470 (for Educational Sociology)
Education 472/474 (for Reading Education)
Education 472/474, or Education 478 (for English Education).
Education 481-2 (for Educational Psychology)

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 to accelerate is obtained from the Director.

Other Programmes — Secondary Field

1. One-Year Programme (Secondary) for Graduates

The requirements for the Interim Professional Certificate are satisfied by this programme for students holding acceptable degrees and admitted without conditions.

	Units
Education 301 (1½), 302 (1½)	3
One of Education 400, 430, 470	3
Education 404 (relating to academic concentrations [1½+1½] or major) [1½]	1½–3
Education 413	1½
4½-6 units chosen from Education 400, 401, 407, 408, 412, 414, 416, 418, 426, 427, 428, 430, 432, 460, 470, 472/474, 478, 479, 481, 482, 483, 490, 493, 494, 495, 496.	
Education 499* (Seminar and in-term and post-sessional practica)	0
Total	15

*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.

2. B.Ed. Secondary for Candidates 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	18
One of Education 400, 430, 470	3
Education 432 (or 332)	3
Education 404 (corresponding to each of the two academic concentrations [1½+1½] or to the major [1½]) (see notes 3 and 4 below)	1½-3
Education 498 (see note 4 below)	0
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 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, 478, 479, 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 425 (formerly 305) or 307 may be substituted for the Education 404 course in the corresponding subject matter field, for 1½ units.
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 Agricultural Sciences, Art, Creative Writing, German, 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. Subjects marked with an asterisk must be accompanied by a concentration in a subject not so marked.

Agriculture*	German*	Social Studies (Emphasis on Geography)
Art	Home Economics	Social Studies (Emphasis on History)
Biological Science	Latin*	Social Studies (Emphasis on Social Sciences)* (Note special conditions)
Commerce (Business)	Library*	
Commerce (Data Processing)	Mathematics	
Commerce (Secretarial)	Music	
Chemistry	Physical Education	
Creative Writing*	Physics	
English	Russian*	
French	Spanish*	
	Theatre*	

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. Agricultural Sciences Concentration

First Year: Biology 101 or 102*, Chemistry 103 or 110 or 120; Mathematics 100 and 121; Physics 105, 110, 115, or 20.

Second, Third and Fourth Years: Agricultural Sciences 101, 201; Animal Science 258 (1½); Plant Science 258 (1½); Agricultural Economics 258 (1½) and 4½ units numbered 300 or above.

*See note in Science section (Biology) of the calendar re application for placement examination in Biology.

This major cannot be completed entirely by Summer or Extra Session.

2. Art Education Concentration

This concentration requires that students take the courses in the sequence described below. Students hoping to transfer into this programme must qualify by (1) showing work of an acceptable standard* and (2) making up any deficiencies in their programme. These qualifying courses may have to be done extra-sessionally or at summer school.

Enrolment in all studio courses limited to 20.

First Year: Fine Arts 100—Students must obtain at least a second class standing in this course to be considered for an art concentration.

Second Year: Fine Arts 101, 201.

Third Year: Fine Arts 302 and one of Fine Arts 401, 303, 305, 307.

Fourth Year: The advanced course of the third year elective e.g. one of Fine Arts 402, 403, 405, 407.

*Transfer students should arrange an interview and present a folio for adjudication during the last two weeks of April. Any enquiries and appointment arrangements must be made with the Chairman, Art Education, Faculty of Education.

3. Biological Sciences Concentration

First Year:

Biology 101 or 102*, Chemistry 103 or 110 or 120; Mathematics 100 and 121; Physics 105, 110, 115, or 120.

Second, Third and Fourth Years:

4½ units from major taxa. Units must be taken from more than one department. Biology 315; *Botany 209 (1½), 210 (1½),* 302, 305, 306 (1½), 307 (1½), 308 (1½), 440; Forestry 111 (1½); Microbiology 200, 201, 307 (1½); *Zoology 203 (1½)* 301, 305 (½), 306 (1½), 311 (1½), 413, 415, 416, 420 (1½), 424 (1½).

3 units from Physiology, Cytology, Anatomy: *Biology 200 (1½), 201 (1½),* 330, 340 (1½); Botany 330, 402 (1½), 435; Physiology 301 and 302; Zoology 204 (1½), 303, 307 (1½), 308 (1½), 428 (1½), 429 (1½).

3 units of Ecology: Biology 321 (1½), 322 (1½), 323, 405; Botany 426 (1½), 427 (1½); Forestry 204, Zoology 401, 421.

At least 1½ units of Genetics: Biology 334 (1½) or 335.

Chemistry 230 may be required as a prerequisite for some courses and is strongly recommended. Geography 105 or 385 and those courses in italics above, are strongly recommended.

Note: Only one of English 200 or 303 need be taken.

*See note in Science section (Biology) of the calendar re application for placement examination in Biology.

4. Chemistry Concentration

First and Second Years: Chemistry 103 or 110 or 120; 205 or 210 or 220; Mathematics 100 and 121; Physics 105, 110, 115, or 120; Biology 101 or 102*; Mathematics 200 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 or 385 is strongly recommended.

Only one of English 200 or 303 need be taken.

*See note in Science section (Biology) of the calendar re application for placement examination in Biology.

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 of senior Commerce courses.

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.

Senior Years: Commerce 252, Commerce 291 (1½), Commerce 356 (3), 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: Commerce 151/190 and two of Economics 200, Geography 102, Commerce 291 (1½).

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.

This major cannot be completed entirely by Summer or Extra Session.

9. English Concentration

First and Second Years: English 100, English 200.

Senior Years: 12 units consisting of:

(a) English 304 or 309;

(b) One of English 331, 360, 365;

(c) One of English 370, 375, 380, 389, 390, 391, 392, 393;

(d) One of English 321, 340, 341, 420, 429, 440, 441, 442, 450, 451, 454.

Recommended electives: Education 472/4 or Education 478 (restricted enrolment).

10. French Concentration

First and Second Years: French 120 (or equivalent), 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, 402 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 301 or 323, German 310 or 350, plus one senior course in German Literature.

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

This concentration has been discontinued in the undergraduate programme. Students in *Fourth* year in 1971-72, however, will be allowed to complete the concentration. Students in the lower years must change to another concentration or develop one of the majors.

Prepartion for Guidance teaching in the Secondary Schools is part of the GRADUATE programme in Counselling.

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), Chemistry 230, and Economics 200.

Second Year: Home Economics 201 (3), Home Economics 202 (1½), Home Economics 220 (1½), Home Economics 210 (Workshop) (1).

Senior Years: Home Economics 203 (1½), Home Economics 205 (1½), Home Economics 312 (1½), Home Economics 360 (1½), Home Economics 362 (1½), Home Economics 450 (1½).

NOTE: Only one of English 200 or 303 need be taken.

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 (2), 120 (1), 121 (1), 200 (2), 221 (2), 222 (1).

Senior Years—Mathematics 310 (3), 311 (3), 312 (1), and 3 more units of mathematics to be selected from Mathematics 140 (1), 205 (2), 322 (3), 412 (2), 413 (3), 445 (1). Computer Science 210 is strongly recommended as an additional elective.

Note: Students who began their programme of senior courses in 1970-71 or earlier, should consult the Mathematics Education Department concerning the completion of their programme.

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; Music 201.

Students must obtain at least a second class in Music 101 to be considered for a Music Education concentration.

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 1)	1
P.E. 201 or 202	1
P.E. 240 or 241	1
One course from Area V	1
One course from Area VI	1
Electives Physical Education Activity	4
	9 units

Theory Courses—6 units to consist of:

Second Year—P.E. 260	1½
P.E. 262	1½
Third and Fourth Years:	
P.E. 360; 361; 362; 363; 365; 380; 381; 460 462; 463; 464; 468; 470	3
Rec. 394	6 units

Total ..... 15 units

Notes:

1. Registration in programmes conducted by the School of Physical Education and Recreation is limited. This restriction applies to all students intending to major in Physical Education on the B.Ed. degree programmes (Elementary and Secondary), and who are enrolling in physical education courses for the first time.

Information regarding application procedure and notification for an appointment will be forwarded by the Registrar at the time of application.

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 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.

19. Physics Concentration

First and Second Years: Physics 105, 110, 115, or 120 and Physics 200 (2) and 219 (1); Mathematics 100, 121 and 200; Chemistry 103, 110 or 120.

Senior Years: Physics 300 (2) and 319 (1), 308 (2) and 318 (1), 316 (3); Biology 101 or 102.*

Note: Only one of English 200 or 303 need be taken. Geology 105 or 385 is strongly recommended. Mathematics 301 is recommended.

*See Science section (Biology) of the calendar re application for placement examination.

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; Russian 400; a course in modern Russian Literature.

Recommended: An additional course in Russian Literature and Liquistics 100.

This major cannot be completed entirely by Summer or Extra Session.

21. Social Studies Concentration (Emphasis on Geography)

First and Second Years

(a) Geography 200, 201 and at least 3 units from 101, 212 and 213. (Students intending to have a concentration in Geography with an emphasis on physical geography must take 212 and 213. Note that 101 is normally a prerequisite for these courses.)

(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. (see Faculty of Arts Calendar).

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. Social Studies Concentration (Emphasis on Social Sciences)

All students electing this concentration must accompany it by #21—Social Studies Concentration (Emphasis on Geography), *or* #22—Social Studies Concentration (Emphasis on History).

First and Second Years: 9 units of 1st or 2nd year course work, *not included in the accompanying concentration*, in Anthropology, Fine Arts or Music (with an emphasis on the history of Art or Music), Economics, Philosophy, Political Science, Sociology, History or Geography.

Third and Fourth Years: 9 units of appropriate senior courses in one of Anthropology, Sociology, Economics, Philosophy, or Political Science.

Note: In the total programme at least 3 units must have an emphasis on Canada.

24. 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 or Spanish 105 (6 units); 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.

25. Theatre Concentration

First and Second Years: Theatre 120, 200.

Senior Years: Theatre 400; *one of* Theatre 310, 320; *one of* Theatre 301, 350, 410 (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
Biological Sciences	French	Mathematics
Commerce	Geography	Music
Chemistry	History	Physics
	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:

1. Art Education Major—This major requires that students take the courses in the sequence described below. Students hoping to transfer into this programme must qualify by (1) showing work of an acceptable standard*, and (2) making up any deficiencies in their programme. These qualifying courses may have to be done extra-sessionally or at summer school.

Enrolment in all studio courses limited to 20.

First Year: Fine Arts 100—Students must obtain at least a second class standing in this course to be considered for an art major.

Second Year: Fine Arts 201, 302, 101.

Third Year: Fine Arts 425 and ONE of Fine Arts 401, 307, plus ONE of Fine Arts 303, 305.

Fourth Year: The advanced courses of the Third Year electives, e.g. ONE of Fine Arts 402 or 407, and ONE of Fine Arts 403 or 405.

Note: Students are advised to consult the Art Department regarding the selection of other electives in their programmes.

*Transfer students should arrange an interview and present a folio for adjudication during the last two weeks of April. Any enquiries and appointment arrangements must be made with the Chairman, Art Education, Faculty of Education.

2. Biological Sciences Major

First Year: Biology 101 or 102*; Chemistry 103, 110 or 120; Mathematics 100 and 121; Physics 105, 110, 115, or 120.

Second, Third and Fourth Years: Chemistry 230; Geology 105 or 385; Biology 334 (1½) or 335.

At least 6 units from major taxa: Botany 209 (1½), 210 (1½), Zoology 203 (1½), and any of Biology 315; Botany 302, 305, 306 (1½), 307 (1½), 308 (1½), 440; Forestry 111 (1½); Microbiology 200, 201, 307 (1½); Zoology 301, 305 (1½), 306 (1½), 311 (1½), 413, 415, 416, 420 (1½), 424 (1½).

At least 4½ units from Physiology, Cytology, Anatomy: Biology 200 (1½), Biology 201 (1½), and any of Biology 330, 340 (1½); Botany 330, 402 (1½), 435; Physiology 301 and 302; Zoology 204 (1½), 303, 307 (1½), 308 (1½), 428 (1½), 429 (1½).

3 units of Ecology: Biology 321 (1½), 322 (1½), 323, 405; Botany 426 (1½), 427 (1½); Forestry 204; Zoology 401, 421.

At least 3 additional units of Biological Science chosen from courses listed above or other approved courses.

Recommended additional courses: Zoology 323 (1½), 400.

Note: Only one of English 200 or 303 need be taken.

*See note in Science section (Biology) of the calendar re application for placement examination.

3. Chemistry Major

First Year: Chemistry 103, 110 or 120; Mathematics 100 and 121; Physics 105, 110, 115, or 120; Biology 101 or 102*.

Second, Third and *Fourth Years:* Geology 105 or 385; 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 200.

Mathematics 300 is recommended.

Note: Only one of English 200 or 300 need be taken.

*See note in Science section (Biology) of the calendar re application for placement examination in Biology.

4. Commerce Major

First and Second Years: Mathematics 130 or 100 and 121; Commerce 151-190; Economics 200; Geography 102; Commerce 110.

Senior Years: Commerce 252, 331, 375; *either* Education 375* *or* Commerce 356 (3) and Commerce 291 (1½); 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.

5. 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 321. Choose *four* of the following groupings, and select *ONE* course from each:

(c) English 350 or 354 or 355

(d) English 331 or 360 or 365

(e) English 370 or 375 or 380 or 389

(f) English 340 or 390 or 391 or 392 or 393

(g) English 341 or 420 or 429 or 440 or 441 or 442 or 450 or 451 or 454

Recommended electives: Education 472/4 or Education 478 (restricted enrolment).

6. French Major

First and Second Years:

French 120 (or equivalent), 202 and 220 (either of these *may* be taken in the third year)

Third and Fourth Years:

French 302 and at least 12 additional units in courses numbered 300 and above (excluding 301, 400 and 401).

Recommended courses: French 306, French 402 and a course in Linguistics.

Recommended professional elective: Education 414.

7. 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.

Second, Third and Fourth Years:

Home Economics 201	3	Home Economics 312	1½
Home Economics 202	1½	Home Economics 342	1½
Home Economics 203	1½	Home Economics 343	1½
Home Economics 205	1½	Home Economics 360	1½
Home Economics 210	1 (workshop)	Home Economics 362	1½
Home Economics 220	1½	Home Economics 450	1½
		Home Economics electives	3
			22

Note: Only one of English 200 or 303 need be taken.

8. Industrial Education Major

Academic Phase: English 100; one of English 200 or 303; Physics 105, 110, 115, or 120 or Chemistry 103 or 110 or 120; Mathematics 100 and 121, *or* 130; three academic electives of which one at least is to be a senior course.

Note: The Mathematics and Science courses should be completed before the Technical Phase of the programme is undertaken.

Professional Phase: Education 200, 332, 301, 302, one of Education 400, 430 or 470; 404, 413 and six units from Education 400, 401, 407, 408, 412, 416, 418, 426, 427, 430, 435, 460, 461, 472, 474, 479, 481, 482 or a senior academic or Industrial Education elective or (with the permission of the director), FA 405; Education 498, 499.

Technical Phase: Offered in the Division of Industrial Education, 3750 Willingdon Avenue, Burnaby 2, B.C.: Education 230, 252, 350, 351, 353, 360, 459 and nine to fifteen units of senior Industrial Education courses chosen in consultation with the Chairman of the Division of Industrial Education, from the following specialties:

(a) Construction Specialty: Education 357, 450, 458(c), 359, 452, 463, 464, 465, 449.

(b) Electrical-Electronic Specialty: Education 356, 361, 458(a), 355, 358, 456, 465, 466, 449.

(c) Metal and Mechanics Specialty: Education 354, 451, 458(b), 453, 454, 457, 465, 467, 449.

Regular Schedule:

First Year: English 100; Physics 105, 110, 115, or 120 or Chemistry 103 or 110 or 120; Mathematics 100, 121 or 130; two academic electives.

Second Year: at 3750 Willingdon Avenue, Burnaby 2, B.C. Education 252, 350, 351, 353, 360, 459, 498.

Third Year: Academic and professional courses at U.B.C.

Fourth Year: at 3750 Willingdon Avenue, Burnaby 2, B.C. Education 459, 404 and technical electives.

Fifth Year: Remainder of academic and professional courses and Education 499.

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, 332.

Extended Winter Session: Education 230, 252, 350, 351, 353, 360, 459, 404, 498, 499.

Summer Session: Six prescribed units from specialty. Remainder of B.Ed. programme by summer session or regular winter session.

All students who plan to enter Industrial Education should arrange an interview with the Chairman of the Division of Industrial Education, 3750 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.

9. Mathematics Major

First and Second Years—Mathematics 100 (2), 120 (1), 121 (1), 200 (2), 221 (2), 222 (1), and Computer Science 210.

Senior Years—Mathematics 310 (3), 311* (3), 312* (1) and 8 more units of mathematics to be selected from Mathematics 140 (1), 205 (2), 322 (3), 412* (2), 413* (3), 445 (1).

Note: Students who began their programme of senior courses in 1970-71 or earlier, should consult the Mathematics Education Department concerning the completion of their programmes.

10. Music Major

First and Second Years: FA 101 or Music 120, Music 101, 201, and two of Music 140, 141, 142 plus two one-unit ensemble courses.

Students must obtain at least a second class in Music 101 to be considered for a Music Education major.

Third and Fourth Years: Music 302, 303, 320, 401.

11. Physics Major

First and Second Years: Physics 105, 110, 115, or 120 and Physics 200 (2) and 219 (1); Mathematics 100, 121 and 200; Chemistry 103 or 110 or 120; Biology 101 or 102.*

Senior Years: Geology 105 or 385; Physics 300 (2) and 319 (1), 308 (2) and 318 (1), 316 (3) and 6 additional units in Physics, including 419 (2) or 429 (3). Mathematics 301 is recommended.

Note: Only one of English 200 or 303 need be taken.

*See note in Science section (Biology) of the calendar re application for placement examination.

12. 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.

13. Social Studies Major (Emphasis on Geography)

First and Second Years:

a. Geography 200, 201 and at least 3 units from 101, 212 and 213. (Students intending to major in Geography with an emphasis on physical geography must take 212 and 213. Note that 101 is normally a prerequisite for these courses.)

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.

d. The Geography Department also recommends a Mathematics Course—Mathematics 100/121 or 130 (see Arts section of calendar).

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.

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 81 units of work will be required in the five years of the programme.

Art Education

Biology	English	History
Botany	French	Mathematics
Chemistry	Geography	Zoology

Details of such a programme must be arranged in consultation with the Head of the department in Arts or Science and Art Education.

UNDERGRADUATE COURSES IN EDUCATION

The courses offered in Education in the 1972-73 calendar may be subject to considerable change in subsequent years as a result of innovations recommended by the Commission on the Future of the Faculty of 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.—Group guidance, counselling and orientation to teaching.

198. (0) Seminars as Arranged.—Counselling and orientation to secondary teaching.

200. (3) Introduction to Secondary Education.—Perspectives on Secondary Education. Selected readings in the philosophy, history and sociology of education designed to provide an understanding of the nature, purposes, techniques and organization of secondary education. [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 as arranged. Half day per week classroom experience in elementary schools during the year. Post-sessional practicum. (Minimum two weeks.)

298. (0) Seminar and Student Teaching.—Seminars as arranged. Half days observation and participation in 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. [3-0; 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]

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. Prerequisite: Education 325 or consent of Chairman of the Department.

310. (1½) 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. (1½) Curriculum and Instruction in Elementary Science.—A study of (a) the curriculum organization in science for the elementary grades; (b) techniques and strategies 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 I. [1-1; 1-1]

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. [2-0; 2-0]

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. [3-0; 3-0]

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. Practical field experiences to be arranged individually with instructor. [2-2; 2-2]

334. (3) The Role of the Teacher in Home and Community.—A study of the philosophy, history and problems of the parent-teacher partnership; development of effective cooperation through individual parent-teacher conferences and parent-group discussions; and examination of community services and inter-professional relationships on behalf of children. Field experiences. [3-0; 3-0]

336. (3) Modern Theories of Education for Young Children.—A critical examination of the sources 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]

370. (1½) Mathematics for Elementary Teachers. [3-0; 0-0]

371. (1½) Methods of Teaching Elementary School Mathematics. [0-0; 3-0]

372/373. (3) Topics in Mathematics for Elementary Teachers.—Prerequisite: Second Class or better in Education 370 or its equivalent. [3-0; 3-0]

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 A1 (Regular) Seminar and Student Teaching.—Counselling as arranged. A minimum of two weeks post-sessional practicum required.

397. (0) Programme A1 Transfer Seminar and Student Teaching.—Seminars as arranged. Periods of teaching practice in fall and winter terms. Demonstration lessons and field trips as arranged. Individual assistance from faculty adviser.

399. (0) Field Experience and Practice, for those undertaking post-graduate diplomas in Education.

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]

402. (3) Social Studies.—Advanced course in elementary social studies—study of recent research and curriculum developments with particular reference to the design of classroom materials. Prerequisite: Education 322. [3-0; 3-0]

403. (1½) Mental Retardation.—Characteristics of mentally retarded children: classification; overview of medical, legal, educational, and social provisions for the mentally retarded.

404. (1½–3) Curriculum and Instruction in Specific Secondary School Subjects.—Students are required to take one Education 404 course corresponding to their major (1½ units) or two Education 404 courses corresponding to their academic concentrations (½+1½).

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]

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. (1½-3) 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. Students registering for 3 units will be required to participate in a special seminar following completion of the 1½ unit course.

409. (3) Science Education.—An advanced course in Elementary science-teaching curriculum and instruction. Study of the research and comparative curricula. Development and innovation of units of instruction in a teaching situation involving children. Prerequisites: two First Year science courses and Education 321. Science Majors must take General Science 309 prior to or concurrently with Education 409. Others require the permission of the instructor. [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 policy-making; 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) Communications Media and Technology in Learning.—The theory, utilization and production of learning resources with emphasis on practical application for the classroom teacher. A background for advanced studies in communications media and technology. [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 and sociological problems and problems associated with the teaching of specific subjects to children in the occupational programme, including assessment and remediation. School and community relations. [3-0; 3-0]

419. (1½) Introduction to Language and Communication Disorders in Children.—A survey for the classroom teacher of the natural development of speech and language as a basis for recognizing and understanding deviations from the normal. [3-0; 0-0]

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) Language Development in the Exceptional Child.—The development of program designs for the stimulation of language development in children with delayed and deviant speech. Theories of language acquisition, pre-linguistic experience, etc. will be studied. [3-0; 3-0]

425. (3) Curriculum and Instruction in Art II.—(formerly Education 305). Required for all Elementary Art majors. Prerequisite: Education 323. [1-3; 1-3]

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. (1½-3) Primary Learning Disabilities.—The identification and assessment of basic motor, perceptual, and language disabilities in children. Students registering for 3 units will participate in a seminar-laboratory following completion of the 1½ unit course. Registration for 3 units requires consent of instructor. [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. (1½ 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. Prerequisite: Ed. 331 or consent of instructor. [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 impairment. [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]

*These courses are available only to full time students in the Diploma Programme for Education of the Deaf.

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. [2-4; 2-4]

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. [2-4; 2-4]

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. [2-4: 2-4]

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) Electricity-Electronics: layout and representation of problems in electrical and electronic design. (c) Metals-Mechanics: surface development; gearing; descriptive geometry. 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; estimates 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. [3-0; 3-0]

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) Guiding Reading Growth in Junior and Senior Secondary Schools.—The reading process and the teaching of reading including survey and analysis of concepts, principles, practices, materials and research relevant to guiding reading growth in various curriculum areas. [3-0; 0-0]

473. (3) Developmental Reading in the Elementary Grades.—The reading process and the teaching of the basic reading skills from beginning stages through the elementary school. [3-0; 3-0]

474. (1½) Developing Reading Programmes for Junior and Senior Secondary Schools.—Research and current practices in the development of comprehensive reading programmes including philosophy, objectives, organization, evaluation, curricula, instruction and teaching materials. Prerequisite: Ed. 472. [0-0; 3-0]

475. (1½) Corrective Reading.—Identification and instruction of children needing corrective teaching in reading in the regular classroom. Prerequisite: Ed. 472 or 473. [3-0; 3-0]

476. (3) Remedial Reading.—Individual diagnosis and treatment of severe reading difficulties. Practicum. Prerequisite: Ed. 472 or 473 and experience in teaching. [3-0; 3-0]

477. (1½) Special Topics in Reading.—In-depth study of selected topics in reading. Prerequisite: Ed. 472 or 473 or 431 and consent of instructor. [3-0; 3-0]

478. (3) Teaching English as a Second Language.—Linguistic insights that govern the effective teaching of English as a second language, and methods of teaching. Practice teaching. As of September, 1973, the prerequisite for Ed. 478 will be one of Ed. 489, English 309, Linguistics 100, 200, 205, 300. [3-0; 3-0]

479. (3) Cross-Cultural Education (Native Indians).—Instructional techniques for adapting teaching to the needs of Indian students; methods of enriching the curriculum by including the cultural background of all students; the course will include some examination of the anthropological, sociological and historical background of native Indians with an emphasis on contemporary situations as these relate to teaching. Faculty members of various University departments will present the course. Prerequisites: Education 470 (Education Sociolgy) and Anthropology 301 (B.C. Indians), *or* permission of the instructor. [3-0; 3-0]

480. (3) Advanced Studies in the Language Arts in the Intermediate Grades.—An in-depth study of two or three selected areas of the Language Arts: e.g. oral language, vocabulary development, writing. Particular attention will be paid to problems of the learner. Basing his work on current research, each student will develop methods and materials to assist the learner. [3-0; 3-0]

481. (1½) Introduction to Research in Education.—The nature of scientific study and essentials of survey and experimental research designs. Designed for students proceeding to graduate work. [1-1; 1-1]

482. (1½) Introduction to Statistics for Research in Education.—Basic concepts and principles of descriptive and inferential statistics. Designed for students proceeding to graduate work involving quantitative methodology. Pre-requisite: Proficiency in modern high school algebra. [2-1; 2-0]

483. (1½) Statistics in Education.—Topical survey of various statistical methods used in research in Education. Designed to prepare students to read literature of empirical research. May not be used as prerequisite to Education 592. [2-1; 2-0]

484. (1½) Nonparametric and Related Statistics.—Distribution-free statistical techniques for analysis of ranked data, and analysis of discrete observations. Prerequisite: Educ. 482 or equivalent. [2-1; 2-0]

487. (3) Recent Developments in Elementary Education.—An examination of recent developments in elementary education with emphasis on the study of open area schools, non-grading, team teaching, techniques of individualizing instruction and use of learning-resource centres. [3-0; 3-0]

488. (1½) Problems in the Teaching of Elementary School Mathematics. [3-0; 0-0]

489. (3) Applied Linguistics for Teachers.—Basic theories of linguistics and their application to classroom practice. [3-0; 3-0]

490. (3) The Selection of Library Materials.—Literature for young people; non-book materials; criteria and standards of selection; bibliographical aids; reading interests and 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. One to two hours of assigned laboratory work. [3-0; 3-0]

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]

493. (1½) Introduction to the Study of Higher Education.—An introduction to the field of higher education in Canada and to British Columbia in particular. Topics to be studied will include the objectives of higher education, its historical development and current issues such as diversity of offerings, enrollment, accessibility, finance, and governance of these institutions. [2-0; 0-2]

494. (1½) Communications Media Programmes in Schools—Motion Picture Film and Television.—Organizing, developing and teaching of motion picture study programmes in educational institutions. The impact of film and television on the viewer. [2-0; 2-0]

495. (1½) Still Photography in Education.—The design and production of educational photographic prints, filmstrips, slides and slide sets as resources for teaching and learning in school. The course is planned with an emphasis on educational design so that students may be able to produce

effective educational resource material to stimulate learning in school. Prerequisite: Education 414. [2-0; 2-0]

496. (1½) Motion Picture Production in Education.—Planning and production of educational motion picture resources for use in achieving specific learning objectives. This will include a study of motion picture design, pictorial continuity in relation to learning and production planning for educational purposes. Prerequisite: Education 414. [2-0; 2-0]

497. (0) Programme A1 Regular Seminar and Student Teaching.—Seminars throughout year to be arranged. A minimum of two weeks post-sessional practicum required.

497. (0) Programme for Graduates A3 Transfer Seminar and Student Teaching.—Seminars as arranged. Period of teaching practice in fall and winter 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 as arranged. Minimum two-weeek 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 winter terms plus a minimum of two weeks post-sessional practicum. Demonstration lessons and field trips as arranged. Individual assistance from faculty adviser.

Fine Arts — Art Education

100. (3) Introduction to the Plastic and Graphic Arts.—Studio study and experiment in the perceptual and conceptual language of art as a basis for advanced work in specialized areas. Students must obtain at least a second class standing in F.A. 100 to be considered for an Art concentration or major. (Formerly Fine Arts 300). [1-3; 1-3]

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]

201. (3) Drawing.—(Formerly F.A. 301). Prerequisite: Fine Arts 100. [1-3; 1-3]

302. (3) Painting I.—Prerequisite: Fine Arts 100. [1-3; 1-3]

303. (3) Ceramics and Modelling I.—Prerequisites: Fine Arts 100 and 201 or equivalent courses. [1-3; 1-3]

305. (3) Design I.—Prerequisites: Fine Arts 100 and 201 or equivalent courses. [1-3; 1-3]

307. (3) Graphic Arts I.—Prerequisites: Fine Arts 100 and 201 or equivalent courses. [1-3; 1-3]

401. (3) Painting II.—Prerequisites: Fine Arts 100 and 302 or equivalent courses. [1-3; 1-3]

402. (3) Painting III.—Prerequisites: Fine Arts 401 or equivalent course. [1-3; 1-3]

403. (3) Ceramics and Modelling II.—Prerequisites: Fine Arts 303 or equivalent course. [1-3; 1-3]

405. (3) Design II.—Prerequisites: Fine Arts 305 or equivalent course. [1-3; 1-3]

407. (3) Graphic Arts II.—Prerequisite: Fine Arts 307 or equivalent course. [1-3; 1-3]

413. (3) Ceramics and Modelling III.—Prerequisites: Fine Arts 303 and 403 or equivalent courses. [1-3; 1-3]

415. (3) Design III.—Prerequisites: Fine Arts 305 and 405 or equivalent courses. [1-3; 1-3]

417. (3) Graphic Arts III.—Prerequisites: Fine Arts 307 and 407 or equivalent courses. [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

190. (3) General Science.—An introduction to the underlying principles and to the experiences in science as they are introduced in the elementary schools. The course follows closely the outline of General Science 309 with special emphasis on the use of appropriate materials. The course is designed for first and second year students. [3-2; 3-2]

Credit will not be given for both General Science 190 and General Science 309.

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. Students must obtain at least a second class standing in this course to be considered for a music concentration or major.

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]

Acceptable Electives

Agricultural Sciences 101. (3) and 201. (3)—Concepts and Resources in Agriculture.

Forestry 300. (3)—Principles of Forestry and Wood Sciences. [3-0; 3-0]

Soil Science 300 (1½) and 301 (1½)—Soil and Man.

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 202, or 215 or 220. German 200 or 210 or 230. Russian 110, 180 or 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 receive approval by the adviser and 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) 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, including at least 6 units of first class work. 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 approved qualifying course 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 program at this university, and (b) adequate experience related to their proposed field of specialization.

Requirements for the M.A. Degree

There are two forms of programmes. Both require at least one full academic year in resident graduate study.

(a) The completion of a minimum of twelve units of approved graduate courses including at least 6 units of courses numbered 500 or above; a thesis.

(b) The completion of a minimum of 15 units of approved graduate courses including at least 9 units of courses numbered 500 or above; one or more major essays; a comprehensive examination.

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 15 units of which 9 must be 500-level courses or above, one or more major essays and a comprehensive examination 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.

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 of the Faculty of Education, 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 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-four areas of study or "departments." An applicant for a Master's degree must select an appropriate department to supervise his programme. Individual courses 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 extra-sessional 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 (M.A. only)
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

*All Graduate Programmes are not necessarily offered in a given year.

Programmes for the Ed.D.

Admission

1. Application for admission to the degree programme is made in writing to:

The Registrar,
The University of British Columbia,
Vancouver 8, B.C.

Applications may be accepted at any time but formal course work in the winter session begins September 14.

2. Applicants for the Ed.D. degree must have completed:

(i) a Master's degree in Education (or equivalent)

(ii) a B.Ed. (Elem.) degree with First Class Standing, *and* a fifth year with First Class Standing, or

(iii) a Bachelor's degree with First Class Standing *and* First Class in Teacher training.

(iv) a B.Ed. (Sec.) degree with First Class Standing.

In addition, the Graduate Committee of the Faculty of Education, and the Executive Committee of the Faculty of Graduate Studies must authorize admission to a proposed course of study.

3. Admission to the Ed.D. programme will be in one of the following categories:

(a) *Full Standing:* Granted to applicants who have met one of the requirements 2(i), 2(ii), 2(iii), 2(iv) above. Students entering directly from the Bachelor's degree under 2(ii), 2(iii), or 2(iv) must, during the first year of graduate study complete nine units with a First Class average and obtain First Class standing in at least five units of course work.

(b) *Provisional Standing:* Granted to applicants with minor deficiencies that must be removed, or in cases where doubt exists.

4. The number of candidates that can be accommodated is limited. The best qualified students are accepted as vacancies occur in the specific fields for which the students have applied.

5. The Executive Committee of the Faculty of Graduate Studies must be satisfied that the student is competent to pursue studies in the English language. The department in which the student intends to write his thesis shall determine the number of and standard of competence in languages other than English.

Courses of Study

1. (a) Candidates will normally be required to spend a minimum of two winter sessions at the University.

(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 must register for each session during their studies. Those who fail to register may forfeit their candidacy and may be required to reapply.

2. Students proceeding to the Ed.D. degree are expected to devote full time to their academic programme, and those who undertake remunerative employment other than Teaching Assistant duties, 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.

3. 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.

The membership of the Candidate's Committee may, if necessary, be altered during the study period. The Executive Committee of the Faculty of Graduate Studies will approve all such changes.

4. Upon registration the student must consult his Candidate's Committee to develop a programme of studies which is then approved by the department concerned, and by the Executive Committee of the Faculty of Graduate Studies. The programme of studies will consist of seminars, directed readings, consultations, and such formal courses as may be deemed essential for the

fulfillment of the requirements for the degree. A major part of the candidate's work will consist of a thesis embodying the results of original research. A thesis will be submitted to an outside examiner or examiners approved by the Dean.

5. Each Candidate's Committee will recommend the kind and number of courses to be taken by the student in relationship to his background and to the requirements which are appropriate to the doctoral level in the chosen major field. No uniform course requirements can be applied to all departments at the doctoral level.

6. Changes in the programme of study may be required during the study period, and these must be approved by the Candidate's Committee, the major department and the Executive Committee of the Faculty of Graduate Studies.

7. Courses listed under 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

1. The progress of all students working for the Ed.D. degree will be reviewed in the spring of each year, and the Executive Committee of the Faculty of Graduate Studies, after consultation with the Candidate's Committee and the department concerned, may require any candidate to withdraw if his work has not been satisfactory.

2. The doctoral student will take 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 languages other than English where departmental regulations require it.

(c) A comprehensive written and/or oral examination normally held after the student has completed all required course work, and intended to test his grasp of the chosen field of study as a whole. The Candidate's Committee will set and judge this examination, in a manner compatible with the policy of the department or departments concerned.

(d) The final oral examination for the degree and defense of the thesis before an examining committee made up of the Candidate's Committee and outside examiner or examiners approved by the Dean, and chaired by the Dean of the Faculty of Graduate Studies. This examination is open to all members of the university, but the judgement of the candidate's success is made by a simple majority vote of the examining committee.

3. All other forms of examinations must be completed before a student takes the final oral examination.

4. A candidate's thesis must be presented in the form described in the leaflet entitled *Instructions for the Preparation of Graduate Theses*, copies of which may be obtained from the Special Collections Division in the Library, or from the Office of the Registrar.

5. The candidate must agree to microfilming of the thesis and publication of a suitable thesis abstract before the degree is awarded. Forms for this purpose may be obtained from the Special Collections Division of the Library.

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 300 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. (1½) Fundamentals of Human Learning and Motivation.—Surveys theoretical points of view and empirical findings in human learning and motivation. Provides acquaintance with methods of the empirical study of learning and orientation to various areas of specialization. A basic course for graduate majors in learning and an elective for non-majors. Prerequisite: Education 301-302 or equivalent, (e.g. Psychology 416). May be taken concurrently with Education 481-482.
(Suggested for fall term and summer session.)

502. (1½) Verbal Learning and Instruction.—Critical examination of verbal learning theories and research data. Processes studied will encompass acquisition, retention, and transfer in verbal behavior, including implicit mediational processes. Includes laboratory exercises and practice in deriving implications for instruction. One or two invariant core courses for graduate majors. Prerequisite: Education 501 and 592 or equivalent.
(Suggested for fall term.)

503. (1½) Conceptual Learning and Instruction.—Critical examination of theories and data of conceptual learning processes; including active processes of mediation and complex hypothesis-testing behaviour. Laboratory exercises and practice in deriving implications for instruction. The second of two invariant core courses for graduate majors. Prerequisite: Education 501 and 592 or equivalent.
(Suggested for spring term.)

504. (1½) Special Topics in Human Learning and Instruction.—Combines lectures and seminars to investigate a range of specific learning topics, depending on student needs and faculty interests. Topics to include problem-solving, thinking creativity, language acquisition and utilization, psychomotor skills, social psychology of learning, influences of social class, influences of individual differences in intellectual and non-intellectual traits, reading skills, automated instruction (including computer-assisted instruction), etc. Designed to test new ideas in research and to stimulate student originality. Prerequisite: Education 501 and consent of instructor. Education 502 and 503 strongly suggested.
(Suggested for fall and spring terms; summer session when possible.)

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.—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.

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.—Test theory, including re-

liability, generalizability, validity, and other psychometric topics. Prerequisite: Education 482, 483, or equivalent, plus introductory course in measurement.

529. (1½) Test Construction.—Measurement and scaling principles, and their applications in the construction and validation of measuring instruments (ability, interest, attitude, etc.). Prerequisite: Education 528 or equivalent.

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. (1½-3) 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: Education 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) Design of Instructional Media Systems.—An analysis of the components within a systems approach and the design of media systems within the framework of instructional objectives. Organization and administration of learning resource centres. Prerequisite: Education 414.

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. (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 Ed. 559).

556. (1½) Administration of the Educational Programme.

557. (1½) Administration of the Elementary School. Prerequisite, Ed. 556.

558. (1½) 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 classroom 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 501 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 Personnel 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. (1½-6) Problems in Education.—Investigation and report of a problem.

581. (1½) Special Topics in Research Design and Analysis.—Topics vary depending on students' needs, and the special interests and competencies of faculty. Includes laboratory and other practical experience. Prerequisite: Ed. 481 and 482 or equivalent.

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. (1½-3) Epistemological Foundations of the Curriculum.—An inquiry into 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.—Analysis of variance and covariance with one covariate, including various analyses via linear contrasts. Prerequisite: Ed. 482 or equivalent.

593. (1½-3) 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. (1½-3) 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.

596. (1½) Design and Analysis in Educational Research II.—Correlation, including partial, multiple, and curvilinear; regression methods in testing linear hypotheses; extended treatment of analysis of variance and covariance. Prerequisite: Ed. 592 or consent of instructor.

597. (1½) Factor Analysis and its Application to Behavioural Sciences.—Understanding of data reduction methods with multivariate observations, meaningful interpretation of extracted factors in the area of behavioural research. Laboratory exercises will be required. Prerequisite: Ed. 596 or consent of instructor.

598. (3) Field Experiences.—For those on Master's, Doctoral and Diploma Programmes.

599. (3-6) Master's Thesis.

601. (3-6) Doctoral Seminar.

630. (1½) Advanced Human Learning and Instruction.—Systematic examination of theory and research findings in applied human learning. A Seminar course for advanced graduate students. May be taken concurrently with an individual research project; this course is designed as a test laboratory for dissertation proposals. Prerequisites: Education 502 and 503 or equivalent. Eduaction 682 suggested.
(Suggested for spring term.)

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) Multivariate Analysis in Behavioural Research.—Multivariate analysis of variance and covariance, discriminant analysis, and canonical analysis. Prerequisite: Ed. 592 and familiarity with matrix algebra.

699. Doctoral Dissertation.

THE SCHOOL OF PHYSICAL EDUCATION AND RECREATION

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.

MRS. MARIAN PENNEY, B.A. (Toronto), A.M. (Texas State College for Women), Professor.

H. DOUGLAS WHITTLE, B.P.H.E. (Toronto), M.S., Ph.D. (Oregon), Professor.

LORNE E. BROWN, B.P.E., M.A. (Oregon), Associate Professor.

ROBERT G. HINDMARCH, B.P.E. (Brit. Col.), M.S., Ed.D. (Oregon), Associate Professor.

JOSEPH R. JOHNSON, B.P.E., M.P.E. (Brit. Col.), Associate Professor.

A. B. LAITHWAITE, C.D., Dip. in Phys. Ed. (Carnegie Phys. Tr. Coll.), M.S. (Oregon), Associate Professor.

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JACK B. POMFRET, B.A. (Health and P.E.), M.S. (Washington), Associate Professor.

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MRS. BONNIE GORDON, B.A. (P.E.) (Sask.), M.Sc. (Purdue), Assistant Professor.

NESTOR N. KORCHINSKY, B.P.E., M.A. (Alta.), Assistant Professor.

CLAUDE P. LARCHER, Diplôme d'Études Superieures de Lettres (Université de Montpellier), M.S., Ph.D. (Oregon), Assistant Professor.

JOHN K. LARSEN, B.Sc. (P.E.), (McGill); M.Sc. (Indiana), Assistant Professor.

ARNO T. LASCARI, B.S. (Michigan), M.S. (S. Connecticut State College), Ph.D. (Wisconsin), Assistant Professor.

RONALD G. MARTENIUK, B.P.E., M.A. (Alta.), Ed.D. (Calif., Berkeley), Assistant Professor.

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MISS SHIRLEY NALEVYKIN, B.A. (Sask.), B.Sc. (McGill), M.S. (Mich.), Assistant Professor.

MISS CECILY OVERALL, Dip. Phys. Ed. (London), M.Ed. (Western Washington), Assistant Professor.

G. PENNINGTON, B.A. (Seattle), M.Sc. (Washington), Assistant Professor.

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MISS ANNE D. TILLEY, Dip. Dartford College of Physical Education, B.A. (McMaster), M.Ed. (Birmingham), Assistant Professor.

MISS SHARON A. WHITTAKER, B.Sc., M.P.E. (Brit. Col.), Assistant Professor.

MRS. INCE WILLIAMS, B.P.E., M.P.E. (Brit. Col.), Assistant Professor.

FRANK T. GNUP, B.S.(P.E.) (Manhattan College), Senior Instructor.

MRS. HELEN GOODWIN, Dip. Laban Art of Movement Studio, London, England, Senior Instructor.

R. J. PHILLIPS, Senior Instructor and Athletic Director.

MISS ANNE ANTHONY, Instructor.

MRS. MOIRA LUKE, Dip. Phys. Ed. (London), Instructor.

FRANK READ, Honorary Lecturer.

K. P. PEDERSEN, Fellow, Imperial Society of Teachers of Dancing (London), Sessional Lecturer.

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 Education (4) the physical education programme for students majoring in Physical Education in the Faculty of Education.

Admission Requirements

See General Information section on Admission.

Admission is limited to Programmes offered by the School.

This limitation applies to students enrolling for the first time in the School at any year level in the following programmes: the B.P.E. degree (Option A and B); the B.R.E. degree; the B.Ed. degree (Secondary, with a major in physical education); and the B.Ed. degree (Elementary, with a major in physical education).

Information regarding application procedure and notification for an appointment will be forwarded by the Registrar at the time of initial application.

(a) B.P.E. Degree Programme.

The School of Physical Education and Recreation accepts graduates of Secondary School programmes with any of the specialties offered. Students who plan to enrol in Option B of the B.P.E. programme should major in sciences while at secondary school.

(b) B.R.E. Degree Programme.

The School of Physical Education and Recreation accepts graduates of Secondary School programmes with any of the specialties offered. Recreation 12 is recommended for entrance.

General Requirements for the Degrees of B.P.E. and B.R.E.

Students in all years are normally subject to the same regulations as those in the B.Ed. (secondary field) course. *Supplemental examinations will not be granted in Physical Education Activity Courses.* Students who are unable to meet the requirements because of medical or other approved reasons may, at the discretion of the School and with the approval of the Dean, be granted deferred examinations. Such privilege will be considered only if the student submits a written application to the Director before the end of the official examination period. When the privilege of supplemental or deferred examinations has been granted, students must complete requirements prior to attendance at the next regular session. The School may require that additional work be undertaken in summer school.

Swimming Requirements

All students enrolled for the B.P.E. and B.R.E. degrees 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, the B.R.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, Option A and Option B.

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*).

N.B. Bachelor of Physical Education students who are currently registered in Fourth Year and have embarked upon a Guidance programme will be considered for admission to the One-Year Programme for Graduates during the 1972-73 Session. Thereafter Guidance will not be accepted as a teaching subject.

This means that Bachelor of Physical Education students who wish to qualify for admission to the Faculty of Education after graduation will not be accepted with Psychology as a second concentration.

Specific Requirements for the Degree of B.R.E.

The B.R.E. degree (the hood is malachite green with gold and green cord) will be awarded on the completion of a minimum of 69 units of approved course work. The B.R.E. degree is a Single Major programme.

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) 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 courses 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 the Graduate Division of the Faculty of Education, enroll for a programme of advanced studies in Physical Education. (See the *Faculty of Graduate Studies*).

Unsatisfactory Standing

(a) A student who passes in fewer than nine units in 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 at least two semesters of college study 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 nine 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.

(d) A student in the Third or Fourth Year who passes in fewer than nine units will not be permitted to re-enrol in the Winter Session immediately following. He may be permitted to re-enrol in a subsequent session if his application is approved by the Director of the School. A student registered for nine units or less shall be required to withdraw if he does not complete satisfactorily the whole of the programme of studies being undertaken.

(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 the Senate Admissions Committee.

Awards and Financial Assistance

(Subject to change)

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 should be consulted by all students who wish to obtain information or to submit applications. It should be noted that most awards do not require the submission of an application. 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 Alice Bishopric Memorial Book Prize

The Fruehauf Trailer Company Scholarships

Gymnastic Book Prize

The J. J. McRae Memorial Book Prize

The Leonard Osborne Memorial Book Prize

The Lieutenant James Douglas Hamilton Book Prize

See General Information for regulations governing:

(i) Fees
(ii) Attendance
(iii) Withdrawal
(iv) Graduates
(v) Review of assigned standing
(vi) Supplemental examinations
(vii) Transcript of student record

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 or 102	3
English 100	3
* Electives: two courses from the Faculty of Arts or the Faculty of Science	6
Physical Education 160	0
Physical Education Activities	4
* See Note 1. (Option A)	16

Second Year	Units
English 200	3
Psychology 100	3
* Electives: two courses from the Faculty of Arts or the Faculty of Science	6
Physical Education 260	1½
Physical Education Activities	4
* See Note 1. (Option A)	17½

Third Year	Units
Electives: including second teaching concentration	6-9
Electives: Physical Education Theory	3-6
Physical Education 391	3
Physical Education 455: see Note 4 (Option A)	0
Physical Education Activities	3
	18

Fourth Year	Units
Electives: including completion of second teaching concentration	6-9
Electives: Physical Education Theory	3-6
Physical Education 455: see Note 4 (Option A)	0
Physical Education 462	1½
Physical Education Activities	4
	17½

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:

Agricultural Sciences*	English	Library
Art	French	Mathematics
Biological Science	Geography	Music
Commerce (Business)	German*	Physics
Commerce (Secretarial)	History	Russian*
Creative Writing*	Home Economics	Spanish*
Chemistry	Latin*	Theatre*

*Indicates courses not widely taught in British Columbia Secondary Schools.

2. Degree Requirements:

Academic courses	36-42	units
Physical Education theory courses	12-18	units
Physical Education activity courses	15	units
Total	69	units

3. Physical Education Activity courses: A student may not count more than 15 units of such course work towards the required total of sixty-nine units for the Bachelor of Physical Education degree.

4. Physical Education 455 may be taken in Third or Fourth Year.

5. Students intending to enter graduate studies should take Physical Education 470 and should discuss their total undergraduate programmes with the Chairman of the Graduate Committee or with the Director of the School.

6. See General Notes for all students.

PHYSICAL EDUCATION ACTIVITY

Required courses for all students on Option A and Option B

- Physical Education 201 or 202
- Physical Education 203
- Physical Education 230 (see Note 4)
- Physical Education 250
- One course from Area II (Dance)
- One course from Area V (Team Activities)
- One course from Area VI (Individual Activities)
- Elective courses:
  - Option A - 8 units
  - Option B - 2-8 units
- Total number of Activity units:
  - Option A - 15 units
  - Option B - 9-15 units

Notes:

1. It is strongly recommended that Women students complete two units of Dance, one of these being P.E. 241.
2. These required activity courses may be taken in *any* of the four years, but it is strongly recommended that they be taken in the first two.
3. All students taking one-unit (1) activity courses meet three times per week for one term, or the equivalent.
4. Students who have not passed P.E. 230 before entering Third Year will have to make special arrangements regarding this course before commencing their third year of study.

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
Chemistry 103 or 110 or 120	3
Mathematics 100 and 121	3
Physics 105 or 110 or 115 or 120 or Psychology 100	3
Physical Education 160	0
Physical Education Activities	4
	16

Second Year	Units
Biology 101 or 102	3
Psychology 100 or Physics 105 or 110 or 115 or 120	3
Chemistry 203 or 230 or Psychology 200	3
Elective	3
Physical Education 260	1½
Physical Education Activities	4
	17½

Third Year	Units
Anatomy 390	3
Zoology 303 (Biology Majors may take 307 and 308)	3
Electives: Life Sciences, Physical Sciences, Social Sciences	3-6
Physical Education 363	1½
Electives: Physical Education Theory	0-3
Physical Education Activities	1-4
Free Elective: Academic, Physical Education Theory or Physical Education Activity—see Note 3 below	0-3
	17½

Fourth Year	Units
Electives: Life Sciences, Physical Sciences, Social Sciences	3-9
Physical Education 461	1½
Physical Education 463	1½
Physical Education 468	1½
Physical Education 470	1½
Electives: Physical Education Theory	3-9
Free Elective: Academic, Physical Education Theory or Physical Education Activity: see Note 3 below	0-3
	18

Notes:

1. 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. Degree Requirements:

	Min.	Max.	
Academic courses	36-	45	units
Physical Education Theory courses	12-	18	units
Physical Education Activity courses	9-	15	units
Free Elective	0-	3	units
Total required	69		units

3. Free Elective: Three units may be elected in the Third OR Fourth Year from among courses offered by the School or by other Departments or Faculties. Courses in Education may not be elected.
4. Anatomy 390 is to be taken after completion of all Second Year course work (Third Year standing).
5. Physical Education Activity Courses: A student may not count more than 15 units of such course work towards the required total of 69 units for the Bachelor of Physical Education degree.
6. Students intending to enter graduate studies should discuss their total undergraduate programmes with the Chairman of the Graduate Committee or with the Director of the School.
7. See General Notes for all students below.

General Notes For All Students (Option A and Option B)

1. All students must be able to swim. See note 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.
2. Students entering the course from college 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.
   (b) Other than the exception noted above, academic courses listed for the First and Second Years may be interchanged.
4. 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 105 or 110 or 115 or 120 must be taken in First or Second Year by all students preparing for the Biological Sciences or Zoology. See Education section of the calendar.
5. 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.
6. Recreation Courses—Recreation 296 and Recreation 394 may be taken as electives in the B.P.E. programme.

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 and one half (12½) units as prescribed hereunder.

Activity Courses	Units
*Physical Education 230: see Note 2	1
*Physical Education 201 or 202	1
Physical Education 240 or 241	1
One course from Area V (Team or Group Activities)	1
One course from Area IV Track & Field or VI Individual Activities	1
	5

Theory Courses	Units
Physical Education 260	1½
Physical Education 262	1½
One other required	1½
Electives: Physical Education Theory or Activity	3
	7½ 12½

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:	Units
Physical Education 230: See Note 1	1
Physical Education 201 or 202	1
Physical Education 240 or 241	1
One course from Area V (Team or Group Activities)	1
One course from Area VI (Individual Activities)	1
Electives: Physical Education Activity	4
	9

Theory Courses—6 units to consist of:	
Second Year:	
Physical Education 260	1½
Physical Education 262	1½
Third & Fourth Years—two of:	
Physical Education 360; 361; 362; 363; 365; 380; 381; 460; 462; 463; 464; 468; 470; Rec. 394	3
	6
	15

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 RECREATION EDUCATION DEGREE

(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.

First Year (17 units)	Units
English 100	3
Psychology 100	3
Biology 101 or 102	3
Fine Arts 125 or 171 or 251 or 261	3
Physical Education Activities: Notes 1 and 2	2
Electives: See Note 3	3

Second Year (17½ units)	Units
English 200	3
Recreation 286: See Note 4	3
Recreation 296: See Note 4	1½
Sociology 200 or 250 or 260	3
Physical Education Activities: See Notes 1 and 2	1
Psychology 206	3
Electives: See Note 3	3

Third Year (17 units)	
Recreation 375: See Note 4	1½
Recreation 394: See Note 4	1½
Recreation 396: See Note 4	1½
Physical Education 262	1½

Fourth Year (17½ units)	
Education 412	3
Recreation 492: See Note 4	1½
Recreation 496: See Note 4	1½

Third or Fourth Year	Units
Psychology 308	3
Architecture 424	1½
Planning 425	1½
Recreation or Physical Education Theory	1½
Electives: See Note 3	15

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. Students may elect 21 units of course work from other Departments or Faculties in consultation with the faculty advisor. Three units must be taken in each of the first two years and 15 units in the third and fourth years. Students may elect three units of theoretical course work from the School of Physical Education and Recreation in the third and fourth years.
4. Required Recreation courses must be taken in proper sequences and in the designated year.

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. For B.R.E. 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 P.E. 391 or Anatomy 390 (may be taken concurrently with Anatomy 390 or P.E. 391.) [2-2; 2-2]

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. [3-0 or 3-0]

366. (1½) Physical Activities for Young Children.—A study of physical activities appropriate for young children in relation to their growth and development. Bachelor of Education (Elementary) students may not register for Education 325 and Physical Education 366 in the same year. [0-0; 3-0]

380. (1½) History of Physical Education and Recreation.—The historical and philosophical bases of physical education and recreation, and the relationship to current programmes and issues. Prerequisite: P.E. 260 (Two hours lecture, one hour seminar) [3-0; 0-0]

381. (1½) Sociological Aspects of Sport.—An introduction to the sociology of sport. Selected aspects of sport will be examined in relation to their functions in modern society. [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: Biology 101 or 102 and Second Year Standing. [2-2; 2-2]

460. (1½) Administrative Practices in Physical Education and Athletics.—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.—An individual study in depth of a topic selected by the student and completed under the guidance of a faculty member. Students must submit the topic in writing to the School of Physical Education and Recreation for approval prior to April 30. (Examples: Skill acquisitions, school programmes, mental retardation, use of media in physical education, historical investigations, care and prevention of athletic injuries.)

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 or P.E. 391. [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]

467. (1½) Physical Education for the Mentally Retarded. — A study of the physical activities and programmes appropriate for the mentally retarded of all ages and all levels of retardation. The course includes an orientation to the field of retardation on an interdisciplinary basis, and opportunities for practical experience working with the retarded in a variety of situations in physical education settings. [1-1; 0-2]

468. (1½) Human Motor Performance.—An analysis of the current research material and theory concerning motor performance and learning of man. Emphasis is placed on the concept of man as a component system. Prerequisite: Third Year standing or consent of instructor. [2-2; 0-0]

470. (1½) Tests and Measurements in Physical Education.—Descriptive statistics, norms, normal probability curve; concepts of correlation, reliability and validity; implications of testing in the motor, affective and cognitive domains; test construction and measurement of programmes. Prerequisite: Third Year standing or consent of instructor. [2-2 or 2-2]

Recreation

286. (3) The Creative Arts in Recreation.—A collaborative programme in art, dance, music and recreation. [2-2; 2-2]

296. (1½) Introduction to Recreation.—An introduction to the background and principles of community recreation; the relationship of school programmes to community programmes; the philosophy and principles of recreation. [3-0; 0-0]

375. (1½) Recreation Leadership and the Group Process.—Examination of leadership theories and related factors; role of leadership in recreation; the group process and its use in recreational programming. Prerequisite: Third Year standing. [3-0; 0-0]

394. (1½) Outdoor Recreation.—An introductory course which will include a study of the natural environment and its relationships to man and his leisure; agencies involved, problems of conservation and pollution, outdoor education and schools, survival, and some practical experience in outdoor living. Students registering for this course in Term I, must obtain written approval from the School before June 15. Prerequisite: Third Year standing or consent of instructor. [3-0; 0-0]

396. (1½) Recreational Field Work/Orientation.—Planned observation and supervised practice work in a variety of appropriate institutions and agencies; seminars 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 field, subject to written approval of the School of Physical Education and Recreation. Such approval must be obtained prior to APRIL 30th.

465. (1½) Therapeutic Recreation.—Philosophy, objectives and content of programmes in therapeutic recreation. [3-0; 0-0]

466. (1½) Recreation for the Mentally Retarded.—A study of leadership and supervision for the development of comprehensive recreational programmes for the mentally retarded in the Community. The course includes visitations to a variety of agencies and field placements with those which have recognized the recreational needs of the retarded. As an essential background to their field, the aetiology of retardation and the behavioral characteristics of the retarded are studied. [1-1; 0-2]

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.—Field work practice; study of programme methods, problems and practice of supervision.

GRADUATE COURSES

500. (1-3) Graduate Seminar.

530. (1-3) Directed Studies.

Topics selected by the student, with the approval of the Chairman of Graduate Studies, can be studied under the supervision of a member of the faculty.

551. (1½) Mathematical Applications in the Study of Sport and Physical Activity.—A selection of topics from: Stochastic models applied to the study of motor learning, involvement in sport socialization through sport, etc., the assessment of change; analyses of scoring systems and playoff procedures used in various sports; game theory.

563. (1½) Measurement of Human 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) Physiological Aspects of Physical Activity.—Survey of research regarding the physiological aspects of activity; the effects of altitude and environmental temperature on man's performance in exercise and sports. Prerequisite: Physical Education 463.

568. (1½) Seminar in Human Motor Performance.—Reports and discussions of research literature concerning theories and findings in human performance. Special emphasis is given to understanding the basic mechanisms underlying motor performance within the framework of man as a component system.

570. (1½) Research Methods in Physical Education.—Research methods applied to the study of sport and physical activity, the nature of scientific inquiry, the design of experiments, the survey as a research medium, the historical and philosophical methods of inquiry, the writing of the research report.

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.

573. (1½) Seminar in Mechanical Analysis of Human Movement.—An investigation of human movement using cinematographical and other research methods. The case study approach will be used to examine kinesiological concepts and principles.

580. (1½) Current Problems in Physical Education.—Objectives; programmes; leadership; history and trends; professional status; community organizations and auspices.

581. (1½) Seminar in the Sociological Aspects of Sport.—The interrelationships between sport and primary social units, basic social institutions, fundamental social processes and social problems. Prerequisite: Physical Education 381 or equivalent.

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

N.B. All one-unit (1) Activity Courses meet three times per week for one term, or the equivalent.

Students should be prepared to acquire specialist clothing and equipment, appropriate to certain activities and as required by instructors.

Area I: 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 (Women)—Tumbling and apparatus, rhythmical gymnastics, teaching methods and techniques.

202 (1) Gymnastic Activities (Men).—Tumbling and apparatus, teaching methods and techniques.

203. (1) Conditioning Programmes.—Conditioning exercises, fitness assessment, adaptation of exercise programmes, teaching methods and techniques.

301. (1) Educational Gymnastics.—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.—Competitive gymnastic skills and routines, teaching and coaching methods and techniques. Prerequisite: Physical Education 201 or 202.

304. (1) Gymnastic Demonstration Programmes.—Tumbling, vaulting, pyramids, rhythmical gymnastics, demonstration techniques. Prerequisite: Physical Education 201 or 202.

402. (1) Gymnastic Coaching.—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** (restricted to women during winter session).

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 (men).

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 April 30.** Normally permission will be granted only if the student has obtained a Second Class standing in the prerequisite course. Previous coaching and/or playing experience is recommended. Registration will be limited.

Area VI: Individual Activities.—Skills, rules, tactics, teaching methods and techniques of:

220. (1) Badminton.

221. (1) Archery.

222. (1) Outdoor Activities.—An introduction to skiing, orienteering, sailing, canoeing. Students are advised that there will be certain costs which they will have to assume; e.g. ski lifts.

223. (1) Wrestling.

224. (1) Golf.

225. (½) Bowling.

226. (1) Tennis.

227. (1) Curling.

228. (1) Figure Skating.—Skills, rules, teaching and coaching methods and techniques. Minimal skating skill required.

229. (1) Squash, Handball, and Racket Ball.

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.

THE FACULTY OF FORESTRY

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Members of Faculty representing other Departments:

J. F. BENDELL, B.A., Ph.D.; F. BOWERS, M.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.; T. R. OKE, B.Sc., M.A., Ph.D.; C.A. ROWLES, M.Sc., Ph.D.; J. K. STAGER, B.A., Ph.D.; R. L. TAYLOR, B.Sc., Ph.D.

FACULTY OF FORESTRY

Objectives of Forestry Education

The Faculty of Forestry is devoted to professional and scientific education, as distinguished from technological education, in forest resource sciences and management. It offers programmes of undergraduate study leading to the professional degree of Bachelor of Science in Forestry (B.S.F.) and graduate programmes leading to higher degrees.

Forestry education is dedicated to the principle that forests and associated lands provide a renewable natural resource base, the sustenance and utilization of which require professional management. The goods and services comprise wood products, water resources, flood and avalanche control, soil and stream productivity, wildlife, recreation, and environmental quality. The needs are complex.

The profession of forestry holds to the principle that forestry is the science, art, and practice of managing and using wisely the natural resources associated with, and deriving from, forest lands. A high standard of education, with professional competence in specific fields, is demanded.

The Faculty of Forestry, through a flexible curriculum, seeks to provide opportunities for students of diverse backgrounds, interests and talents, to acquire a good general education combined with a broad forestry education and professional excellence in one or more of the forest resource fields. The Faculty also seeks to provide society with a spectrum of well-educated and proficient professionals and scientists for forest resource management, research, and education.

Undergraduate study programmes are designed to prepare students for entry into the profession of forestry, to provide a base for graduate studies leading to careers in research or forestry education, and to provide a forestry base for careers in public education.

Students seeking teaching and research careers in Forest Biology, rather than professional forestry may elect a four-year combined Honours programme in Biology and Forest Biology.

Programmes in forest technology and forest products technology, emphasizing technological skills, are provided by the British Columbia Institute of Technology and certain of the Public Colleges. The programmes provide terminal two-year courses of study for students seeking sub-professional occupations. Transfer of technology graduates into the Faculty of Forestry professional programme, is possible under prescribed conditions.

Graduate study programmes are designed to enable students who already hold degrees to pursue advanced studies leading to careers in management, research, and education.

Scope of Undergraduate Programmes

Undergraduate courses leading to the B.S.F. degree provide for diverse programmes within the main areas of Forest Biology, Forest Resources Management, Forest Harvesting, and Wood Science and Industry.

Forest biology deals with the living and environmental constituents and influences in forests. Interest areas in forest biology include: dendrology; tree physiology; genetics; silvics, ecology; hydrology; soils; pathology; entomology; fire science; vertebrate zoology.

Forest resources management encompasses the management and utilization of all the resources of forest land. Interest areas include: forest resources or multiple-product management; timber management; silviculture; protection; recreation management; water resources management; wildlife management; inventory and analysis. Within an interest area students may emphasize management for one or more goods and services.

Forest harvesting includes the harvesting of timber crops to serve market needs, and manipulation of forest cover to serve silvicultural and other objectives. Students selecting this option find employment as specialists in production and engineering. Their education places emphasis upon design and planning of harvesting operations utilizing computer techniques and analytical approaches.

Students in Wood Science and Industry are concerned with wood properties and behavior as related to production and marketing aspects of wood-based products. During their studies a special emphasis is directed toward chemistry, physics, mathematics, specialized botany and commerce as a necessary foundation for better utilizing the wood renewable resource. Managerial aspects and technical control in manufacture and sales may be emphasized by students interested in the business aspects of timber and other forest products.

Graduate Studies

Graduate programmes in the aforementioned fields are provided through the Faculty of Forestry under the authority of the Faculty of Graduate Studies. The degrees include the following:

- M.F. — in the spectrum of fields (noted under Scope of Programmes), for students with a B.S.F. degree
- M.Sc. — in scientific aspects of forestry and wood science for graduates in Science, Applied Science, Agricultural Sciences or Forestry
- M.A.Sc. — in Forestry 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 Faculty of Graduate Studies section of the calendar.

Environment for Learning

The Faculty of Forestry is favorably situated for education of men and women as foresters, wood scientists, forest business administrators and forest biologists. It enjoys the benefits of a large university with good library and other facilities for study. The teaching staff of the Faculty of Forestry is widely diversified. The Canadian Forestry Service Forest Products Research Laboratory on campus cooperates in teaching and research.

In addition to the lecture and laboratory classrooms, the Faculty of Forestry has a teaching and research facility embodied in the University of British Columbia Research Forest at Maple Ridge some 40 miles distant. This Forest comprises an area of 12,500 acres where special studies and professional exercises are carried out.

Beyond the formal boundaries of the Faculty of Forestry the province of British Columbia provides, within reasonable travel access, one of the most diversified patterns of biotypes anywhere in the world. Throughout the region many different forest resources management and utilization practices may be observed by students on scheduled field trips or during summer employment.

Regional Professional Opportunities

The regional forest-based economy is favorable to forestry employment as well as education. Many opportunities exist in British Columbia for professional careers in all aspects of managing, harvesting, protecting and growing of forest crops, for manufacturing and selling forest products and for other goods and services. 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. Good opportunities exist also for employment in Alberta, Saskatchewan, Manitoba and other Canadian Provinces. Several firms of consultant foresters serving national and international markets have their headquarters 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.

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 industry that generates annually more than one billion dollars of income. 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 opportunities for wildland recreation.

Graduates may be eligible for registration in the Association of British Columbia Professional Foresters.

Requirements for B.S.F. Degree

The B.S.F. is a professional degree granted on completion of the required programme of five years of university, comprising first-year science or equivalent plus four years of approved study in the Faculty of Forestry. The five-year programme comprises a minimum of 75 in-session units of study, including a thesis of 2 or 4 units. A unit ordinarily represents 25 lecture or 50 laboratory or problem session hours, or other equivalent.

In a four-month period between the spring and fall sessions the student is expected to obtain practical experience not obtainable in laboratory or field classes. A candidate is required to satisfy the Faculty that he has gained a suitable amount of experience related to his interest area.

Students are required to attend a 10-day field course in forest surveying at the University Research Forest near Maple Ridge immediately prior to the fall term, preceding the Second Year.

Immediately preceding the fall term, all students in third year forestry must take a 6-day field trip. They also must complete 21 field days of instruction at the University Research Forest following completion of the spring examination period. 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.

Eligibility for B.S.F. Programme

The general requirements for admission to the University are given in the General Information section of the calendar. Students should consult with the faculty advisor and discuss potential interest areas before registering in the Faculty of Forestry. Sample programmes are available for various interest areas.

Students in Secondary Schools anticipating a forestry programme at university are advised to complete prerequisites for entry into First Year Science at university. Presently this includes Chemistry 11 or 12, Mathematics 12, Physics 11 or 12, and Biology 11 or 12.

For admission to first year Forestry, a student shall have completed the First Year in Science at the University of British Columbia, or the equivalent at another university or college, with an average grade of at least 60 per cent.

Students who plan to enter Forestry should register for the following courses in First Year Science, or the equivalent:

Biology 101 or 102, Principles of Biology.

Physics 105, 110, 115, or 120 (depending upon the student's Secondary School physics course(s), if any).

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.

Students who lack certain of the stipulated prerequisite courses should consult with the admissions officer of the Faculty of Forestry for consideration of their case.

A Grade 12 certificate of another Canadian province will not be accepted as equivalent to the pre-Forestry year in the Faculty of Science at U.B.C.

Graduates from the British Columbia Institute of Technology Forest Products Programme of the Forestry Resources Technology (Engineering Division) having an overall average of 70 per cent or higher may be admitted to First Year Forestry.

Graduates from the British Columbia Institute of Technology Forestry Programme must present equivalent credits of First Year Science (60 per cent or better average) from a college or university.

Transfer of Credits from other Institutions

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 area 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. In some** areas advanced standing will be granted to mature and experienced individuals **who present academically acceptable evidence to the Dean which indicates a high potential for an outstanding career in professional forestry.**

In order to facilitate transfer from public colleges and similar institutions, only 23 units "in session" are defined as a core programme for First and Second years of Forestry combined. Forestry 111, 125, 130, 146, 204, 236, 248, 251, 270, and 280, a 3-unit course in economics, and a 3-unit course in Arts should be completed by the end of Second Year Forestry. At least four units in addition should be completed. Chemistry 230, Math. 200, Com. 459, Geol. 150 and pertinent courses in Arts are strongly recommended for certain interest areas.

British Columbia Institute of Technology graduates who have had the corresponding courses at the Institute, may be granted advance credits in Forestry 251, 280 and 307 (section on fire).

See the General Information section for regulations governing the following:

Fees

Examinations and Advancement

Graduation

Attendance

Withdrawal

Examination results

Review of Assigned Standing

Supplemental examinations

Transcript of Academic Record

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 in 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 or 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 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. 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 in any year taking a full programme of studies who does not pass in at least sixty per cent of it will be required to withdraw from the University for at least one year. A student taking a partial programme of studies who does not pass all courses being taken will be required to withdraw.

9. 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.

10. A student who fails a year of University study for a second time will be required to withdraw from the University.

11. 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.

12. 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.

The Forestry Program for Undergraduates

The curriculum is planned, and courses prescribed or specially designed with the intention that all forestry students shall have foundations in the sciences and humanities. From this base they may direct themselves toward any one of the interest areas. Introductory courses in forestry are designed to help students find their niche at an early stage. The programme provides for deferment of commitment to a special interest stream until the Third and Fourth Year Forestry. The overall objective of the curriculum is to provide a dynamic balance among courses representing fixed requirements, a pool of electives, and free electives to suit needs of individual students for their areas of interest.

The programme for all students in First and Second Year Forestry will comprise a pool of required courses amounting to 26 units, plus electives amounting to 4 units. This pooling of courses is intended to provide for preferred sequences and, within certain constraints, to allow students from other departments or institutions an opportunity to enter First or Second Year Forestry with advance credits in non-forestry subjects. Deficiencies in forestry subjects can be overcome by the end of Second Year Forestry, so that transfer students can expect to achieve approximate parity with the U.B.C. forestry stream at that point.

The programme for all students in Third and Fourth Year Forestry will also include a pool of core subject requirements, consisting of 13½ to 15½ units. In addition, electives from prescribed groups of subjects, and free electives will complete diverse programmes in the various interest areas.

At least 12 units must be identifiable with one of the interest areas. Students who maintain second class standing may elect another 12 units in which their general knowledge is broadened or deepened, or professional competence is extended into more than one sub-discipline of forestry. Certain extra-sessional requirements including essays, theses, field work, and field instruction must also be satisfied.

The curriculum is constantly under review and undergoing rapid evolution. The objectives are to ensure optimum opportunities for students to enter from two-year Public Colleges as well as to provide for diverse needs of students within the Forestry programmes.

The common core and full programmes for all interest areas will not be described completely by years until 1974. However, the current offerings for second, third, and fourth years of Forestry have been modified in pursuit of the above principles. The Forestry class entering U.B.C. in 1972 will benefit from the flexibility and variety of educational opportunities provided.

Until 1974 transfers into Forest Harvesting, and Wood Science and Industry areas may present some difficulties.

The student at the beginning of Third Year forestry shall elect a main area or interest area within it in consultation with a faculty advisor.

It is impossible to schedule all course combinations of potential interest to students. The programmes shown, therefore, represent what is considered to be the optimum combination for a particular area of concentration. Students with averages of at least 65 per cent who wish to prepare themselves within a specialized field may take some courses which have not been scheduled or which conflict with the prescribed courses. The Dean may allow such students to substitute up to six units for the in-session courses ordinarily required. Substitutions must be recommended by the appropriate staff advisor. Omissions from the core programme must be made up later. The maximum number of in-session course units is 18 for each year, and the minimum is 15 units.

Forestry (B.S.F.) Course

First Year

Subject	First Term		Second Term	
	Lect.	Lab.	Lect.	Lab.
For. 111 (3) Dendrology	3	2	3	2
For. 125 (1½) Forest Resources Use	2	2	0	0
For. 130 (3) Biometrics and Data Processing	3	2	3	2
For. 146 (0) Profession of Forestry	0	0	1	0
and 7½ to 10½ units chosen in consultation with Faculty advisor from:†				
Chem. 230 (3) Organic Chemistry	3	3	3	3
Geol. 150 (3) Earth Science for Engineers	2	2*	2	2*
Math. 200 (2) Calculus II	2	—	2	—
Math. 221 (2) Linear Transformations	2	0	2	0
Com. 459 (3) Introduction to Accounting	3	—	3	—
Arts Electives (1½) to (6)	—	—	—	—
Science Electives (1½) to (6)	—	—	—	—

*Alternate weeks.

†Chem. 230 is highly recommended and required for Forest Biology and Wood Science and Industry Main areas. Math. 200 or 221 is required for Harvesting. Com. 459 is required for Harvesting and is a pre-requisite to other courses in Commerce and Business Administration. Geol. 150 is highly recommended for Harvesting, Forest Resources Management and some aspects of Forest Biology Main areas. At least three units of courses in the Humanities and Social Sciences other than English and Economics are highly recommended and may be required by the end of the third year in some Interest areas.

Second Year

Subject	First Term		Second Term	
	Lect.	Lab.	Lect.	Lab.
Required				
Econ. 200 (3) Principles of Economics	3	0	3	0
For. 204 (1½) Forest Ecology	0	0	3	0
For. 236 (3) Mensuration	2	2	2	2
For. 248 [1] Essay	0	0	0	0
For. 251 [1½] Field Work in Forest Surveying	0	0	0	0
For. 270 (2) Wood Anatomy	2	4	0	0
For. 280 (3) Harvesting and Manufacture of Forest Products	3	2	3	2
Geog. 214 (1½) Introduction to Weather and Climate	2	2	0	0
Soil Sc. 200 (1½) Introduction to the Study of Soils	0	0	3	2
and according to Main areas up to 3 units from:†				
Bot. 330 (3) Plant Physiology	3	2	3	2
Com. 261 (2) Fundamentals of Marketing	0	0	2	0
Phys. 155 (3) Mechanics	2	4	2	2
Chem. 205 (3) Phys.-Inorg. & Analytic. Chem.	3	4	3	4
For. 125 (1½) Forest Resources Use	2	2	0	0
For. 273 (2) Wood Physics	0	0	2	4
3 units of other approved elective	3	0	3	0

If entry is from a Public College, Forestry 111 and Forestry 125 will be required, and adjustments made in relation to advance credits for Forestry 130 and other courses.

†First priority should be given to completion of courses recommended in preparation for the Main area or Interest area likely to be chosen by the student at the beginning of his Third Year. Botany 330 is recommended for Forest Biology and Forest Resources Management Main areas. Phys. 155 is recommended for Harvesting and must be completed by the end of third year Forestry. Com. 261, Chem. 205, For. 273 and Physics 155 are recommended for the appropriate Interest areas within the Wood Science and Industry Main area.

All students entering Second Year Forestry are required to attend a 10-day field course in forest surveying at the University Research Forest near Maple Ridge 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 January 31.

Third and Fourth Years

1. Common Core

	Subject	First Term Lect.	First Term Lab.	Second Term Lect.	Second Term Lab.
THIRD YEAR	For. 304 (3) Silviculture	3	2	3	2
	For. 307 (3) Forest Protection	3	2	3	2
	For. 325 (1½) Princ. of Forest Land Management	2	2	0	0
	For. 345 (1) Seminar	0	1	0	1
	For 348 [1] Summer Essay	—	—	—	—
	For. 351 [1] Field Work	—	—	—	—
FOURTH YEAR	For. 419 (3) Forestry Economics	2	2	2	2
	For. 445 (1) Seminar	0	1	0	1
	For. 451 [3] Field Work	—	—	—	—
	For. 499 (2) or (4) B.S.F. Thesis	—	—	—	—

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 must also complete 21 days of field instruction at the University Research Forest following completion of spring examinations.

All students other than those in Wood Science are required to complete the field work at the University Research Forest before proceeding into the Fourth year. The students in Wood Science may replace For. 451 (Field Work) with 3 units of For. 449 (Directed Studies). Individuals with extraordinary experience may in some cases substitute For. 449 for 451 upon written application to the Dean.

2. Forest Biology

			Subject	First Term Lect.	First Term Lab.	Second Term Lect.	Second Term Lab.
THIRD YEAR			For Common Core see Section I.				
	ELECTIVES †	Not less than 3 units from	Bio. 200 (1½) Cell Biology I	3	0	0	0
			Bio. 201 (1½) Cell Biology II	0	0	3	0
			Bio. 330 (3) Cell Physiology	2	3	2	3
			Bot. 330 (3) Plant Physiology	3	2	3	2
			Zool. 303 (3) Vertebrate Physiology	2	2	2	2
			For. 395 (1½) For. Wildlife Ecology	2	2	0	0
		1½ units from	For. 302 (1½) Forest Genetics	0	0	2	2*
			Bio. 334 (1½) Fundamental Genetics	3	2	0	0
		Not less than 1½ units from	Geol. 150 (3) Earth Science for Engineers	2	2*	2	2*
			For. 312 (1½) Forest Soils	2	2	0	0
			Chem. 230 (3) Organic Chemistry	3	3	3	3
FOURTH YEAR			For Common Core see Section I.				
		Required	For. 415 (1½) Forest History and Policy	3	0	0	0
	ELECTIVES †	Not less than 4 units from	Bot. 426 (2) Plant Synecology	3	3	0	0
			Bot. 427 (2) Plant Autecology	0	0	3	3
			Bio. 321 (1½) Population and Community Biology I	3	0	0	0
			Bio. 322 (½) Population and Community Biology II	0	0	3	0

*Alternate weeks.

†In addition to the above, approved electives may be chosen in consultation with Faculty advisor to complete total unit requirement, to liberalize education and/or to extend the student's special knowledge in breadth or depth within an interest area.

3. Forest Harvesting

			Subject	First Term Lect.	First Term Lab.	Second Term Lect.	Second Term Lab.
THIRD YEAR			For Common Core see Section I.				
		Required	For. 362 (3) Timber Harvesting	2	2	2	2
	ELECTIVES	First Pool †	Ap. Sc. 270 (2) Strength of Materials	2	1	2	1
			Com. 322 (1½) Labour Relations	3	0	0	0
			For. 331 (3) Optimization Techniques in Forestry	2	2	2	2
			For. 363 (1½) Forest Surveying	2	2	0	0
			Other approved courses				
		Second Pool §	For. 335 (1½) Quality Control Systems in Forest Products Industry	2	2	0	0
			For. 395 (1½) Forest Wildlife Ecology	2	2	0	0
FOURTH YEAR			For Common Core see Section I.				
	ELECTIVES	First Pool †	For. 459 (3) Analysis of Harvesting Operations	2	2	2	2
			For. 462 (1½) Industrial Forest Management	0	0	2	2
			For. 463 (3) Forest Transportation Systems	2	3	2	3
			For. 473 (2) Mechanical Properties of Wood	3	3	0	0
			Other approved courses				
		Second Pool §	For. 415 (1½) Forest History and Policy	3	0	0	0
			For. 420 (1½) Forest Environmental Management	2	2	0	0
			For. 442 (1½) Photo-Interpretation	2	2	0	0
			For. 485 (3) Hydrology of Forest Land Use	2	2	2	2
			For. 491 (1½) Forest and Wildland Recreation	0	0	2	2

†During the Third and Fourth Years the student must choose a total of not less than 6 units from the First Pools.

§and a total of not less than 3 units from the Second Pools.

4. Forest Resources Management

		Subject	First Term Lect.	First Term Lab.	Second Term Lect.	Second Term Lab.
THIRD YEAR	For Common Core see Section I.					
	Electives †	For. 331 (3) Optimization Techniques in Forestry	2	2	2	2
		For. 395 (1½) Forest Wildlife Ecology	2	2	0	0
		§For. 430 (1½) Advanced Biometrics	0	0	2	2
		§For. 485 (3) Hydrology of Forest Land Use	2	2	2	2
		For. 491 (1½) Forest and Wildland Recreation	2	2	0	0
FOURTH YEAR	Required	For. 415 (1½) Forest History and Policy	3	0	0	0
		For. 420 (1½) Forest Environmental Management	2	2	0	0
	Electives †	For. 404 (2) Advances in Silviculture	2	0	2	0
		For. 406 (1½) Methods in Forest Pathology	0	0	2	2
		For. 408 (1½) Problems in Forest Entomology	0	0	2	2
		For. 425 (1½) Forest Management	0	0	2	2
		For. 427 (1½) Fire Control and Use	2	2	0	0

†In addition to the above, up to 15½ units of other electives, identified with an interest area within Forest Resources Management, may be chosen in the Third and Fourth Years in consultation with faculty advisor. At least two of these courses must be elected.

§May be taken also in Fourth Year if scheduling of courses permits.

5. Wood Science and Industry

		Subject	First Term Lect.	First Term Lab.	Second Term Lect.	Second Term Lab.
THIRD YEAR	For Common Core see Section I.					
	Required	For. 335 (1½) Quality Control Systems in Forest Products Ind.	2	2	0	0
	ELECTIVES 5 to 8 units from	Comm. 261 (2) Fundamentals of Marketing	2	0	2	0
		Comm. 331 (3) Commercial Law	3	0	3	0
		Comm. 364 (1½) International Marketing	3	0	0	0
		For. 331 (3) Optimization Techniques in Forestry	2	2	2	2
		Phys. 156 (1½) Heat and Thermodynamics	2	3*-1	0	0
		Phys. 158 (1½) Wave Phenomena	0	0	2	3*-1
		Chem. 205 (3) Physical-Inorganic and Analytical Chemistry	3	4	3	4
		Ap. Sc. 270 (2) Strength of Materials	2	1	2	1
		OR other approved elective (3)	—	—	—	—
FOURTH YEAR	For Common Core see Section I.					
	ELECTIVES 7 to 12 units from	Comm. 221 (2) Organizational Behaviour	4	0	0	0
		Comm. 252 (3) Management Accounting	3	0	3	0
		Comm. 322 (1½) Labour Relations	3	0	0	0
		For. 430 (1½) Advanced Biometrics	0	0	2	2
		For. 470 (2) Physical and Chemical Properties of Wood	0	0	3	3
		For. 473 (2) Mechanical Properties of Wood	3	3	0	0
		For. 480 (2) Forest Products Utilization	2	0	2	0
		For. 481 (2) Glued Wood Products	3	3	0	0
		For. 482 (2) Wood Seasoning and Preservation	0	0	3	3
		OR other approved electives (6)	—	—	—	—

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.

111. **(3) Dendrology.**—Development, anatomy and morphology of trees, with particular reference to function, and relationship to environment. Mr. Worrall. [3-2-0; 3-2-0]

125. **(1½) Forest Resources Use.**—Nature, extent, and values of forest and associated wildland resources; principles underlying their use to provide goods and services for human benefit; present and potential utilization. Mr. J. H. G. Smith and the staff. [2-0-2; 0-0-0]

130. **(3) Biometrics and Data Processing.**—Basic theories of probability and statistics; applications to forestry; FORTRAN IV computer programming; programming techniques for statistical and numerical analysis in forestry. Mr. Kozak, Mr. Munro, Mr. S. M. Smith and Mr. Young. [3-0-2; 3-0-2]

146. **The Profession of Forestry.**—Survey of the profession; opportunities available in forestry and the wood sciences. No credit. Dean Gardner and the staff. [0-0-0; 1-0-0]

204. **(1½) Forest Ecology.**—Form and functioning of forest ecosystems. Interaction of organisms with their physical and biotic environment. Introduction to forest communities and associations. Ecological basis for silviculture and management. Prerequisites: Geography 214. Soil Science 200 is to be taken concurrently. Mr. Kimmins. [0-0-0; 3-0-0]

236. **(3) Forest Mensuration.**—Methods of measuring forests and forest products; forest inventory systems; prediction of growth and yield. Mr. S. M. Smith. [2-0-2; 2-0-2]

248. **(1) Essay.**—Students entering Second Year are required to submit an essay of not less than 1000 words. It should take the form of a scientific report, preferably on original observations made during the summer.

251. **(1½) Field Work in Forest Surveying.**—Ten days of surveying at University Research Forest immediately prior to fall term. Textbook: Wilson: *Elementary Forest Surveying and Mapping.* Mr. Adamovich. Fee: $50.

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.* 3rd Ed. Mr. Wilson. [2-4-0; 0-0-0]

273. **(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]

280. **(3) Harvesting and Manufacture of Forest Products.**—Introduction to the methods used in harvesting, manufacture and distribution of forest

products emphasizing the relationships between these processes, forest management practices and forest environment. Mr. Valg, Mr. Wellburn. [3-2-0; 3-2-0]

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 to undergraduate forestry students; no prerequisites.) Mr. Thirgood and the staff. [3-0-0; 3-0-0]

302. (1½) Forest Genetics.—Principles of genetics and their application to forestry; selection and breeding methods. Mr. Sziklai. [0-0-0; 2-2*-0]

304. (3) Silviculture.—Theory and practice of controlling forest establishment, composition, and growth; methods of establishing natural and artificial regeneration; stand manipulation; development of silviculture in western North America. Textbook: Smith, *Practice of Silviculture.* Mr. Haddock, Mr. Sziklai. [3-2-0; 3-2-0]

307. (3) 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. (The individual one-unit components (pathology, entomology and fire) may be taken for credit separately). Mr. Graham, Mr. Henderson, Mr. van der Kamp. [3-2-0; 3-2-0]

312. (1½) Forest Soils.—Forest soil environment, relation of soil properties to forest management, forest humus, interpretation of soil properties; emphasis on properties affecting fertility. (Also offered as Soil Science 303.) Prerequisite: Soil Science 200. Mr. Ballard. [2-0-2; 0-0-0]

325. (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. J. H. G. Smith. [2-0-2; 0-0-0]

331. (3) Optimization Techniques in Forestry.—Theory and application of probability, simulation, network techniques, linear and dynamic programming, and queueing analysis. Prerequisites: Math. 200 or 221 or equivalent and For. 130 or equivalent. Mr. Young. [2-0-2; 2-0-2]

335. (1½) Quality Control Systems in Forest Products Industry.—Statistical quality control methods, acceptance sampling inspection, and economic aspects of quality control. Mr. Valg. [2-0-2; 0-0-0]

345. (1) Seminar.—The staff. [0-0-1; 0-0-1]

348. (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.

351. (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 representative forest types. A substantial written report is a required part of the course. Required of all students entering Third Year. Fee: $50.

362. (3) Timber Harvesting.—Methods of planning, analysis and supervision of timber harvesting operations. Mr. Adamovich, Mr. Wellburn, and Mr. Young. [2-0-2; 2-0-2]

363. (1½) Forest Surveying.—Methods in forest surveying with emphasis on forest road location and design. Textbook: Meyer: *Route Surveying.* Mr. Adamovich. [2-2*-2*; 0-0-0]

395. (1½) Forest Wildlife Ecology.—Biology of important bird, mammal, and fish species resident in forested regions, with particular emphasis on the influences of silvicultural and logging practices. Mr. Bunnell. [2-2-0; 0-0-0]

401. (1½) Tissue Repair Mechanisms in Trees.—Response of trees to injury by biotic and abiotic agents. Physiology of cellular dedifferentiation and redifferentiation in repair processes. Cellular and biochemical mechanisms of defense and tissue rejection. Implications for tree resistance and survival, and vegetative propagation. Prerequisites: Chemistry 230, and equivalents of Botany 330 and Forestry 307. Mr. Mullick. [2-2-0; 0-0-0]

404. (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]

405. (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]

406. (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]

408. (1½) Problems of Forest Entomology.—Decision-making in the protection of forests from insects. Insect problems viewed from other disciplines of forestry. Bases of biological and economic evaluation, and choice of control methods. Mr. Graham. [0-0-0; 2-2-0]

409. (1½) Forest Ecosystem Laboratory.—Radioisotope tracer and other methods for the study of energy flow and nutrient dynamics in forest ecosystems. Mr. Kimmins. [0-0-0; 2-2-0]

415. (1½) Forest History and Policy.—The development and implementation of forest policies in Canada, the United States and other countries. Mr. Thirgood. [3-0-0; 0-0-0]

419. (3) Forestry Economics.—Economics of production, distribution and consumption of goods and services produced by, or dependent on, the forest resource. Mr. Haley. [2-0-2; 2-0-2]

420. (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. [2-0-2; 0-0-0]

422. (1½) Forest Land Classification.—Methods of classifying capability of land for multiple purpose forestry. Mr. Lacate. [0-0-0; 2-0-2]

425. (1½) Forest Management.—Preparation and analysis of plans for regulating and increasing timber production. Mr. J. H. G. Smith. [0-0-0; 2-0-2]

427. (1½) Fire Control and Use.—Fire prevention; danger rating; fire behaviour, detection, communication, transportation and suppression; planning for control and use of fire. Mr. Henderson. [2-0-2; 0-0-0]

430. (1½) Advanced Biometrics.—Analysis of variance, multiple regression and analysis of covariance. Sampling procedures. Design and analysis of experiments. (Also given as Pl. Sc. 322.) Mr. Kozak. [0-0-0; 2-0-2]

436. (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]

442. (1½) Photo-Interpretation.—Application of photo-interpretation, photo-mensuration and photo-mapping to forest management. Mr. Lacate. [2-0-2; 0-0-0]

445. (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]

449. (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.

451. (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. Fee: $100.

452. (1-3) Regional Field Studies in Forestry and Forest Products.—Directed field experience in one of the major forest producing regions of the world. Pre-tour seminars and post-tour reports are required. The Staff.

459. (3) Analysis of Harvesting Operations.—Industrial engineering aspects of planning and control of harvesting operations. Mr. Young, Mr. Wellburn. [2-0-2; 2-0-2]

462. (1½) Industrial Forest Management.—The relationships, interactions, functions, and objectives of the companies, governments, unions, and associations which make up the forest industry. Mr. Wellburn. [0-0-0; 2-0-2]

463. (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]

470. (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. Franz, Mr. Wilson. [0-0-0; 3-3-0]

473. (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, Mr. Franz. [3-0-3; 0-0-0]

480. (2) Forest Products Utilization.—Utilization problems; product development; distribution and marketing of forest products. Mr. Wellwood. [2-0-0; 2-0-0]

481. (2) Glued Wood Products.—Types and characteristics of wood adhesives; manufacture, properties, and uses of plywood, laminated wood, and composite wood products. Prerequisite Forestry 273. Mr. Valg, Mr. Wellwood. [3-3-0; 0-0-0]

482. (2) Wood Seasoning and Preservation.—Principles and methods of seasoning forest products; principles of finishing wood; preservative treatments. Pre-requisite Forestry 273. Mr. Valg, Mr. Wellwood. [0-0-0; 3-3-0]

485. (3) Hydrology of Forest Land Use.—Influence of forest and other vegetation and of land use upon water yield, regime and quality; management of watersheds for water production. Mr. Willington. [2-0-2; 2-0-2]

491. (1½) Forest and Wildland Recreation.—Principles of managing resources and visitors for recreation opportunities in forests, wildlands and non-urban parks. Mr. Dooling. [2-0-2; 0-0-0]

492. (1½) Recreation Resources Planning and Development.—Identification, inventory, allocation, acquisition, and development of forestland, wildland and water resources for recreational purposes. Principles of park and outdoor recreation area planning and design. Mr. Dooling. [0-0-0; 2-2*-2*]

495. (1½) Forest Wildlife Management.—Theory and techniques of evaluation and manipulation of wildlife populations and habitat. Approaches to

*Alternate weeks.

decision making in multiple resource systems with particular emphasis on forested lands. Prerequisite: For. 395 or equivalent. Mr. Bunnell. [0-0-0; 2-2-0]

499. (2 or 4) 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 area of interest.

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.

500. (1-3) Studies in Forest Tree Physiology.—Principles of plant physiology as applied to problems in growth and development of tree species. Mr. Worrall.

502. (1-3) Studies in Forest Genetics.—Problems associated with forest tree improvement; analysis of variation in tree quality. Mr. Sziklai.

504. (1-3) Silvics and Silviculture.—Directed study in silvical characteristics of forest trees; silvicultural systems. Mr. Haddock, Mr. Sziklai, Mr. Thirgood.

505. (1-3) Advanced Studies in Forest Ecosystems.—Directed studies in the energetics and biogeochemistry of forest ecosystems including studies on the ecological impact of forest land management practices. Mr. Kimmins.

506. (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 1973-74 and alternate years.) Mr. van der Kamp.

507. (1-3) Problems in Forest Protection.—Mr. Graham, Mr. Henderson, Mr. van der Kamp.

508. (2) Forest Insect Ecology.—Interactions between insects and forests; time-space-numbers relations, causal factors; examination of theories and axioms; relevance of ecological principles to pest management; research concepts. (Recommended to be taken in conjunction with 1 unit of Zoology 502.) Mr. Graham.

510. (1) Forest Tree Seed.—Seed production, collection, provenance, testing, treatment, and the application of these to the practice of forestry. Mr. Haddock, Mr. Sziklai.

512. (1-3) Problems in Forest Tree Nutrition.—Nutrient requirements, mycorrhizal effects, symbiotic nitrogen fixation, factors affecting nutrient availability, processes involving nutrient loss from the ecosystem. Mr. Ballard, Mr. Kimmins.

514. (1) Seminar in Forest Biology.—Advanced topics in biology as related to forestry and wood sciences. The Staff.

515. (1-3) Studies in Forest and Land Use History. Mr. Thirgood.

517. (1-3) Studies in Forest Policy. Mr. Thirgood.

519. (1-3) Advanced Studies in Forest Economics and Finance.—Economics of reforestation, forest land management, harvesting, manufacturing, and marketing. Mr. Haley, Mr. J. H. G. Smith.

521. (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.

523. (1-3) Advanced Studies in Forest Management.—Problems in forest and forest land management; planning and development of forestry or forest industry programmes. Mr. J. H. G. Smith.

525. (1-3) Problems in Forest Land Management. Mr. Lacate, Mr. J. H. G. Smith.

527. (1-3) Forest Fire Control.—Advanced study in fire control and use in forestry. Mr. Henderson.

529. (1) Seminar in Management of Forest Resources.—Objectives and methods for integration and improvement of management and use of forests and associated wildlands. The Staff.

530. (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. Given 1973/74 and on alternate years thereafter. Mr. Kozak.

532. (1-3) Data Processing in Forestry.—Selected readings and problems in the collection and analysis of data in forestry. Use of electronic computers for special forestry and forest research problems. Mr. Kozak.

533. (1-3) Problems in Statistical Methods.—Directed studies in problems of advanced statistical techniques as a tool in forest research. Mr. Kozak, Mr. Valg.

536. (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. J. H. G. Smith, Mr. S. M. Smith.

539. (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]

542. (1-3) Advanced Studies in Forest Photogrammetry.—Problems in photo-interpretation, photo-mensuration and forest-land classification. Mr. Lacate.

545. (1) General Forestry Seminar.—Selected topics in Forestry and Wood Sciences. (Note: Either Forestry 545 or 584 will be required for the first year of all graduate students in Forestry. One or more of Forestry 514, 529, 546 and 584 to be taken concurrently, or subsequently.) The Staff.

546. (1) Seminar in Research Methods.—Needs, philosophy, objectives, and criteria for initiation and evaluation of projects, programs and missions. The Staff.

549. (3-9) Master's Thesis.

555. (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. Young. [3-0-0; 3-0-0]

559. (1-3) Operations Research in Forestry.—Directed studies in the application of O.R. techniques to the diverse problems of the forest environment and forest industries. Mr. Valg, Mr. Young.

563. (1-3) Problems in Forest Engineering.—Planning and control of logging systems; special design problems of forest roads, bridges, cableways and associated structures. Mr. Adamovich, Mr. Young.

567. (1) Logging Cableways.—Location, design and construction of cableways. Mr. Adamovich.

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. Franz, Mr. Gardner, Mr. Wellwood, Mr. Wilson.

572. (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. Paszner, Mr. Wilson. [3-0-0; 0-3-0]

574. (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: Forestry 270 and Mathematics 300, or taken concurrently. Textbook: Nielsen, Mechanical Properties of Polymers, Mr. Franz, Mr. Wilson, Mr. Wellwood. [1-2-0; 1-2-0]

576. (2) Origin of Wood Pulp Properties.—Exploration of basic interrelationships between wood characteristics, chemical and mechanical processing and wood pulp behaviors. Prerequisites: Forestry 270 and 470, or taken concurrently. Textbook: Rydholm, *Pulping Processes*. Mr. Wilson. [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. Franz, Mr. Gardner, Mr. Wellwood and Mr. Wilson.

580. (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.

584. (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: Forestry 270 and 445, or equivalents. Pre-reading list will be furnished. The Staff.

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. Goodell. [0-0-0; 3-0-2]

587. (1-3) Research in Forest Hydrology. Mr. Goodell.

589. (1-3) Problems in Forest Watershed Management. Mr. Goodell.

591. (1-3) Research Methods in Forest and Wildland Recreation. Mr. Dooling.

593. (1-3) Problems in Forest and Wildland Recreation.—Analysis of and solutions to problems in administration and management of recreation resources in forests, wildlands and non-urban parks. Mr. Dooling.

595. (1-3) Research Methods in Forest Wildlife Studies. Mr. Bunnell.

597. (1-3) Problems in Forest Wildlife Management. Mr. Bunnell.

599. (3-9) M.A.Sc. Thesis.

649. Ph.D. Thesis.

COURSES GIVEN IN OTHER FACULTIES

(For course descriptions see appropriate sections of the calendar.)

Applied Science
270. Strength of Materials.

Biology
101. (3) Principles of Biology.
102. (3) Principles of Biology.
200. (1½) Cell Biology I.
201. (1½) Cell Biology II.
321. (1½) Population and Community Biology I.
322. (1½) Population and Community Biology II.

Botany
302. (3) Morphology & Taxonomy of Seed Plants.
308. (1½) Structure and Reproduction of Fungi.
309. (1½) Physiology and Ecology of Fungi.
330. (3) Plant Physiology.
425. (3) Plant Ecology.
426. (2) Plant Synecology.
427. (2) Plant Autecology.

Chemistry
205. (3) Physical-Inorganic and Analytical Chemistry.
230. (3) Organic Chemistry.

Commerce
221. (2) Organizational Behaviour.
252. (3) Management Accounting.
261. (2) Fundamentals of Marketing.
271. (2) Business Finance.
322. (1½) Labour Relations.
331. (3) Commercial Law.
364. (1½) International Marketing.
459. (3) Introduction to Accounting.
465. (1½) Marketing Research Problems.
466. (1½) Industrial and Resource Marketing Problems.
468. (1½) International Marketing Management.

Economics
200. (3) Principles of Economics.

Geography
214. (1½) Introduction to Weather and Climate.

Geology
150. Earth Science for Engineers.

Mathematics
120. (1) Introduction to Analysis I.
200. (2) Calculus II.
221. (2) Linear Transformations in Euclidean Space.
301. (3) Ordinary Differential Equations.

Physics
105. (3) Elementary Physics.
110. (3) Mechanics, Electricity and Atomic Structure.
115. (3) Wave Motion, Mechanics and Electricity.
120. (3) Matter and Mechanics.
155. (3) Mechanics.
156. (1½) Heat and Thermodynamics.
158. (1½) Wave Phenomena.

Plant Science
404. (1½) Range Ecology.

Sociology
200. (3) Introduction to Sociology.

Soil Science
200. (1½) An Introduction to the Study of Soils.
413. (1½) Soil Physics.
414. (1½) The Soil-Plant-Atmosphere System.
416. (1½) Classification and Geography of Soils.

Zoology
203. (1½) Comparative Animal Morphology.
306. (1½) Vertebrate Zoology.
311. (1½) Introduction to Entomology.
410. (1½) Entomology.
416. (3) Terrestrial Vertebrate Zoology.
421. (3) Principles of Applied Ecology.

CANADA

DEPARTMENT OF THE ENVIRONMENT

Canadian Forestry Service

Western Forest Products Laboratory

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 research in timber engineering, plywood, wood anatomy, wood preservation, wood pathology, wood chemistry, harvesting, seasoning, sawmilling, pulping, physics and physical chemistry. Currently there are 49 professionals and a total staff of 129.

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.

AWARDS AND FINANCIAL ASSISTANCE

Subject to change.

The following list of scholarships, bursaries, prizes, and loans is specifically designed for students proceeding towards a degree in Forestry. (Descriptions will be found in the Awards and Financial Assistance section of the calendar.) In addition, students in Forestry are eligible for a number of awards open to the student body at large. The complete list of scholarships, prizes, bursaries, and loans available at this University is to be found in the section of the calendar entitled Awards and Financial Assistance.

Scholarships and Prizes

British Columbia Forest Products Ltd. Bursaries.
The Canadian Institute of Forestry Medal.
The H. R. MacMillan Prize in Forestry.
The Association of British Columbia Foresters Prizes.
The Canadian Forest Products Ltd. Prizes in Forestry.
The Canadian Forest Products Ltd. Scholarships in Forestry.
The Canadian Forestry Association of B.C. Scholarship.
Commonwealth Forestry Bureau Book Prize.
The Council of Forest Industries' Forest Protection Scholarship.
The David Bell Little Memorial Scholarship.
The Dr. G. S. Allen Scholarship in Forest Genetics.
The Finning Tractor & Equipment Co. Ltd. Scholarships.
Forestry Summer Camp Scholarship.
The Galt Elkington Memorial Scholarship.
The Harry Hobson Memorial Prize.
The Kaiser Resources Ltd. Prize in Conservation and Rehabilitation.
The H. R. MacMillan Scholarships in Forestry.
The H. R. MacMillan Prize in Forest Harvesting.
The John E. Bier Memorial Prize in Forest Pathology.
The Kapoor Singh Scholarship in Forestry.
MacMillan Bloedel Limited Scholarships for Forestry.
Prince George Forestry Scholarship.
Proficiency Prize in Dendrology (For. 111).
The Rayonier Canada (B.C.) Limited Scholarship in Forestry.
Ted Johnson Scholarship in Forestry.
The Truck Loggers' Association Scholarships.
The William McMahan Scholarship.

Bursaries

The Cattermole-Trethewey Bursary.
The Council of Forest Industries Bursary in Forestry.
The Donald S. McPhee Forestry Awards.
The Fred D. Mulholland Bursary in Forest Management.
Weldwood of Canada Limited Bursaries.

Loans

The H. R. MacMillan Loan Fund.

For Graduate Study

The B.C. Forest Products Fellowship in Forest Genetics.
The Council of the Forest Industries of British Columbia Fellowship in Wood Science.
The Don Buckland Memorial Scholarship in Forest Pathology.
The George S. Allen Memorial Scholarship.
The Kaiser Resources Ltd. Fellowship.
The MacMillan Bloedel Fellowship in Forest Mensuration.
The VanDusen Graduate Fellowships in Forestry.
The Walter W. Jeffrey Memorial Scholarship.

THE FACULTY OF GRADUATE STUDIES

FIELDS OF STUDY

Agricultural Economics
Agricultural Engineering
Agricultural Extension
Agricultural Mechanics
Anatomy
Animal Resource Ecology
Animal Science
Anthropology
Applied Mathematics and Statistics
Architecture
Arctic and Alpine Research
Asian and Slavonic Research
Asian Studies
Astronomy and Space Science
Audiology and Speech Sciences

Biochemistry
Biology
Botany

Chemical Engineering
Chemistry
Civil Engineering
Classics
Commerce and Business Administration
Community and Regional Planning
Comparative Literature
Computer Science
Creative Writing

Economics
Education
Electrical Engineering
Engineering Physics
English

Fine Arts
Fisheries
Food Science
Forestry
French

Genetics
Geography
Geological Engineering
Geology
Geophysics
German
Greek

Hispanic and Italian Studies
History
Human Nutrition
Hydrology

Industrial Relations
International Relations
Interdisciplinary Studies
Italian

Latin
Law
Linguistics

Mathematics
Mechanical Engineering
Metallurgical Engineering
Metallurgy
Microbiology
Mineral Engineering
Music

Neurological Sciences
Nursing

Oceanography

Pathology
Pharmaceutical Sciences
Pharmacology
Philosophy
Physical Education
Physics
Physiology
Plant Science
Political Science
Poultry Science
Psychiatry
Psychology

Religious Studies
Resource Science Centre
Romance Studies

Slavonic Studies
Sociology
Soil Science
Spanish
Surgery

Theatre

Urban Studies

Westwater Research Centre

Zoology

FACULTY OF GRADUATE STUDIES

IAN MCTAGGART COWAN, S.M., B.A. (Brit. Col.), Ph.D. (California), LL.D. (Alta.), F.R.S.C., Dean of the Faculty.

BENJAMIN N. MOYLS, M.A. (Brit. Col.), Ph.D. (Harvard), Assistant Dean.

JOHN K. STAGER, B.A. (McMaster), Ph.D. (Edinburgh), Assistant Dean.

Membership of the Executive Committee of the Faculty:

Ex-officio Members—The DEAN (Chairman) and the Assistant Deans of the Faculty, the Dean of Inter-Faculty and Student Affairs, the Chairman, Curriculum Committee: Dr. S. H. Zbarsky, the Registrar.

Elected Members—

DR. J. D. CHAPMAN, DR. N. A. HALL, DR. P. A. LARKIN; terms expire 1972.

MR. W. OPECHOWSKI, DR. M. ORMSBY, DR. G. W. POLING; terms expire 1973.

DR. R. J. GREGG, DR. T. D. M. MCKIE, DR. M. ZACHER; terms expire 1974.

Membership of the Faculty

Ex-officio Members—The President, the Dean and the Assistant Deans of the Faculty of Graduate Studies, the Dean of Inter-Faculty and Student Affairs, the Librarian.

All full-time Professors, Associate Professors and Assistant Professors teaching graduate courses or supervising graduate theses, and all Instructors and Lecturers actively engaged in the supervision of graduate studies.

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 Science in Business Administration (M.Sc.-Bus. Admin.)
Master of Education (M.Ed.)
Master of Engineering (M.Eng.)
Master of Fine Arts (M.F.A.)
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.

Admission

1. Application for admission to the degree programme is made in writing to:

The Dean, Faculty of Graduate Studies,
The University of British Columbia,
Vancouver 8, B.C.

Applications may be accepted at any time but formal course work in the winter session begins the second Monday in September.

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 year on a Master's programme, with clear evidence of research ability.

In addition, the Executive Committee of the Faculty of Graduate Studies must authorize admission to a proposed course of study.

3. Applicants for the Ed.D. degree must have completed:
   (i) a Master's degree (or equivalent) in Education, or
   (ii) a Bachelor's degree with First Class Standing **and** First Class in Teacher Training, or
   (iii) a B.Ed. (Elem.) degree with First Class Standing **and** a fifth year with First Class Standing.

In addition, the Graduate Committee of the Faculty of Education, and the Executive Committee of the Faculty of Graduate Studies must authorize admission to a proposed course of study.

4. Admission to the Ph.D. or Ed.D. programme will be in one of the following categories.

(a) **Full Standing:** Granted to applicants who have met one of the requirements 2 (i), 2 (ii), 2 (iii), or 3 (i), 3 (ii), 3 (iii), above. Students entering directly from the Bachelor's degree under 2 (ii), 3 (ii) or 3 (iii) must during the first year of graduate study complete nine units with a First Class average and obtain First Class Standing in at least five units of course work.

5. The number of candidates that can be accommodated is limited. The best qualified students are accepted as vacancies occur in the specific fields for which the students have applied.

6. Although application to enter Graduate Studies may be made at any time, most students begin their programme at the beginning of a winter session. The limitation on the number of students that can be accommodated requires that their selection takes place well before the beginning of a winter session. Applicants are advised to write to the Department in which they intend to study to determine the date by which their application must be received.

7. The Executive Committee of the Faculty of Graduate Studies must be satisfied that the student is competent to pursue studies in the English language. The department in which the student intends to write his thesis shall determine the number of and standard of competence in languages other than English.

Courses of Study

1. (a) Students will normally be required to spend a minimum of three winter sessions at the University. Those possessing a Master's degree (or the equivalent) may have this period of time reduced by the Executive Committee 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 must register for each session during their studies. Those who fail to register 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 remunerative employment other than Teaching Assistant duties, 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.

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 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.

The membership of the Candidate's Committee may, if necessary, be altered during the study period. The Executive Committee of the Faculty of Graduate Studies will approve all such changes.

4. Upon registration the student consults his Candidate's Committee to develop a programme of studies which is then reviewed and approved by the department concerned, and by the Executive Committee of the Faculty. The programme of studies will consist of seminars, directed readings, consultations, and such formal courses as may be deemed essential for the fulfillment of the requirements for the degree. A major part of the candidate's work will consist of a thesis embodying the results of original research. The thesis will be submitted to an outside examiner or examiners approved by the Dean.

5. Each Candidate's Committee will recommend the kind and number of courses to be taken by the student in relationship to his background and to the requirements which are appropriate to the doctoral level in the chosen major field. No uniform course requirements can be applied to all departments at the doctoral level.

6. Changes in the programme of study may be required during the study period, and these must be reviewed and approved by the Candidate's Committee, the major department and the Executive Committee of the Faculty.

7. Courses listed under 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

1. The progress of all students working for the Ph.D. and Ed.D. degrees will be reviewed in the spring of each year, and the Executive Committee of the Faculty of Graduate Studies, after consultation with the Candidate's Committee and the department concerned, may require any candidate to withdraw if his work has not been satisfactory.

2. The doctoral student will take 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 languages other than English where departmental regulations require it.

(c) A comprehensive written and/or oral examination normally held after the student has completed all required course work, and intended to test his grasp of the chosen field of study as a whole. The Candidate's Committee will set and judge this examination in a manner compatible with the policy of the department or departments concerned.

(d) The final oral examination for the degree and defense of the thesis before an examining committee made up of the Candidate's Committee and outside examiner or examiners approved by the Dean, and chaired by the Dean of the Faculty of Graduate Studies or his nominee. This examination is open to all members of the university, but the judgment of the candidate's success is made by a simple majority vote of the examining committee.

3. All other forms of examination must be completed before a student takes the final oral examinaton.

4. A candidate's thesis must be presented in the form described in the leaflet entitled *Instructions for the Preparation of Graduate Theses*, copies of which may be obtained from the Special Collections Division in the Library, or from the Office of the Registrar.

5. The candidate must agree to microfilming of the thesis and publication of a suitable thesis abstract before the degree is awarded. Forms for this purpose may be obtained from the Special Collections Division of the Library.

Courses 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 departments concerned, provided credit has not already been obtained for such courses.

(b) Certain courses numbered 300 or above in related subjects as approved in particular cases on the recommendation of the department concerned.

MASTER'S DEGREES

Admission

1. Application for admission to the degree programme is made in writing to:

The Dean, Faculty of Graduate Studies,
The University of British Columbia,
Vancouver 8, B.C.

Applications may be accepted at any time, but formal course work in the winter session begins the second Monday in September.

2. The Master's degree is offered in various approved fields, and in each field the degree conferred will be that which, in the view of the Faculty, describes most appropriately the character of the work done.

(a) If the field of study lies wholly within a single department the Master's programme is 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 programme 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 programme must be approved by the special committee appointed by the Executive Committee to supervise his work. The programme so chosen must also be approved by the Executive Committee of the Faculty of Graduate Studies.

3. Applicants for a Master's degree must hold a Bachelor's degree with

(a) Honours in the field of the proposed Master's course with First Class standing in at least two (6 units) of the Third and Fourth Year courses in that field, or

(b) First Class standing in at least two (6 units) of the courses and at least Second Class standing in each of the remaining courses of Third and Fourth Year work prescribed by the department or departments or special committee concerned as prerequisite to the Master's programme.

4. Graduate students who do not meet the full requirements of Section 3 may be permitted to make up any deficiencies and to proceed concurrently in the Master's programme provided that they keep within an over-all maximum of 18 units (or the equivalent in the departments of Applied Science) in any one winter session, but may receive credit for such courses only 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 following 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 of prerequisite courses to be completed.

(b) **Provisional standing.** Granted at the discretion of the Executive Committee of the Faculty to students who have more than 6 units of prerequisites remaining to be completed, or to students with deficiencies in standing.

6. Students completing their courses for a Bachelor's degree may, if they lack not more than 6 units, register in courses open to graduate students, provided that they keep within an over-all maximum of 18 units. They will receive credit for such courses towards a higher degree only after registering for such degree.

7. Students with Bachelor's degrees who have serious deficiencies in prerequisites for a chosen field of graduate study may be classified as *qualifying* students until such time as they complete sufficient requirements to become eligible to apply for admission to the Faculty of Graduate Studies. Admissions in this category are limited and are not normally granted to holders of bachelor's degrees of other universities.

8. Each student must satisfy the department, inter-departmental, or special committee that will direct his 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 also be determined in the same way.

9. Although application to enter Graduate Studies may be made at any time, most students begin their programme at the beginning of a winter session. The limitation on the number of students that can be accommodated requires that their selection takes place well before the beginning of a winter session. Applicants are advised to write to the Department in which they intend to study to determine the date by which their application must be received.

Courses of Study

1. Students working for a Master's degree are required

(a) to spend at least one winter session at the University 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 academic programme, 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 will not be allowed to come up for final examination in less than two full winter sessions of supervised study after registration as graduate students; those whose duties do not exceed this amount may be permitted to qualify after one winter session (September to May) at the University provided that they complete, before or after the winter session, an additional three to four months of research work fully satisfactory to the department or departments concerned and have received prior approval, through these departments, from the Executive Committee.

3. For certain Master's degrees there are two forms of programme, one requiring a thesis, and the other without thesis requiring additional course work, one or two major essays and a comprehensive examination. The choice of either or both of these programmes lies with the individual departments and faculties. A Master's thesis is lodged in the library; major essays are submitted to the office of the Dean of Graduate Studies.

Programme with Thesis (M.A., M.Ed., M.Sc., M.B.A. and M.F. degrees)

The minimum requirements are:

Thesis	3 to 9 units
Courses numbered 300 or above, including at least 6 units of courses numbered 500 or above	12 to 6 units
Total	15 units

Programme with Comprehensive Examination (M.A., M.Ed., M.Eng., M.Sc., M.B.A. and M.F. degrees)

The minimum requirements are:

Courses numbered 300 or above, including at least 9 units of courses numbered 500 or above	15 units
One or two major essays	
Comprehensive examination	

4. The **M.A.Sc., M.Arch., LL.M., M.Mus., M.S.N. and M.P.E.** programmes will require a thesis counting from 3 to 6 units, and courses numbered 300 or above so that the total number of units, including the thesis, is at least 18 (or the equivalent in the Faculty of Law) with 15 units in departments of the Faculty of Applied Science. The programme will normally include at least 6 units of courses numbered 500 or above. If the degree is to be taken in a single department, 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. 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.

6. A student whose work is considered to be unsatisfactory may be required to withdraw from the Faculty.

7. 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

1. 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 a Master's degree with Thesis 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 Preparation 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 programme will be held at the discretion of the faculty, department or departments concerned. Examinations may be written or oral, or partly written and partly oral.

4. A comprehensive examination is required when candidates for a Master's degree do not present a thesis.

Supplementals

1. In a course in the programme leading to a Master's degree a supplemental may be granted:

(a) if, in the winter session, the student has obtained a final mark of not less than 50 per cent and has obtained at least 9 units of credit in that session; 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 of not less than 50 per cent in the course concerned and has obtained at least 3 units of credit in that session.

2. No candidate will be granted more than one supplemental in respect of the same course; but, with the permission of the Executive Committee the course may be repeated, or a permissible course may be taken in its place.

3. A supplemental must be written at the regular supplemental examination period following the examination in which the candidate failed to obtain adequate standing. (See General Information for details).

Summer Session

Some graduate courses are available in Summer Session. Students should consult the Summer Session Calendar to learn of the offerings which can be included in their graduate programmes.

GRADUATE STUDENT STATUS

1. Full-Time Graduate Student.

A full-time graduate student is one in pursuit of a graduate degree devoting full time to his or her academic programme. This means that the student may not commit more than 12 hours a week of working time, including teaching assistant or research assistant duties, to matters other than the degree programme.

The full-time graduate student will be geographically available to the campus, visit it regularly, and make regular use of the University's resources.

Under special circumstances a full-time student may be required to conduct research at some location away from this campus. With the permission of the Executive of the Faculty of Graduate Studies, up to a year of this research time may be counted as residence.

2. Part-Time Graduate Student

A part-time graduate student does not devote full time to his or her academic programme. This means that more than 12 hours of working time, including teaching assistant or research assistant duties, are committed to matters other than the degree programme. A part-time student may not count the time he or she is registered as part-time to the residence requirements of the degree programme.

3. On-leave Status

On-leave status may be granted with permission of the Executive of the Faculty of Graduate Studies to graduate students who find it necessary to interrupt their graduate studies. A student may be on leave for no more than a year, and the time so spent will not be counted as part of the limited time period allowed for completion of the degree programme. Students on leave will be assessed the continuing registration fee of $150.

4. Faculty as Graduate Students

The Faculty of Graduate Studies does not accept, as graduate students seeking an advanced degree at this University, members of the full-time teaching staff of the University of British Columbia.

REGISTRATION

1. All students admitted to the Faculty of Graduate Studies must normally register in person on the dates specified for such registration and announced by the Office of the Registrar.

2. Graduate students must thereafter maintain continuous registration during 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 absence of five years or more, and taking 6 units or more, are required to have a medical examination completed by their family physician. A medical form is obtainable from the Registrar, and it must be submitted to the Health Service office prior to commencement of lectures.

See General Information for:

(i) fees
(ii) transcript of academic record
(iii) graduation
(iv) student housing

FINANCIAL ASSISTANCE

Requests for financial support should be directed to the specific department in which the student wishes to study.

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 that offer many non-academic advantages to the community of graduate students at the University.

INTERNATIONAL HOUSE

International House is a meeting place for foreign and Canadian students. It has a (non-residential) Programme and Service Centre with a dual purpose. First, it assists foreign students in establishing themselves here and responds to any special needs which may arise during their stay. Secondly, it provides an opportunity for students to develop a varied programme through their own initiative. Lectures, seminars, sports and social gatherings are sponsored by International House, all with the purpose of helping foreign and Canadian students become better acquainted with each other and the Vancouver Community.

Enquiries may be sent to the Director, International House.

AGRICULTURAL ECONOMICS—M.Sc. degree.

Professor and Chairman: G. R. Winter.
Professor: C. Verner (Adult Education).
Associate Professor: M. J. Dorling.
Assistant Professors: P. L. Arcus, J. D. Graham.

Prerequisites for M.Sc.: Honours in Agricultural Economics, Economics, or other relevant discipline; or at least 9 units in Agricultural Economics together with 6 units of Third and Fourth Year work in Economics, Political Science, Geography or related disciplines.

Students wishing to undertake the Ph.D. degree in Agricultural Economics may undertake a thesis programme under supervision of members of the Department of Agricultural Economics but will be required to fulfill the normal requirements for a Ph.D. in Economics (Arts).

Courses and Seminars:

500. (1-3) Graduate Seminar.
501. (3) Advanced Marketing.
502. (3) Agricultural Problems and Policy.
504. (3) Extension Planning and Evaluation.
508. (1½) Advanced Production Analysis.
530. (1-3) Directed Studies.
540. (1½) Agriculture in the Developing Economies.
549. (5-6) Master's Thesis.

AGRICULTURAL ENGINEERING—M.A.Sc. degree.

Professor and Acting Chairman: W. D. Powrie.
Professors: T. Lionel Coulthard, Ernest L. Watson, Leonard M. Staley.
Assistant Professors: N. Ross Bulley, Erling O. Nyborg.
Honorary Lecturer: Mr. V. Raudsepp.

The Master of Applied Science is offered for qualified engineering graduates. Ph.D. programmes can be arranged for suitable candidates in conjunction with some other engineering departments.

The Department has well equipped laboratories for studies in Water Quality and Hydrology; Environmental Control; Physical Rheological and Thermal Properties of Biological Materials; and Food Process Engineering. Basic facilities are also available for Power and Mechanization research programmes.

Research equipment and facilities include: Flame and atomic absorption total organic carbon analyser, 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, metres for measuring conductive, convective and radiant heat transfer, Instron tester, Haake viscometer, microscopes, strain gauge analysers, polariscope, liquid nitrogen freezer, freeze-drier, freezing rooms, differential thermal analyser, driers and heat exchange apparatus, analog computer, and digital data acquisition system. A 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 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.

554. (1½) Instrumentation for Biomaterial Research.
555. (1½) Load Response of Biomaterials.
561. (1) Advanced Drainage.
562. (1) Advanced Irrigation.
563. (1) Quality of Water Supplies.
565. (1) Environmental Control for Food Resource Planning.
566. (1) Design of Food Production Systems.
571. (1) Bio-Machine Systems.
572. (1½) Soil-Machine Systems.
580. (1) Engineering Principles Applied to Food Concentration.
583. (1) Viscious Properties of Foods.
584. (1) Thermal Properties of Plant and Animal Products.
590. (1-2) Waste Treatment in Agricultural and Food Industries.
597. (1-3) Topics in Agricultural Engineering.
598. (1) Seminar.
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, together with satisfactory Agricultural Extension experience.

The programme consists of a three-unit thesis plus six units of course work chosen from Agricultural Sciences and six units of course work chosen from Education 412, 514, 516, 518 and 583.

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 the Department chosen from courses offered in the Third and Fourth Years.

500. (1-3) Graduate Seminar.
501. (3) Advanced Food Mechanics.
530. (3) Directed Studies.
549. (5-6) Master's Thesis.

ANATOMY—Ph.D. and M.Sc. degrees

Professor and Head: Sydney M. Friedman.
Professors: F. D. Garrett, M. J. Hollenberg, J. A. Hinke, W. A. Webber.
Associate Professors: C. L. Friedman, V. Palaty.
Assistant Professors: C. T. Friz, C. E. Slonecker, A. W. Spira.

The Department offers opportunities for advanced study in the classical fields of Anatomy but its major orientation at the present time is in the areas of Ultrastructure and Cellular Biophysics. Special interests include membrane transport processes, the biophysics of striated and vascular smooth muscle, electrochemistry of ion and water distribution in cells and tissues, cytogenetics in amoeba, cellular immunology and ultrastructure of the kidney and of the eye muscle. Facilities include equipment for histological, histochemical and radio-autographic preparative techniques, electromicroscopy, transmission and scanning, β and δ 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.
501. (3) Microscopic Human Anatomy.
502. (4) Microscopic Anatomy.
504. (1) Seminars in Ultrastructure.
505. (3) General Cytological Biophysics.
506. (3) Biophysics of Cell Membranes.
510. (2) Neuroanatomy.
511. (3) Neuroanatomy.
548 (1-3) Directed Studies in Anatomy.
549. (6) M.Sc. Thesis.
649. Ph.D. Thesis.

INSTITUTE OF ANIMAL RESOURCE ECOLOGY

Professor and Director: C. S. Holling (Zoology).

Professors: I. McT. Cowan (Zoology, and Dean of the Faculty of Graduate Studies), I. E. Efford (Zoology), W. S. Hoar (Zoology), J. Kane (Zoology), P. A. Larkin (Zoology), W. G. Wellington (Agricultural Sciences), N. J. Wilimovsky.

Associate Professors: C. Krebs (Zoology), J. D. McPhail (Zoology), T. G. Northcote (Zoology), (Part-time).

Assistant Professors: J. Krebs (Zoology), I. Vertinsky (Commerce), C. S. Walters (Zoology), C. F. Wehrhahn (Zoology).

Instructor: F. L. Bunnell (Forestry).

Research Associates: N. Gilbert, H. B. Messenger, R. Vickson.

Computer Analyst: S. W. Borden.

A student desiring to undertake graduate work in Animal Resource Ecology should discuss his programme with the Director of the Institute.

The Institute of Animal Resource Ecology is a part of the Faculty of Graduate Studies concerned with research and teaching in resource ecology. Its aim is to identify principles of theoretical ecology, applied ecology and population genetics and relate them to specific ecological systems—freshwater and marine communities, mammal, bird, fish and insect populations and human systems. The total programme emphasizes an interaction among field and laboratory experimentation, mathematical modeling, simulation and analysis. New techniques of systems analysis are facilitated through an open-shop ecology computing centre containing an analog and digital computer, optical and graphical displays and automated field and laboratory data acquisition systems. A systems mathematician, computer analyst and programmers are on the Institute's staff.

The Institute's activities have been historically closely tied to those of the Department of Zoology. Now there is increasing interaction with ecologists in Agricultural Sciences, Forestry and Community and Regional Planning. In addition, various other groups share interest in resource science and provide courses that complement the research and teaching programme of the Institute. A resource science workshop encourages interdisciplinary studies involving Institute staff and members of the Faculties of Agricultural Sciences, Commerce and Business Administration, and Forestry, the Departments of Economics, Geography, and the School of Community and Regional Planning.

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.
Zoology 500. Special Advanced Courses.
Zoology 502. (1-3) Advanced Ecology.
Zoology 509. (1½) Population Genetics.
Zoology 527. (3) Theoretical Population Dynamics.

Resource Ecology 500. (3) Resource Science Workshop.—Resource use problems studied comprehensively using computer simulation techniques. Faculty and students from different disciplines act as an interdisciplinary team studying specific resource problems with ecological, economic, demographic, and social dimensions. Techniques and methods of simulation models are emphasized to show their value in integrating knowledge, defining policy, and facilitating communication. No prerequisites required. Mr. Holling.

(II) Specific Areas of Study.

Zoology 517. (2) Principles and Problems of Applied Entomology.
Zoology 520. (3) Limnology.
Zoology 521. (3) Fisheries Biology and Management.
Zoology 522. (2) Limnology Seminar.
Zoology 528. (3) Ichthyology A.
Zoology 529. (3) Ichthyology B.

(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. (Not offered 1972-73.) Mr. Curtis.

Fisheries 501. (1) Hydraulics.—A seminar course designed to acquaint the student with some hydraulic problems related to fisheries conservation. (Not offered 1972-73.) 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. (Not offered 1972-73.) 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. (Not offered 1972-73.) Mr. Scott.

ANIMAL SCIENCE—Ph.D. and M.Sc. degrees

Professor and Chairman: W. D. Kitts.

Professor: J. Hodges.

Associate Professors: R. M. Beames, C. R. Krishnamurti.

Assistant Professors: R. J. Hudson, R. G. Peterson, R. M. Tait.

The Department offers excellent facilities for basic and applied research in the fields of nutrition, physiology, genetics and breeding and management of domestic animals. Newly constructed units for research studies on beef cattle, dairy cattle, sheep, swine and fur-bearing animals (mink and chinchilla) are located on the University campus. Laboratory space and facilities are available for experimentation with the small laboratory animal (rats, mice, guinea pigs and rabbits). The teaching and research laboratories are well equipped. In addition to the regular laboratory apparatus, modern equipment needed for gas-liquid chromatography, paper and thin-layer chromatography, electrophoresis, 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) Quantitative Genetics.
518. (1½) Advances in Animal Physiology I.
520. (1½) Advances in Animal Physiology II.
521. (1½) Advances in Animal Nutrition I.
522. (1½) Advances in Animal Nutrition II.
530. (1-3) Directed Studies.
549. (5-6) Master's Thesis.
649. Ph.D. Thesis.

ANTHROPOLOGY—Ph.D. and M.A. degrees

Professor and Head: (Anthropology and Sociology) Cyril S. Belshaw.

Professors: David F. Aberle, Michael M. Ames, Kenelm O. L. Burridge, Wilson Duff, H. B. Hawthorn, William E. Willmott.

Associate Professors: Braxton Alfred, Audrey Hawthorn, Elli Kongas Maranda, Pierre Maranda, Richard Pearson (Archaeology).

Assistant Professors: Nadia Abu-Zahra, Brenda Beck, Michael J. Egan, Helga Jacobson, J. E. Michael Kew, 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 File. 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, Dr. Helga Jacobson.

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.
525. (3) Semantic Analysis of Myth.
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.

INSTITUTE OF APPLIED MATHEMATICS AND STATISTICS

Acting Director: B. N. Moyls.

At present the members of the Steering Committee of the Institute include: M. S. Bloombaum (Sociology), G. W. Bluman (Mathematics), G. K. C. Clarke (Geophysics), K. Denike (Geography), G. W. Eaton (Agriculture), B. Fraser (Medicine), M. S. Humphries (Psychology), J. Kane (Animal Resource Ecology), J. M. Kennedy (Computer Science), L. G. Mitten (Commerce), D. McKie (Education), L. A. Mysak (Oceanography), K. Nagatani (Economics), S. W. Nash (Mathematics), R. E. Robinson (Philosophy), R. F. Snider (Chemistry), L. de Sobrino (Physics), A. G. Soudack (Electrical Engineering), D. W. Thompson (Chemical Engineering), R. S. Uhler (Social Science Centre), J. Varah (Computer Science), H. Vaughan (Mechanical Engineering), T. Wales (Economics), G. C. Young (Forestry), J. V. Zidek (Mathematics).

The purpose of the Institute of Applied Mathematics and Statistics is to coordinate advanced teaching in statistics and applied mathematics and to promote the growth of interdisciplinary research activities in these fields. The Institute serves as a focus for such activities by providing a well-defined channel for communication between professional applied mathematicians and statisticians on the one hand and research workers in the physical, social, and life sciences on the other. It does this by providing a mechanism that enables mathematicians to obtain ready access to problems in applied mathematics and statistics and also enables non-mathematicians to have the best advice possible in applying mathematical methods to their own research.

The Institute organizes and directs colloquia and special seminars in applied mathematics, statistics and related areas. It sets up interdisciplinary committees for graduate students who wish to pursue advanced degrees of an interdisciplinary nature in Applied Mathematics and Statistics. The Institute will propose new graduate courses in applied mathematics and statistics as the need arises and will eventually offer Master's and Ph.D. programmes in Applied Mathematics and Statistics. The Institute provides consultative assistance to those who use Mathematics or Statistics in their research or who are planning courses in related areas. In particular the Institute operates a Statistical Consulting Laboratory (SCL) directed by Professor S. W. Nash. The services of SCL are available at no cost to faculty and students of UBC.

At present the faculty of the Institute consists of members who also hold appointments in other departments of the university. Eventually the faculty of the Institute may include members who hold appointments wholly within the Institute and temporary members such as visiting professors, research associates and post-doctoral fellows.

The fields of research offered by the Institute include numerical analysis, fluid mechanics (including geophysical fluid dynamics and gas dynamics), wave propagation, asymptotic methods, similarity methods, differential equations, integral equations, elasticity, stochastic processes, control theory and optimization, operations research, statistical mechanics, quantum mechanics, combinatorics, mathematical ecology, statistics, mathematical economics, mathematical psychology and econometrics.

Courses which are expected to form a large part of a graduate student's program in Applied Mathematics and Statistics are divided into three groups as follows:

Group I. Courses in mathematics and mathematical methods. Examples of these would include:

Mathematics 400 (Applied Analysis II)
Mathematics 406 (Introduction to Mathematical Statistics)
Mathematics 420 (Analysis)
Mathematics 518 (Probability)
Mathematics 519 (Statistics)
Mathematics 520 (Numerical Analysis II)
Mathematics 528 (Methods of Applied Mathematics)
Computer Science 402 (Numerical Computation II)
Computer Science 510, 520 (Numerical Methods in Partial Differential Equations I, II)

Group II. Courses of a general nature in which mathematical concepts and techniques common to various disciplines are discussed and applied to specific problems. Examples of these include:

Physics 510 (Stochastic Processes in Physics)
Computer Science 537 (Topics in Coding and Information Theory)
Computer Science 540 (Topics in Applied Combinatorial Analysis)
Commerce 584 (Mathematical Programming)
Philosophy 402 (Symbolic Logic)

Group III. Courses dealing with special topics in areas such as economics, ecology, fluid mechanics, communication theory, control theory, mathematical physics and psychology. Many of these courses may not be of a mathematical nature. In particular for a student with a purely mathematical background some of these courses can serve as his introduction to an area of application.

It is expected that a student associated with the Institute will take a significant number of his courses both from those of the type described in Group I and from those of the type in Groups II and III.

Students interested in the activities of the Institute should write to the Acting Director.

ARCHITECTURE—M.Arch. degree

Professor and Director: Henry Elder.

Professors: Wolfgang Gerson (in charge of Graduate Studies), Abraham Rogatnick, B. Paul Wisnicki.

Associate Professor: Robin P. A. Clarke.

Assistant Professors: Bruno Freschi, Andrew Gruft, Charles A. Tiers, Woodruff W. Wood, 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 twelve full months. In practice however students spend one academic year on course work and in the preparation of their research project, and a further academic year on the completion of the research project. All research will be under the direction of a professor who is a member of the faculty of the School of Architecture.

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.
6. **Industrialization of the Building Process**
   Systems building—the comprehensive approach to large-scale community and institutional problems. Design management — systems research and benefits—the potential for new design solutions and innovations. Roles of the professional designer.

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. It is expected that students who are returning to complete their research project will again participate in this 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
503 (3) History of Architectural Theory and Philosophy
504 (3) The Residential Environment
505 (3) Form and Structure
547 (1-3) Directed Studies
549 (9) Research Project for the Master's Degree

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

Director: Dr. Barrie M. Morrison, Department of Asian Studies.

The Institute of Asian and Slavonic Research is 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 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 is distinct from that of the Departments of Asian Studies and of Slavonic Studies in the Faculty of Arts. Membership in the Institute is 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.

Enquiries should be addressed to the Director of the Institute.

ASIAN STUDIES—Ph.D. and M.A. degrees

Professor and Head: E. G. Pulleyblank.
Professors: F. C. Chang, C.-Y. Chao, W. L. Holland, L. Hurvitz, P. Harnetty.
Associate Professors: J. F. Howes, B M. Morrison, M. Soga, L. Zolbrod.
Assistant Professors: A. N. Aklujkar, R. Goldman, S. Kurl.
Senior Instructor: H. T. Chen.
Instructors: Z. Shirakawa, J. W. Walls.
Lecturers from other Departments: William E. Willmott (Anthropology), Kernial Sandhu (Geography), E. Wickberg (History), B. St. Jacques (Linguistics), A. E. Link, J. I. Richardson (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 125,000 volumes in Chinese and Japanese in addition to substantial holdings in western languages. The library also has a 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 the degrees of Ph.D. and M.A. in Chinese or Japanese in the fields of language, literature, and pre-modern history and the M.A. degree in certain fields of South Asian literature, and in the pre-modern history of India. It also provides language training for those doing graduate work relating to China, Japan, and South Asia 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 Asian Studies normally requires graduation in the Honours programme in Chinese, Japanese, or Indic Languages, or a major in Chinese, Japanese, or Indic Languages 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.

Admission to the Ph.D. programme in Asian Studies (Chinese and Japanese Studies only) normally requires an M.A. in Asian Studies or its equivalent. Candidates for the Ph.D. must have *before admittance* an adequate command of Chinese or Japanese. In the case of Chinese this will normally mean a competent reading knowledge of both modern and classical forms of the language.

Courses and Seminars:

501. (3) Research Methods and Source Material in Chinese Studies.
503. (3) Problems in the History of the Chinese Language.

508. (3) Topics in Pre-Modern Chinese History and Institutions.
513. (3) Topics in Chinese Literature.
521. (3) Research Methods and Source Material in Japanese Studies.
523. (3) Topics in the History and Structure of the Japanese Language.
528. (3) Problems of Japanese Intellectual History.
533. (3) Topics in Japanese Literature.
541. (3) Research Methods and Source Material in Indic Studies.
543. (3) Topics in the History and Structure of Indian Languages.
546. (3) Topics in Indian Literatures.
553. (3) Topics in Early Indian Civilizations.
561. (3) Problems of Modernization in Eastern and Southern Asia.
599. (3-6) Master's Thesis.
699. Ph.D. Thesis. (in Chinese or Japanese Studies only.)

INSTITUTE OF ASTRONOMY AND SPACE SCIENCE

—M.Sc., M.A.Sc., and Ph.D. degrees

Professor and Acting Director: M. H. L. Pryce (Physics).

Professors: A. J. Barnard (Physics), F. K. Bowers (Electrical Engineering), A. M. Crooker (Physics), J. P. Duncan (Mechanical Engineering), H. P. Gush (Physics), E. Leimanis (Mathematics), V. J. Modi (Mechanical Engineering), R. A. Nodwell (Physics), M. W. Ovenden (Geophysics), R. D. Russell (Geophysics).

Associate Professors: B. Ahlborn (Physics), I. Ozier (Physics), W. L. H. Shuter (Physics), G. A. H. Walker (Geophysics), T. Watanabe (Geophysics).

Assistant Professors: J. R. Auman (Geophysics), G. G. Fahlman (Geophysics), J. Meyer (Physics), H. B. Richer (Geophysics).

Research and Graduate studies in Astronomy and Space Science is carried out in several departments of the University of British Columbia. The Institute of Astronomy and Space Science has been formed to coordinate such activities. Applications for admission to graduate studies in these fields may be addressed to the Director of the Institute who will forward them to the appropriate research groups.

At the discretion of the Director of the appropriate observatories, observing privileges may be arranged at the Dominion Astrophysical Observatory, the Dominion Radio Astrophysical Observatory and the Algonquin Park Radio Observatory.

AUDIOLOGY AND SPEECH SCIENCES—M.Sc. degree

Assistant Professor and Head: J. H. V. Gilbert.

Assistant Professors: A.-P. Benguerel, J. B. Delack, J. D. Edwards.

Clinical Assistant Professor: J. O. Hastings.

Clinical Instructors: K. Deshpande, D. Johnson, C. N. S. Jones, G. M. Muller, M. Waldman, V. Rothstein, P. Seymour, M. Young.

Lecturers from other Departments: R. P. Gannon (Surgery, Division of Otolaryngology), J. Wada (Neurological Sciences, Psychiatry).

The Division of Audiology and Speech Sciences, offers a Master of Science degree with opportunities for research and/or clinical experience.

The Division does not offer the Ph.D. degree; however, it is possible for selected students to pursue a "field of studies" Ph.D. degree.

A maximum of seven students are accepted each year. In addition to the Faculty of Graduate Studies requirements, students entering the Division should have an Honours or First Class degree in one of the following three fields: Science, Psychology or Linguistics, with introductory level background in the other two fields. Students are expected to have had at least first year university calculus and physics, or the equivalent. All prospective students are required to take the Graduate Record Examination before they are accepted.

During the first year of the 2-year programme, all students follow the core curriculum of the Division. During the summer between first and second year, those students who elect a clinical option must complete four months of continuous supervised internship at appropriate institutions in Vancouver. Towards the completion of their clinical internship, students are examined in problem-solving situations by their clinical instructors. This is followed by an oral examination given by the same instructors.

In addition, Psychiatry 510/511 (Neuroanatomy) are required courses in the first year of studies.

Where appropriate, prospective candidates may apply for Medical Research Council Studentships.

Paediatrics

500. (2) Acoustic Phonetics.
501. (2) Instrumental Phonetics.
502. (2) Mechanisms of the Auditory System.
503. (2) Perceptual Acoustics.
504. (3) Developmental Phonology.
505. (3) Acquisition of Language.
506. (2) Speech Perception.
507. (3) Neurological Aspects of Language.
546. (1-3) Seminar in Problems of Audiology and Speech Sciences.
547. (1½-3) Directed Reading and Conference.
548. (1) Departmental Seminar.
549. (3-6) M.Sc. 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, Michael Smith, Gordon M. Tener, Sidney H. Zbarsky.

Associate Professors: Albert F. Burton, James F. Richards.

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 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) Biochemical Methods.
501. (1-3) Advanced Biochemistry Laboratory.
502. (1½) The Biochemical Function of Proteins.
503. (1½) Biochemistry of Nucleic Acids.
504. (1½) Biochemistry of Amino Acids and Proteins.
505. (1½) Biochemistry of Carbohydrates.
506. (1½) Biochemistry of Lipids.
507. (1½) Biochemistry of Steroids and Hormones.
530. (1) Seminar in Biochemistry.
548. (1-3) Directed Studies.
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. Inquiries may be directed to the Chairman, Room 2340, Biological Sciences Building, but 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.
504. (1½) Principles and Techniques in Electron Microscopy II.
505. (3) Comparative Biology.
506. (1½) Principles of Radiotracer Methodology in Biological Research.
507. (1½) Biological Applications of Radiotracers.
508. (3) Current Topics in Genetics.
509. (3) Advanced Biometrics.
548. (1-3) Advanced Topics in Biology.
549. (6) Master's Thesis.

BOTANY—Ph.D. and M.Sc. degrees

Professor and Head: R. F. Scagel.

Professors: R. J. Bandoni, Kathleen M. Cole, V. J. Krajina, C. O. Person, G. E. Rouse, W. B. Schofield, Janet R. Stein, R. L. Taylor, G. H. N. Towers.

Associate Professors: Katherine I. Beamish, T. Bisalpultra, B. A. Bohm, G. C. Hughes, F. J. R. Taylor, I. E. P. Taylor, E. B. Tregunna.
Assistant Professors: C. E. Beil, R. E. Foreman, Beverley R. Green, J. R. Maze.

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.
504. (3) Taxonomy of Vascular Plants.
505. (2) Cytogenetics of Natural Populations.
510. (3) Marine Phycology.
511. (3) Freshwater Phycology.
512. (2) Practical Marine Phytoplankton Study.
513. (2) Cytology of Marine Algae.
515. (3) Advanced Mycology.
520. (3) Phytogeography.
525. (3) Advanced Plant Autecology.
526. (3) Advanced Plant Synecology.
528. (1½) Current Topics in Plant Biochemistry.
529. (1½) Chemical Plant Taxonomy.
530. (3) Advanced Plant Physiology I.
531. (3) Advanced Plant Physiology II.
540. (3) Advanced Palaeobotany and Palynology.
541. (3) Structure and Development of Pteridophytes and Gymnosperms.
542. (3) Structure and Development of Angiosperms.
543. (3) Recent Advances in the Biology of Plant Cells.
546. (1-3) Advanced Topics in Botany.
549. (3-6) Master's Thesis.
649. Ph.D. Thesis.

CHEMICAL ENGINEERING—Ph.D., M.A.Sc. and M.Eng. degrees.

Professor and Head: F. E. Murray.
Professors: S. D. Cavers, N. Epstein, J. S. Forsyth, K. L. Pinder.
Associate Professors: R. M. R. Branion, J. Lielmezs, K. B. Mathur, D. W. Thompson.
Assistant Professors: A. Meisen, A. P. Watkinson.

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;
(e) Pollution control studies.

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 or Mineral Engineering.

Course—Must include Chemical Engineering 598, and at least 6 units chosen from graduate courses in the Department, and 3 units of approved courses outside the Department, to a minimum of 9 units. Thesis 6 units.

M.Eng. Degree:

Offered primarily for candidates who have a minimum of two years work experience after obtaining their B.A.Sc. degree. Under special circumstances students with less than two years work experience may be accepted.

Prerequisites: Graduation or equivalent in Chemical Engineering, or graduation in Agricultural Engineering, Mechanical Engineering, Metallurgical Engineering or Mineral Engineering.

Course: Must include Chemical Engineering 598 and at least 6 units chosen from other graduate courses within the Department, a minimum of 3 units of approved courses outside the Department, and an additional 6 units of approved courses chosen from those offered within or outside the Department. An essay of at least 3000 words.

550. (1-2) Industrial Kinetics and Catalysis.
551. (1-2) Chemical Engineering Thermodynamics.
552. (1-2) Optimization Methods.
553. (1-2) Mathematical Operations in Chemical Engineering.
554. (1-2) Momentum, Heat and Mass Transfer.
555. (1-2) Solvent Extraction and Gas Absorption.
556. (1-2) Distillation.
557. (1-3) Fluid and Particle Dynamics.
558. (1-2) Process Heat Transfer.
559. (1-3) Topics in Chemical Engineering.
560. (1-3) Biochemical Engineering.
570. (1-3) Advanced Paper Technology.
571. (1-3) Non-Newtonian Fluid Behaviour.
572. (1-3) Water Pollution Control.
573. (1-2) Less Common Separation Methods.
574. (1-2) Equilibrium Properties of Non-Ideal Mixtures.
575. (2) Air Pollution Control.
598. Seminar.
599. (6) Thesis.—For M.A.Sc. degree.
699. Thesis.—For Ph.D. degree.

CHEMISTRY—Ph.D. and M.Sc. degrees

Professor and Head: C. A. McDowell.
Professors: A. Bree, B. A. Dunell, W. R. Cullen, G. G. S. Dutton, J. B. Farmer, D. C. Frost, L. G. Harrison, L. D. Hayward, J. G. Hooley, J. P. Kutney, D. G. L. James, W. C. Lin, E. A. Ogryzlo, N. L. Paddock, R. E. Pincock, G. B. Porter, C. Reid, A. Rosenthal, R. F. Snider, R. Stewart, J. Trotter.
Associate Professors: F. Aubke, N. Basco, C. E. Brion, D. P. Chong, J. A. R. Coope, L. D. Hall, B. R. James, D. E. McGreer, A. J. Merer, T. Money, E. Piers, J. R. Sams, R. C. Thompson, D. C. Walker.
Assistant Professors: M. C. L. Gerry, F. G. Herring, P. Legzdins, A. G. Marshall, K. A. R. Mitchell, L. J. Muenster, J. R. Scheffer, B. Shizgal, R. D. Spratley, A. Storr, 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 magnetic radioactive counters, automatic X-ray diffraction equipment, analytical and preparative gas chromatographs, magnetic balances; high-energy electron accelerator, a Gammacell 220, a helium liquefier, U.V. Photoelectron and ESCA Spectrometers. Facilities for mycochemistry, phytochemistry, and biogenetic studies are available. There are excellent mechanical, electronics, and glass-blowing 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; Non Aqueous Solution Chemistry; Inorganic Ring Systems; Organic Photochemistry; Chemical Cryogenics; Structural Inorganic Chemistry; Chemical Physics.

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.
509. (1) Electron and Photon Impact Spectroscopy.
510. (1) Magnetic Resonance.
512. (1) Colloid Chemistry.
513. (1) Chemical Thermodynamics.
514. (1) Radiation Chemistry.
517. (2) Topics in Inorganic Chemistry.
518. (1) Advanced Inorganic Chemistry.
519. (1) Nuclear Chemistry.
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., M.A.Sc., and M.Eng.

Professor and Head: S. L. Lipson.

Professors: S. Cherry, W. D. Finn, S. H. deJong, R. F. Hooley, E. Ruus.

Associate Professors: J. D. Anderson, H. R. Bell, R. G. Campanella, B. Madsen, N. D. Nathan, M. C. Quick.

Assistant Professors: D. L. Anderson, A. H. Benedict, G. R. Brown, P. M. Byrne, R. D. Cameron, S. Mindess, W. K. Oldham, M. D. Olson, S. O. Russell, R. A. Spencer.

M.A.Sc. and M.Eng. degrees:

Prerequisite: Graduation in 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.
501. (1) Applications of Matrix Structural Analysis.
503. (1) Special Advanced Topics in Structural Theory.
505. (1) Numerical Procedures in Structural Analysis.
507. (1) Dynamics of Structures I.
508. (1) Dynamics of Structures II.
510. (1½) Inelastic Bending and Limit Design I.
511. (1½) Inelastic Bending and Limit Design II.
513. (1) Advanced Reinforced Concrete Design I.
514. (1) Advanced Reinforced Concrete Design II.
515. (1) Prestressed Concrete.
519. (1) Earthquake Resistant Design of Structures.
521. (1½) Optimization of Engineering Design.
529. (1½) Advanced Strength of Materials.
531. (1½) Theory of Plates.
532. (1½) Theory of Shells.
533. (1) Energy Theorems of Structural Mechanics.
535. (1½) Visco-elasticity and Plasticity.
537. (1) Finite Elements.
540. (1) Advanced Fluid Mechanics I.
541. (1) Advanced Fluid Mechanics II.
542. (1) Unsteady Flow in Closed Conduits I.
543. (1) Unsteady Flow in Closed Conduits II.
544. (1) Steady Flow in Open Channels.
545. (1) Unsteady Flow in Open Channels.
546. (1) Rivers and Canals.
547. (1) Harbour and Coastal Engineering.
548. (1) Governing of Hydraulic Turbines.
551. (1) Hydrology II.
554. (1) Water Resource Development I.
555. (1) Water Resource Development II.
558. (1) Water Resource Development Seminar.
560. (1) Sanitary Engineering Design.
562. (1½) Sanitary Engineering Laboratory.
563. (1½) Unit Operations & Unit Processes in Sanitary Engineering.
564. (1) Engineering Management of Solid Wastes.
565. (1) Water Supply Engineering.
567. (1) Water Pollution Control Engineering I.
568. (1) Water Pollution Control Engineering II.
569. (1½) Advanced Studies of Waste Treatment.
570. (1½) Soil Mechanics I.
571. (1) Soil Mechanics II.
572. (1½) Applications of Physical-Chemical Principles to Clay Behaviour in Soil Engineering.
573. (1) Numerical Methods in Soil Mechanics.
574. (1½) Experimental Soil Mechanics.
576. (1½) Civil Engineering Uses of Aerial Photographs.
578. (1) Principles of Pavement Design.
580. (1) Advanced Topics in Soil Mechanics.
582. (1) Structure of Hardened Cement Paste.
583. (1) Experimental Cement Technology.
585. (1) Traffic Engineering and Design.
586. (1½) Urban Transportation System Analysis.
587. (1½) Transit Operations Engineering.
588. (1) Transit Design Engineering.
590. (1-3) Topics in Geodesy.
592. (1-3) Topics of Photogrammetry.
598. (½-3) Topics in Civil Engineering.
599. (3-6) Thesis.—For the M.A.Sc. degree.
699. Thesis.—For the Ph.D. degree.

CLASSICS—Ph.D. and M.A. degrees

Professor and Head: Malcolm F. McGregor.

Associate Professors: H. G. Edinger, James Russell.

Assistant Professors: A. A. Barrett, E. A. E. Bongie, W. J. Dusing, P. E. Harding, Gerald N. Sandy, Robert B. Todd, E. H. Williams.

Instructor: K. Ann McCallum.

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) Studies in Greek Literature.
525. (3) Seminar in Greek Literature.
530. (3) Studies in Greek Archaeology.
535. (3) Seminar in Greek History.
540. (3) Seminar in Greek Palaeography.
545. (3) Seminar in Greek Epigraphy.
549. (3-6) Master's Thesis.
649. Ph.D. Thesis.

Latin

521. (3) Studies in Latin Literature.
525. (3) Seminar in Latin Literature.
530. (3) Studies in Roman Archaeology.
535. (3) Seminar in Roman History.
540. (3) Seminar in Latin Palaeography.
545. (3) Seminar in Latin Epigraphy.
549. (3-6) Master's Thesis.
649. Ph.D. Thesis.

COMMERCE AND BUSINESS ADMINISTRATION

—Ph.D., M.B.A. and M.Sc. (Bus. Admin.) degrees

Dean of the Faculty: Philip H. White.

Assistant Dean of the Faculty: Colin C. Gourlay.

Professors: A. Beedle, L. L. Cummings, D. B. Fields, H. E. Gray, N. A. Hall, R. R. Loffmark, P. A. Lusztig, K. R. MacCrimmon, J. C. T. Mao, R. V. Mattessich, C. L. Mitchell, L. G. Mitten, R. U. Ratcliff, K. M. Ruppenthal, C. Sarndal, D. L. Weiss.

Associate Professors: E. Blaine, B. E. Burke, G. A. Feltham, J. D. Forbes, T. D. Heaver, R. H. Heywood, R. F. Kelly, V. F. Mitchell, L. F. Moore, S. M. Oberg, R. W. Pollay, B. Schwab, J. W. C. Tomlinson, J. B. Warren, H. C. Wilkinson.

Assistant Professors: M. E. Ace, R. T. Barth, M. J. Brennan, F. J. Brooks-Hill, S. L. Brumelle, J. E. Butterworth, A. S. Dexter, G. M. Dickinson, J. L. Evans, B. C. Fauman, R. Gayton, L. L. George, M. A. Goldberg, G. Gorelik, R. W. Grayston, S. W. Hamilton, P. A. Laurence, C. A. Prentice, J. B. Sidney, F. H. Siller, W. T. Stanbury, W. J. Swanson, C. Swoveland, R. N. Taylor, I. Tepper, M. Thompson, P. Z. W. Tsong, D. Uyeno, I. Vertinsky, G. A. Walter, W. G. Waters II, J. K. Welsby, H. J. Will, W. Winiata, W. F. J. Wood, W. T. Ziemba.

Lecturers: I. Davis, H. L. Purdy, P. D. Watts.

Ph.D. degree

At the present time doctoral candidates will be accepted for programmes with specialization in the fields of Accounting, Finance, Marketing, Management Science and Organizational Behaviour, as broadly defined. Other fields of Business Administration are available by registration as an Interdisciplinary candidate in the Faculty of Graduate Studies, an arrangement which facilitates the crossing of departmental and faculty boundaries in defininig the area of study. In such cases, the Doctoral 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 an oral examination in defense of this thesis proposal.

M.Sc. Degree (Bus. Admin.)

Applicants are required to meet existing entrance requirements of the Faculty of Graduate Studies.

The maximum number of units to be required of a particular student will depend on his undergraduate background and personal career objectives and will be determined at the time of his initial enrolment subject to approval by the Director of Graduate Studies of the Faculty of Commerce. A student may be required to complete up to 18 units of preparatory work in order to make up deficiencies in the educational background requirements appropriate to his particular programme objective.

The minimum requirements will be established by the Faculty of Graduate Studies. That is, the alternative will be provided for either a programme with thesis or a programme without thesis but with a comprehensive examination. There will be no common curriculum or core of courses required of all students enrolled in the M.Sc. degree programme, although students pursuing similar career objectives no doubt will find themselves channeled into many of the same courses. However, each student's programme will be developed by his advisor from the resources of the University community so as to best prepare him for his particular career objective.

The M.Sc. degree is designed for graduate students who wish to prepare for specialized careers in the performance of technical and analytical functions or in the administration and management of non-profit organizations. It is expected that students undertaking this degree will have one of the following objectives: (1) to prepare in some depth for specialized functions of an analytical nature such as urban land economics or management science or (2) to prepare somewhat broadly for careers with organizational management responsibilities, such as the administration of engineering activities or health care organizations.

M.B.A. degree

A student with a Bachelor's degree other than Commerce normally will be required to complete up to 15 units to qualify for admission to the Second Year of the programme. Additional preparation work may be required if, in the opinion of the Admission Committee, such additional work appears justified.

A student with a Bachelor's degree in Commerce or Business Administration may be admitted directly into the second year of the M.B.A. programme. The Admissions Committee will assess the undergraduate background of each applicant and may require that additional preparatory work be done.

Students may be permitted to make up deficiencies and to proceed concurrently in the second year course provided that they keep within an overall maximum of 18 units in any one winter session. They will receive credit for such courses only if they become candidates for the Master's degree.

The student with the approval of his advisor 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 9 units of 500-level courses in Commerce. Up to 3 units of 300- or 400-level courses may be taken.

Students in the thesis programme will register in Commerce 549. An oral examination on the field of the thesis normally will be taken after the course work on the Master's year has been completed.

Students in the non-thesis programme will be required to submit a major essay 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.

It should be noted that in the second year the student is permitted to take up to 6 units of courses outside the Faculty of Commerce and Business Administration although he is not required to do so. However, all M.B.A. students are required to include Commerce 591 (1½ units) and Commerce 592 (1½ units) in the 15-unit second year programme, and must take an additional 7½ units outside the chosen field of specialization, thus limiting courses taken in the special field to 4½ units.

First Year

313. (1) Quantitative Methods-Analysis.
314. (1) Quantitative Methods-Probability.
315. (1½) Quantitative Methods-Statistics.
316. (1) Quantitative Methods—Algebra.
323. (1½) Introduction to Administrative Studies.
352. (3) Managerial Accounting.
361. (1½) Merchandising and Distribution.
373. (1½) Business Finance.

Students are also required to complete the following Economics courses:

301. (1½) Intermediate Microeconomic Theory.
302. (1½) Intermediate Macroeconomic Theory.

In addition to the above required fields, the following two courses may, at the student's option, be taken in the graduate programme:

317. (1½) Introduction to Data Processing.
342. (1½) Transportation Policy.

An undergraduate degree in business administration (B.Com.) or its equivalent normally provides appropriate background in many of these fields.

Courses

Urban Land Economics:

507. (1½) Seminar in Contemporary Land Investment Problems.
508. (1½) Seminar in Government Policy in Relation to Urban Land Ownership.
509. (1½) Seminar in Mortgage Financing.
510. (1½) Economics of Location.

Organizational Behaviour and Labour Relations:

520. (1½) Organizational Behaviour and Administration.
521. (1½) Theory, Research and Methodology in the Study of Organization Behaviour.
522. (1½) Selected Problems in Labour Relations.

523. (1½) Seminar in Labour Relations.
524. (1½) Organization Development.
525. (1½) The Measurement and Evaluation of Individual Behaviour in Work Organizations.
625. (1½) Seminar of Organization Behaviour.
626. (1½) Seminar in Manpower Management.
628. (1½) Organizational Behaviour Research Seminar.

Transportation:

544. (1½) Seminar in Transportation.
545. (1½) Seminar in Transportation Economics.

Accounting and Management Information Systems:

551. (1½-3) Advanced Accounting Seminar.
552. (1½) Seminar in Income Determination.
553. (1½) Seminar in Accounting Standards.
554. (1½) Seminar in the Management of Information Systems.
555. (1½) Seminar in Computerized Information Systems.
556. (1½) Seminar in Advanced Managerial Accounting.
557. (1½) Seminar in Taxation.
651. (1½) Seminar in Advanced Accounting and Information Systems.
658. (1½) Research Seminar in Accounting and Information Systems.
659. (1½) Directed Studies in Accounting and Information Systems.

Marketing:

562. (1½) Marketing Strategy.
563. (1½) Marketing Planning.
564. (1½) Seminar in Market Analysis.
566. (1½) Seminar in International Marketing.
568. (1½) Seminar in International Business.
660. (1½) Research Seminar in Marketing.
661. (1½) Seminar in Marketing Systems.
662. (1½) Seminar in Buyer Behaviour.

Finance and Investments:

571. (1½) Seminar in Optimal Financing Decisions.
572. (1½) Seminar in Financial Management.
574. (1½) Seminar in Security Analysis.
575. (1½) Seminar in Investment Management.
576. (1½) Seminar in Financial Institutions.
577. (1½) Seminar in International Finance.
579. (1½) Seminar in Insurance and Risk Management.
671. (3) Advanced Topics in Finance.
672. (1½) Research Seminar in Finance.

Production:

580. (1½) Seminar in Production.

Management Science:

581. (1½-3) Seminar in Business Applications of Management Science.
582. (1½-3) Computer Application in Management Science.
583. (1½-3) Statistical Methodology.
584. (1½-3) Mathematical Programming.
585. (1½-3) Applied Stochastic Processes.
681. (1½) Seminar on Theoretical Development in Management Science.
682. (1½) Seminar in Optimization Methods.

Policy and Administration:

591. (1½) Seminar in Business Policy.
592. (1) Seminar in Business Administration.

Research:

549. (3) Master's Thesis.
590. (1½-3) Research in Business Administration.
593. (1½) Seminar in Research Methodology (of Business Administration.)
595. (1½-3) Seminar on Computer Applications in Business.
596. (1½) Managerial Decision-Making.
649. Ph.D. Thesis.

THE SCHOOL OF COMMUNITY AND REGIONAL PLANNING

(See separate section of Calendar following Faculty of Graduate Studies)

COMPARATIVE LITERATURE

Chairman of the Programme: Professor Z. Folejewski, Department of Slavonic Studies.

Lecturers: D. Baudouin (French), J. Bryans (Spanish), M. H. Bullock (Creative Writing), A. Busza (English), C. Chiarenza (Italian), B. Czaykowski (Slavonic Studies), M. Goetz Stankiewicz (German), G. Good (English), F. J. Grover (French), H. C. Knutson (French), M. A. Manzalaoui (English), P. Merivale (English), A. Pacheo (Spanish), F. B. St. Clair, (French), D. E. Soule (Theatre), G. R. Tougas (French), L. M. Zolbrod (Asian Studies).

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 at 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 the language).

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 registered as M.A. candidates in Comparative Literature may be admitted to these courses with the permission of the instructor.

500. (3) Introduction to Comparative Literature.
501. (1½-3) Studies in Genre.
502. (1½-3) Studies in Literary Movements and Periods.
503. (1½-3) Studies in Myth, Theme and Tradition.
504. (1½-3) Topics in Comparative Literature.
505. (1½-3) New Problems in Comparative Literature.
506. (1½-3) Comparative Studies in Oriental and Occidental Literatures.
547. (3-6) Reading Course.
549. (3-6) Master's thesis.

Creative Writing 515; English 507 and 512; French 502, 511, 512, 514; German 507; Russian 540; Slavonic Studies 542; Spanish 502 and 506; and Theatre 510 and may be accepted as equivalent to seminars in Comparative Literature.

COMPUTER SCIENCE—Ph.D., M.Sc. degrees.

Professor and Head: John E. L. Peck.

Professor: James M. Kennedy.

Associate Professors: J. R. H. Dempster, J. M. Varah.

Assistant Professors: W. J. Hansen, G. D. Johnson, A. A. Mowshowitz, F. Nake, J. L. Parker, R. Reiter, R. S. Rosenberg, H. Scheidig, D. A. R. Seeley.

Lecturers from other Departments: W. Dettwiler (Computing Centre), A. G. Fowler (Computing Centre), Z. A. Melzak (Mathematics), G. F. Schrack (Electrical Engineering).

The Department, founded in 1968, offers opportunities for advanced study leading to the M.Sc. and Ph.D. degrees. Fields of study include Programming Languages, Artificial Intelligence, 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 duplex system with a full range of terminal facilities.

Detailed information on programme requirements, 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. (1½) Theory of Automata I.
502. (1½) Artificial Intelligence I.
503. (1½) Computational Linguistics I.
504. (1½) Information Retrieval.
505. (1½) Simulation Methods.
506. (1½) Graphic Data Processing.
507. (1½) Information Theory.
508. (1½) Computer Systems.
509. (1½) Advanced Programming Language I.

510. (1½) Numerical Methods in Partial Differential Equations I.
520. (1½) Numerical Methods in Partial Differential Equations II.
521. (1½) Theory of Automata II.
522. (1½) Artificial Intelligence II.
523. (1½) Computational Linguistics II.
527. (1½) Coding Theory.
529. (1½) Advanced Programming Languages II.
530. (1-3) Topics in Information Processing.
531. (1-3) Topics in the Theory of Automata.
532. (1-3) Topics in Artificial Intelligence.
534. (1-3) Topics in Information Retrieval.
535. (1-3) Topics in Simulation.
537. (1-3) Topics in Coding and Information Theory.
538. (1-3) Topics in Computer Systems.
540. (1-3) Topics in Applied Combinatorial Analysis.
542. (1-3) Topics in Numerical Computation.
549. (3-6) Master's Thesis.
649. Ph.D. Thesis.

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 Professors: Michael Bullock, George McWhirter.

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*.

A detailed brochure is available on application to the Department.

506. (3) Advanced Writing for Radio, Screen and Television.
507. (3) Advanced Writing of Drama for the Stage.
509. (3) Advanced Writing of Fiction.
510. (3) Advanced Writing of Poetry.
515. (3) Advanced Workshop in Translation.
547. (1-4) Directed Reading.

549. (3) Thesis.—The thesis will consist of a substantial amount of poetry, fiction, drama, translation, or work in radio, screen, television (scripts, tapes, etc.). In some instances the Department will accept a combination of writings from two or more of these genres. Playwrights in the Creative Writing—Theatre M.A. are required to write and to help stage the equivalent of a full-length play. Students proficient in a second language may fulfil 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.

ECONOMICS—Ph.D. and M.A. degrees

Professor and Head: A. Milton Moore.

Professors: G. C. Archibald, R. M. Clark, J. G. Cragg, J. F. Helliwell, S. M. Jamieson, P. H. Pearse, G. Rosenbluth, A. D. Scott, R. A. Shearer, R. M. Will, J. H. Young.

Associate Professors: P. G. Bradley, W. E. Diewert, G. B. Hainsworth, S. P. S. Ho, G. R. Munro, K. Nagatani, P. A. Neher, R. S. Uhler.

Assistant Professors: J. Borcich, J. D. Boyd, C. Clark, H. C. Davis, D. J. Donaldson, B. C. Eaton, R. G. Evans, D. J. Ford, C. K. Harley, R. W. Huenemann, M. G. Kelly, H. V. Lewis, D. Orr, J. D. Rae, R. D. Swidinsky, W. G. Waters, A. D. Woodland.

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 forty members, 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, international trade and finance, 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 Relations, the University Computing Centre, and the Statistical Centre for the Social Sciences. The Computing Centre has an IBM 7040 computer and 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 are not offered every year. A listing and description of the courses offered this year are contained in a detailed brochure available on application to the Department.

500. (1½) Micro-Economics I.
501. (1½) Micro-Economics II.
502. (1½) Macro-Economics.
503. (1½) Economic Fluctuations and Growth.
519. (3) History of Economic Analysis.
520. (1½) Mathematical Economics I.
521. (1½) Mathematical Economics II.
525. (3) Applied Statistics and Econometrics.
530. (3) Economic History.
540. (3) Economic Development.
545. (3) Money and Banking.
550. (1½) Government Finance: Expenditures.
551. (1½) Government Finance: Revenues.
555. (1½) International Economics I.
556. (1½) International Economics II.
560. (1½) Economics of Labour.
561. (1½) Topics in Industrial Relations.
565. (1½) Market Structure and Business Behaviour.
566. (1½) Business Performance and Public Policy.
570. (3) Economic Analysis and Natural Resources.
590. (1-3) Special Advanced Course.
592. (1-3) Directed Reading.
594. (3) Research Seminar.
599. (3-6) Master's Thesis.
615. (1½) Special Topics in Economic Theory.
629. (3) Advanced Econometrics.
641. (1½) Problems and Policies in Economic Development.
642. (1½) Workshop in Economic Development and Planning.
645. (3) Banking Processes and Policies.
652. (1½) The Economics of Federation.
653. (1½) The Economics of Income Security.
654. (1½) Current Issues in Public Finance.
655. (1½) Topics in International Economics.
660. (1½) Topics in the Economics of Labour.
661. (1½) Topics in Industrial Relations.
670. (1½-3) Workshop in Natural Resource Economics.
699. Ph.D. Thesis.

EDUCATION—Ed.D., M.Ed. and M.A. degrees

Professor and Dean of Faculty: Neville V. Scarfe.
Professor and Associate Dean: E. D. MacPherson.
Professor and Director of Graduate Studies: G. M. Chronister.

Professors: K. F. Argue, W. H. Auld, S. Black, C. J. Brauner, F. L. Brissey, G. H. Cannon, A. E. Clingman, H. M. Covell, C. G. David, W. J. Hartrick, R. J. Hills, F. H. Johnson (Director of Elementary Division), R. G. Jones, J. Katz, D. Kendall, N. Law, R. McConnell, J. McGechaen, J. R. McIntosh (Director of Secondary Division), T. D. M. McKie, L. C. Marsh, M. B. Nevison, E. G. Ozard, L. H. Slind, D. C. Smith, G. Smith, R. N. Smith, E. G. Summers, G. S. Tomkins, C. Verner.

Associate Professors: C. J. Anastasiou, S. S. Blank, W. Boldt, J. Calam, P. R. Campbell, B. R. Clarke, J. R. Coombs, J. D. Dennison, J. D. Friesen, F. Gamble, R. F. Gray, I. Housego, T. A. Howitz, S. S. Lee, V. A. MacKay, J. R. Mitchell (Director of Student Teaching) B. C. Munro, J. A. Niemi, M. T. Niemi, O. A. Oldridge, R. L. R. Overing, W. Schwahn, J. N. Sutherland, D. C. Thomas, C. G. Trowsdale, H. A. Wallin, L. Walters, N. Watt, T. Westermark, B. R. Whitinger.

Assistant Professors: D. E. Allison, D. A. Bain, J. L. Conry, J. Dahlie, L. B. Daniels, W. L. Davis, G. D. Day, E. G. Fiedler, S. Foster, W. Gray III, P. Koopman, R. Leduc, S. E. Marks, P. Montgomery, A. More, J. S. Murray, D. C. Rodgers, I. R. Shaw, J. Sherrill, K. Slade, G. J. Spitler, W. Szetela, G. Walsh.

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 reports on his progress. All changes in programmes must receive approval by the adviser and be reported to the office of the Graduate Division.

Requirements for Admission and Regulations governing the Ed.D., degree are found under "Admission".

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, including at least 6 units of first class work. 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.

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 approved 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.Ed. degree

The M.Ed. degree makes provision for a more general study, at an advanced level, of several fields. A minimum of 15 units of which 9 must be 500 level courses or above, one or more major essays and a comprehensive examination 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.

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, of the Faculty of Education, 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 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-four areas of study or "departments". An applicant for a master's degree must select an appropriate department to supervise his programme. Individual courses 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 extra-sessional 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 & Counselling (M.A. only)
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

N.B.: All Graduate Programmes are not necessarily offered in a given year.

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. (1½) Fundamentals of Human Learning and Motivation.
502. (1½) Verbal Learning and Instruction.
503. (1½) Conceptual Learning and Instruction.
504. (1½) Special Topics in Human Learning and Instruction.
507. (1½) History of Special Education.
508. (3 or 6) Review of Research in Methods of Teaching Specific School Subjects.
509. (1½) Organization of Special Education.
510. (3) The Development of Science Curriculum Materials.
511. (3) Seminar in Science Education.
513. (1½) Advanced Seminar in Mental Retardation.
514. (3) Foundations of Adult Education.
516. (3) Mass Media and Adult Education.
517. (3) Health Education in Schools.
518. (3) Methods of Adult Education.
519. (3) History of Canadian Education.
521. (1½-3) Advanced Seminar in Philosophy of Education.

522. (3) The Logic of Teaching.
523. (3) Comparative Education.
524. (3) Advanced Seminar in Comparative Education.
525. (3) Social History of American Education.
527. (3) Seminar in Library Education.
528. (1½) Basic Principles of Measurement.
529. (1½) Test Construction.
531. (1½) The Interview and Non-Standardized Measures in Guidance Services.
532. (1½-3) Tests in Pupil Personnel Services.
533. (1½) Psychology of Handicapped Children.
536. (3) Individual Tests.
538. (3) Communications Theory.
539. (3) Educational Television.
540. (3) Design of Instructional Media Systems.
541. (3) Theory and Principles of Art Education.
542. (3) Theory and Principles of Music Education.
543. (3) Historical Aspects of Speech Communication.
545. (1½) Foundations of Mathematics Education.
546. (1½) Measurement and Evaluation in Mathematics Education.
547. (1½) Mathematics in the Elementary School.
548. (1½) Mathematics in the Secondary School.
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.
560. (1½) School Law.
561. (1½-3) Laboratory Practicum.
562. (1½) Curriculum Organization in the Elementary School.
563. (1½) Curriculum Organization in the Secondary School.
564. (3) Research Problems in Curriculum Organization.
565. (3) Special Course in Subject Matter field.
566. (3) Principles of Secondary Education.
567. (3) Problems in Elementary Education.
568. (1½) Special Education of the Orthopaedically and Neurologically Handicapped.
569. (3) The Regional, Junior or Community College.
570. (3) Advanced Seminar in Educational Sociology.
571. (3) Advanced Seminar in Educational Psychology.
572. (3) Advanced Seminar in Curriculum Organization.
573. (3) Advanced Seminar on Exceptional Children.
574. (3) Supervision of Reading.
575. (1½) Classical Theories of Education.
576. (3) Advanced Seminar in the Supervision of Instruction.
577. (1½) Pragmatism and Education.
578. (1½) Counseling Theory and Procedures I.
579. (3) Research on Guidance Services.
580. (1½-6) Problems in Education.
581. (1½) Special Topics in Research Design and Analysis.
583. (3) Advanced Seminar in Adult Education.
584. (3) Human Development: Self Process in Education.
585. (3) Advanced Seminar in Research on Young Children.
586. (1½) Philosophy and Educational Policy.
587. (1½) Social Philosophies and Education.
588. (1½) Existentialism and Education.
589. (3) Theories and Models of Education as a Discipline.
590. (3) Current Developments in Higher Education.
591. (1½-3) Epistemological Foundations of the Curriculum.
592. (1½) Design and Analysis in Educational Research I.
593. (1½-3) Ethical Foundations of Educational Thought and Practice.
594. (1½-3) Mental Constructs in Educational Theory.
595. (1½) Analysis of Educational Concepts.
596. (1½) Design and Analysis in Educational Research II.
597. (1½) Factor Analysis and Its Application to Behavioural Sciences.
598. (3) Field Experiences.
599. (3-6) Master's Thesis.
601. (3-6) Doctoral Seminar.
630. (1½) Advanced Human Learning and Instruction.
677. (1½) Theories of Vocational Development.
678. (1½) Counseling Theory and Procedures II.
679. (1½) Information Systems in Guidance and Counselling.
682. (1½) Multivariate Analysis in Behavioural Research.
699. Ed.D. Thesis.

ELECTRICAL ENGINEERING—Ph.D. and M.A.Sc. degrees

Professor and Head: A. Donald Moore.

Professors: E. V. Bohn, F. K. Bowers, M. M. Z. Kharadly, Avrum Soudack, Lawrence Young, Yao-Nan Yu.

Associate Professors: M. P. Beddoes, R. W. Donaldson, J. S. MacDonald.

Assistant Professors: G. B. Anderson, H. R. Chinn, M. S. Davies, B. J. Kabriel, D. L. Pulfrey, G. F. Schrack.

Prerequisites—Graduation in Electrical Engineering, Engineering Physics, Honours Physics or Honours Math-Physics. Some students, particularly those with Honours Science Degrees, 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 12 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 9 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 9 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.

M.Eng. Degree:

The degree of M.Eng. may be obtained on the basis of the completion of 15 units of course work together with an essay or report and a comprehensive examination. This degree is intended mainly for candidates who may wish to extend their knowledge after a period of engineering practice following first graduation.

Students should consult the Department for information regarding courses to be offered this session.

551. (2) Applied Electromagnetic Theory.
553. (1) Electric Power Systems.
555. (1½) Computational Techniques in Systems Optimization and Identification.
557. (2) Non-linear Systems.
560. (1) Network Analysis.
562. (1) Network Synthesis.
564. (1½) Detection and Estimation of Signals and Patterns.
566. (1½) Communication and Information Theory.
568. (1) Control Systems.
569. (2) Logic Design.
570. (1) Optimum Systems Control.
571. (1-2) Electrical Engineering Seminar and Special Problems.
572. (½-1) Advanced Topics in Control.
573. (1½) Power System Dynamics.
575. (1) Signal and Image Processing.
579. (1) Solid-State Electronics.
583. (2) Microwave Measurements and Techniques.
585. (2) Antennas and Radio Propagation.
587. (1-2) Thin Film and Solid-State Electronic Devices.
589. (1½) Man-machine Communication.
591. (1) Engineering Applications of Analogue and Hybrid Computers.

596. (1) Optical Signal Processing I.
598. (1) Optical Signal Processing II.
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: Robert M. Jordan.

Professors: G. P. V. Akrigg, G. H. Durrant, W. E. Fredeman, Elliot B. Gose, W. F. Hall, S. K. Heninger, Jr., R. W. Ingram, J. A. Lavin, M. A. Manzalaoui, Patricia Merivale, Philip Pinkus, William Robbins, M. W. Steinberg, W. M. Thompson.

Associate Professors: Keith Alldritt, D. M. Beach, Frederick Bowers, Geoffrey Creigh, Jan de Bruyn, M. K. Goldberg, James A. Hart, V. G. Hopwood, John F. Hulcoop, B. L. Grenberg, David Macaree, Craig W. Miller, William H. New, G. E. Powell, P. A. Quartermain, Ian S. Ross, P. G. Stanwood, D. G. Stephens, S. W. Stevenson, J. F. Stewart, Bickford Sylvester, Warren Tallman, L. M. Whitehead, F. H. Whitman.

Assistant Professors: R. W. Bevis, Margaret A. H. Blom, Thomas E. Blom, Andrew Busza, John Doheny, E. Durbach, David L. Evans, A. V. Globe, G. Good, R. B. Hatch, L. M. Johnson, Ronald C. Johnson, J. H. Kaplan, J. Kieran Kealy, A. R. Kilgallin, N. Harriet Kirkley, Annette Kolodny, E. Ross Labrie, W. E. Messenger, I. B. Nadel, Ruby D. Nemser, A. T. L. Parkin, Roger G. Seamon, F. E. Stockholder, Katherine Stockholder, Peter A. Taylor, Patricia Wolfe.

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. Details of the seminars to be offered in 1972-73 are given in the Department's pamphlet. For requirements, students are referred to the Departmental Graduate Handbook.

500. (1) Research Tools and Methods.—Required of all graduate students lacking the equivalent.
501. (3) Studies in Bibilography.
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) Studies in Old English.
511. (3) Chaucer.
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.
541. (3) Studies in American Literature Since 1890.
545. (3) Studies in Canadian Literature.
546. (3) Studies in Commonwealth Literature.
547. (1-3) Directed reading in fields in which no courses are offered.
549. (3-6) Master's Thesis.
649. Ph.D. Thesis.

FINE ARTS—M.A. degree

Professor and Head: George Knox.

Professor: B. C. Binning.

Associate Professors: Ian McNairn, Mary Morehart.

Assistant Professors: Alvin Balkind, James Caswell, Harold Kalman, George Rosenberg, Graham Smith.

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 periods; in the area of Fine Arts Criticism and Methodology; and in the field of Asian 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.

Courses

A broadsheet giving details of the M.A. programme, and indicating which graduate courses will be offered in any one year, will be available from the Departmental office.

529. (3) Studies in Ancient Art. (Also listed as Classical Studies 530).
533. (3) Studies in Mediaeval Art.
535. (3) Studies in the Art of the Renaissance.
537. (3) Studies in Seventeenth-and Eighteenth-Century Art.
539. (3) Studies in Nineteenth-and Twentieth-Century Art.
541. (3) Special Advanced Course.
551. (3) Studies in Asian Art.
565. (3) Studies in Canadian Art.
571. (3) Problems in the Criticism and Methodology of Fine Arts. (Not offered 1972-73).
575. (3) Theory and Criticism of Asian Art.
591. (3) Directed Study in the Visual Arts.
599. (3-6) Master's Thesis.

A normal programme comprises the thesis (Fine Arts 599) and 15 units of approved courses, 6 units of which must be at graduate level within the Department.

FISHERIES—(See Animal Resource Ecology)

FOOD SCIENCE—Ph.D. and M.Sc. degrees

Professor and Chairman: William D. Powrie.

Associate Professors: Shuryo Nakai, James F. Richards, Philip M. Townsley.

Assistant Professor: Marvin A. Tung.

Lecturer: E. L. Watson.

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 systems. The Department is particularly well equipped for research in the areas of single cell culture, fermentation, chemical composition, microstructure, rheological properties and sensory evaluation of foods. Equipment available to graduate students includes, an amino acid analyzer, 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.

Further information may be obtained by writing to the Chairman of the Department.

Courses

500. (1-3) Graduate Seminar.
501. (1) Food Lipids.
502. (1½) Food Pigments and Colorimetry.
503. (1) Chemistry of Food Proteins.
504. (1) Molecular Basis of Chemoreception.
505. (1) Food Suspensions, Emulsions and Foams.
506. (1½) Structure and Chemistry of Food Myosystems.
507. (1) Food Carbohydrates.
508. (1½) Biorheology.
509. (1) Food Enzymes.
513. (1½) Advanced Cell Culture.

530. (1-3) Directed Studies.
549. (5-6) Master's Thesis.
649. Ph.D. 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, Oscar Sziklai, Robert W. Wellwood, Jack W. Wilson, Raymond E. Foster.

Associate Professors: Laszlo Adamovich, David Haley, Antal Kozak, D. S. Lacate, Donald D. Munro, Eric P. Swan, J. Vincent Thirgood.

Assistant Professors: T. Ballard, Peter J. Dooling, Leonid Valg, Bart J. van der Kamp, J. P. Kimmins, Robert P. Willington, John G. Worrall, Glen G. Young.

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 economics, forest genetics, forest hydrology, forest pathology, forest entomology, forest soils, tree physiology, wood anatomy, chemistry and physics, and wildlife biology.

M.F. degree

In major branches of Forestry, including biometrics, ecology, economics, entomology, fire control and use, genetics, forest hydrology, harvesting, land management, mensuration, operations research, pathology, photo interpretation physiology, products, recreation, silvics, silviculture, soils, 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 545 or 584, and other courses to complete the requirements. Alternatively, the Programme with Comprehensive Examination may be taken (without Thesis) as described under "Courses of Study".

M.Sc. degree in fields as noted above for the Ph.D. degree.

Prerequisite: Graduation in Science, Applied Science, Agricultural Sciences or Forestry.

Course: Thesis, counting at least 3 units, at least 3 units chosen from graduate courses in Forestry, including Forestry 545 or 584, and other approved courses appropriate to the field of study. Alternatively, the Programme with Comprehensive Examination may be taken without Thesis.

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.

500. (1-3) Studies in Forest Tree Physiology.
502. (1-3) Studies in Forest Genetics.
504. (1-3) Silvics and Silviculture.
505. (1-3) Advanced Studies in Forest Ecosystems.
506. (3) Advanced Forest Pathology.
507. (1-3) Problems in Forest Protection.
508. (2) Forest Insect Ecology.
510. (1) Forest Tree Seed.
512. (1-3) Problems in Forest Tree Nutrition.
514. (1) Seminar in Forest Biology.
515. (1-3) Studies in Forest and Land Use History.
517. (1-3) Studies in Forest Policy.
519. (1-3) Advanced Studies in Forest Economics and Finance.
521. (1-3) Studies in Forest Development Planning.
523. (1-3) Advanced Studies in Forest Management.
525. (1-3) Problems in Forest Land Management.
527. (1-3) Forest Fire Control.
529. (1) Seminar in Management of Forest Resources.
530. (3) Multiple Regression Methods.
532. (1-3) Data Processing in Forestry.
533. (1-3) Problems in Statistical Methods.
536. (1-3) Advanced Studies in Forest Mensuration.
539. (3) Forest Sampling Methods.
542. (1-3) Advanced Studies in Forest Photogrammetry.
545. (1) General Forestry Seminar.
546. (1) Seminar in Research Methods.
549. (3-9) Master's Thesis.
555. (3) Dynamic Programming in Resource Allocation.
559. (1-3) Operations Research in Forestry.
563. (1-3) Problems in Forest Engineering.
567. (1) Logging Cableways.
570. (1-3) Wood Science.
572. (2) Energy Transfer Mechanisms in Wood and Related Products.
574. (2) Rheological Behaviours of Wood Base Materials.
576. (2) Origin of Wood Pulp Properties.
578. (1-3) Advanced Studies in Wood Products.
580. (1-3) Problems in Forest Products.
584. (1) Wood and Pulp Science Seminar.
585. (2) Research Methods in Forest Hydrology.
587. (1-3) Research in Forest Hydrology.
589. (1-3) Problems in Forest Watershed Management.
591. (1-3) Research Methods in Forest and Wildland Recreation.
593. (1-3) Problems in Forest and Wildland Recreation.
595. (1-3) Research Methods in Forest Wildlife Studies.
597. (1-3) Problems in Forest Wildlife Management.
599. (3-9) M.A.Sc. Thesis.
649. Ph.D. Thesis.

The Western Forest Products Laboratory of the Canada Department of the Environment 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, Alistair R. MacKay, David J. Niederauer, Marguerite A. Primeau.

Assistant Professors: Claude Bouygues, Olga Cragg, Heather Franklyn, David Highnam, Richard G. C. Holdaway, Edward J. Matte, Harriet Mowshowitz, James Panter, Helen M. C. Purkis, Floyd B. St. Clair, Ruth L. White.

The Department of French offers opportunities for advanced study in the language and literature of France, French Canada and French Africa. For a detailed outline of specific Ph.D. and M.A. programmes and information about library resources, write to the Graduate Adviser of the Department.

Courses and Seminars

500. (1½) Methods of Bibliography and Literary Criticism.
501. (1½-3) Studies in the Literature of Mediaeval France.
502. (1½-3) Studies in Sixteenth-Century Literature.
503. (1½-3) Studies in Seventeenth-Century Literature.
504. (1½-3) Studies in the Seventeenth-Century Novel.
505. (1½-3) Studies in Seventeenth-Century Drama.
506. (1½-3) Studies in the Eighteenth-Century Novel.
507. (1½-3) Studies in the French Enlightenment.
508. (1½-3) Studies in French Romantic Literature.
509. (1½-3) Studies in Post-Romantic Nineteenth-Century Literature.
510. (1½-3) Baudelaire and the Symbolists.
511. (1½-3) Studies in Contemporary French Literature.
512. (1½-3) Studies in Literary Criticism.
513. (1½-3) Studies in French-Canadian Literature.
514. (1½-3) Problems relating to the French Novel.
515. (1½-3) Studies in Romance Philology.
516. (1½-3) Studies in the History of the French Language.
517. (1½-3) Literatures of the French-Speaking World.

519. (1½-3) The Language and Literature of Old Provençal.
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

Advisory Committee on Genetics

Professors: J. R. Miller (Medical Genetics), chairman, C. O. Person (Botany), H. F. Stich (Zoology), D. Suzuki (Zoology).

Associate Professors: C. W. Roberts (Poultry Science), R. A. J. Warren (Microbiology).

Although there is no Department of Genetics at U.B.C., studies leading to the M.Sc. and Ph.D. degrees in Genetics are available. The programme is administered by the Advisory Committee on Genetics which is responsible to the Dean of the Faculty of Graduate Studies.

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.

The Genetics programme is a flexible one intended to accommodate the diverse background of students wishing to enter it, and also take account of the broad nature of genetics research. Students who apply for entrance must satisfy the general regulations of the Faculty of Graduate Studies, and are selected by the Genetics Admissions Committee.

The Student's graduate programme will be decided upon by the student, his adviser, and the student's committee. The only formal requirement in this regard, other than those set forth by the Faculty, is that at some time during his or her academic programme the student must take a course in each of biochemistry, microbial genetics, and statistics. If these have not been met satisfactorily in the student's undergraduate programme, they must be included in the graduate programme. In addition, each student proceeding towards a Ph.D. degree must write a qualifying examination at the end of the first academic year.

A student's committee for the M.Sc. degree will include at least two members of the Advisory Committee, and the student's committee for a Ph.D. degree will include at least three members of the Advisory Committee. The Advisory Committee will monitor the progress of all students in the Genetics programme.

Additional information on graduate programmes in Genetics can be obtained directly from the Departments or Divisions mentioned above or from members of the Advisory Committee.

530. (3) (Paediatrics) Advanced Human Genetics
549. M.Sc. Thesis.
649. Ph.D. Thesis.

GEOGRAPHY—Ph.D. and M.A. degrees

Professor and Head: J. D. Chapman.

Professors: W. G. Hardwick, J. Ross Mackay, J. Lewis Robinson, J. K. Stager.

Associate Professors: A. L. Farley, G. R. Gates, R. C. Harris, J. V. Minghi, T. R. Oke, K. S. Sandhu, A. H. Siemens, H. O. Slaymaker,

Assistant Professors: M. Church, K. Denike, R. Leigh, R. N. North, H. S. Swain.

Instructors: R. Copley, M. E. A. North.

Lecturers: J. M. Houston, June M. Ryder.

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—economic, behavioural and historical approaches in the study 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. (1½) Physical Geography.
501. (1½) Economic Geography.
502. (1½) Cultural and Historical Geography.
503. (1½) Political Geography.
504. (1½) Geomorphology II.
505. (1½) Climatology and Hydrology.
506. (1½) Economic Geography.
507. (1½) Urban Geography.
508. (1½) Political Geography.
509. (1½) Cultural and Historical Geography.
510. (1½) Cartographic and Quantitative Analysis.
511. (1½) Modelling Techniques in Geography.
512. (1½) Techniques of Spatial Analysis.
513. (1½) Research Sources for Regional Study.
514. (1½) Contemporary Geographic Methodology.
515. (1½) History of Geographic Methodology.
516. (1½-3) Heat and Water Balance Climatology.
521. (1½) Permafrost.

Second Year and above:

560. (1½-3) Geomorphology III.
570. (1½-3) Economic Geography.
571. (1½-3) Urban and Transportation Geography.
572. (1½-3) Spatial Interaction.
580. (1½-3) Canada.
581. (1½-3) Western Arctic.
582. (1½-3) Monsoon Asia.
583. (1½-3) U.S.S.R.
584. (1½-3) Latin America.
600. Doctoral Research Seminar.

Readings and Theses:

550. (1½-3) Directed Reading.
599. (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: Hugh R. Wynne-Edwards.

Professors: W. R. Danner, Hugh J. Greenwood, K. C. McTaggart, Wm. H. Mathews, 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, R. C. Kucera, J. W. Murray, J. L. Rau, Alastair J. Sinclair.

Assistant Professors: W. C. Barnes, R. L. St. L. Chase, E. P. Meagher, P. B. Read.

Instructor: Alfred J. Akehurst.

Lecturer: B. E. B. Cameron.

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 could require 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.
511. (3) Geology of North America.
514. (3) Problems of Stratigraphy.
519. (1½) Seminar in Sedimentology.
520. (1½) Problems in Sedimentology.
521. (3) Problems in Paleontology.
524. (3) Advanced Geochemistry (Mineral Research).
526. (3) Mineral Deposits.
531. (3) Advanced Invertebrate Paleontology.
533. (1½) X-ray Mineralogy.
534. (1½) Mechanics of Natural Deformation.
541. (3) Paleobotany.
543. (1½) Advanced Mineralogy.
544. (1½) Rheology and Analysis of Natural Deformation.
545. (1) Reading Course.
546. (1-3) Directed Studies in Geology.
549. Master's Thesis.
554. (1½) Structure and Properties of Crystals and Crystal Aggregates.
555. (1) Advanced Igneous Petrology.
558. (2-3) Theory of Ore Search.
565. (1) Advanced Metamorphic Petrology.
575. (1) Geological Phase Equilibrium.
585. (1) Equilibria in Mineral Systems.
649. Ph.D. Thesis.

GEOPHYSICS—Ph.D., M.Sc. and M.A.Sc. degrees

Professor and Head: R. Doncaster Russell.

Professors: Michael W. Ovenden (Astronomy), William F. Slawson.

Associate Professors: Jason R. Auman (Astronomy), Garry K. C. Clarke, Robert M. Ellis, Roy D. Hyndman (Visiting), Douglas E. Smylie, Tadeusz J. Ulrych, Gordon A. H. Walker (Astronomy), Tomiya Watanabe.

Assistant Professors: Ronald M. Clowes, Gregory G. Fahlman (Astronomy), John M. Ozard (Visiting), Harvey B. Richer (Astronomy).

Lecturer: Ann C. Gower (Astronomy).

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. Experimental work includes the development of novel electronic techniques of observing stellar spectra, and of detecting rapid fluctuations in stellar brightness. Facilities include a Zeiss Abbé Comparator, and a fully-digitized Joyce-Loebl microdensitometer. The Department has a 12-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. A marine seismic programme for investigations of crustal structure beneath the oceans from analyses of reflected and refracted waves is under way. 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).

(g) Communication Theory

Application of communication theory to the analysis of potential field, seismic and astronomical data.

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 500.

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 or Mathematics 534 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.
520. (1-3) Directed Studies in Geophysics or Astronomy.
521. (1) Modern Aspects of Geophysics.
549. (6) M.Sc. Thesis.
599. (6) M.A.Sc. Thesis.
649. Ph.D. Thesis.

Astronomy Courses

500. (3) Principles of Modern Astronomy.
515. (2-3) Stellar Astronomy.
561. (2-3) Observational Astronomy.
563. Galactic Astronomy.

Geophysics Courses

502. (2) Principles of Earth Science.
511. (1-2) Seismology.
512. (1-2) Geomagnetism and Aeronomy.
513. (1-2) Radioactive and Isotopic Processes in Geophysics.
514. (1-2) Geophysical Analysis.

GERMAN—Ph.D. and M.A. degrees

Professor and Head: Michael S. Batts.

Professor: Mark Boulby.

Associate Professors: James A. McNeely, Leslie L. Miller, Marketa Goetz Stankiewicz.

Assistant Professors: Maria Fürstenwald, Iselind Hanewald, J. Edward W. Mornin, Patrick O'Neill, Peter A. Stenberg.

Senior Instructors: Ronald Beaumont, Louis Medveczky.

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 of 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 and 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. (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.
507. (1½-3) Studies in Literary Criticism.
508. (1½-3) Gothic and Comparative Germanic Linguistics.
509. (1½-3) The Enlightenment.
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) 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).

Professor: D. Aguzzi-Barbagli (Italian).

Associate Professors: Mrs. S. Ciccone (Italian), K. J. Kobbervig (Spanish), J. A. McDonald (Spanish), A. Pacheco (Spanish).

Assistant Professors: R. Barman (Spanish), T. Bartroli (Spanish), J. Bryans (Spanish), C. Chiarenza (Italian), Mrs. M. Chiarenza (Italian), Mrs. M. G. R. Coope (Spanish), J. C. Murchison (Spanish), I. Rubio (Spanish).

Instructors: Mrs. G. De Stefanis (Italian), Miss M. Tomsich (Spanish).

Lecturers: D. C. Carr (Spanish), Mrs. A. M. Gomes (Portuguese).

The Department has graduate programmes leading to the degrees of M.A. and Ph. D. It provides opportunities to undertake advanced work in Italian, Spanish and Portuguese (Pensinsular and Latin American) Studies.

Spanish—Ph.D. degree and 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.
649. Ph.D. 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.

Romance Studies

520. (3) Studies in Romance Languages and Literature.

HISTORY—Ph.D. and M.A. degrees

Professor and Head: Margaret A. Ormsby.

Professors: Ivan Avakumovic, John S. Conway, Peter Harnetty, Brian Harrison, Harvey Mitchell, John M. Norris, Stanley Z. Pech, Leslie F. S. Upton, Edgar Wickberg.

Associate Professors: Janos M. Bak, A. Jean Elder, L. F. Hill, Charles W. Humphries, E. J. Hundert, Daniel M. Klang, Robert V. Kubicek, Fritz Lehmann, A. N. MacDonald, Margaret E. Prang, Allen A. Sinel, Murray M. Tolmie, James H. Winter.

Assistant Professors: June I. Gow, F. Murray Greenwood, James P. Huzel, D. A. Kubesh, J. C. Lawrence, Peter N. Moogk, H. K. Ralston, A. C. L. Smith, Christopher W. Stocker, Stephen M. Straker, Richard W. Unger.

Lecturers from other Departments: 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. It is one of four Canadian libraries receiving materials on India under the book purchasing programme of the Shastri Indo-Canadian Institute. 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. (3) 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. (3) Readings in Comparative Asian History.
571. (3) Readings in Chinese History.
572. (3) Readings in Japanese History.
573. (3) Readings in Southeast Asian History.
574. (3) Readings in South Asian History.
575. (6) Seminar in Comparative Asian History.
576. (6) Seminar in Chinese History.
577. (6) Seminar in Japanese History.
578. (6) Seminar in Southeast Asian History.
579. (6) Seminar in South 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.

HUMAN NUTRITION (School of Home Economics)—M.Sc.

Professor and Director: Melvin Lee.
Associate Professor: I. D. Desai.
Assistant Professors: J. F. Angel, J. A. Birkbeck, J. Leichter.
Instructors: C. Daem, C. Ireton.

The Division of Human Nutrition of the School of Home Economics offers opportunities for advanced study and original investigations in basic, experimental and community aspects of Human Nutrition. The curriculum is interdisciplinary in nature and includes course work, field study and laboratory research in various experimental aspects of nutrition involving laboratory animals and human subjects.

The teaching and research laboratories include modern instruments and equipment for automated biochemical analysis, atomic absorption, gamma spectrometry and scintillation counting of radio-isotopes, gas chromatography, spectrophotometric analysis, data processing and other routine laboratory analysis required for nutritional and biochemical investigations.

Research opportunities are available in the fields of (1) evaluation of nutritional status, (2) metabolism of trace minerals, (3) function of vitamins and cofactors, with particular interest in tocopherols, quinones and pyridoxine, (4) nutritional state and lysosomal enzymes, (5) nutritional and biochemical studies of marine planktonic algae, (6) metabolism of lipids in humans, (7) nutritional aspects of inborn errors of metabolism, (8) nutritional aspects of embryonic development and growth, (9) nutritional implications of carbohydrate development and metabolism, (10) nutritional evaluation of infant formulas, and (11) other suitable topics of interest to students and faculty members of the department.

Prerequisites: Bachelor's degree, preferably with honours, in the field of Chemical or Biological Sciences, Agricultural Sciences, Home Economics (with a major in Foods, Nutrition or Dietetics), and Health Sciences, together with admission requirements as specified by the Faculty of Graduate Studies and the Division of Human Nutrition. It is strongly recommended that entering candidates have on their undergraduate record a course in Biochemistry, Biometrics, Microbiology, and Physiology.

Course: The Master's programme will require a minimum of 18 credit units, of which up to a maximum of 6 units must consist of a thesis, and of which at least 6 units must be courses numbered 500 and above. The remainder of the units must consist of courses numbered 300 and above, either in the field of Nutrition or related disciplines. Additional units may have to be taken in order to correct deficiencies, if any, towards undergraduate prerequisites in Biochemistry, Biometrics, Microbiology and Physiology, but only up to a maximum of 3 units may be counted towards a minimum requirement of 18 credit units for the Master's programme.

Courses in Human Nutrition:

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 Metabolism.
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, Forestry, 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 of The Westwater Research Centre 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.

Note: See also The Westwater Research Centre.

INSTITUTE OF INDUSTRIAL RELATIONS

Professor and Director: Noel A. Hall (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 research 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 560. (1½) Economics of Labour.
Economics 561. (1½) Topics in Industrial Relations.
Economics 660. (1½) Topics in the Economics of Labour.
Economics 661. (1½) Topics in Industrial Relations.

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.
Commerce 521. (1½) Theory, Research and Methodology in the Study of Organizational Behaviour.
Commerce 522. (1½) Selected Problems in Labour Relations.
Commerce 523. (1½) Seminar in Labour Relations.

Law

Law 315. Labour Law.
Seminars (Law 331).

Psychology*

Psychology 501. (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

Director: Dr. M. Zacher, Department of Political Science.

The Institute of International Relations has been established 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 endeavours 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. The Institute itself does not offer courses or degree programmes. Membership or association with the Institute is open to graduate students and faculty from all departments and faculties.

Information regarding the programmes of the Institute may be obtained from the Director.

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 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: A. J. McClean.

Professors: C. B. Bourne, P. T. Burns, L. Getz, R. G. Herbert, D. S. M. Huberman, L. G. Jahnke, D. J. MacDougall, J. M. MacIntyre, J. C. Smith, A. R. Thompson, E. C. E. Todd.

Associate Professors: J. J. Atrens, C. R. B. Dunlop, D. L. Larson, A. R. Lucas, D. W. Roberts.

Assistant Professors: S. H. Berner, W. W. Black, C. Carr, R. D. Diebolt, H. Eddy, R. T. Franson, M. A. Jackson, P. D. Leask, J. G. Matkin, A. F. Sheppard, B. Slutsky, S. Wexler, A. A. Zysblat.

Dean Emeritus: G. F. Curtis.

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. It does not give entry to the British Columbia or other bar.

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. degree. 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 the Faculty of Law section of the Calendar.

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.

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 vear for which admission is sought.

LINGUISTICS—M.A. degree

Professor and Acting Head of the Department: Robert J. Gregg.

Associate Professor: Bernard Saint-Jacques.

Visiting Assistant Professor: James E. Hoard.

Instructor: Ingrida Brenzinger.

Lecturer: Kenneth F. Reeder.

Lecturer from another Department: J. H. V. Gilbert (Audiology and Speech Sciences).

The Department offers two forms of programme leading to the M.A., one requiring a thesis and a second without thesis requiring additional course work, one essay and a comprehensive.

Programmes are individually planned, and courses may also be selected from the approved list (in the Faculty of Arts section) of courses in other departments.

Courses:

510. (1½-3) Problems in Phonology.
519. (1½-3) Problems in Comparative and Historical Linguistics.
520. (1½-3) Problems in Grammatical Analysis.
525. (1½-3) Problems in Semantics.
530. (1½-3) Linguistic Problems in a Special Area.
532. (1½-3) Field Methods in Linguistics.
535. (1½-3) Contrastive Linguistics.
540. (1½-3) Problems in Dialectology.
549. (3-9) Master's Thesis.

MATHEMATICS—Ph.D., M.Sc. and M.A. degrees

Professor and Head: R. D. James.

Professors: A. T. Bui, P. Bullen, D. J. Bures, C. Clark, P. C. Gilmore, E. E. Granirer, K. Hoechsmann, Z. A. Melzak, B. Moyls, D. Murdoch, S. W. Nash, R. Ree, M. Sion, R. Westwick, J. V. Whittaker.

Associate Professors: R. A. Adams, C. T. Anderson, N. P. Cac, A. H. Cayford, R. Douglas, A. Frei, J. Gamst, K. Lam, E. Luft, E. Maus, L. A. Mysak, J. V. Zidek.

Assistant Professors: G. W. Bluman, T. Cramer, P. E. Greenwood, L. S. Halabisky, C. W. Lamb, L. G. Roberts, D. P. Rolfsen, J. G. Schnute, R. W. Shorrock, D. Sjerve, U. Suter.

Ph.D. degree

Programmes of study are offered in most branches of Pure and Applied Mathematics, including Numerical Analysis. A leaflet describing opportunities for research 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 Head 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) Commutative Algebra.
510. (3) Homological Algebra.
511. (3) Algebraic Topology.
512. (3) Theory of Groups.
513. (3) Topological Groups.
514. (3) Nonlinear Differential Equations.
515. (3) Integral Equations.
516. (3) Harmonic Analysis.
517. (3) Complex Analysis.
518. (3) Probability.
519. (3) Statistics.
520. (3) Numerical Analysis.
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.
527. (3) Theory of Elasticity.
528. (3) Methods of Applied Mathematics.
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., M.A.Sc. and M.Eng. degrees.

Professor and Head: James P. Duncan.

Professors: Christopher A. Brockley, Geoffrey V. Parkinson, Zeev Rotem, Vinod J. Modi.

Associate Professors: Edward G. Hauptmann, Ronald C. Hazell, Muhammad Iqbal, Ian S. Gartshore, Hilton Ramsey.

Assistant Professors: Terry N. Adams, Karl V. Bury, Robert E. McKechnie, Thomas E. Siddon, Henry Vaughan.

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.

The degree of M.Eng. may be obtained on the basis of the completion of 15 units of course work together with an essay or report and a comprehensive examination. This degree is intended mainly for candidates who may wish to extend their knowledge after a period of engineering practice following first graduation.

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.

Courses and Seminars

Students should consult the department for courses to be offered in the session since not all courses will be available.

550. (1) Special Advanced Courses.
553. (1½) Advanced Design I.
554. (1½) Advanced Design II.
555. (1) Hydrodynamic Lubrication.
556. (1) Boundary Lubrication.
558. (3) Engineering Applications of Statistical Distribution Theory.
561. (1) Advanced Linear Elasticity.
562. (1) Introduction to Continuum Mechanics.
564. (3) Space Dynamics I.
565. (1) Linear Vibrations I.
566. (1) Linear Vibrations II.
567. (1) Nonlinear Elasticity.
568. (1) Theory of Plasticity.
569. (2) Non-Linear Vibration.
570. (3) Space Dynamics II.
572. (1½) Convection Heat Transfer.
573. (1½) Radiation Heat Transfer.
575. (1½) Special Topics in Heat and Mass Transfer.
576. (1½) Advanced Thermodynamics.
577. (1½) Applied Statistical Thermodynamics.
580. (1½) Theory of Ideal Fluids.
581. (1½) Theory of Low Speed Airfoils.
582. (3) Theory of Real Fluids.
583. (1½) High Speed Gas Dynamics.
584. (1½) Mechanics of Rarefied Gases.
585. (3) Aeroelasticity.
586. (2) Turbulent Shear Flow.
587. (1) Engineering Acoustics I.
588. (1) Engineering Acoustics II.
589. (1½) Aerodynamic Noise I.
590. (1½) Aerodynamic Noise II.
591. (1½) Industrial Aerodynamics.
598. (1) Seminar.
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, plus at least 3 units of other approved courses.

METALLURGY—Ph.D., M.Sc. and M.A.Sc. degree

Professor and Head: E. Teghtsoonian.

Professors: W. M. Armstrong, A. C. D. Chaklader, J. A. Lund, E. Peters, C. S. Samis, I. H. Warren, F. Weinberg.

Associate Professors: T. H. Alden, L. C. Brown, A. Mitchell, J. S. Nadeau, N. R. Risebrough, D. Tromans.
Assistant Professors: J. K. Brimacombe, R. G. Butters, D. E. Coates, E. B. Hawbolt.
Professor Emeritus: F. A. Forward.

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) static fatigue of glass and vitreous carbon, abrasives, 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.
554. (1-2) Hydrometallurgy.
555. (1) Statistical Thermodynamics of Metals.
556. (2) Advanced Process Metallurgy.
558. (2) Corrosion.
560. (2) Metallurgical Transport Processes.
570. (2) Structure of Metals III.
571. (1) Solidification I.
573. (1) Solidification II.
574. (1) Topics in Physical Metallurgy.
575. (2) Phase Transformations in Solids.
576. (1) Diffusion.
580. (1) Metal Fabrication II.
581. (1) Sintering Theory.
582. (1) Advanced Ceramics.
583. (1) Non-Crystalline Materials.
584. (1) Advanced X-Ray Diffraction.
586. (2) Advanced Metallography.
592. (1-3) Special Topics in Metallurgy.
599. (6) Thesis for M.A.Sc. and M.Sc. Degrees.
699. Thesis.—For Ph.D. Degree.

MICROBIOLOGY—Ph.D. and M.Sc. degrees

Professor and Head: J. J. R. Campbell.
Professors: D. M. McLean, C. C. Walden (Honorary).
Associate Professors: J. E. Bismanis, T. H. Blackburn, Julia Levy, Audrey F. Gronlund, J. J. Stock, R. A. J. Warren.
Assistant Professors: J. B. Hudson, E. E. Ishiguro, D. G. Kilburn, B. C. McBride, R. C. Miller, Delfa Syeklocha.

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.
503. (1½) Bacterial Cytology and Genetics.
505. (1½) Molecular Microbiology.
506. (3) Microbiological Research Procedures I.
507. (3) Microbiological Research Procedures II.
509. (3) Viral Ecology.
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., M.A.Sc., and M.Eng. degrees

Professor and Head: J. B. Evans.
Professors: L. G. R. Crouch, C. L. Emery, J. Leja, G. W. Poling.
Assistant Professor: I. Weir-Jones.

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; applications of surface chemistry to corrosion, emulsification, wetting, lubrication.

M.A.Sc., M.Eng. Degrees:

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.
551. (2) Rock Mechanics.
552. (2) Applied Physical Measurements.
553. (2) Operations Research.
554. (1) Mineral Property Evaluation.
570. (1) Theory of Fine Particles.
571. (2) Properties of Interfaces.
573. (1) Treatment of Mineral Industry Effluents.
574. (2) Corrosion.
590. (1-3) Special Advanced Topics.
598. (1) Seminar.
599. Thesis.—For M.A.Sc. Degree.
699. Thesis.—For Ph.D. Degree.

MUSIC—M.Mus. degree

Professor and Head: Donald M. McCorkle.
Professors: Cortland R. Hultberg, G. Welton Marquis, Robert B. Morris, Hans-Karl Piltz, Dale Reubart, Elliot M. Weisgarber.
Associate Professors: Terence W. Bailey, John A. Loban, Hugh J. McLean, Douglas E. A. Talney, French A. Tickner, Eugene N. Wilson.
Assistant Professors: Kathryn Bailey, John S. Chappell, Paul M. Douglas, Robert Rogers, John E. Sawyer, James R. Schell, John Swan.

The Master of Music degree is offered in the following areas: (1) Musicology/Ethnomusicology; (2) Theory/Composition; (3) Performance; and (4) General Music.

Musicology/Ethnomusicology

520. (4) Seminar in Musicology.
521. (3) Seminar in Performance Practices *OR* (522 below).
522. (3) Seminar in Notation of Polyphonic Music.
549. (3) Thesis.

Theory/Composition

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.
504. (3) Twentieth-Century Practices.
506. (4) Seminar in Conducting, Materials and Procedures.
509. (3) Advanced Orchestration and Arranging.
549. (3) Master's Thesis.

History and Literature of Music

520. (4) Seminar in Musicology.
521. (3) Seminar in Performance Practices.
522. (3) Seminar in Notation of Polyphonic Music.

523. (3) Seminar in Mediaeval Music.
524. (3) Seminar in Music of the Renaissance.
525. (3) Seminar in Baroque Music.
526. (3) Seminar in Eighteenth-Century Music.
527. (3) Seminar in Nineteenth-Century Music.
528. (3) Seminar in the Literature of Music.
549. (3) Master's Thesis.

Applied Music

544. (1) Private Applied.
545. (2) Private Applied.
546. (3) Private Applied.
549. (3) Master's Thesis.

Ensembles

550. (0) University Symphony 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 Ensembles.
560. (0) String Chamber Ensembles.
561. (0) Piano Chamber Ensembles.

NEUROLOGICAL SCIENCES—M.Sc. degree

Associate Professor and Head: Patrick L. McGeer.

Distinguished Visiting Professor: Sir John Eccles.

Professors: William C. Gibson (Research Professor), Juda H. Quastel (Neurochemistry), Juhn Wada.

Associate Professors: S. C. Sung, Louis I. Woolf.

Research Associates: Edith G. McGeer, Paul Spong, 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, Chemistry, 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 related fields.

It is recommended that students intending to take this degree complete basic work in Chemistry, Physics, Psychology, and Physiology in their undergraduate work.

For full descriptions of the following courses see Department of Psychiatry, Faculty of Medicine.

510. (2) The Neurological Basis of Human Behaviour.
511. (1) The Neurological Basis of Human Behaviour (Laboratory).
512. (1) Problems of Cerebral Function.
513. (1) Behavioural Physiology.
514. (1) Neurochemistry.
515. (1) Psychopharmacology.

NURSING—M.S.N. degree

Professor and Director: Muriel Uprichard.

Professor: Elizabeth K. McCann.

Associate Professors: Alice J. Baumgart, Margaret A. Campbell, Pauline Capelle, H. Elizabeth Cawston, Helen Gemeroy, Floris E. King, Margaret S. Neylan, Margaret M. Street.

Assistant Professors: Mary Cruise, Maude Dolphin, Helen Elfert, Margaret R. Francis, Jessie Hibbert, Sylvia Holmes, June Horrocks, Betsy La Sor, Barbara Lee, Rose Murakami, Sharon Ogden, Helen Olsen, Helen Shore, Kirsten Weber.

Inquiries Relating to Admission

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.

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.

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.
c) psychiatric nursing and public health nursing experience are desirable for students electing N.532 and N.533;
d) an introductory course in statistics.

The Programme

First Year: 520, 521; one of 530, 532; supportive courses numbered 300 or above. Total unit value: 17.

Second Year: 533, for those choosing to take Community Mental Health Nursing; one of 560, 570; supportive courses numbered 300 or above selected from other offerings of nursing and other faculties; 599. Total unit value: 13.

(The choice of supportive courses will require approval by the departments concerned.)

Graduate Courses

520. (3) Core Concepts of Nursing.
521. (4) Methods and Techniques of Research.
530. (4) Nursing in Long-Term Illness.
532. (4) Psychiatric and Mental Health Nursing.
533. (3) Community Mental Health Nursing.
560. (4) Nursing Education.
570. (4) Administration and Supervision in Nursing Services.
599. (3) Thesis.

INSTITUTE OF OCEANOGRAPHY

Director: G. L. Pickard.

Professors: R. W. Burling, W. H. Mathews, T. R. Parsons, R. F. Scagel.

Honorary Professor: R. W. Stewart.

Associate Professors: G. C. Hughes, P. H. LeBlond, A. G. Lewis, J. W. Murray, L. A. Mysak, G. S. Pond, F. J. R. Taylor.

Assistant Professors: R. L. Chase, R. M. Clowes, E. V. Grill, M. Miyake, T. R. Osborn.

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, 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 Buildings, comprises over 45,000 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, 403 and 404 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*. Given first term. 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. Given second term. Mr. Pickard.

Oceanography 503. (1) Oceanographic Methods.—Oceanographic instrumentation, design of experiments, processing and analysis of data. Given both terms. 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. Given second term. Mr. Lewis 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). Given first term. 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. Given second term. Mr. Lewis.

Oceanography 509. (1) Biological Oceanographic Mechanisms.—A study of components in the pelagic food chain of the sea including factors affecting the production and consumption of marine organisms. Prerequisite: Oceanography 400. Given second term.

For course descriptions see Science section (Botany, Zoology) of the calendar.

Botany 510. (3) Marine Phycology.
Botany 512. (2) Practical Marine Phytoplankton Study.
Botany 517. (3) Aquatic Mycology.
Zoology 511. (2) Advanced Marine Zooplankton.

Chemical Oceanography

Oceanography 402. (1) Introduction to Chemical Oceanography.—The composition of sea water, biochemical and chemical factors affecting its variation, determination of selected constituents. Given first term. Mr. Grill.

Oceanography 502. (1) Advanced Chemical Oceanography. — Selected topics in the marine geochemistry of organic and inorganic constituents of sea water. Given second term. 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. Prerequisite: Oceanography 400. Given second term. Mr. Chase, Mr. Murray.

For course descriptions see the Science (Geology) section of the calendar.

Geology 519. (1½) Seminar in Sedimentology.
Geology 520. (1½) Problems in Sedimentology.

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. Given first term. Mr. Burling, Mr. LeBlond, Mr. Pond.

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 in the atmosphere and in the water: radiative transfer processes, structure of the boundary layer, wave generation theories. Mr. Miyake.

For course descriptions see the Science (Physics) section of the calendar.

Physics 441. (1) Introductory Meteorology.
Physics 537. (1) Advanced Dynamic Oceanography.
Physics 538. (1) Fluid Mechanics.
Physics 539. (1) Waves and Tides.
Physics 540. (2) Turbulence.
Physics 541. (1) Dynamic Meteorology.
Physics 542 (1) Waves in Rotating Fluids.

PATHOLOGY

Professor and Head: William L. Dunn.
Professors: Paris Constantinides, Philip S. Vassar, Samuel W. French.
Associate Professors: Donald J. Campbell, William H. Chase, David F. Hardwick, Richard H. Pearce, Ralph W. Spitzer (Part-time).
Assistant Professors: Louis H. Honoré, Philip E. Reid, William S. Wood.
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.
502. (3) Histochemistry in Pathology.
506. (1) Ultrastructural Pathology.
510. (2) Analytical Methods in Chemical Pathology.
512. (2) Chemical Pathology.
515. (4) Experimental Pathology.
520. (2) Recent Advances in Bio-Pathology.
525. (1) Immunopathology.
535. (1) Seminar.
548. (1-3) Directed Studies.
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, J. N. Hlynka, John H. McNeill, Alan G. Mjtchell, Janis O. Runikis.
Assistant Professors: Frank S. Abbott, Gail D. Bellward, Allan M. Goodeve, J. Glen Moir, Basil D. Roufogalis, John G. Sinclair.
Senior Instructors: Leona R. Goodeve, Norman C. Zacharias.

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 section of the calendar.

A detailed brochure is available on application to the Faculty describing its graduate degree programmes.

Courses and Seminars:

500. (3) Pharmaceutical Research Techniques.
510. (1) Advanced Pharmaceutics I.
511. (1) Advanced Pharmaceutics II.
512. (1) Advanced Pharmaceutics III.
521. (1) Advanced Medicinal Chemistry I.
522. (1) Advanced Medicinal Chemistry II.
530. (2) Advanced Pharmacognosy.

540. (1) Topics in Pharmacology.
541. (1) Drug Metabolism.
542. (1) Pharmacology of the Nervous System.
548. (1) Seminar.
549. (3-9) Master's Thesis.
550. (1-3) Directed Studies.
649. Ph.D. Thesis.

PHARMACOLOGY—Ph.D. and M.Sc. degrees

Professor and Head: Morley C. Sutter.

Professors: George I. Drummond, James G. Foulks, Thomas L. Perry.

Associate Professors: Gordon E. Dower, David M. J. Quastel, Harvey D. Sanders, Rudolf Vrba.

Assistant Professors: Alfred Fessler, David V. Godin, Florence A. Perry.

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 410 or 411; Pharmacology 425; Thesis, counting 6 units, and courses in related fields selected in consultation with the Department.

500. (2) Advanced Pharmacology.
511. (2) Pharmacology Seminar.
512. (4) Advanced Pharmacological Techniques.
513. (2) Pharmacology of Anaesthesia.
514. (5) Neuropharmacology.
549. (6) M.Sc. Thesis.
649. Ph.D. Thesis.

PHILOSOPHY—Ph.D. and M.A. degrees

Professor and Head: Peter Remnant.

Professors: Jonathan Bennett, Donald G. Brown, Samuel C. Coval, Thomas E. Patton, Robert J. Rowan.

Associate Professors: James C. Dybikowski, Warren J. Mullins, Richard E. Robinson.

Assistant Professors: Howard Jackson, Andrew Levine, Edwin Levy, Alan B. Loveland, Elbridge N. Rand, Steven Savitt, Richard I. Sikora, John P. Stewart, Gary A. Wedeking, Earl R. Winkler.

Lecturer from another Department: Fo-Ch'uan Chang.

The Department undertakes doctoral work in epistemology, metaphysics, ethics, aesthetics, political philosophy, logic, philosophy of language, philosophy of science and philosophy of mathematics.

500. (1½-3) Metaphysics and Epistemology.
501. (1½-3) Moral Philosophy.
502. (1½-3) Logic.
503. (1½-3) Ancient Philosophy.
505. (1½-3) Philosophy of Mathematics.
506. (1½-3) Philosophy of Mind.
511. (1½-3) Aesthetics.
513. (3) Mediaeval Philosophy.
514. (1½-3) Philosophy of Science.
521. (1½-3) Political Philosophy.
524. (1½-3) Philosophy of Social Science.
530-539. (1½) Problems.
549. (6) Master's Thesis.
573. (1½-3) Plato.
583. (1½-3) Aristotle.
593. (1½-3) 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 Professor: Robert G. Hindmarch.

Assistant Professors: Eric F. Broom, Kenneth D. Coutts, Arno T. Lascari, Ronald G. Marteniuk, Robert W. Schutz, Anne D. Tilley.

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.
551. (1½) Mathematical Applications in the Study of Sport and Physical Activity.
563. (1½) Measurement of Human Motor Proficiency.
565. (1½) Physiological Aspects of Physical Activity.
568. (1½) Seminar in Human Motor Performance.
570. (1½) Research Methods in Physical Education.
571. (1½) Physical Education for the Atypical Student.
573. (1½) Seminar in Mechanical Analysis of Human Movement.
580. (1½) Current Problems in Physical Education.
581. (1½) Seminar in the Sociological Aspects of Sport.—Prerequisite: Physical Education 381 or equivalent.
583. (1½) Physical Education Programmes.
584. (1½) Motor Skills and Physical Efficiency of Young Children.
599. (3-6) Master's Thesis.

PHYSICS—Ph.D., M.Sc. and M.A.Sc. degrees

Professor and Acting Head: Kenneth C. Mann.

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, Garth Jones, Friedrich A. Kaempffer, D. L. Livesey, Roy Nodwell, W. Opechowski, George L. Pickard, M. H. L. Pryce, P. Rastall, L. de Sobrino, Robert W. Stewart, E. W. Vogt, George M. Volkoff, J. B. Warren, B. L. White, D. Ll. Williams.

Associate Professors: B. Ahlborn, E. G. Auld, J. W. Bichard, M. K. Craddock, W. N. Hardy, Roger Howard, P. H. LeBlond, J. M. McMillan, P. W. Martin, P. W. Matthews, D. F. Measday, M. Miyake, I. Ozier, G. S. Pond, C. F. Schwerdtfeger, W. L. H. Shuter, B. G. Turrell.

Assistant Professors: D. A. Axen, D. A. Balzarini, D. S. Beder, J. F. Carolan, M. J. Crooks, J. E. Eldridge, R. R. Johnson, J. Meyer, T. R. Osborn.

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. Millimeter wave studies using 15-foot UBC campus radiotelescope.

(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.

(j) *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.

(l) *Tri-University Meson Facility (TRIUMF):*

In conjunction with scientists from Simon Fraser University, University of Victoria and the University of Alberta, construction is underway on the UBC campus of a sector-focussed cyclotron providing a 100 microampere beam of protons of energy variable from 150 MeV up to a maximum of 500 MeV. This facility will be ready for immediate 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, Biophysics, Chemistry, Electrical Engineering, Mathematics and Metallurgy.

M.Sc. Degree

Prerequisite: Honours in Physics (single or combined), 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.

M.A.Sc. Degree (Engineering Physics)

Prerequisite: Graduation in Engineering Physics or Electrical Engineering. The M.A.Sc. program requires a minimum of 15 units with the thesis counting 6 units and normally at least 6 units from graduate courses in physics, although for those students interested in inter-disciplinary fields this may be reduced to 4 units with permission of the department.

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 both undergraduate level physics courses (numbered less than 500) and the graduate courses listed below, consult the Faculty of Science section of the Calendar and the Faculty of Applied Science section of the Calendar.)

501. (2) Elementary Quantum Mechanics.
502. (2) Waves.
503. (1) Electromagnetic Theory.
505. (2) Nuclei and Particles.
506. (2) Quantum Theory of Solids.
507. (2) Plasma Physics.
509. (1) Theory of Measurements.
510. (1) Stochastic Processes in Physics.
511. (1) Advanced Magnetism.
512. (1) Spectroscopy.
513. (1) Crystal Structure and X-rays.
514. (1) Special Relativity.
515. (1) Physical Electronics.
516. (2) Statistical Mechanics.
517. (1) Introduction to Low Temperature Physics.
518. (1) Introduction to Superconductivity.
519. (1) Molecular Spectroscopy.
520. (2) Advanced Spectroscopy.
521. (2) Group Theory Methods in Quantum Mechanics.
522. (2) Nuclear Physics.
523. (1) Advanced Electronics.
524. (1) Waves and Antennas.
525. (1) Advanced Topics in Solid State Physics.
526. (2) Intermediate Quantum Mechanics.
527 (1) Theoretical Nuclear Physics.
528 (2) Elementary Particle Physics.
529. (2) Advanced Quantum Mechanics.
530. (1) General Relativity Theory.
531. (1) Advanced Plasma Physics.
532. (2) Plasma Dynamics.
533. (1) Laser Physics.
534. (1) Radiological Physics I.
535. (1) Radiological Physics II.
537. (1) Advanced Dynamic Oceanography.
538. (1) Fluid Mechanics.
539. (1) Waves and Tides.
540. (2) Turbulence.
541. (1) Dynamic Meteorology.
542. (1) Waves in Rotating Fluids.
544. (1) Magnetic Resonance Seminar.
545. (1) Theoretical Physics Seminar.
549. (6) Master's Thesis.
555. (1-3) Directed Studies in Physics.
570. (1) Radio Astronomy.
571. (1) Cosmic Physics.
649. Ph.D. Thesis.

Note: Attention of students interested in Biophysics is drawn to Anatomy 505 and 506. See Faculty of Medicine section of calendar.

PHYSIOLOGY—Ph.D. and M.Sc. degrees

Professor and Head: D. Harold Copp.

Professors: J. R. Ledsome, Hugh McLennan.

Associate Professors: John C. Brown, Carl F. Cramer, Ralph Keeler, Franco Lioy.

Assistant Professors: C. Owen Parkes, A. J. Pearson, P. C. Vaughan.

Ph.D. degree

The Department offers opportunities for advanced study in the field of animal 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 or 303 and Biochemistry 410 and 411 if not already taken; Thesis, counting 6 units, and approved courses in related fields.

511. (1-3) Seminar in Mammalian Physiology.
549. (6) M.Sc. Thesis.
649. Ph.D. Thesis.

PLANT SCIENCE—M.Sc. and Ph.D. degrees

Professor and Chairman: V. C. Runeckles.

Professors: V. C. Brink, A. J. Renney, M. Shaw, R. Taylor, W. G. Wellington.

Associate Professors: G. W. Eaton, C. A. Hornby, J. W. Neill.

Assistant Professors: R. J. Copeman, P. A. Jolliffe, B. J. R. Philogène.

Lecturers from other institutions: J. Bandy, Fish and Wildlife Branch, B.C. 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 physiology, air pollution effects, the biology of weeds, vegetable crops culture and breeding, pomology, 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 air pollutants, 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 and for isotopic tracer studies 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, biological control and applied entomology. 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 normally includes a thesis counting 6 units. However, applicants who do not wish to undertake an extensive research project leading to a thesis may follow a course which includes the preparation of one or two essays and involves a comprehensive examination.

500. (1-3) Graduate Seminar.
504. (3) Principles, Techniques and Problems in Applied Plant Ecology.
511. (3) Advances in Pomology.
513. (3) Topics in Plant Genetics and Breeding.
516. (1-3) Advances in Landscape Architecture.
517. (3) Topics in Vegetable Crop Production.
524. (1½) Control of Plant Growth by Synthetic Chemicals.
525. (3) Crop Ecophysiology.
530. (3) Directed Studies.
531. (2) Biological Control.
532. (1½) Anthropod Vectors of Plant Disease.
536. (2) Plant Virology.
537. (3-5) Topics in Plant Pathology.
538. (3) Topics in Weed Ecology.
538. (3) Weed Ecology.
539. (1½) Responses of Plants to Air Pollutants.
549. (6) Master's Thesis.
649. Ph.D. Thesis.

POLITICAL SCIENCE—Ph.D. and M.A. degrees

Associate Professor and Head: Walter D. Young.

Professors: A. C. Cairns, H. J. Holsti, Ole R. Holsti, Frank C. Langdon, Jean A. Laponce, R. S. Milne, W. J. Stankiewicz.

Associate Professors: G. A. Feaver, Mark W. Zacher.

Assistant Professors: Donald E. Blake, Heath B. Chamberlain, David J. Elkins, Robert H. Jackson, Martin B. Levin, Paul J. Marantz, Philip Resnick, Paul L. Smoker, Paul Tennant, Michael D. Wallace, John R. Wood.

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. (1½) 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 Chairman: W. D. Kitts.

Professor: B. E. March.

Associate Professors: D. B. Bragg, C. W. Roberts.

Assistant Professor: R. C. Fitzsimmonds.

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 Embryology Laboratory: The research conducted in this laboratory is directed toward understanding the chemical controls involved in embryogenesis. Areas of research include the control of macro-molecular synthesis, induction of enzyme synthesis, calcium mobilization in the avian embryo and hormonal controls in development. Nutritional interactions in development and protein uptake by the in vitro cultivated chick embryo are also under investigation in this laboratory.

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) Advances in Poultry Development and Physiology.
513. (3) Quantitative Genetics.

521. (1½) Advances in Poultry Nutrition I.
522. (1½) Advances in Poultry Nutrition II.
523. (1½ or 3) Biometrical Techniques.
524. (1½) Advances in Poultry Nutrition III.
530. (1-3) Directed Studies.
549. (5-6) Master's Thesis.
649. Ph.D. Thesis.

PSYCHIATRY—M.Sc. degree

Professor and Head: Milton H. Miller.

Professors: Edward L. Margetts (leave of absence), James S. Tyhurst.

Associate Professors: Harry Klonoff (Head, Division of Psychology), Patrick L. McGeer, Hamish Nichol (Head, Division of Child Psychiatry), H. Clyde Slade (Honorary), Shan Sung, Juhn A. Wada, Louis I. Woolf.

Assistant Professors: Peter Bunton, M. Ali Ghaed, Roy Makepeace (Acting Head, Division of Social Psychiatry), Andrew N. McTaggart, James E. Miles, Gunther Reith, Ralph Shulman. P. Susan Stephenson.

Teaching Fellows: Jay C. C. Cheng, William Maurice.

Lecturers: Gerald E. Beroldi, Patricia Diewold, Linda C. Eaves, Henry Hoey, Valerie MacBean, Robert J. Postman, Ronald Slosky.

Clinical Professors: George A. Davidson, Joseph C. Thomas, Henry Zeldowicz.

Clinical Associate Professor: Libuse Tyhurst.

Clinical Assistant Professors: Norman B. Hirt, Carl L. Kline, Hugh L. Parfitt, Roy Slakov, Gordon H. Stephenson, Roderick L. Whitman.

Clinical Instructors: Robert Halliday, F. William Hanley, Philip G. Ney, Ernest Wong.

Lecturers from other Departments: F. D. Garrett (Anatomy), John H. V. Gilbert (Paediatrics), David C. Kendall (Paediatrics), David Quastel (Pharmacology), Robert S. Ratner (Anthropology and Sociology), R. A. H. Robson (Anthropology and Sociology).

For prerequisites and courses 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.
501. (1) Psychopathology.
502. (1) The Interview and the Examination of the Patient.
503. (2) Psychotherapy I.
504. (1) Drugs and Somatic Treatments in Psychiatry.
505. (1) Methods in Evaluation and Research.
506. (1) The Province and Functions of Psychiatry.
507. (2) Psychotherapy II.
508. (1) Group Therapy and Milieu Therapy.
508A. A series of lectures and demonstrations on sociological approaches to the group.
508B. Family Therapy.
508C. Group Therapy.
509. (1) Theories and Etiology.
510. (2) The Neurological Basis of Human Behaviour.
511. (1) The Neurological Basis of Human Behaviour (Laboratory).
512. (1) Problems of Cerebral Function.
513. (1) Behaviour Physiology.
514. (1) Neurochemistry.
515. (1) Psychopharmacology.
520. (2) Social Psychiatry.
530. (2) Development and Learning.
531. (1) Child Psychiatry.
540. (1) Psychological Measurement.
550. (3) Directed Studies.
560. (6) Master's Thesis.

PSYCHOLOGY—Ph.D. and M.A. degrees

Professor and Acting Head: Edro I. Signori.

Professors: R. D. Hare, Douglas T. Kenny, Romuald Lakowski, Louis J. Moran.

Associate Professors: David J. Albert, E. S. W. Belyea, R. S. Corteen, K. D. Craig, Robert E. Knox, Demetrios Papageorgis, D. L. G. Sampson, T. F. Storm, R. C. Tees, R. Wong.

Assistant Professors: D. Susan Butt, W. G. Davenport, D. G. Dutton, D. L. Foth, G. J. Johnson, Meredith M. Kimball, C. R. deMartino, A. G. Phillips, J. P. J. Pinel, G. E. Plum, Reva Potashin, C. J. Tragakis, C. J. S. Tuppen, F. P. Valle, D. M. Wilkie, J. 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.
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 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—Ph.D. and M.A. degrees

Professor and Head: C. G. William Nicholls.

Professor: Arthur E. Link.

Associate Professors: Charles P. Anderson, Hanna E. Kassis.

Assistant Professors: N. Keith Clifford, Shotaro Iida, Joseph I. Richardson.

Lecturers: William J. Martin (Part-time).

The Department of Religious Studies offers advanced studies leading to the degree of Master of Arts. Candidates may choose any one of four areas of

concentration: Religions of South and East Asia; Biblical Studies; Comparative Religion; Christian Thought and Institutions. Before a candidate may proceed to the writing of his 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.

The Department also offers studies leading to the Ph.D. degree in the field of Buddhist Studies.

Courses and Seminars:

500. (3) Reading and Research.
531. (3) Graduate Seminar.
549. (3-6) Master's Thesis.

RESOURCE SCIENCE CENTRE

The Resource Science Centre encourages the realignment of traditional disciplines into new patterns by offering programmes that are interdisciplinary in the broad areas of resource and environmental studies. Members of the Centre are drawn from the Faculties of Agricultural Sciences, Commerce and Business Administration, and Forestry; the Departments of Economics, Geography and Zoology; the School of Community and Regional Planning; and the Institute of Animal Resource Ecology. **Programmes leading to Master's and Ph.D. degrees** are arranged by the Centre in co-operation with one of the Faculties, Departments, School or Institute in which the student will register.

Laboratory and field facilities are available for exploring the ecological, economic, and social dimensions of renewable resource problems. A resource science computing centre houses an analogue and digital computer and optical displays. It is operated on an open-shop basis and interfaces with the university IBM 360-67 to provide an interactive mode for exploring complex simulation models.

A core of interdisciplinary courses is offered by the participating groups in four areas: Principles of Renewable Resources, Resource Economics, Planning, and Techniques of Mathematical Analysis.

Students seeking admission should apply directly to the Dean of the Faculty of Graduate Studies.

SLAVONIC STUDIES—Ph.D. and M.A. degrees

Associate Professor and Acting Head: Bogdan Czaykowski.

Professors: Cyril Bryner, Zbigniew Folejewski, Michael H. Futrell, H. E. Ronimois, James O. St. Clair-Sobell.

Associate Professors: Valerian Revutsky, Jan J. Solecki, Alexander W. Wainman.

Assistant Professors: Frank Beardow, Alex P. Harshenin, Nicholas Poppe, Irina M. Reid, Christopher J. G. Turner.

Instructors: Catherine S. Leach, Aram H. Ohanjanian, Irina Rebrin, Vera T. Reck.

M.A. and Ph.D. degrees are offered in the fields of Russian and Polish literature. Steadily growing facilities are provided for training in language, literature and area studies. Library holdings have been described in official reports as being among the best in Canada. Comparative studies can be undertaken in conjunction with the Comparative Literature Program.

Courses and Seminars

Language and Literature Studies

Russian

501. (3) History of the Russian Language.
503. (1½) Russian Linguistics: Phonemics.
504. (1½) Russian Linguistics: Morphophonemics.
505. (1½) Russian Linguistics: Lexicology.
506. (1½) Russian Linguistics: Syntax.
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.
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.

Professors: Milton Bloombaum, Reginald Robson.

Associate Professors: Yunshik Chang, Werner Cohn, Adrian Marriage, Martin Meissner, Dorothy Smith, Roy Turner.

Assistant Professors: Martha Foschi, George Gray, Graham Johnson, Blanca Muartorio-Posse, John O'Connor, Robert Ratner, Theodore Ravetz, David Schweitzer, Ronald Silvers, Matthew Speier.

(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. John O'Connor.

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.
533. (1-3) Directed Studies.
534. (1-3) Seminar.
535. (1-3) Seminar.
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.

Associate Professors: Douglas S. Lacate, Leslie M. Lavkulich, Lawrence E. Lowe.

Assistant Professors: T. Andrew Black, Timothy M. Ballard, Jan de Vries.

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 and Biometeorology, 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.
501. (1) Hydrology Seminar.
503. (1-3) Problems in Forest Tree Nutrition.
504. (1-3) Advanced Soil Chemistry.
512. (1-3) Advanced Soil Microbiology.
513. (1-3) Soil Physics.
514. (1-3) Biometeorology.
516. (1-3) Soil Genesis and Classification.
518. (1-3) Colloidal Properties in Soil.
530. (1-3) Directed Studies.
549. (5-6) Master's Thesis.
649. Ph.D. Thesis.

SPANISH—Ph.D. and M.A. degree. (See Hispanic and Italian Studies.)

SURGERY—M.Sc. degree

Professor and Head: R. C. Harrison.

Professors: F. R. C. Johnstone, *F. P. Patterson (Orthopedic).

Associate Professors: W. B. Chung; *K. S. Morton (Orthopedic).

Assistant Professors: D. B. Allardyce; I. G. M. Cleator; M. M. Cohen; I. B. Holubitsky; P. J. Moloney (Urology); S. S. Shim (Orthopedic); J. G. Schweigel (Orthopedic); I. M. Turnbull (Neurosurgery).

Honorary Assistant Professor: J. C. Brown (Department of Physiology).

***Clinical Associate Professors:** P. G. Ashmore; R. J. Cowan (Plastic); G. B. Thompson (Neurosurgery).

***Clinical Assistant Professors:** P. Allen (Thoracic); A. D. Courtemanche (Plastic); W. G. Trapp (Thoracic).

***Clinical Instructor:** G. D. McPherson (Orthopedic).

***Part-time.**

Prerequisites: M.D., M.B., D.M.D., D.V.M. or equivalent.

Surgery 548 is required. A maximum of four of Surgery 502 to 515 may be taken. The candidate with the advice of his committee may select other approved courses in related fields.

500. (2) Surgical Research.
501. (2) Surgical Methodology in Research.

Courses 502 to 515 consist of a series of two-year courses common to all branches of surgery (core) plus lectures structured for selected major disciplines in surgery. The fundamental aspects of the subject as it is presently understood will be critically discussed and the student encouraged to seek answers to unresolved questions.

502. (1) Surgical Core I.
503. (1) Surgical Core II.
504. (1) Advanced Surgery I.
505. (1) Advanced Surgery II.
506. (1) Advanced Anesthesiology I.
507. (1) Advanced Anesthesiology II.
508. (1) Advanced Orthopedics I.
509. (1) Advanced Orthopedics II.
510. (1) Advanced Urology I.
511. (1) Advanced Urology II.
512. (1) Advanced Neurosurgery I.
513. (1) Advanced Neurosurgery II.
514. (1) Advanced Plastic Surgery I.
515. (1) Advanced Plastic Surgery II.
548. (1) Seminar in Surgery.
549. (3-9) Thesis.

THEATRE—M.A. and M.F.A. degrees

Associate Professor and Head: John Brockington.

Professor: Donald E. Soule.

Associate Professors: A. J. Reynertson, Klaus G. Strassman.

Assistant Professors: Peter Loeffler, John Newton, Richard Kent Wilcox, Stanley A. Weese, Irene Prothroe.

Instructor: Kurt Wilhelm.

The Department offers opportunities for advanced studies leading to the M.A. degree 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.

The Department offers studies in stage direction and in scene and costume design leading to the M.F.A. degree.

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.
521. (3) Styles in Directing.
525. (3) Seminar: Study of a Major Dramatist.
530. (3) Seminar: Relationships Between Theatre and the Other Arts.
547. (3) Directed Studies in Theatre and Drama.
549. (3-6) Master's Thesis.
550. (3) Seminar: Advanced Problems in Design and Theatre Architecture.

URBAN STUDIES

Urban studies are the concern of several university departments. Their interests are coordinated by a Committee operating within the Faculty of Graduate Studies. The Committee sponsors seminars in which a multidisciplinary viewpoint is developed and it interests itself in facilitating research that crosses traditional departmental boundaries.

Students seeking admission to graduate work in Urban Studies should apply directly to the Dean of Graduate Studies.

THE WESTWATER RESEARCH CENTRE

Director: Irving K. Fox.

Assistant to the Director: Anthony H. J. Dorcey.

The Westwater Research Centre was established during the spring of 1971 with funding from the Department of the Environment. The function of the Centre is to conduct interdisciplinary research on problems concerning water resources and their associated lands. It is the general objective of the Centre to provide an improved foundation for decisions about policies and institutional arrangements through rigorous analysis of the alternative courses of action that might be undertaken. The Centre serves as a catalyst in conceptualizing and conducting these research enquiries which extend beyond the scope of a single discipline. The research programme is interdisciplinary in that it involves physical, biological and social scientists in the analysis of multi-dimensional problems. Faculty members of University departments constitute the research personnel of the Centre. Students may be associated with the Centre by working with a faculty member who is engaged in a Centre project.

ZOOLOGY—Ph.D. and M.Sc. degrees

Professor and Head: Peter A. Larkin.

Professors: A. B. Acton, James R. Adams, Dennis H. Chitty, Ian McTaggart Cowan, Paul A. Dehnel, Ian Efford, Cyril V. Finnegan, H. D. Fisher, W. S. Hoar, C. S. Holling, Julius Kane, A. M. Perks, J. E. Phillips, G. G. E. Scudder, H. F. Stitch, David T. Suzuki, N. J. Wilimovsky.

Associate Professors: Nelly Auersperg, James F. Bendell, Thomas H. Carefoot, Peter Ford, P. W. Hochachka, David R. Jones, C. J. Krebs, A. G. Lewis, N. R. Liley, J. D. McPhail, Harold C. Nordan, T. G. Northcote, D. J. Randall, J. Mary Taylor, C. F. Wehrhahn.

Assistant Professors: J. D. Berger, R. H. Drent, J. R. Harger, David G. Holm, Mary Jackson, Harold E. Kasinsky, John R. Krebs, Carl J. Walters.

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 and Developmental Biology—Several groups of workers in the area of cell and developmental biology, which includes GENETICS, are independently investigating problems in a number of different fields of cell biology. Following are the major topics currently under active study: Histochemistry of development in *Raja* and *Ambystoma;* skin-graft rejection in mutant mice; cytogenics of *Chironomus* and of man and other mammals; biochemistry of development; analysis of induction in the early development of the salamander; tissue culture of cancer of recombination and development in *Drosophila melanogaster;* synergistic effect of virus and chemical mutagens, incorporation of viral DNA into host cells. Equipment includes: Fluorescence and Nomarski interference microscopes (Zeiss); UV-microspectrophotometer (Zeiss); ultracentrifuge (Spinko); electron microscopes (Cambridge; Stereoscan. Hitachi HS7S and AEI801S, Phillips 75); ultramicrotomes (Porter-Blum, LKB, Reichert); cryostat; tissue culture and electrophoresis apparatus. Saltwater and freshwater aquaria, a vivarium and radioisotope handling facilities (liquid scintillation counter, automatic planchette counter) and environmental chambers are available.

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.

Research programmes include: community structure and productivity of a fresh water lake; interspecific competition between intertidal invertebrates; optimum yield and simulation models of fish populations; genetic variability with insect and plant populations; effects of predation on behaviour and genetics of fish populations; population dynamics of birds and mammals; experimental analysis and mathematical models of predation, competition, and dispersal; a systems approach to human ecology; sea bird ecology and behaviour; ecology of large mammals.

Comparative Physiology and Biochemistry—Equipment required for most kinds of sophisticated 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 investigation include: environmental physiology of marine invertebrates (particularly osmotic and ionic regulation); membrane structure and cell permeability of insect tissues; enzyme systems in poikilotherms; neurohypophysial hormones of fishes (particularly elasmobranchs) and mammalian embryos; reproductive endocrinology and behaviour of fishes; physiology of marine mammals; bioenergetics 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, a vivarium and aquarium, field equipment including vehicles and rooms for animal culture, experimentation and observation. Problems currently under investigation include: population differences and relationships between closely related species of aquatic insects (*Cenocorixa* and Chironomidae) that occur in different extremes of a salinity range; studies of functional morphology and evolution of insect structure; zoogeography of insects in British Columbia and the systematics of the Lygaeidae of the world; distribution of marine plankton in relation to physical and chemical oceanography; systematics of fishes—particularly of the North Pacific and Arctic; significance of natural variation in morphology and behaviour of fishes—particularly the guppy *Poecilia* and the stickleback *Gasterosteus*; prey selection in natural predators of the guppy; influence of environmental and hormonal factors on fish behaviour; role of predation on the origin and maintenance of isolation between genotypes (sticklebacks); reproductive biology of mammals; factors affecting reproductive output in wild populations; regulation of breeding activity in natural 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.

Resource Science Program—Dr. C. S. Holling, Director of the Institute of Animal Resource Ecology.

Oceanography—Dr. G. L. Pickard, Director of the Institute of Oceanography.

Fisheries—Dr. P. A. Larkin, Department of Zoology, Dr. N. J. Wilimovsky, Institute of Animal Resource Ecology.

Wildlife Biology—Dr. J. F. Bendell, Department of Zoology.

Courses:

The graduate courses listed below are described more fully in the Science section of the Calendar. 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; 507, 508, 509, 511, 515, 517, 520, 525, 526, 530, 532, will be offered in 1972-73 and alternate years; 503, 510, 512, 516, 522, 531, will be offered in 1973-74 and alternate years; others as required.

500. Special Advanced Course.
502. (3) Advanced Ecology.
503. (3) Comparative Physiology.
504. (1½) Ethology Seminar.
505. (3) Cell Biology.
506. (1) Marine Field Course.
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.
519. (3) Parasitology.
520. (3) Limnology.
521. (3) Fisheries Biology and Management.
522. (2) Limnology Seminar.
525. (1½) Problems in Systematics and Evolution.
526. (1) Marine Zoogeography.
527. (2) 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 1971

Department	Degree	Total
Agricultural Economics	M.Sc.	11
Agriculture Engineering	M.A.Sc.	5
Agricultural Mechanics	M.Sc.	3
Anatomy	M.Sc.	1
	Ph.D.	2
Animal Science	Ph.D.	8
	M.Sc.	11
Anthropology	M.A.	34
	Ph.D.	30
Architecture	M.Arch.	9
Asian Studies	M.A.	10
	Ph.D.	6
Audiology	M.Sc.	10
Biochemistry	M.Sc.	8
	Ph.D.	19
Botany	M.Sc.	24
	Ph.D.	42
Chemical Engineering	M.A.Sc.	14
	Ph.D.	12
Chemistry	M.Sc.	27
	Ph.D.	107
Civil Engineering	M.A.Sc.	28
	M.Eng	11
	Ph.D.	12
Classics	M.A.	5
	Ph.D.	13
Commerce	M.B.A.	174
	M.Sc.	21
	Ph.D.	31
Community and Regional Planning	M.A.	52
	M.Sc.	17
	Ph.D.	5
Comparative Literature	M.A.	16
Computer Science	M.Sc.	29
	Ph.D.	3
Creative Writing	M.A.	24
Economics	M.A.	20
	Ph.D.	19
Education	M.A.	96
	M.Ed.	168
	Ed.D.	67
Electrical Engineering	M.A.Sc.	41
	Ph.D.	31
Engineering Physics	M.A.Sc.	1
English	M.A.	112
	Ph.D.	54
Fine Arts	M.A.	18
Food Science	M.Sc.	11
	Ph.D.	8
Forestry	M.F.	21
	M.Sc.	20
	Ph.D.	32
French	M.A.	20
	Ph.D.	39
Geography	M.A.	37
	Ph.D.	17
Geological Engineering	M.A.Sc.	5
Geology	M.Sc.	20
	Ph.D.	26
Geophysics	M.Sc.	15
	Ph.D.	18
Genetics	M.Sc.	4
	Ph.D.	11
German	M.A.	7
	Ph.D.	23
Hispanic & Italian Studies	M.A.	20
History	M.A.	37
	Ph.D.	24
Human Nutrition	M.Sc.	6
Interdisciplinary	M.A. and M.Sc.	3
Law	LL.M.	4
Linguistics	M.A.	15
Mathematics	M.A.	9
	M.Sc.	26
	Ph.D.	41
Mechanical Engineering	M.A.Sc.	10
	Ph.D.	13
Metallurgical Engineering	M.A.Sc.	17
	M.Eng	1
	Ph.D.	9
Metallurgy	M.Sc.	5
	Ph.D.	8
Microbiology	M.Sc.	11
	Ph.D.	13
Mineral Engineering	M.A.Sc.	7
	M.Eng.	1
	Ph.D.	3
Music	M.Mus.	22
Nursing	M.S.N.	23
Pathology	M.Sc.	1
	Ph.D.	3
Pharmaceutical Sciences	M.Sc.	11
	Ph.D.	9
Pharmacology	M.Sc.	2
	Ph.D.	5
Philosophy	M.A.	8
	Ph.D.	29
Physical Education	M.P.E.	20
Physics	M.Sc.	43
	Ph.D.	66
Physiology	M.Sc.	13
	Ph.D.	7
Plant Science	M.Sc.	14
	Ph.D.	8
Political Science	M.A.	30
	Ph.D.	20
Poultry Science	M.Sc.	6
	Ph.D.	4
Psychology	M.A.	30
	Ph.D.	22
Psychiatry	M.Sc.	1
Religious Studies	M.A.	10
Romance Studies	Ph.D.	13
Slavonic Studies	M.A.	21
	Ph.D.	7
Sociology	M.A.	30
	Ph.D.	34
Soil Science	M.Sc.	12
	Ph.D.	7
Surgery	M.Sc.	5
Theatre	M.A.	16
Zoology	M.Sc.	68
	Ph.D.	81
	Total	2779

THE SCHOOL OF COMMUNITY AND REGIONAL PLANNING

(A School of the Faculty of Graduate Studies)

ACADEMIC STAFF

H. Peter Oberlander, B.Arch. (McGill), M.C.P., Ph.D. (Harvard), Professor and Director. (Leave of absence to June 1972.)

Brahm Wiesman, B.Arch., M.Arch. (Planning) (McGill), Associate Professor and Acting Director to June 30, 1972.

Robert W. Collier, A.B. (Whittier), M.S., Ph.D. (Urban Studies) (S. Calf.), Associate Professor and Assistant Director to June 30, 1972.

Irving K. Fox, A.B., A.M. (Social Sci.) (Michigan), Professor of Regional Planning; Director, Water Resources Research Centre.

V. Setty Pendakur, B.E. (Civil) (Mysore), M.Sc. (Planning) (Brit. Col.), M.S.C.E., Ph.D. (Transportation) (Wash.), Professor.

Gordon W. Stead, B.Com., B.A. (Economics), LL.D. (Brit. Col.), Visiting Professor.

Jonas Lehrman, Diploma (A.A. London), Diploma (Town Planning) (University College, London), M.Arch. (McGill), Visiting Associate Professor.

Nirmala devi Cherukupalle, B.Sc., M.A. (Madras) M.R.P., Ph.D. (Planning) (Harvard), Assistant Professor.

H. Craig Davis, B.S.E.E. (Purdue), M.A., Ph.D. (Economics) (Calif.), Assistant Professor.

William E. Rees, B.Sc. (Hons. Life Sci.), Ph.D. (Ecology) (Toronto), Assistant Professor.

Paul O. Roer, B.A.Sc. (Toronto), M.A.Sc. (Transportation) (Waterloo), Assistant Professor.

Michael Y. Seelig, Dip. Arch. (Hammersmith), M.C.P., Ph.D. (City Planning) (Penn.), Teaching Postdoctoral Fellow.

William T. Lane, B.A., B.Com., LL.B. (Brit. Col.), Part-Time Lecturer.

Norman Pearson, B.A., M.A. (Planning) (Brit. Col.), Part-time Lecturer.

Honorary Professors:

C. S. Holling, M.Sc. (Toronto), Ph.D. (Brit. Col.), Professor of Zoology and Director of the Institute of Animal Resources Ecology.

R. L. Taylor, M.Sc. (McGill), Ph.D. (Berkeley), Professor of Plant Science and Director of Botanical Gardens.

THE SCHOOL OF COMMUNITY AND REGIONAL PLANNING

Over the past few decades we have witnessed the rapid growth and a shift in the distribution of the Canadian population from the rural countryside to our burgeoning cities and towns. Thus Canada has clearly emerged as an urban nation, faced with the challenge of the rapid social, economic, political and environmental changes inherent in a city-oriented society in an urbanizing world. Concurrently, the total impact of our technological society on the rural and natural environment is increasing at an accelerating rate, with mushrooming world demand for renewable and non-renewable resources.

Within this context the field of planning has expanded rapidly. Permanent planning agencies are now recognized as an essential part of municipal government and play an increasingly important role within the framework of metropolitan, regional, provincial and federal government programs.

Planning is concerned with anticipating and guiding social, economic, political and environmental changes and involves a wide range of rationally applied techniques of research, analysis and design. In addition, the scope of planning has broadened to include administrative and co-ordinating activities within individual agencies and between agencies at all levels of government. Community and regional planning utilizes all these techniques to relate rational decision-making to the factors affecting the patterns and process of human settlement and regional growth. Planning thus constitutes an increasingly multi-disciplinary and therefore comprehensive approach to the distribution and use of human and natural resources.

The teaching and research programmes of the School emphasize community and regional planning in the context of rapid urbanization in a resource conversion economy. The curriculum is particularly concerned with the spatial implications of urban and regional development and the opportunity for improving the quality of the resulting environment through planning as an integrative and coordinative process. The School is therefore oriented toward preparing students for a professional career as planners in an urbanizing world, and offers appropriate facilities for urban and regional research leading to the Master's and Ph.D. degrees.

The School's Master's Degree programme is highly structured with emphasis on course work. A thesis is also required. The following three areas of specialization are offered, but the School recognizes the need for flexibility in the design of individual programmes:

(a) Resource Development and Regional Planning.
(b) Transportation and Support Systems.
(c) Urban Structure and Housing.

The Master's degree will be either a Master of Arts or Master of Science, whichever best describes the prerequisites offered by the candidate and the course chosen.

The School's doctoral (Ph.D.) program in community and regional planning is intended for students wishing to teach and pursue advanced urban and regional research.

Master's Degree Programme

Application for Admission

To facilitate admissions procedure the school requests that applications for admission be filed by February 15th. Applications should be accompanied by a written statement of not more than 500 words indicating why the student wishes to study planning, and his reasons for electing to pursue his chosen field at the University of British Columbia.

Prerequisites for Admission

A Bachelor's degree with high standing is a prerequisite for admission to the School. In addition, maturity demonstrated by a capacity for involvement through self education and strong interaction with faculty and fellow students is desirable.

Undergraduate backgrounds of applicants to the School vary widely and include: Agriculture, Anthropology, Architecture, Civil Engineering, Commerce, Economics, Fine Arts, Forestry, Geography, Law, Philosophy, Psychology, Political Science, Sociology, and 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 courses that relate directly to his graduate study in Community and Regional Planning at the 300-level or above, in three different fields during his undergraduate study. The following courses listed in the general calendar of the University exemplify courses that satisfy these requirements: Anthropology 300, 412, 430; 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, 364, 385, 400, 409, 412, 415, 460, 481, 484; Fine Arts 228, 331, 425, 431; Geography 350, 351, 360, 361, 366, 407, 450, 460, 461, 462; Philosophy 424; Political Science 300, 302, 304, 400, 404; Sociology 330, 425; Soil Science 314, 416; Zoology 401, 421.

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, the student will take courses listed above in the specific field in which his background is deficient.

Applications for admission to the programme should be in the hands of the Director before February 15.

Curriculum:

The candidate for the Master's degree must satisfactorily complete an approved programme of study consisting of a minimum of 30 units of core courses and elective courses. The candidate ought to choose an area of specialization at the beginning of the second semester of the first year and select his course work accordingly.

MASTER'S PROGRAMME CURRICULUM

TERM I	OPTION	TERM II	TERM III	TERM IV
Planning 500 (1½) Four electives	(a) Resource Development and Regional Planning	Planning 500 (1½) Planning 507 (1½) Planning 527 (1½) Two Electives (3) Electives should include not fewer than two of Pl. 520, 521, 526	Planning 522 (1½) Planning 549 (1½) Three Electives (4½)	Planning 549 (3) Three Electives (4½)
		Electives to be selected from the following courses: Planning 425, 501, 502, 503, 505, 508, 520, 521, 522 (4th Term), 523, 525, 526, 528, 533, 550 Agriculture 310 Commerce 307, 507, 508, 510 Economics 470, 540 Forestry 491, 492, 591, 593 Geography 461, 462, 463, 464, 497 Political Science 404 Resource Ecology 500		
	(b) Transportation and Support Systems	Planning 500 (1½) Planning 507 (1½) Planning 527 (1½) Planning 535 (1½) One Elective (1½) Electives should include not fewer than two of Pl. 531, 532, 533, 534	Planning 522 (1½) Planning 549 (1½) Electives (4½) Three Electives (4½)	Planning 549 (3) Three Electives (4½)
		Electives to be selected from the following courses: Planning 425, 501, 502, 503, 505, 508, 521, 522 (4th term), 523, 525, 526, 528, 531, 532, 533, 534, 550. Commerce 342, 510, 544, 545 Civil Engineering 585, 586 Economics 484 Geography 464 Political Science 404 Resource Ecology 500		
	(c) Urban Structure and Housing	Planning 500 (1½) Planning 507 (1½) Planning 527 (1½) Two Electives (3) Electives should include not fewer than two of Pl. 504, 510, 511	Planning 522 (1½) Planning 549 (1½) Three Electives (4½)	Planning 522 (1½) Planning 549 (1½) Two Electives (3)
		Electives to be selected from the following courses: Planning 425, 501, 502, 503, 504, 505, 508, 510, 511, 521, 523, 525, 526, 528, 532, 535, 550 Agriculture 310 Architecture 424, 504 Civil Engineering 585, 586 Commerce 307, 507, 508, 509, 510 Geography 450, 464 Political Science 404 Resource Ecology 500		
Total Units 7½		7½	7½	7½

Examinations and Thesis (see Faculty of Graduate Studies)

Additional Requirements:

In addition students are required to gain work experience either with a community planning agency or conducting research during the summer months following the first year.

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.

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 Maser's course.

Ph.D. Programme

Prerequisites for Admission:

A Master's degree in Community and Regional Planning or equivalent is a prerequisite for admission to the doctoral programme. The programme emphasizes original scholarly contribution to the problems and methods in community and regional planning and therefore only cadidates with high academic standing and demonstrated aptitude for independent research are admitted to the programme. The candidate is required to choose one of the areas offered by the School as his specialization and scholarly research as a primary basis of his doctoral programme.

Therefore, candidates applying for admission to the doctoral programme should submit a brief statement of purpose and research objectives they wish to pursue if admitted to the programme. This statement, not exceeding 1000 words, should be clear enough to enable the School to evaluate not only the candidate's research objectives but also the School's interest and capabilities to handle the candidate's proposed research.

Candidates interested in pursuing doctoral study in Community and Regional Planning should apply directly to the Director of the School. The number of candidates that can be accommodated is limited.

Curriculum

Students will normally be required to spend a minimum of two winter sessions at the University. 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.

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.

Students proceeding to the Ph.D. degree are expected to devote full time to their academic programme, and those who undertake remunerative employment other than Teaching Assistant duties, 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 addition-

al 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 School.

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 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.

It shall be the duty of each candidate's committee to recommend the kind and number of courses to be taken by the student in relation to his background and to the requirements which are appropriate to the doctoral level in the chosen major field. The membership of the Candidate's Committee may, if necessary, be altered during the study period. The Executive Committee of the Faculty of Graduate Studies will approve all such changes.

Upon registration the student must outline his proposed programme of study to his Candidate's Committee for its approval, followed by that of the School, 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 fulfillment of the requirements for the degree.

Changes in the programme of study may be required during the study period, and these must be approved by the Candidate's Committee, the School, and the Executive Committee of the Faculty.

Dissertation Requirements:

After successful completion of the qualifying comprehensive examinations and language requirements as approved by the candidate's committee, the candidate will formally proceed with research related to his dissertation. The primary purpose of the dissertation is to pursue scholarly research in the chosen area and to demonstrate research and scholarly competence in tools and techniques and methods of planning as they are applied to the chosen specialized area. 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 Dean. At the completion of his research the candidate is expected to take an oral examination in full defence of his dissertation as required by the Faculty of Graduate Studies.

Examinations and Thesis
Courses for Credit } See the Graduate Studies section of the calendar.

See the General Information section of the calendar for:

(i) Fees
(ii) Attendance
(iii) Review of Assigned Standing
(iv) Graduation
(v) Withdrawal
(vi) Transcript of Academic Record

See the Graduate Studies section of the calendar for:

(i) Registration
(ii) On-leave status
(iii) Graduate Student Association
(iv) Thea Koerner House

Financial Assistance to Students

The School offers several scholarships, fellowships and assistantships for master's and doctoral students. These financial awards vary from $500 to $3000 for an academic year depending upon the candidate's background, need and academic competence. While fellowships and scholarships are awarded to enable the candidates to pursue their academic goals with no strings attached, the research and teaching assistantships have several requirements. The teaching assistantships involve assisting the faculty in teaching programmes and research assistantships involve either independent or supervised research during the academic year and/or the summer.

The recipients of financial awards are not exempt from fees and other financial obligations to the University.

The following scholarships and fellowships are currently offered by the School:

Central Mortgage and Housing Corporation Fellowships:

The Corporation awards about 160 Fellowships each year varying from $3000-$5000 per annum for students entering or continuing Master's or Doctoral programmes. Admission to a recognized School is a pre-requisite. Details and application forms available from the Central Mortgage and Housing Corporation, Montreal Road, Ottawa, Ontario, by January 15, 1972.

National Parks Fellowships:

Fellowships supported by the National Parks Service of Canada of $2000 each will be available to students pursuing thesis research in the area of Outdoor Recreation.

Transportation Fellowships:

About 35 fellowships for postgraduate studies related to the field of transportation are available through the Canadian Transport Commission. Basic awards are $3,600 at the Master's Degree level and $4,500 at the Doctoral level, plus travel allowances and a $1,000 supplementary grant for successful applicants with one or more dependent children. Admission to a recognized school is a prerequisite.

Applications are available directly from the Canadian Transport Commission, 275 Slater Street, Ottawa. Deadline for filing for the 1972 program was March 15, 1972.

University of British Columbia Fellowships:

One Fellowship of $2,500 may be available for an exceptionally qualified student in Community and Regional Planning.

Assistantships:

Several teaching and research assistantships through the Academic year and summer recess are available for students in the Master's or Doctoral programmes.

Application Procedures for Financial Assistance

Admission to the School is a prerequisite for application for financial assistance. The student should apply in writing to the Director of the School, specifying the award, or awards he is interested in.

An additional list of Fellowships, Scholarships, Bursaries and Loans open to students in the University will be found in the Awards and Financial Assistance section of the calendar. In general, application must be made to the Dean of Inter-Faculty and Student Affairs.

Urban Studies Committee

The School co-operates with other departments with interests in Urban Studies. The activities in Urban Studies are coordinated by a Committee operating within the Faculty of Graduate Studies. The Committee sponsors joint seminars which emphasize a multi-disciplinary viewpoint. Students wishing to do graduate work in this area should apply directly to the Dean of Graduate Studies.

Research Programme

The School has on-going research efforts in:

1. Transportation
2. Housing and the Residential Environment
3. Regional Development
4. Environmental Quality.

Students interested in research in these areas should apply to the Director, School of Community and Regional Planning.

Description of Courses

Planning 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 centuries in Europe and North America; the antecedents of the current planning process in Canada. Emphasis is placed upon urban planning as a process of Government within the general framework of social and economic change as the city becomes the prevailing way of life in Canada. Examples from Greater Vancouver are used.

This course is identical and corresponds to *Arch. 425* see School of Architecture listing.

Planning 500. (3) Community Planning Workshop I.—This course and its sequels, Planning 510 and Planning 520 and Planning 534, form the core of the planning curriculum. It is organized as a planning workshop and seminar. Students work individually and collaboratively. During the first term emphasis is placed on planning theory; decision-making and the political process; and the structure and evolution of the urban community. During the second term, planning projects dealing with the details of survey, analysis and design introduce the student to the problems of urban communities and their possible solutions.

Planning 501. (1½) Introduction to Planning Analysis.—The context within which analysis for planning takes place as a professional activity; relationship to the social sciences. Concepts of statistics within a planner's frame of reference. Questionnaire design and scaling methods, sampling design. The general kinds of analyses in planning and their application to urban and regional problems.

Planning 502. (1½) Advanced Planning Analysis I.—Use of the scientific method in planning decision-making. Methods and techniques of analysis, forecasting and programming in population, economic base, and land use studies. Concepts and application of social indicators.

Planning 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.

Planning 504. (1½) Urban Land Subdivision.—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.

Planning 505. (1½) Traffic and Transportation Planning.—Problems, policies and prospects in Transportation Planning in a multi-modal framework; transport infrastructure and the urbanization process; metropolitan transportation trends; policy issues and policy formulation at federal, provincial and metropolitan levels, mass transportation issues and trends; organization for transportation planning, public finance in transportation, current traffic measurements, origin-destination studies, transit studies; transport problems and prospects. This course is a prerequisite for students selecting the transportation planning option.

Planning 506. (1½) Urban Land Planning and Economic Change.—The economic principles governing the structure, growth, and development of urban economies. 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.

Planning 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.

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, the use of multivariate statistical tools.

Planning 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.

Planning 511. (1½) Urban Renewal Seminar.—Federal, Provincial and local objectives, and programmes in the areas of urban development, rehabilitation, conservation, and public housing are reviewed. 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.

Planning 520. (1½-3) 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.

Planning 521. (1-3) Regional Planning Theory, Methods and Techniques.—The principles, 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.

Planning 522. (1½-3) 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.

Planning 523. (1½). Seminar on Urban and Regional Planning in Developing Countries.—Issues in Spatial Aspects of Economic Development. Dualism, Spatial Allocation of Investment, Balanced vs. Unbalanced growth; Urbanization in Developing Countries, Magnitudes, Empirical Documentation, Morphology of Cities, Investment in Urban Facilities and services. Cost of Urbanization Cultural role of Urbanization; Implementation of Community and Regional Planning, Physical Planning in the context of a National plan. Innovation in Administration and Bureaucracy, Legal and Fiscal tools in Local Planning, The Context of Economic Development.

Planning 525. (1½) Environmental Planning II (Regional Environmental Planning: An Ecological Approach).—Human perception of environment and implications for regional planning; human environments—the dynamics of social and man-oriented ecological systems; environmental considerations in regional planning—environmental resource analysis and the ecological basis for land-use planning; regional recreational resource planning; the future—implications of urbanization as a way of life.

Planning 526. (1½) Regional Planning in Canada.—An examination of federal, provincial and regional agencies involved in regional planning in Canada. Discussion of agency definition of regions and regional development. Agency intervention in regional economic development; statutory, social, economic and land-use aspects. Constitutional issues and federal-provincial roles in regional development; agency programmes and approaches in Canadian regions.

Planning 527. (1½) Quantitative Methods in Regional Planning I.—Network analysis, export base theory, input-output analysis and linear programming in the context of regional planning and development. Discussion of the function of model building in the planning profession. Use is made of computer library routine.

Planning 528. (1½) Quantitative Methods in Regional Planning II.—Markov processes, simulation, network analysis, and dynamic programming as applied in regional planning. Evolutionary aspects and potential applications in the planning context. Use is made of computer library routine.

Planning 531. (1½). Urban Mass Transit Planning.—The evolution of urban mass transit, analysis of developments in selected cities; Transit Systems Characteristics and Design Aspects, networks, route location criteria, land use and community impacts; Emerging concepts, network and vehicle system technology; Mode characteristics and consumer choice, mode indifference, captive and non-captive demand; Terminals and inter-modal co-ordination, feeder systems, neighborhood impact; Policy aspects, social, political, economic and financial issues.

Planning 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 Urban Structure.

Planning 533. (1½) Transportation Planning II.—Regional and System's Analysis.

Regional Transportation Needs and Regional Development; Transport Technology and Transportation Modes; Inter-relationship between Air, Rail and Road, Travel; Transportation Terminal Systems and Inter-Terminal Transportation; Transport Investment and the Regional Economy; Regional Transportation for Resource Development; Recreation and Special Purposes; Transport System's Analysis and Coordination.

Planning 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.

Planning 535. (1½) Transportation Planning III-Models.—The application of transportation models to the process of planning metropolitan transportation systems. Techniques of forecasting and predicting travel demands and their relationships to land use and urban development; the application and interpretation of models for travel generation, travel distribution, modal choice, and trip assignment.

Planning 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.

Planning 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.

Planning 649: Thesis for the Ph.D. degree.

THE FACULTY OF LAW

ACADEMIC STAFF

A. J. McCLEAN, LL.B. (Queen's, Belfast), Ph.D. (Cantab.), Professor and Dean of the Faculty.

G. F. CURTIS, Q.C., LL.B. (Sask.), B.A., B.C.L. (Oxon.), LL.D. (Dalhousie, Sask.), D.C.L. (New Brunswick), Professor.

C. B. BOURNE, B.A. (Toronto), LL.B. (Cantab.), S.J.D. (Harvard), Professor.

P. T. BURNS, LL.B., LL.M. (Otago), Professor.

L. GETZ, B.A., LL.B. (Cape Town), LL.M. (London and Harvard), Professor.

R. G. HERBERT, D.F.C., C.D., B.A., LL.B. (Brit. Col.), Professor.

D. S. M. HUBERMAN, B.A., LL.B. (Brit. Col.), LL.M. (Harvard), Professor.

L. G. JAHNKE, LL.B. (Sask.), LL.M. (London), Professor.

D. J. MacDOUGALL, LL.B. (Melbourne), J.D. (Chicago), Professor.

J. M. MacINTYRE, B.Com., LL.B. (Brit. Col.), LL.M. (Harvard), Professor.

J. C. SMITH, B.A., LL.B. (Brit. Col.), LL.M. (Yale), Professor.

A. R. THOMPSON, LL.B. (Manitoba), LL.M. (Toronto), J.S.D. (Columbia), Professor.

E. C. E. TODD, LL.B., LL.M. (Manchester), Professor.

J. J. ATRENS, B.A. (Sask., Oxon.), M.A., B.C.L. (Oxon.), Associate Professor.

C. R. B. DUNLOP, B.A., LL.B., M.A. (Alberta), LL.M. (London), Associate Professor.

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D. W. ROBERTS, B.A., LL.B. (Brit. Col.), LL.M. (Harvard), Associate Professor.

S. H. BERNER, B.A., LL.B. (Brit. Col.), LL.M. (London), Assistant Professor.

W. W. BLACK, A.B. (Stanford), LL.B. (Harvard), Assistant Professor.

C. CARR, LL.B. (London), Assistant Professor.

R. D. DIEBOLT, B.A., LL.B. (Brit. Col.), LL.M. (London), Assistant Professor.

H. R. EDDY, B.A. (Harvard), J.D. (Wash.), Assistant Professor.

R. T. FRANSON, B.E.P. (Cornell), J.D. (Calif.), Assistant Professor.

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THE HON. MR. JUSTICE V. L. DRYER, B.A. (Brit. Col.), Lecturer on Evidence.

L. AMIGHETTI, B.A., LL.B. (Brit. Col.), Lecturer on Succession.

Y. M. CHERNOFF, B.Com., LL.B. (Brit. Col.), C.A., Lecturer on Accounting.

J. R. CUNNINGHAM, LL.B. (Brit. Col.), Lecturer on Maritime Law.

W. F. DICKSON, B.A., LL.B. (Dalhousie), LL.M. (Harvard), Lecturer on Securities Regulations.

B. E. EMERSON, B.A., LL.B. (Brit. Col.), Lecturer on Municipal Law.

J. T. ENGLISH, B.Com., LL.B. (Brit. Col.), LL.M. (Harvard), Lecturer on Vendor Purchaser and Advanced Real Property.

R. F. GOSSE, Q.C., LL.B. (Brit. Col.), Ph.D. (Oxon.), Lecturer on Law Reform.

M. GROPPER, B.A., LL.B. (Sask.), LL.M. (London), Lecturer on Corporate Planning and Corporate Finance.

H. A. HOLLINRAKE, LL.B. (Brit. Col.), Lecturer on Insurance and Civil Litigation.

K. C. MACKENZIE, B.Com., LL.B. (Brit. Col.), LL.M., S.J.D. (Mich.), Lecturer on Civil Litigation.

A. M. MARCUS, B.A., M.A. (Cantab.), L.M.S.S.A. (London), D.Psych. (McGill), Assistant Professor Faculty of Medicine, Division of Forensic Psychiatry, Lecturer on Law and Psychiatry.

G. R. SCHMITT, B.A., LL.B. (Sask.), LL.M. (Harvard), Lecturer on Insurance and Civil Litigation.

J. G. WATSON, B.Sc., LL.B. (Dalhousie), Lecturer on Estate Planning.

T. V. McCALLUM, B.A., LL.B. (Brit. Col.), Honorary Liaison Secretary.

N. A. M. MACKENZIE, President Emeritus, Honorary Professor of Public International Law.

F. READ, LL.B. (Man.), Professor Emeritus of Law (1950).

T. J. SHORTHOUSE, B.A., B.L.S. (Brit. Col.) Librarian.

A. H. SOROKA, B.A. (Columbia), LL.B. (Virginia), M.L.S. (Columbia), Librarian.

MRS. G. MACRAE, B.A., B.L.S. (Brit. Col.), Librarian.

FACULTY OF LAW

General

The Faculty of Law was established in 1945. The present building, opened in 1951, contains a library of approximately 70,000 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 section of the 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. The number of students entering the practice of law in Canada has increased in the last few years to a large extent and a degree in law is no guarantee of a position in either the necessary year of articles (described below) or in the practice of law.

Admission: (i) *Application*

All applicants applying for entry to the faculty, 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 June 30. 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.

All students applying for admission to the Law School are required to take the Law School Admission Test (L.S.A.T.). This is a uniform general admission test which is designed to evaluate capacities for analysis and expression and to assist the Faculty in considering the merits of students who apply, as they now do, with widely varying academic backgrounds. The L.S.A.T. score will not be used as an absolute criterion of admission or rejection, but will be used in combination with the other materials presently supplied by candidates. The test is administered in many locations in Canada and the United States and will be administered at least at the University of British Columbia and perhaps at other centres in British Columbia. The L.S.A.T. scores are sent to the applicant and also directly to any law school as requested by the applicant.

Candidates should apply to "Law School Admission Test, Educational Testing Service, Box 944, Princeton, New Jersey, 08540, U.S.A." Further information about dates and locations may be obtained from the Faculty, but the application to take the test must be made directly to the above address. The test dates vary slightly from year to year, *but the last available date for registration for this test may be as early as March 10*, and so applicants must ensure that they have registered and taken the test in time for the results to reach the Faculty before the deadline for admissions.

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 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.

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 1¼ inches by 1¾ 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.

See the General Information section for regulations governing:

(i) fees
(ii) attendance
(iii) review of assigned standing
(iv) graduation
(v) transcript of student record
(vi) withdrawal.

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 20, 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 20 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.

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.

Examinations (i) *General*

Final examinations will be held at the close of each term in December and April except in respect of full year courses which will be examined in April. Such examinations *may* be substituted or supplemented from time to time as may be deemed appropriate.

A student, in order to pass his year, must obtain an average of not less than 55 per cent in the work of that year. No supplemental examinations will be granted or held.

Results in each course will be given in bands and candidates will be ranked in units of one for all those falling within the top 25% of the class or in quarters for all those below that number. No other information will appear on the transcript.

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.

Admission as Barristers and Solicitors

The possession of an LL.B. degree does not in itself confer the right to practise 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. It is now published twice yearly. 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

The LL.B. programme requires a student to acquire a total of 45 units in his three years in the Law School. Thus he will need to average 15 units each year. Necessary adjustments will be made for students who commenced their studies under the former curriculum.

All of the first-year courses are compulsory. In second and third years all courses will be optional except for (a) Evidence, and (b) one subject from a "Legal Philosophy" grouping.

A student must undertake, in either his second or third year, at least one independent research project and submit a substantial paper (or series of papers) embodying the results of this research. This obligation usually will be satisfied within the seminar programme. However, a limited number of students may complete this obligation outside the seminar programme by taking Law 501 or Law 503 (Directed Research).

101. Canadian Constitutional Law. Two hours per week, both terms.
General principles and distribution of powers in the Canadian constitution.

103. Contracts. Three hours per week, both terms.
Historical development; formation and enforceability of contracts; parties; contractual terms; changes of circumstances; remedies for breach.

105. Criminal Law and the Criminal Process. Two hours per week, both terms.
Bases of criminal responsibility; principles and objectives of the criminal law and procedure; particular offences.

107. Legal Institutions. Two hours per week, first term.
An introduction to the courts and the legal profession. The structure and functions of the court system and its relationship to other branches of government. Appointment, tenure, removal of judges. The courts and the community. The legal profession, its role and organization. The adversary system.

109. Principles of Civil Litigation. Two hours per week, second term.
An introduction to the principles governing the conduct of civil litigation. Procedure as a means for the orderly resolution of disputes. The stages of civil litigation from commencement to judgment.

111. Real Property. Three hours per week, both terms.
Historical and conceptual analysis of interests in land, future interests, the Torrens system of land registration.

113. Torts. Three hours per week, both terms.
A study of the bases of civil liability for intentionally and accidentally caused harms.
Legal Writing and Moot Court: 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 AND THIRD YEARS

In any given year, one or more of the following courses may not be offered if Faculty is not available or student demand is insufficient.

All students must take 231 Evidence and one subject from the group of "Legal Philosophy" courses (239 Jurisprudence; 241 Modern Jurisprudential Problems and 247 (Legal Process).

Each student must then take a sufficient number of programmes from the courses and seminars listed to obtain the total number of units required (45) for the LL.B. degree. Necessary adjustments will be made for students who commenced their studies under the former curriculum. The unit value of each course is shown in the course description.

A student may not enrol in a course for which another subject is a "prerequisite" unless he has previously taken the required course. In special circumstances the Dean, in consultation with the Faculty member teaching the subject, may waive this stipulation. A student may enrol in a course without taking the "recommended" courses. However these recommendations are intended to guide student choice and students would be ill-advised to disregard them. Where you do not propose to take the recommended course you should discuss your proposed programme with a Faculty member.

201. Administrative Law. Three hours per week, one term. (1½ units)
Consideration of the system of legal control exercised through non-judicial agencies and the relationship of the courts to the administrative process.

203. Advanced Criminal Law. Two hours per week, one term. (1 unit)
An examination of selected topics relating to the substantive criminal law. The course will concentrate on topical problems, including the evaluation of the legislative policy expressed in the Criminal Code in the light of proposals for reform and modern research, the examination of specific offences and categories of offences, defences to criminal charges, and the mentally-ill offender. The course will be designed to provide comprehensive coverage of the topics selected.

205. Advanced Criminal Procedure. Two hours per week, one term. (1 unit)
The course will examine selected topics relating to criminal law enforcement and procedure. The subjects to be considered will include the following: the relation of the police to the community; police powers and practices in the enforcement of the criminal law; the impact of the criminal process on specific groups in society; the collection and presentation of evidence in criminal cases; modern techniques of investigation; appeals in criminal matters; the comparison of Canadian procedures with those of other jurisdictions; and sentencing of offenders.
Recommended: 231 Evidence

207. Advanced Real Property. Three hours per week, one term. (1½ units)
A study of the law relating to the sale and purchase of realty with particular emphasis on remedies available for breach of realty contracts; the law of mortgages.

209. Agency and Partnership. Two hours per week, one term. (1 unit)
An examination of the legal principles governing the relationship between principal and agent and those with whom they deal, with partnership being used as a significant example of those relationships.

211. Civil Liberties. Two hours per week, one term. (1 unit)
The study of the relationship between the government and the individual. Consideration of freedom of expression, freedom of religion, immigration and citizenship, minority groups, and the Canadian Bill of Rights.

213. Commercial Transactions. Three hours per week, one term. (1½ units)
A study of the law of sale of goods and bills of exchange.

215. Company Law. Three hours per week, one term. (1½ units)
The structure and characteristics of the corporation; the promotion and organization of business corporations; authority and fiduciary obligations of management; shareholders' rights and remedies.
Recommended: 209 Agency and Partnership

217. Conflict of Laws. Three hours per week, one term. (1½ units)
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.
Recommended: Not to be taken in Second Year

219. Consumer Protection. Two hours per week, one term. (1 unit)
Relation of the legal process to the marketplace; history of market practices; appraisal of how the political process treats consumer proposals; the overcommitted debtor; adequacies of government services for the consumer.
Recommended: 213 Commercial Transactions
261 Secured Transactions

221. Corporate Finance. Two hours per week, one term. (1 unit)
An analysis of the legal characteristics of various kinds of corporate securities (common and preferred shares, warrants, options, etc.), aspects of the law of dividends, corporate reorganizations (including reductions of capital, amalgamations, etc.), loan financing and floating charges.
Recommended: 215 Company Law

223. Corporate Planning. Two hours per week, one term. (1 unit)
Advanced study of corporate planning; corporate reorganization and the problems of financing and taxation.
Prerequisite: 215 Company Law

225. Creditors' Remedies. Two hours per week, one term. (1 unit)
The remedies of the unsecured creditor, such as execution, garnishment, and equitable execution; fraudulent conveyances and preferences; creditors' agreements; mechanics' liens; bankruptcy.
Recommended: 261 Secured Transactions
213 Commercial Transactions

227. Equitable Remedies. Two hours per week, one term. (1 unit)
The history and development of equity; remedies for injuries to tangible property as well as to business disparagement and interests to personality; injunctions; specific performance.

229. Estate Planning. Two hours per week, one term. (1 unit)
(Students who have taken Commerce 370 cannot take this course.) Advanced study of pre-death planning of dispositions of property with emphasis on tax considerations.
Recommended: 269 Taxation
271 Trusts
267 Succession

231. Evidence. Two hours per week, both terms. (2 units)
Problems of proof, materiality, admissibility; the hearsay rule, confessions, opinion evidence, relevancy, corroboration, character evidence and similar problems.

233. Family Law. Three hours per week, one term. (1½ units)
The law of marriage, separation and divorce; custody, support and adoption; family courts, property rights.

235. Insurance. Two hours per week, one term. (1 unit)
The general legal principles of life, automobile, fire, and other types of insurance; the regulation of the insurance industry.

237. International Organizations. Two hours per week, one term. (1 unit)
A study of current international organizations including the United Nations, international economic and social organizations and the institutional aspects of the European Communities. Particular attention is paid to the law-creating role and processes of these organizations.

239. Jurisprudence. Two hours per week, both terms. (2 units)
(Students who take 241 Jurisprudence [Modern Jurisprudential Problems] cannot take Jurisprudence.)
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.

241. Modern Jurisprudential Problems. Three hours per week, one term. (1½ units)
Students who take 239 Jurisprudence cannot take Modern Jurisprudential Problems. The course studies modern schools of jurisprudence and their relationship to dominant philosophical and intellectual currents of thought in the twentieth century. Among the problems considered will be the nature of law, the relationship of law to ethics, the tension between law and freedom, and the nature of the judicial process. Students will not be restricted to the traditional jurisprudential mate-

rials but will look at the above and other problems as they appear in modern philosophy, social theory and literature. Each student will be expected to do one or two oral presentations to the class, and a major written essay.

243. Labour Law. Three hours per week, one term. (1½ units)
Union-management relations; the collective bargaining processes; the collective agreement, arbitration and conciliation procedure. The relationship between the union and its membership.
Recommended : 201 Administrative Law

244. Landlord and Tenant. Two hours per week, one term. (1 unit)
A study of the law of landlord and tenant.

245. Legal Accounting. Two hours per week, one term. (1 unit)
(Students who have taken an accounting course for credit cannot take this course.)
An introduction to basic accounting theory; statement analysis, valuation, and specific applications of accounting to legal problems.

247. Legal Process. Two hours per week, both terms. (2 units)
A critical examination of the legislative and judicial processes. The 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.

249. Maritime Law. Two hours per week, one term. (1 unit)
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.

251. Municipal Law. Three hours per week, one term. (1½ units)
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.

253. Natural Resources. Two hours per week, one term. (1 unit)
A survey of the law of mining, forestry, and water, in the context of regulation of resource exploitation.
Note: Natural Resources is a general course. It includes a consideration of material dealt with in greater detail in 275 Water Law and 443 Mining and Forest Law. A student may enrol for both the specialized courses. However, a student may not enrol in (i) Natural Resources and (ii) either or both of the specialized courses without the permission of the Dean.
Recommended: 201 Administrative Law

255. Petroleum and Natural Gas. Two hours per week, one term. (1 unit)
A course in basic oil and gas law emphasizing problems relating to the origin, occurrence and production of oil and gas; acquisition and disposition of interests in oil and gas; rights under oil and gas leases; pooling; acquisition of surface rights.

257. Public International Law. Three hours per week, one term. (1½ units)
(Students who have taken Political Science 411 cannot take this course.)
History, sources and evidence of international law and its relation to municipal law, international personality, state jurisdiction, and treaties.

259. Restitution. Two hours per week, one term. (1 unit)
Theoretical basis, personal and proprietary claims; acquisition of benefit from plaintiff or third party; remedies for fraud, duress, mistake; constructive trusts; imperfect gifts.

261. Secured Transactions. Three hours per week, one term. (1½ units)
A study of the problems involved in chattel mortgages, conditional sales contracts, assignment of book debts, bills of sale and securities under the Bank Act.

263. Securities Regulation. Three hours per week, one term. (1½ units)
Take-over bids; disclosure, the raising of capital and distribution of securities; problems of regulation.
Recommended: 215 Company Law

265. Selected Problems in Jurisprudence. Three hours per week, one term. (1½ units)
To be offered as either a course or a seminar. Offered to third-year students who have taken Jurisprudence or with permission of the instructor. The course or seminar will deal with specific jurisprudential problems which may vary from year to year.

267. Succession. Two hours per week, one term. (1 unit)
The law of wills, intestate succession, statutory interference with wills, principles of probate and administration of estates.
Recommended: 271 Trusts

269. Taxation. Three hours per week, one term. (1-1½ units)
A survey of the law and practice of income and capital gains taxes.
Recommended: Law 245 Legal Accounting or equivalent course.

271. Trusts. Three hours per week, one term. (1½ units)
The history and nature of trusts; express, resulting, implied secret and charitable trusts, administration of the trusts, breach of trust.

275. Water Law. Two hours per week, one term. (1 unit)
The law relating to the acquisition and protection of water rights; appropriation and riparianism; law relating to public management and planning for water use; constitutional, administrative and policy problems; legal aspects of water quality and conservation.
Recommended: 201 Administrative Law
Also see note to 253 Natural Resources

SEMINARS

Each student is required to undertake at least one independent research project. It is contemplated that this research project will normally be satisfied within the seminar programme. The number and content of these seminars will vary from year to year.

401. Administration of Criminal Justice. Three hours per week, one term. (1½ units)
A study of the Criminal Law in operation; police practices; prosecutional discretion; victims of crimes; status crimes; drug offences; civil liberties; non-police functionaries in the ordinary system; trial by newspaper.

403. Close Corporation. Three hours per week, one term. (1½ units)
The corporation, taxation, accounting, insurance and estate planning aspects of the close corporation, the formation of corporations, the compensation of executives, the sale or purchase of businesses with reference to the closely-held corporation.
Prerequisite: 215 Company Law

405. Comparative Constitutional Law. Three hours per week, one term. (1½ units)
An introduction to United States Constitutional Law and a comparison in selected fields of the ways in which particular problems are solved and governmental jurisdictions allocated in Canada and the United States; the effect of an entrenched Bill of Rights on judicial decision-making and judicial behaviour.

407. Comparative Law. Three hours per week, one term. (1½ units)
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.

409. Computers and Communication Sciences. Three hours per week, one term. (1½ units)
Selected topics illustrating special legal problems being created by the computer; uses of the computer by the legal profession; protecting privacy, role of copyright; regulation of telecommunications industry.

411. Criminology. Three hours per week, one term. (1½ units)
An examination of selected topics of criminal law and criminology including the extent of the crime problems 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.

413. Current Problems in Constitutional Law. Three hours per week, one term. (1½ units)
Consideration of the institutions, concepts and legal doctrines developed under Canadian federalism with emphasis on issues of current importance.

415. Environmental Control Techniques. Three hours per week, one term. (1½ units)
Study of the effectiveness of private law remedies. Various alternative administrative schemes for controlling environmental degradation will be be investigated. Particular emphasis will be placed on legal aspects of air and water pollution control.
Recommended: 201 Administrative Law

417. Family Law Reform. Three hours per week, one term. (1½ units)
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.
Recommended: 233 Family Law

419. **Government Regulation of Business.** Three hours per week, one term. (1½ units)
A study of the uses and limitations of legal techniques of economic control. Areas of concern include the conservation of natural resources, combines legislation, government marketing boards, public utility regulation, merchandising and advertising (including trademarks, unfair methods of competition, frauds on consumers, public health and trading stamps), customs, excise and quotas, governmental licensing, and public ownership.
Recommended: 201 Administrative Law

421. **Industrial and Intellectual Property.** Three hours per week, one term. (1½ units)
The law of copyright, trademarks, industrial design and patents.
Recommended: 227 Equitable Remedies

423. **International Business Transactions.** Three hours per week, one term. (1½ units)
(Name changed from International Law and Economic Transactions.) Principles of international law in the context of economic transactions. The first part will be concerned with public transactions, particularly public economic institutions and treaties with economic significance. The latter part will be devoted to an examination of the effects of these institutions, treaties and principles upon private international transactions.
Prerequisite: 257 Public International Law, or
237 International Organizations

425. **International Law Problems.** Three hours per week, one term. (1½ units)
A research seminar in which selected problems of international law and organizations are investigated.
Prerequisite: 257 Public International Law, or
237 International Organizations

427. **International Taxation.** Three hours per week, one term. (1½ units)
A comparative analysis of national tax systems; their relation with international tax conventions in the fields of commercial, personal, and estate taxes.
Prerequisite: 269 Taxation

429. **Land Use Control.** Three hours per week, one term. (1½ units)
A study of the legal (common law and statutory) and administrative techniques of regulating land use and development. Emphasis will be given to the law relating to zoning, sub-division control and expropriation.
Recommended: 251 Municipal Law

431. **Law and Poverty.** One and one-half hours per week, both terms. (1½ units)
The aim of this seminar is to develop an understanding of the full scope of the impact which legal system has on the poorer social strata of society. Emphasis will be placed on empirical studies conducted by the participants. Among the topics which may be covered are the following: legal aid; protecting the low-income consumer; low-income housing; welfare assistance, food and medical care programmes; the effect of discretionary administrative powers on the welfare recipient; education and job programmes. Up to four sections will be offered depending upon student demand.

433. **Law and Psychiatry.** Three hours per week, one term. (1½ units)
A course designed to familiarize law students with psychiatric and psychoanalytic concepts, to consider their relevance in relation to selected legal problems, and to examine certain problem areas in which the lawyer and the psychiatrist come into contact.

435. **Law Reform.** Three hours per week, one term. (1½ units)
Methodology of law reform; examination of specific area or areas in need of reform; evaluation of available devices.

437. **Law Relating to Juveniles.** Three hours per week, one term. (1½ units)
An examination of the civil and criminal law affecting juveniles; custody, guardianship and adoption; the effect and operation of the Juvenile Deliquent Act (Can.) and the Protection of Children Act (B.C.).
Recommended: 223 Family Law

439. **Methods of Empirical Research.** Three hours per week, one term. (1½ units)
An introductory course designed to help lawyers understand the significance of reports prepared by social scientists and the techniques used in their preparation. Consideration will be given to meaning and measurement in research; sampling; questionnaire design; interviewing; the quantification of data; statistical inference and proof; computer applications.

441. **Methods of Loss Distribution.** Three hours per week, one term. (1½ units)
Analysis of the current methods for dealing with accidental personal injuries as a social problem rather than as a matter of rights and wrongs and their underlying rationale. The course will cover the major common law devices such as liberalization of the negligence action and strict liability and legislative programmes such as employers' liability, workmen's compensation and the proposed reforms relating to automobile accident losses. Special emphasis will be given to the impact of liability insurance on the tort law and the changing relationship between tort law and the growing number of public and private first-party insurance programmes such as employment fringe benefits, medicare and disability pensions.

443. **Mining and Forest Law.** Three hours per week, one term. (1½ units)
Acquisition of mineral and timber interests; development, financing and organization of mining companies; regulation of exploitation; industry contracts; management techniques in forestry; special problems of taxation.
Recommended: 201 Administrative Law
Also see note to 253 Natural Resources

445. **Negotiation.** Three hours per week, one term. (1½ units)
Negotiation and bargaining; formulation of general principles governing the negotiation process; negotiation in legal practice.

447. **Problems in Administrative Law.** Three hours per week, one term. (1½ units)
The study of the administrative process by focus on one particular institution having varied and complex decision-making functions. A different institution will be studied each year.
Prerequisite: 201 Administrative Law

449. **Problems in Conflict of Laws.** Three hours per week, one term. (1½ units)
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.
Prerequisite: 217 Conflict of Laws

451. **Real Estate Development.** Three hours per week, one term. (1½ units)
A study of the legal aspects of the development of real estate projects such as shopping centres, sports centres, condominiums. The specific project studied will vary from year to year.
Prerequisite: 207 Advanced Real Property

453. **Regulation of the Petroleum Industry.** Three hours per week, one term. (1½ units)
A study of government regulation of the petroleum industry through legislation and administrative techniques.
Recommended: 255 Petroleum and Natural Gas Law

455. **Selected Topics in the Philosophy of Law.** Three hours per week, one term. (1½ units)
Joint seminar with the Department of Philosophy, open to both law students who have taken Jurisprudence or Philosophy students who have taken the course in Legal Philosophy offered by that Department, or by permission of either instructor. The seminar will concentrate on recent developments and current thought in the field of legal philosophy.
Recommended: 239 Jurisprudence

457. **Special Problems in Labour Law.** One and one-half hours per week, two terms. (1½ units)
An examination of concrete examples of problems of contract formation; specific problems in collective agreement observance. Students 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.
Recommended: 243 Labour Law

457A. **Law of Trade Unions.** Three hours per week, one term. (1½ units)
The law governing trade unions, its legal status, rights and responsibilities including successor rights, union security and the liability of a union for civil wrongs. Special consideration will be given to the relationship of the union and his rights and duties with emphasis on the right of fair representation, expulsion and control.

459. **Tax Policy.** Three hours per week, one term. (1½ units)
Review of current and proposed taxation techniques; the equity of the various proposals; taxation of special industries.
Prerequisite: 269 Taxation

461. Trial and Appellate Practice. Three hours per week, one term. (1½ units)
Techniques of advocacy in civil and criminal cases; methods of pretrial preparation, developing facts in court; tactical and ethical considerations. Prerequisite: 231 Evidence

501. Directed Research (1½)

503. Directed Research (1½)
Students who are able to obtain permission from a Faculty member to do directed research under the supervision of the Faculty member may substitute the research project for either a course or a seminar. However, no student will be entitled to receive total credits for Directed Research in excess of 90 class-hours (i.e. 3 course units).

Moot Court

Each student in the Fall term of his second year is required to prepare and argue a moot case unless he elects either to claim the exemption available for some positions on the Law Review staff, or, with the prior approval of the Faculty, to submit a case comment or other legal research. The Law Review exemption is available to the Editor-in-Chief, the three Associate Editors and the Managing Editor. A student who elects for the writing option is expected to make his work available for publication in the Law Review. A student's mooting performance will be entered on his record although it will not appear on his transcript. A student who does not perform satisfactorily in the second year moot court programme will be required to re-moot in the Spring term of second year or in his third year until his performance is satisfactory.

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 research, public service and the practice of law. It does not give entry to the British Columbia or other bar.

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.

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.

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.

Awards and Financial Assistance

Subject to change.

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 entitled "Awards and Financial Assistance". This section 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. 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 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 which provides 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.

Entrance Scholarships

The Diana and P.AE Irving Scholarship Trust Fund

Scholarships and Prizes

The Allan S. Gregory Memorial Prizes

The Armstrong, Brawner and Speton Scholarship

The Boughton, Street and Company Prize in Law

The Butterworth's Prize

Campney & Murphy Scholarship

The Canada Law Book Limited Prizes

The Canada Permanent Mortgage Corporation Prize

Canada Permanent Trust Company Prize in Trusts

The Carswell Company Limited Prizes

C.H.A.P. Copy Ltd. Scholarships

The Class of Law '53 Scholarship Fund

The David Neil Hossie, Q.C., Scholarship in Corporation Law

The Faculty of Law Legal Writing Prize

The Farris, Farris, Vaughan, Wills & Murphy Scholarship

The Griffiths, McLelland & Co. Prize in Torts

The Harold and Anne Joseph Prize in Law

The Harper, Gilmour, Grey & Co. Scholarship

The H. Carl Goldenberg Book Prize

The Hon. R. L. Maitland Memorial Scholarship

The Insurance Company of North America Prize in Law

Judge Schultz Prize in Criminal Law

The Ladner Prizes in Law

The Lord Denning Scholarship

Malcolm MacIntyre Prizes in Law

The Mike Edwards Memorial Scholarship

The Norman MacKenzie Prize in Public International Law

The Panvini Scholarship Fund in Law

Patrons of the Law Review Prize

The Robie L. Reid Scholarship

The Russell & DuMoulin Scholarship

Special Book Prize

The Superior Courts Judges' Scholarship

The Thomas Francis Hurley Prize

The Thorsteinsson, Mitchell, Little & O'Keefe Scholarship

The Law Society Gold Medal and Prize

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

Bull, Housser & Tupper Bursary
The Cariboo Bar Association Bursary (in memory of P. E. Wilson, Q.C.)
The Clark, Wilson & Co. Bursary
The Davis & Company Bursary
The Douglas, Symes & Brissenden Bursary in Law
The Esmond Lando Bursary
The Fraser Valley Bar Association Bursary
The Freeman, Freeman, Silvers & Koffman Bursary in Law
The Saint Thomas More Law Burses
William C. Moresby, Q.C., Bursary
The Plimsoll Club Bursary for Law
The Vancouver Bar Association Bursaries
1971-72 Graduate Fellowships
The Law Society of British Columbia Fellowship
The Norman MacKenzie Fellowships

THE FACULTY OF MEDICINE

FACULTY OF MEDICINE

Office of The Dean

DAVID V. BATES, M.B., B.Ch., M.D. (Cantab.), M.R.C.S., L.R.C.P., M.R.C.P., F.R.C.P.(C)., Professor and Dean of the Faculty from July 1, 1972.

JOHN F. MCCREARY, M.D., LL.D. (Toronto), D.Sc. (Memorial), F.R.C.P.(C), Professor and Dean of the Faculty to June 30, 1972.

DONALD C. GRAHAM, M.D. (Toronto), F.R.C.P.(C), F.A.C.P., Assistant Professor and Associate Dean.

W. WEBBER, M.D. (Brit. Col.), Professor and Associate Dean.

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PALMER N. NERLAND, B.A. (Brit. Col.), Business and Research Officer, Health Sciences Centre.

Division of Continuing Medical Education

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WILLIAM G. MCCLURE, M.D. (Toronto), Honorary Lecturer.

LAWRENCE E. RANTA, M.D., D.P.H. (Toronto), Honorary Lecturer.

Department of Anaesthesiology

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K. M. LEIGHTON, M.B., Ch.B. (Aberdeen), F.R.C.P.(C), Assistant Professor.

J. P. MUNROE, M.D., C.M. (McGill), F.R.C.P.(C), Assistant Professor (Part-time).

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W. A. DODDS, M.D. (Toronto), Clinical Assistant Professor.

WILLIAM M. HALL, M.D. (Alta.), Clinical Assistant Professor.

JEAN T. HUGILL, B.Sc., M.D. (Alta.), Clinical Assistant Professor.

F. W. MCCAFFREY, B.A. (Montreal), M.D. (Laval), Clinical Assistant Professor.

J. A. MCCONNELL, B.A. (Brit. Col.), M.D. (West Ont.), Clinical Assistant Professor.

J. E. NIXON, M.D. (West. Ont.), Clinical Assistant Professor.

JOHN L. OULTON, B.Sc., M.D., C.M. (McGill), Clinical Assistant Professor.

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LOIS DAVIES, M.D. (Toronto), Clinical Instructor.

W. A. DOLL, B.Sc., M.D. (Alta.), Clinical Instructor.

D. M. DONALD, M.D. (Manitoba), 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.

P. W. HUDSON, M.D. (Alta.), Clinical Instructor.

HAROLD ANDERSON KESTER, B.A., M.D. (West. Ont.), Clinical Instructor.

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N. R. J. MCMILLEN, M.D. (Toronto), Clinical Instructor.

I. S. PATERSON, M.B., B.S. (London), F.F.A.R.C.S.(England), Clinical Instructor.

PETER B. PERCHESON, M.D., C.M. (Queen's), F.R.C.P.(C), Clinical Instructor.

JOHN CRANSTON POOLE, M.D. (Man.), Clinical Instructor.

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HERBERT SAMUEL RANDALL, B.A. (New Bruns.), M.D., C.M. (McGill), Clinical Instructor.

E. H. RATZLAFF, M.D. (Brit. Col.), 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.

K. C. K. WONG, M.D. (Brit. Col.), Clinical Instructor.

RALPH STAPLES WOODSWORTH, M.D. (Man.), Clinical Instructor.

Department of Anatomy

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FREDERIC D. GARRETT, A.B., Ph.D. (Cornell), Professor.

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CONSTANCE L. FRIEDMAN, M.Sc., Ph.D. (McGill), Research Associate Professor.

CARL T. FRITZ, Ph.D. (Minn.), Associate Professor.

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F. R. C. JOHNSTONE, M.B., Ch.B., F.R.C.S. (Edinburgh), Lecturer (Part-time).

SAUL MILLER, M.Sc., M.D., C.M. (McGill), Clinical Associate Professor in Radiological Anatomy.

ROLAND RADCLIFFE, M.A. (Brit. Col.), M.D., C.M. (Queen's), Clinical Assistant Professor.

JOHN ROBERT MCIVER, M.B., Ch.B. (Glasgow), Clinical Instructor.

MICHAEL PIPER, M.D. (Brit. Col.), Teaching Fellow.

MONIQUE RYSER, M.D. (Lausanne), Teaching Fellow.

Department of Biochemistry

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CHARLES T. BEER, D.Phil. (Oxon.), A.R.I.C., F.R.I.C. (M.R.C. Associate), Professor.

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VINCENT J. O'DONNELL, B.Sc., Ph.D. (McGill), Professor.

WILLIAM J. POLGLASE, M.A. (Brit. Col.), Ph.D. (Ohio State), Professor.

MICHAEL SMITH, B.Sc., Ph.D. (Manchester), (M.R.C. Associate), 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. (Leave of absence 1972-73).

PHILIP D. BRAGG, B.Sc., Ph.D. (Bristol), Associate Professor.

ALBERT F. BURTON, B.Sc. (Man.), M.Sc. (West. Ont.), Ph.D. (Sask.), Associate Professor.

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Cancer Research Centre of the University of British Columbia

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JANET CHANG, B.Sc. (Brit. Col.), Research Assistant.
SUSAN M. COUPEY, B.Sc. (Queen's), Research Assistant.
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LUCILLE HOOVER, B.A. (Brit. Col.), Research Assistant.
DENISE MCCLELLAN, B.Sc. (Simon Fraser), Research Assistant.
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MARNIE THOMSON, B.Sc. (Brit. Col.), Research Assistant.
CHARLOTTE YOSHIZAWA, B.Sc. (Brit. Col.), Research Assistant.

Department of Diagnostic Radiology

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TYRONE H. SOODEN, M.B., Ch.B. (Leeds), F.R.C.P.(C), Instructor.
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JOHN B. CHETWYND, L.R.C.P.&S., L.R.F.P.&S. (Edinburgh), D.M.R.D. (England), R.C.P.S.(C), Clinical Instructor.
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CONNIE M. SIU, M.B.B.S. (Hong Kong), Research Fellow.

Department of Health Care and Epidemiology

CORTLANDT, J. G. MACKENZIE, M.D., C.M. (Queen's), D.P.H. (Toronto), C.R.C.P. (C), Associate Professor and Chairman of the Department.
DONALD O. ANDERSON, B.A., M.D., (Brit. Col.), S.M. in Hyg. (Harvard), F.R.C.P.(C), Professor.
ANNE O. J. CRICHTON, M.A. (Liverpool), Ph.D. (Wales), Associate Professor.
GEORGE SZASZ, M.D. (Brit. Col.), Associate Professor and Milbank Faculty Fellow.
LLOYD F. DETWILLER, M.A. (Brit. Col.), M.H.A. (Minn.), Clinical Associate Professor.
KENNETH R. WEAVER, B.A., B.S.W. (Brit. Col.), M.S. in Social Work (Columbia), M.H.A. (Minn.), Clinical Associate Professor.
PALMER M. NERLAND, B.A. (Brit. Col.) Clinical Instructor.

Division of Epidemiology and Biometry

BRENDA J. FRASER, B.A. (Brit. Col.), M.S. (Iowa St.), Ph.D. (Reading), Assistant Professor.
FREDERICK P. GLICK, JR., B.A. (Oberlin), M.S., Ph.D. (Stanford), Assistant Professor.
JESSIE G. MACCARTHY, B.A.Sc. (Brit. Col.), M.P.H. (Berkeley), R.N., Assistant Professor.
JOHN H. DOUGHTY, B.Com. (Brit. Col.), M.A. (Toronto), Clinical Instructor.
ANTHONY A. LARSEN, B.A. (Brit. Col.), M.D. (Alta.), D.P.H. (Toronto), M.P.H. (Minn.), C.R.C.P.(C), Clinical Instructor.

Division of Industrial Medicine

JOHN H. SMITH, M.B., B.Ch., B.A.O. (Queen's, Belfast), D.I.H. (London), D.P.H. (Toronto), C.R.C.P.(C), Clinical Assistant Professor.

Division of Primary Health Care

H. CLYDE SLADE, M.D., C.M. (Dalhousie), F.R.C.P.(C), Associate Professor, and Director.
MANUEL G. HOWAT, B.Sc. (Sask.), M.Sc. (Alta. & Wisc.), Ph.D. (Michigan State), Visiting Associate Professor.
JACK D. BLANCHARD, M.D. (Toronto), Assistant Professor.
ALEXANDER BOGGIE, B.A., M.D. (Brit. Col.), Assistant Professor.
LUCILLE CREGHEUR, B.A., M.S.W. (Ottawa), Assistant Professor.
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ALBERT W. WALLACE, B.Sc. (Sask.), M.D. (Man.), Clinical Instructor and Lecturer in Medical Ethics.
CHARLES A. BRUMWELL, B.S.A., M.D. (Brit. Col.), Clinical Instructor.
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DONALD J. FARQUHAR, B.A., M.D. (Brit. Col.), Clinical Instructor.
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STANLEY L. SUNSHINE, M.D. (Brit. Col.), Clinical Instructor.
ARTHUR D. VAN WART, M.D. (Toronto), Clinical Instructor.
ADAM C. WALDIE, B.A. (Brit. Col.), M.D. (Alta.), Clinical Instructor.
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General Information

The medical course extends through four academic sessions and leads to the degree of Doctor of Medicine (M.D.).

The academic sessions in each of the first two years of the course are of 32 weeks' duration, that in the Third year is of 24 weeks' duration, and the final year (Phase IV), is of 62 weeks' duration.

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, St. Paul's Hospital, and the Psychiatry Unit of the Health Sciences Centre on campus.

The Third and Fourth years of the course have been combined as a continuum with a two-week vacation between the end of the Third year (Phase III) and the beginning of the final phase, the clinical clerkship.

During Phase III the student is provided with essentials of modern diagnosis and treatment and is given the opportunity of applying this knowledge to patient care on the wards of the Vancouver General, Shaughnessy, St Paul's Hospitals and the Psychiatry Unit of the Health Sciences Centre on campus.

During the clinical clerkship the senior medical student is afforded the opportunity to practice clinical medicine under supervision and with increasing responsibility for patient care in order to achieve the following objectives:

1. To consolidate, extend and apply his knowledge of basic and clinical sciences.
2. To enhance his clinical skills.
3. To continue to cultivate appropriate attitudes.
4. To increase his understanding of professional and ethical principles.
5. To pursue his own self-education.
6. To explore areas of special interest by choosing appropriate electives from among those available to him, or review areas in which he has experienced difficulty.

The clerkship for each student is divided in the following manner: Medicine (including specialties), 12 weeks; Surgery (including specialties) 12 weeks; Elective, 12 weeks; Obstetrics and Gynaecology, 8 weeks; Paediatrics, 8 weeks; Psychiatry, 8 weeks; Health Care (Social Medicine), 2 weeks.

During the clinical continuum (the final two years of the course) the facilities of the Children's Hospital, Grace Hospital, Lions Gate Hospital, the Provincial Mental Hospital, B.C. Cancer Institute, G. F. Strong Rehabilitation Centre, Canadian Arthritis and Rheumatism Society Centre, are utilized for various aspects of clinical teaching in addition to that provided in the Vancouver General, Shaughnessy and St. Paul's Hospitals and the Psychiatry Unit of the Health Sciences Centre on campus.

A wide range of electives is available, including those offered by community hospitals throughout British Columbia as well as those offered by departments within the Faculty of Medicine. Should the student so desire he can present his own elective programme to the Faculty for approval.

During the final 62-week clinical clerkship each student is allowed a fourteen-day vacation period.

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, 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.

In addition, construction of an extensive modern Instructional Resources Centre to be used by all of the Health Science disciplines was begun in 1970 and this facility will be available early in 1972.

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.

A new building to house facilities for the Division of Medical Genetics, and the Division of Audiology and Speech Science is under construction and it is anticipated that this facility will become available in 1972.

The School of Rehabilitation Medicine, established in 1961, is a part of the Faculty of Medicine and offers training in physical and occupational therapy. However, it issues its own calendar and enquiries should be sent to the Director of the School.

Planning is now well advanced for the construction of a 410-bed hospital on campus. The 60-bed Psychiatric wing of the Health Sciences Centre hospital opened in 1969 and is now operating at full capacity.

Admission to the Faculty of Medicine

Admission to the Faculty of Medicine is based primarily on ability and premedical 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 sixty (60) students.

A candidate is required to take the Medical College Admission Test by the spring of the year in which he is applying for admission to the Faculty of Medicine. However, completion of this test at an earlier date is desirable to facilitate evaluation of the application by the Admissions Committee. Arrangements to take the test should be made with the counselling 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, N.Y. 10017, 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.

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, the deadline date for receipt of applications. 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.

Notification of accepted applicants will generally be forwarded by early July.

An applicant who is accepted must submit a deposit of $100.00 within four weeks of notification of his acceptance at this University. This deposit is non-refundable and shall be applied toward the tuition of the first term of the session for which the student has been accepted.

An accepted applicant who is taking his premedical work at the University of British Columbia is required to have a physical examination at the University 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 or equivalent).

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 Chemistry), or Chemistry 210 or 220 (Physical, Inorganic Chemistry);

(3) Chemistry 203 or 230 (Organic Chemistry).

Physics: Physics 105 (Elementary Physics); or Physics 110 (Mechanics, Electricity and Atomic Structure), or Physics 115 (wave motion, Mechanics and Electricity); or Physics 120 (Matter and Mechanics). All courses—3 units each.

Biology: Biology 101 or 102 (Principles of Biology) or equivalent. If a student has been granted exemption from Biology 102 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.

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 on the combined programme registered in the first year of the Faculty of Medicine who have already obtained satisfactory standing in Biochemistry 410 (or the equivalent) and Physiology 400 (or the equivalent) may with approval of the Dean of Medicine substitute equivalent units of other appropriate 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.

All students in the Faculty of Medicine wishing to qualify for the B.Sc. degree on the combined degree programme, must file a copy of their programme in First Year Medicine with the Dean of Science by September 15 in the Fall of the year *preceding* the year of the Congregation at which they plan to qualify for the B.Sc. degree.

Admission of Students by Transfer

A student who has successfully completed one or two years of the medical course 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 upon 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 for classes in the First and Second years and Phase III (Third Year). The academic term for Phase IV (Fourth Year) begins in mid-March.

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—*See General Information.*

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	$275.00
Instruments for anatomy and physiology	$15.00
Stethoscope	$25.00
Laboratory coats (4)	$24.00
Second Year	
Ophthalmoscope with otolaryngological attachments	$80.00
Sphygmomanometer	$50.00
Third Year	
Haemoglobinometer	$14.00
Haemocytometer	$20.00

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 list of bursaries, fellowships, scholarships and loans see later section of the calendar.

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, and approved electives.

It is strongly recommended that the courses in Preclinical Sessions and the History of the Health Sciences be taken by all students other than those taking special programmes approved by the Faculty.

Second Year:

Introduction to Medicine, Introduction to Obstetrics, Introduction to Paediatrics, Introduction to Psychiatry, Introduction to Surgery, Medical Genetics, Medical Microbiology, Neuroanatomy, Neurophysiology, Parasitology, Pathology, Pharmacology, Electives.

Phase III (Third Year):

Health Care and Epidemiology, Medicine and Therapeutics, Obstetrics and Gynaecology, Ophthalmology, Paediatrics, Psychiatry, Radiology, Surgical Pathology, Surgery (including sub-specialties and Anaesthesiology), Laboratory Medicine.

Phase IV (Fourth Year):

Medicine, Obstetrics and Gynaecology, Paediatrics, Psychiatry, Health Care, Surgery (including sub-specialties and Anaesthesiology), Approved Electives.

Examinations and Advancement

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 term or final examination, must submit a certificate, obtained from a physician, to the University Health Service as promptly as possible.

A student *planning* to be absent from classes *for any reason* must obtain previous permission from the Dean's office.

Withdrawal—*See General Information*

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 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.

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).

Phase III (Third Year):

Promotion of students from Phase III (Third Year) to Phase IV (Fourth Year) will be based on a continuing evaluation carried out by each Department during the Phase III period and on results of a comprehensive interdisciplinary written examination and a clinical-oral examination at the end of the term.

The subjects in which students will be assessed in Phase III will be: Medicine; Laboratory Medicine; Obstetrics and Gynaecology; Paediatrics; Psychiatry; Preventive Medicine; and Surgery. Students will also be required to demonstrate satisfactory knowledge of radiological aspects of the above-listed subjects.

Phase IV (Fourth Year):

Health Care, Medicine (including Therapeutics), Obstetrics and Gynaecology, Paediatrics, Psychiatry, and Surgery.

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 student 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 with the regulations of the appropriate licensing body, including the requirements of other Colleges of Physicians and Surgeons.

A student who has registered in another province should ordinarily obtain his 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 certain 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 one year in a post graduate program within an approved hospital before he becomes eligible for a licence to practise.

Post Graduate Education

It is in the best interests of the medical graduate to undertake at least one year of post graduate medical education in a clinical discipline even if he plans a career which does not involve the care of patients. Basic medical education is not considered complete without this educational experience.

The Faculty of Medicine assists in the arranging for post graduate positions and advises on the merits of those available. The office of the Dean should be consulted early in Phase IV (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 post graduate placement or the assignment of graduating students to post graduate positions. The Canadian Intern Matching Service, Association of Canadian Medical Colleges, does provide a matching service programme for internships in Canada.

The Canadian Intern Matching Service

The Matching Service is a clearing-house designed to help final year medical students obtain the internships of their choice, and to help hospitals and internship program directors obtain the students of their choice. It provides an orderly method for students to decide where to intern and for hospitals to decide which applicants they wish to enroll. For both students and program directors, it removes the factors that generate unfair pressures and premature decisions.

The Matching Service acts as the student's agent on the instruction embodied in the student's confidential list of all the internships for which he or she has applied, ranked in order of preference. Similarly, the Matching Service acts as the hospital's agent on the instructions embodied in its confidential list of all the students that have applied, ranked in order of the hospital's preference.

The CIMS is operated by the Association of Canadian Medical Colleges. Policy is under the control of an Advisory Committee on which seven national medical organizations directly involved in medical education are represented. Student representatives are invited to attend and to participate in the Advisory Committee meetings.

The CIMS brochure and relevant documents for participation in the matching program are distributed annually in June to all final year medical students through each Dean's Office. Further information is available from the CIMS office, c/o ACMC, 151 Slater Street, Ottawa, K1P-5H3, Ontario (telephone 613-237-0070).

Division of Continuing Medical Education

A Division of Continuing Medical Education has been established within the Office of the Dean. Its purposes are to: initiate and support programmes in continuing medical education for physicians in practice, initiate and support health sciences interprofessional programmes of continuing education, assist hospitals in intern education, initiate and support efforts designed to define needs in continuing medical education, initiate and support programmes of evaluation in continuing medical education, initiate and support experiments in new methods of learning in undergraduate and continuing medical education, and improve methods of information dispersal in continuing medical education leading to improved patient care.

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 Phase III (Third Year) and 475 to 499 in Phase IV (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 102, 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.

425. Elements of Neuroanatomy.—An introduction to the structure of the human nervous system. First term. 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 selected properties of the cell and underlying mechanisms based on the ultrastructure of the cell and on the physical chemistry of open systems.

506. (3) Biophysics of Cell Membranes.—A comprehensive study of the structural, electrical, osmotic, transport and regulatory properties of biological membranes.

510. (2) Neuroanatomy.—The gross and microscopic study of the nervous system 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 to surgery.

Department of 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 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]

412. (1½) Biochemistry Conferences.—A series of conferences correlating biochemistry with selected topics in Medicine and Dentistry. [0-0; 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) Biochemical Methods.—Lectures on advanced biochemical techniques and their application to biomedical problems.

501. (1-3) Advanced Biochemistry Laboratory.—A laboratory course in advanced biochemical techniques. Biochemistry 500 or its equivalent is required. Students are strongly recommended to take Biochemistry 500 and Biochemistry 501 concurrently. Admission to Biochemistry 501 is limited and 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 in 1972-73 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 1972-73 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 1972-73 and alternate years.

505. (1½) Biochemistry of Carbohydrates.—The pathways, reactions, regulatory mechanisms and dynamic control of carbohydrate and energy metabolism. Given in 1972-73 and alternate years.

506. (1½) Biochemistry of Lipids.—Modern concepts of the metabolism and biochemical function of fats, phospholipids and cholesterol. Given in 1973-74 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 in 1973-74 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.

Department of Diagnostic Radiology

465. Principles of Radiological Diagnosis.—A course of lectures and small group discussions to acquaint the student with the use of X-ray in diagnosis. The basic physics of roentgenology is dealt with. Both terms.

Department of Health Care and Epidemiology

400. Statistics in the Health Sciences.—A seminar on the wisdom and joy of statistics: merits and limitations of statistical inference; common basic techniques; computational methods using electronic small calculators or large computers and by hand; examples from recent health science research. Attendance requires instructor's permission. Elective (First term). [3-0; 0-0]

425. Epidemiology.—A seminar organized to study and apply descriptive, analytic, and experimental epidemiological principles and methods. HC/E 400 or an equivalent course in biometry or statistics is recommended and may be taken concurrently. Permission of the instructor must be obtained before registration. Elective. (Available both first and second terms.) [3-0; 0-0] *or* [0-0; 3-0]

426. Health Care and Epidemiology.—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]

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.

475. Health Care.—Social medicine, including the community approach to health care and environmental medicine and the principles of medical care.

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. This is an elective course but it is highly recommended that this course be taken by all medical students who are not enrolled in special programmes approved by the Faculty. First term.

501. (1) History of Medicine.—Seminar. Second term.

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.—1. Systematic lectures are given by members of the department in conjunction with members of other departments under the direction of committees arranging these presentations of disorders in the following groups—cardiovascular disease, dermatology, endocrinology and metabolic disease, gastroenterology, haematology, neurology, renal disease, respiratory disease, rheumatic disease. 2. Bedside clinical instruction and individual work on the medical wards are undertaken in which students record case histories and examinations of patients. Textbooks: Harrison, *Principles of Internal Medicine;* Beeson, McDermott, Cecil-Loeb, *Textbook of Medicine;* Harvey, *Principles and Practice of Medicine;* Brainerd, Margen, Chatton, *Current Diagnosis and Treatment.* Both Terms.

451. Introduction to Therapeutics.—A course of didactic lectures and class exercises to introduce systematic therapeutics and the use of drugs for specific disease processes. Practice in prescription writing is included in the course. Both terms.

452. Laboratory Medicine.—A course of lectures, laboratory periods and demonstrations in which laboratory diagnosis in clinical medicine is studied. The clinical application and significance of laboratory procedures are emphasized. First term.

475. Medicine-Clinical Clerkship.—This consists of a period of twelve weeks in which the student is attached to a teaching unit. During this time the student will carry out under supervision clinical activities of examination and study of patients, and participate in the discussion and management of the problems they present. Opportunities for work in the outpatient department and emergency service will be provided. Opportunity for election to work in a specialty field will be afforded.

During the clerkship phase, in addition to the above obligatory twelve-week period, a further twelve-week elective period may be spent in the Department of Medicine in one of several elective subjects as outlined in the elective brochure. Textbooks: as for Medicine 450.

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.

426. Parasitology.—Clinical features, pathogenesis, life cycles, epidemiology, laboratory diagnosis, therapy and control of common unicellular and multicellular parasites of man.

447. Directed Studies.—A special elective program of directed studies in clinical or molecular microbiology for students in their first medical year who have completed third year Science courses in a major program in Microbiology, subject to approval by the Head of the Division.

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 Fourth Years: Eastman, *Obstetrics;* Oxorn and Foote, *Human Labor and Birth;* Taylor, *Obstetrical Practice.*

450. Principles of Obstetrics.—A series of lectures covering the field of normal and abnormal obstetrics. During two of the four quarters, small group seminars as well as outpatient and ward instruction are conducted.

451. Principles of Gynaecology.—A series of lectures which deal with the more common gynaecological diseases. Teaching and demonstrations to small groups of students supplement the didactic work. Recommended textbook: Behrman and Gosling, *Fundamentals of Gynaecology;* Novak, *Gynaecology.*

475. Obstetrics.—A clinical clerkship of eight weeks provides an experience in two different types of hospitals while working in close association with more senior colleagues. There is an opportunity to acquire experience and judgment in the delivery of ante-, intra-, and post-partum care. Definite hospital duties are assigned which are complemented by scheduled rounds and seminars.

476. Gynaecology.—During the eight-week clinical clerkship, responsibilities are assigned in both the gynaecology outpatient and inpatient services. There is an opportunity to see common problems in ambulatory as well as in surgical gynaecology. Definite hospital duties are assigned which are complemented by scheduled rounds and seminars.

Department of Ophthalmology

(Phase III) 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 the management of ocular problems by family physicians, problems which require referral for specialist care, and the ocular manifestations of systemic disease. Each student should have his own ophthalmoscope.

(Phase IV) Fourth Year: The student may elect to take a one-month or two-week rotation in the Department during his assigned time in surgery. Intensive instruction in the diagnosis and treatment of the commoner eye diseases will be given. The student attends ward rounds and is given clinical instruction by the staff clinicians. He may attend specialty eye clinics which include eye pathology, neuro-ophthalmology, glaucoma, corneal, ocular radiotherapy, ocular microbiology, low vision, refraction, contact lens, motility and/or retina clinics. In addition a student may elect to spend his 12-week elective period in the Department. This elective time can be devoted to special study projects and research or it can be spent in a more comprehensive clinical study of the specialty, provided that special arrangements are made.

Department of Paediatrics

351. (3) Human Physical Growth and Development.—An examination of the factors concerned with human physical growth and development from conception to maturity, their assessment and study, with emphasis on normal variation and sexual dimorphism. A review of factors which may influence growth and development adversely will be included, but the major emphasis is on normal patterns.

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.

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.—1. This is a series of lectures and clinics devoted to paediatrics. Students are as far possible taught in small groups. 2. Students are assigned to the Department of Paediatrics for four afternoons a week for a six-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.

475. Paediatrics.—Students are assigned to the Department of Paediatrics for an eight-week clinical clerkship. For four weeks they are on the inpatient service and are assigned individually to a clinical teaching team. They are responsible for history taking, examination, and the general investigation of patients assigned to them and take part in the daily ward rounds with members of the resident staff and in the regular rounds of the active staff. In the evenings they are on duty on rotation under appropriate supervision to observe and assist with the care of acutely ill patients admitted, and during these times they receive instruction on clinical problems. For the remaining four weeks, students are offered electives of two weeks each in the new born nursery, community paediatrics, various subspecialties and a further period in the inpatient service. Regular teaching sessions are given by the Teaching Fellow each week and students participate also in the twice weekly rounds of the Department and in the teaching rounds available to the resident staff.

Graduate Courses

Division of Audiology and Speech Sciences:

500. (2) Acoustic Phonetics.—Study of the acoustic characteristics of speech with reference to their physiological and perceptual correlates. Discussion of the major theories; experimental methods and research findings. [6-1; 0-0]

501. (2) Instrumental Phonetics.—Study of instrumental methods in speech research, in particular, sound spectrography, speech analysis and synthesis. Lectures, demonstrations and laboratory work. [0-0; 4-2]

502. (2) Mechanisms of the Auditory System.—Concepts and principles basic to the understanding of the normal hearing process, including auditory physiology and theories of hearing. [2-0; 2-0]

503. (2) Perceptual Acoustics.—Critical study of current theories of hearing, psychoacoustics, recent advances in bioacoustics. [2-0; 2-0]

504. (3) Developmental Phonology.—Phonetic skills: discrimination, production and transcription; critical survey of research in child speech development; analysis of methodology and research techniques [3-0; 3-0]

505. (3) Acquisition of Language.—Critical examination of theoretical approaches to the acquisition of language: historical, psychological and philosophical implications, with special reference to English transformational grammar. [3-0; 3-0]

506. (2) Speech Perception.—Critical analysis of current theories in speech perception viz. motor theory, distinctive features and analysis by synthesis. Review of current position in speech recognition. [2-0; 2-0]

507. (3) Neurological Aspects of Language.—Theories of cortical functioning and their relation to language, and language-dissolution. [3-0; 3-0]

546. (1-3) Seminar in Problems of Audiology and Speech Sciences.

547. (1½-3) Directed Reading and Conference.

548. (1) Departmental Seminar.

549. (3-6) M.Sc. Thesis.

Division of Medical Genetics:

530. (3) Advanced Human Genetics.

549. (3-6) M.Sc. Thesis.

Department of Pathology

375. Introduction to Human Pathology.—A lecture-demonstration course designed to acquaint students in the allied health professions with a basic understanding of the causes, natural history, and pathophysiology of common disease processes. Prerequisites: Biology 101 or 102, Chemistry 103, 110 or 120, Physiology 301, Biochemistry 410, Anatomy 390 and Anatomy 501 or their equivalents.

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 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 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) Histochemistry in Pathology.—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.

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. Prerequisite: Pathology 500 and 502.

520. (2) Recent Advances in Bio-Pathology.—A series of lectures with related reading designed to cover advancing knowledge concerning new concepts in Biopathology with emphasis on functional and structural alterations in disease. Prerequisites: M.D. or D.M.D. degree or Pathology 500 or equivalent.

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 or 102, Chemistry 120, 203 or 203 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 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 drug actions. 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.

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 105, 110, 115, or 120, and Biology 101 or 102 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. Credit will normally be given for only one of the following: Physiology 301 and 302; Zoology 303 or Zoology 307, 308. Prerequisites: Biology 101 or 102 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]

303. (1½) Laboratory in Human Physiology (Honors).—A laboratory course in the techniques and principles of human physiology, which is intended primarily for honours and graduate students. This course must be taken in conjunction with Physiology 301. Enrollment limited and subject to the consent of the Department. Students will be given credit for only one of Physiology 302 and 303. [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. [3-6; 3-6]

Physiology 301 or Zoology 307, and Biochemistry 410, or the equivalents, and the consent of the department, are prerequisites for all courses numbered 421-427.

421. (1½) Advanced Topics in Renal Physiology.—A lecture and seminar course in which certain aspects of this field will be considered in detail. (1972-73). [3-0; 0-0]

422. (1½) Advanced Topics in Cardiovascular Physiology.—A lecture and seminar course. (1972-73). [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. (1973-74). [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. (1974-75). [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. (1973-74). [0-0; 2-3]

Physiology 303 or the equivalent, and the consent of the Department are required for the following laboratory course in which enrollment will be limited.

427. (1½) Advanced Topics in Respiratory Physiology.—A lecture and seminar course (1973-74). [3-0; 0-0]

430. (3) Advanced Laboratory in Physiology.—A laboratory course giving training in the methods, techniques and use of instruments required for physiological investigation. Each year a number of exercises will be included which will be relevant to the advanced topics (421-427) being taught in that year. [0-6; 0-6]

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 or 303, 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 Freedman, *The Theory and Practice of Psychiatry;* Gregory, *Fundamentals of Psychiatry.* Reference text: Friedman and Kaplan, *Comprehensive Textbook of Psychiatry.* In addition, reading lists are provided for courses and areas of study.

450. Principles of Psychiatry and Clerkship in Psychiatry.—Based upon material covered in the first year and second year, the student is expected to learn various aspects of the diagnostic process in psychiatry through lectures and supervised clinical experience. (a) Systematic review of psychiatric syndromes and reaction-types; (b) introduction to concepts of etiology including psychodynamics; (c) introduction to certain aspects of treatment. Textbooks: Besides textbooks already listed under Psychiatry 425, students should have *Diagnostic and Statistical Manual Mental Disorders* (Second Edition—D.S.M. II), prepared by the Committee on Nomenclature and Statistics of the American Psychiatric Association.

475. Psychiatry.—Emphasis is upon bringing together material learned in previous years on psychopathology, etiology and psychodynamics, and therapy in the development of a diagnostic formulation and a treatment plan. Under supervision, clinical clerks treat selected adult inpatients on an inpatient service; they also participate in the maintenance of the therapeutic milieu of the ward. On an outpatient basis they evaluate and treat a family in which there is a child or an adolescent who is identified as a psychiatric patient. Seminars are concerned with further material on etiology and therapy, and with special topics in psychiatry—addiction, forensic psychiatry, child psychiatry, community psychiatry, ageing, mental deficiency, etc. Textbooks: see list given under 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 first year 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 for first year graduate students 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. This is an elective course.

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 given in second and third years.

508. (1) Group Therapy and Milieu Therapy.—This is an introductory course primarily for first year psychiatric residents. The course is divided into 3 sections:

508A. A Series of lectures and demonstrations on sociological approaches to the group.

508C. Group Therapy. Weekly meetings throughout the year to experience and explore group tensions and communications.

508B. Family Therapy.—Weekly lectures and clinical sessions. All residents beyond first year are required to take the course or to do family and group therapy under supervisors.

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 given in second and third years.

510. (2) The Neurological Basis of Human Behaviour.—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. *Offered to second and third year graduates.

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 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 the basic surgical principles. Bedside and outpatient clinics illustrating the principles of physical diagnosis are given in cooperation with the Department of Medicine and surgical specialties. Students are given the opportunity to examine patients. A series of lectures and demonstrations in first aid technique is given. Textbooks: Hamilton Bailey, *Physical Signs in Clinical Surgery;* Dunphy and Botsford, *Physical Examination of the Surgical Patient.* American Orthopaedic Association: *Manual of Orthopaedic Surgery.* Second term.

450. Principles of Surgery.—Systematic lectures and clinics in general surgery, orthopaedic surgery, otorhinolaryngology, urology, neurosurgery, plastic surgery, chest surgery, and anaesthesiology, which emphasize the relationships of the basic sciences to an understanding of surgical conditions. The students are expected to acquire some knowledge of the whole field of surgery during Phase III (Third Year). Surgical diagnosis is emphasized rather than surgical techniques.

On the surgical wards of the Vancouver General 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.

The students record case histories, perform physical examinations and carry out assigned laboratory studies on the general surgical and orthopaedic wards.

Textbooks: Christopher *Textbook of Surgery;* Allen, Harkins and Rhoads, *Surgery—Principles and Practice;* J. Crawford Adams, *Outline of Fractures;* Boies, *Fundamentals of Otolaryngology.*

475. Surgery.—A 12-week clinical clerkship in surgery and the surgical specialties. The student, with departmental guidance if requested, should select those surgical services which most closely meet his individual requirements, having in mind his undergraduate training and his career interests. In general surgery or orthopaedics the clinical clerkship rotations are of four weeks' duration while rotations in ophthalmology, otolaryngology, plastic surgery, paediatric surgery and urology are of two weeks' duration. During these periods the student is an integral part of these services, attends the outpatient and emergency departments and assists at operations in selected cases. In addition to Service Rounds and Seminars, there are other teaching activities within the department within this 12-week period.

During the Elective period the student may rotate through surgical specialties that he has missed, or if he has decided on a career in any particular specialty he may return to it for further study in depth. The minimal duration of a rotation during this elective period is four weeks.

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.

Graduate Courses

500. (2) Experimental Surgery.—Lectures and seminars dealing with the selected application of surgical techniques in biological investigation.

501. (2) Surgical Methodology in Research.—Seminars with the laboratory preparation of advanced procedures used in modern physiological and surgical research.

Courses 502 to 511 consist of a series of two year courses common to all branches of surgery (core) plus lectures structured for selected major disciplines in surgery.

502. (1) Surgical Core I.—The scientific aspects of surgery common to all branches of surgery. Given in 1973-74 and in alternate years.

503. (1) Surgical Core II.—The second year of the above program—alternate years.

504. (1) Advanced Surgery I.—Fundamental concepts in general surgery given in 1973-74 and alternate years.

505. (1) Advanced Surgery II.—The second year of the above program—given in alternate years.

506. (1) Advanced Anesthesiology I.—Directed studies in anesthesiology and applied pharmacology and physiology. Given in 1973-74 and alternate years.

507. (1) Advanced Anesthesiology II.—The second year of the above programme. Given in alternate years.

508. (1) Advanced Orthopedics I.—Selected topics in orthopedic surgery and related basic sciences. Given in 1973-74 and in alternate years.

509. (1) Advanced Orthopedics II.—The second year of the above programme which will be given in alternate years.

510. (1) Advanced Urology I.—Selected topics in urology and related basic sciences. Given in 1973-74 and in alternate years.

511. (1) Advanced Urology II.—The second year of the above programme.

512. (1) Advanced Neurosurgery I.—Selected topics in neurosurgery and the related basic sciences. Given in 1973-74 and in alternate years.

513. (1) Advanced Neurosurgery II.—The second year of the above programme, given in alternate years.

548. (1) Seminar in Surgery.

549. (3-9) M.Sc. Thesis.

Interdepartmental Requirements

400. Preclinical Sessions.—Central themes of this course are communication and interviewing and the study of interpersonal relationships, especially the patterns of interaction between the members of a family. Of great importance also are the interactions of family and community, in particular, the relationships with the helping professions.

The course also pursues a number of related topics. One of these is that of personal growth and development and another the family as a social unit within which developmental and health problems arise, have their impact and are managed. Students are encouraged to consider the needs of the individual, the family and the community and various ways in which these needs are or are not met. Contacts and activities involving community agencies amplify studies of the assigned families.

Tutorial group sessions with experienced clinicians from various health science faculties create an atmosphere in which free but relevant reporting and discussion can occur.

This is an elective but it is strongly recommended that it be taken by all medical students.

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. Satisfactory performance in this series of examinations is a prerequisite to promotion to Phase III (Third Year).

Thesis

Students, especially those who have taken part in research projects during their summer vacations, are encouraged to submit a thesis in competition for one of the available prizes. Regulations governing the preparation of such theses may be obtained from the office of the Dean.

Electives

During the First Term of the Second Year, each student will be given the opportunity to participate in an elective subject which will occupy one half day each week. Students will be supplied with a list of elective subjects available.

Information concerning elective offerings available for students in first year, second year and Phase IV of the medical course may be obtained from the office of the Dean. In addition to formal courses offered by the Faculty of Medicine elective programmes arranged by the student may be permissible in individual cases, subject to approval by the Faculty.

MEDALS, FELLOWSHIPS, SCHOLARSHIPS, PRIZES BURSARIES, AND LOANS

For information on the following, and awards available to all students in the University, reference should be made to the Awards and Financial Assistance section of the calendar.

Faculty of Medicine

The Arthur Crease Award.

The B.C. Branch of the Federation of Medical Women Scholarship in Medicine.

B.C. Oto-Ophthalmological Society Prize.

The Bristol Laboratories Medical Prize.

British Pacific Life Insurance Company Scholarships in Medicine.

The Burroughs Wellcome Fellowship in Anaesthesiology and Applied Pharmacology.

The Charles E. Frosst Medical Scholarship.

The Charles Leonard Gorvich Memorial Scholarship.

CIBA Students Awards.

CIBA-Geigy Summer Research Scholarship.

The CIBA Prize in Psychiatry.

The College of Physicians & Surgeons Medical Entrance Scholarship.

The C. V. Mosby Company Prizes.

The Dean M. M. Weaver Medal.

The Dr. A. B. Schinbein Memorial Scholarship.

The Dr. A. E. Trites Memorial Prize.

The Dr. A. M. Agnew Memorial Scholarship.

The Dr. A. Maxwell Evans Award.

The Dr. and Mrs. Schaffer Memorial Award.

Dr. Ernest Roland Myers Scholarship Fund.

The Dr. Frank Porter Patterson Memorial Scholarship.

The Dr. H. A. Henderson Memorial Medal.

The Dr. H. L. W. Turnbull Memorial Scholarship.
The Dr. J. H. McDermot Award.
Dr. Joseph Nicholas Sankey Scholarship Fund.
The Dr. Lachlan Neil MacKechnie Memorial Entrance Scholarship.
The Dr. Lavell H. Leeson Memorial Scholarship.
The Dr. Paul Alexander Donaldson Scholarship.
The Dr. Peter H. Spohn Memorial Prize.
The Dr. Wallace Wilson Leadership Award.
The Dr. Walter Stewart Baird Memorial Medal.
The Dr. W. A. Whitelaw Scholarship.
Dr. A. W. D. (Bill) Knox Memorial Award.
Dr. W. T. Kergin Memorial Scholarship.
The Elizabeth K. Craig Memorial Scholarship.
Government of British Columbia Scholarships.
The G. F. Amyot and S. Stewart Murray Prizes.
The Hamber Gold Medal and Prize.
The Hamber Scholarships in Medicine.
The Hamish Heney McIntosh Memorial Prize.
The Hoffmann-La Roche Limited Scholarship.
The Horner Prize and Gold Medal.
The H. Rocke Robertson Prize in Surgery.
The Ingram & Bell Limited Prize.
Irving Clinic Medical Entrance Scholarship.
The Dr. Jack Margulius Memorial Prize.
The Janet Hatfield Medical Scholarship.
The Joseph L. Jackson Prize in Anatomy.
The J. R. Neilson Memorial Book Prize.
Lange Medical Publications Award.
The Louis Lipsey Toohill Scholarships.
Max and Susie Dodek Medical Scholarship.
Mead Johnson of Canada Ltd. Prize in Paediatrics.
The Metropolitan Bio-Medical Laboratories Ltd. Prize in Clinical Biochemistry.
The M. M. Weaver Prizes in the History of Medicine.
The M.S.A. Medical Entrance Scholarships.
The Myron M. Weaver Memorial Scholarship.
The Northwest Association of Physical Medicine and Rehabilitation Award.
The Okanagan Medical Entrance Scholarship.
The Osler Society of Vancouver Scholarship.
The Parke, Davis & Company Ltd. Awards (Medicine).
The Poulenc Fellowship in Applied Physiology.
The Richard and Mary Legh Trophy.
The Richard Owen Memorial Prize.
The Samuel and Rebecca Nemetz Memorial Scholarship.
The Shane Fellowship.
Ronald S. Toban Memorial Scholarship.
The Tommy Diespecker Memorial Medical Scholarship.
The Triple Entente Chapter I.O.D.E. Scholarship in Medicine.
The Vancouver General Hospital Department of Family Medicine Prize.
The Vancouver Medical Association Medical Entrance Scholarship.
The Vancouver Women's Canadian Club Scholarship in Medicine.
The Vera and Dudley Myers Prize.
The V.G.H. Department of Psychiatry Attending Staff Prize.
The W. S. Berryman Memorial Scholarship Fund.

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 Awards and Financial Assistance section of the 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 Scholarship and Bursary Office after June 1. See also "Government Bursaries" below.

Unless announced otherwise, 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.
University Bursaries.
The British Columbia Medical Association Bursary Fund.
The B.C. Society of Internal Medicine Bursary.
The British Columbia Surgical Society Bursary Fund.
The Canadian Anaesthetists' Society, British Columbia Division, Bursaries.
The Dr. Ernest Billig Memorial Bursary.
The Dr. Rolf S. Manson Memorial Bursary.
Dr. William Campbell Memorial Bursary.
The Edith Cavell Hospital Bursary.
The Florence E. Heighway Medical Bursary Fund.
The Jack Aron Memorial Bursary.
Kiwanis Club of Uptown Vancouver Ted Lewis Memorial Medical Bursary.
British Columbia Association for the Mentally Retarded Bursaries.
Langley Memorial Hospital Medical Staff Bursary.
The North Shore Medical Society Bursary.
Okanagan Valley Medical Bursary.
The Suzanne H. Mullin Bursary Fund.
The Plimsoll Club Bursary in Medicine (donated by the Empire Stevedoring Company Limited).
The R.C.A.F. Chapter, I.O.D.E., Bursary in Medicine.
The Roche Entrance Bursary.
The Samuel David Leshgold Memorial Bursary.
The St. Paul's Hospital Medical Staff Bursary.
The Section of General Practice, B.C. Division, C.M.A., Student Aid Fund.
The Upper Vancouver Island Medical Society Bursary.
The West Kootenay Medical Association Bursary.
Westminster Medical Association Bursary.
The Willard Kitchen Memorial Bursaries.

LOAN FUNDS

Inquiries relating to the following loan funds, and all applications for loans, should be addressed to the Scholarship, Bursary and Loan Office, 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.
Dr. A. E. H. Bennett Medical Student Aid Fund.
The Christmas Seal Medical Student Loan Fund.
The Medical Students Loan Fund.
The Mr. and Mrs. P. A. Woodward's Foundation Medical Students' Fund.

LECTURESHIPS AND SPECIAL FUNDS

The British Columbia Medical Association Grant.
British Columbia Tuberculosis-Christmas Seal Society Grant.
The Canadian Arthritis and Rheumatism Society Grant for Professional Education.
Canadian Cancer Society Grant.
Canadian Cancer Society, British Columbia Division, Lectureship.
The CIBA Lectureship.
The Merck Sharp & Dohme Lectures.

THE SCHOOL OF REHABILITATION MEDICINE

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 MARGARET R. HOOD, B.A. (Brit. Col.), Dip. Occupational Therapy (Toronto), Assistant Professor and Head of Division of Occupational Therapy.

MISS W. JANE HUDSON, B.P.T. (Manitoba), Dip. Physiotherapy, Dip. Teaching Physiotherapy (Toronto), Assistant Professor and Head of Division of Physiotherapy.

MISS WINIFRED L. GRAYSTON, Dip. Occupational Therapy (Toronto), Senior Instructor.

H. S. HOWARD, Dip. Physiotherapy, Dip. Teaching Physiotherapy (Chartered Society of Physiotherapy, England), Senior Instructor.

MISS MARGARET J. G. HUNTER, Dip. Physiotherapy, Dip. Teaching Physiotherapy (Chartered Society of Physiotherapy, England), Senior Instructor.

MISS B. LOUISE MCGREGOR, B.A. (Brit. Col.), Dip. Physiotherapy (McGill), Dip. Teaching Physiotherapy (Toronto), Senior Instructor.

MISS BEVERLEY MCCONNELL, B.P.T. (Man.), Dip. Physiotherapy and Occupational Therapy (Toronto), Senior Instructor.

A. ONUOHA, Dip. Physiotherapy, Dip. Teaching Physiotherapy (Chartered Society of Physiotherapy, England), Instructor.

MRS. L. QUASTEL, B.A. (Sir G. Williams), Dip. O.T. and P.T. (McGill), Instructor.

MISS HAZEL M. SOUTHARD, B.A. (Queen's), 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.
E. J. Bradley, Assistant Professor, Supervisor of Social Work, Health Care and Epidemiology.
P. J. A. Bratty, Clinical Assistant Professor, Neurology.
W. T. Brown, Associate Professor, Psychiatry.
P. Bunton, Assistant Professor, Psychiatry.
W. H. Chase, Associate Professor, Pathology.
R. M. Christensen, Assistant Professor, part-time, Surgery.
W. B. Chung, Associate Professor, Surgery.
A. D. Courtemanche, Clinical Assistant Professor, Plastic Surgery.
W. A. H. Dodd, Clinical Instructor, Dermatology.
K. R. Donnelly, Assistant Professor, Anatomy.
L. Dunn, Associate Professor and Head of the Department of Pathology.
W. H. Fahrni, Clinical Instructor, Orthopedics.
V. O. Hertzmann, Clinical Instructor, Medicine.
R. H. Hill, Assistant Professor, Paediatrics.
W. S. Hoar, Head and Professor of Zoology.
I. B. Holubitsky, Assistant Professor, Surgery.
A. M. Johnson, Clinical Instructor, Medicine.
A. M. Marcus, Assistant Professor, Psychiatry.
P. D. Moyes, Clinical Instructor, Neurosurgery.
D. J. MacFadyen, Associate Professor and Head of the Neurology Division.
G. D. McPherson, Clinical Instructor, Orthopedics.
A. Ian Munro, Clinical Instructor, Surgery.
P. G. Ney, Clinical Assistant Professor, Psychiatry.
H. Nichol, Associate Professor and Head of Child Psychiatry.

Lecturers from the School of Nursing:

F. P. Patterson, Professor (Part-time) and Head of the Department of Surgery (Orthopaedics).
A. M. Perks, Associate Professor, Zoology.
G. E. Pirie, Assistant Professor, Paediatrics.
H. S. Robinson, Clinical Associate Professor, Medicine.
D. B. Rix, Clinical Assistant Professor, Pathology.
H. S. Salvador, Assistant Professor, Obstetrics.
M. E. Towell, Associate Professor, Obstetrics.
L. H. Truelove, Clinical Assistant Professor, Medicine.
J. S. Tyhurst, Professor, Psychiatry.
L. Tyhurst, Clinical Associate Professor, Psychiatry.
P. S. Vassar, Professor, Pathology.
W. A. Webber, Professor, Anatomy.
H. D. Whittle, Professor, Physical Education.

Lecturers from other Institutions:

L. G. Andrews, G. F. Strong Rehabilitation Centre.
W. S. J. Buckler, Vancouver General Hospital.
M. W. Chepesuik, Shaughnessy Hospital.
C. W. Fast, Shaughnessy Hospital.
D. E. MacKay, B.C. Hospital Insurance Society.
W. E. Milbrandt, Workmen's Compensation Board.
A. C. Pinkerton, G. F. Strong Rehabilitation Centre.
R. Tate, Children's Hospital, Vancouver General Hospital.
B. R. Wylie, Holy Family Hospital.

List of Clinical Supervisors of School of Rehabilitation Medicine Students.

Name	*Hospital*
Mrs. W. Bodley, M.C.P.A.	Burnaby General Hospital.
Mrs. W. Keelan, O.T.Reg.	Canadian Arthritis and Rheumatism Society.
Mrs. P. Phillips, M.C.P.A.	Canadian Arthritis and Rheumatism Society.
Mrs. P. Peterson, M.C.P.A.	Children's Hospital
Mrs. S. Robertson, O.T.Reg.	Children's Hospital.
Mrs. H. Nicholson, O.T.Reg.	Gorge Road Hospital, Victoria.
Mrs. J. Owen, M.C.P.A.	Gorge Road Hospital, Victoria.
Miss A. Banton, O.T.Reg.	Holy Family Hospital.
Mrs. Hilary Brown, M.C.P.A.	Holy Family Hospital.
Mrs. J. Andrew, O.T.Reg.	Lions Gate Hospital.
Mrs. M. Wiesman, B.P.T. (Manitoba), M.C.P.A.	Lions Gate Hospital.
Miss J. Strachan, B.S.R., O.T.Reg.	Department of Psychiatry, Health Science Hospital.
Miss Jennifer Line, M.A., O.T.Reg.	Burnaby Mental Health Centre.
Mrs. T. Plaster, O.T.Reg.	Woodlands School.
Miss M. Barber-Starkey, O.T.Reg.	Pearson Hospital.
Miss A. Jorgenson, M.C.P.A.	Pearson Hospital.
Mrs. D. N. Jellema, M.C.P.A.	Royal Columbian Hospital.
Mrs. S. Moilliet, M.C.P.A.	Royal Jubilee Hospital, Victoria.
Mrs. M. Reynolds, M.C.P.A	St. Joseph's Hospital, Victoria.
Miss Joan Johnson, M.C.P.A.	St. Paul's Hospital.
Miss A. Holmes, O.T.Reg.	Shaughnessy Hospital.
Miss Audrey Kelly, M.C.P.A.	Shaughnessy Hospital.
Miss Sylvia Horne, B.S.R., O.T.Reg.	G. F. Strong Rehabilitation Centre.
Miss B. Jones, M.C.P.A.	G. F. Strong Rehabilitation Centre.
Miss M. Schouten, M.C.P.A.	G. F. Strong Rehabilitation Centre, (Children).
Miss F. Robertson, O.T.Reg.	G. F. Strong Rehabilitation Centre, (Children).
Mrs. N. Milne, B.S.R., O.T.Reg.	Sunnyhill Hospital for Children.
Mrs. H. Perry, M.C.P.A.	Sunnyhill Hospital for Children.
Mrs. R. Fortune, M.C.P.A.	Vancouver General Hospital.
Mrs. P. Phillips, O.T.Reg.	Vancouver General Hospital.
Miss J. Bailey, O.T.Reg.	Workmen's Compensation Board Rehabilitation Centre.
Mr. J. Smythe, M.C.P.A.	Workmen's Compensation Board Rehabilitation Centre.
Miss G. A. Wright, M.C.P.A.	St. Mary's Hospital, New Westminster.

THE SCHOOL OF REHABILITATION MEDICINE

Combined Course in Physical and Occupational Therapy

The rehabilitative aspects of medicine receive increasing recognition each year from all persons responsible for the planning and delivery of health care. This results in a growing demand for Rehabilitation Therapists (Physical and Occupational Therapists) who provide the greater part of the services required in this field.

This course is designed to produce a professionally-trained therapist who, together with the physician and nurse can fill an important role as an active member of the health treatment team, practising at all levels of care in hospital, community and home settings.

General Information

The course offered at the School of Rehabilitation Medicine consists of combined training in physical and occupational therapy, leading to the degree of Bachelor of Science in Rehabilitation (B.S.R.). The purpose of this course is to provide basic knowledge and technical skills required to practise these therapies.

The first three years are given mainly on campus. During the summer sessions and in fourth year increasing amounts of clinical experience and instruction will be obtained in the occupational and physiotherapy departments under the guidance of University-appointed instructors.

On completion of the clinical experience following fourth year, a student will be eligible for membership in the Canadian Association of Occupational Therapists and/or Canadian Physiotherapy Association.

Both men and women are accepted. Recommended age of entry is 18-35 years, but exceptions may be made in special circumstances.

Admission

British Columbia secondary school students with an average grade between C and C+ (or better) will be considered for admission in order of their academic performance. Applicants will be selected on the basis of their overall secondary school records, on the results of Department of Education examinations where applicable, on possible other tests (in which case applicants will be so notified), and on a general assessment of their capacity for success in university studies as made by the Admissions Committee.

Credit on transfer is restricted 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 who has completed the requirements of the First Year with acceptable standing may be admitted to Second Year if space is available.

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.

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.

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. See the General Information section for details.

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.

Students will receive a small interning salary during the summer sessions *after third and fourth years.*

Books and Supplies

Textbooks: Information regarding textbooks will be given during the first class period in each course.

Two white laboratory coats.

Instruction regarding purchase of uniforms will be given by the school.

General Programme

Entrance Requirements from Secondary School Graduation on the Academic/Technical Programme

Mathematics 11 or 12
Chemistry 11
Physics 11, suggested
Chemistry 12, suggested
Biology 11, 12, suggested or Botany 105 or Zoology 105.

First Year

English 100	3 units
Chemistry 103, 110 or 120	3 units
Mathematics 130 or 100 and 121	3 units
Biology 101 or 102*	3 units
One elective course	3 units
Rehabilitation Medicine Orientation 110	1 unit

*See note on Biology 101 and 102 in Faculty of Science section.

Second Year

Anatomy 390, Elementary Human Anatomy	3 units
Sociology 200. Introduction to Sociology or Elective in Social Science (selected with permission of faculty advisor)	3 units
Zoology 303. Vertebrate Physiology	3 units
Pathology 375. Introduction to Human Pathology	1½ units
Physical Education 203. Conditioning Programme	1 unit

Rehabilitation Medicine Courses

200. Practical and Applied Anatomy I	2 units
201. Medicine and Surgery I	2 units
203. Psychiatry I	1½ units

Rehabilitation Therapy Courses

204. Remedial Exercises I	3 units
205. Medical Electricity and Electrotherapy I	1½ units
206. Therapeutic Occupations I Laboratory	2 units
207. Therapeutic Occupations I	2 units

Third Year

361. Sociology or Anthropology 301 or elective in Social Science (selected with permission of faculty advisor	3 units

Rehabilitation Medicine Courses

300. Practical and Applied Anatomy II	3 units
301. Medicine II, and Surgery II	2 units
303. Psychiatry II	1½ units

Rehabilitation Therapy Courses

304. Remedial Exercises II	4 units
305. Medical Electricity and Electrotherapy II	1 unit
306. Therapeutic Occupations II Laboratory	3 units
307. Therapeutic Occupations II	2 units
308. Clinical Training	3 units

Fouth Year

Rehabilitation Medicine Courses

401. Medicine III and Surgery III	2 units
403. Psychiatry III	1½ units

Rehabilitation Therapy Courses

400. Practical and Applied Anatomy III	½ unit
404. Remedial Exercises III	3 units
405. Electro-, Thermo- and Hydrotherapy III	1 unit
406. Therapeutic Occupations III Laboratory	2 units
407. Therapeutic Occupations III	2 units
408. Clinical Training	5 units
409. Supervision and Administration	½ unit

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.

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. 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.

Examinations and Advancement

1. Examinations in the School of Rehabilitation Medicine may be held at various times throughout the year, with final examinations being written at the end of each academic year. These examinations are obligatory for all students.

2. If a student is unavoidably absent from a sessional examination, he must notify the School of Rehabilitation Medicine office before the end of the examination period. Failure to observe this rule may result in the recording of a failure for the course.

3. When a sessional examination has been missed through illness or domestic affliction, application for a deferred examination or for special consideration must be made in writing to the School of Rehabilitation Medicine office not later than forty-eight 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.

4. A student may be denied the privilege of writing a sessional examination in any subject because of unsatisfactory work or attendance, and may be considered 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 and clinical training is unsatisfactory may be asked to withdraw from the School, or to repeat the entire work for the year.

(d) A student in any year taking a full programme of studies who does not pass in at least sixty per cent of it will be required to withdraw from the University for at least a year. A student taking a partial programme of studies who does not pass all of it will be required to withdraw.

(e) A student may not repeat more than one year.

(f) A student who fails twice will be required to withdraw from the University.

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]
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

200. (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]

300. (3) Practical and Applied Anatomy II.—Lecture and Laboratory course with emphasis on the structure of the nervous system. (Neuroanatomy). [2-5; 0-1]

400. (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]

201. (2½) Medicine I. and Surgery 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; 2-0]

301. (2) Medicine II and Surgery II.—A series of lectures and clinical demonstrations on various diseases and surgical procedures. [2-0; 2-0]

401. (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]

203. (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; 1-0]

303. (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. [1-0; 1-1]

403. (1½) 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 supervision. [1-0; 1-1]

Rehabilitation Therapy

204. (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]

304. (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]

404. (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]

205. (1½) Medical Electricity and Electrotherapy.—Mechanics of movement including levers and pulleys. Basic physics of electricity, which is then related to basic production of currents used in electrotherapy. Practical classes relating to the application of constant current and interrupted current for stimulation of nerve and muscle. Infra-red techniques, wax baths, and an introduction to short-wave treatment will also be included. [2-1; 1-1]

305. (1) Medical Electricity and Electrotherapy II.—Lectures, demonstrations and practical classes on production and application of short-wave, ultraviolet and further consideration of stimulating currents. [1-1; 1-1]

405. (1) Electro-, Thermo- and Hydrotherapy III.—A series of lecture-demonstrations and practical classes on the production and therapeutic use of ultra-sonics, micro-wave diathermy and special ionizations. Theory and application of hydrotherapy. [1-1; 0-1]

206. (2) Therapeutic Occupations I. Laboratory.—Practical classes in techniques used in instruction and practical application of the basic techniques of ceramics, woodworking, needlework, rugmaking, basketry and seagrass seating. [0-4; 0-3]

306. (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; 0-4]

406. (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]

207. (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]

307. (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]

407. (2) Therapeutic Occupations III.—Lectures on further aspects of rehabilitation [2-0; 2-0]

308. (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]

408. (5) Clinical Training.—Five half-days a week in both terms will consist of supervised participation in rehabilitation procedures in the Physical and Occupational Therapy Departments of the Vancouver hospitals and rehabilitation centres. [0-17½; 0-17½]

409. (½) Supervision and Administration.—Lecture course on methods of supervising staff and students in training as well as department management and organization. [1-0; 0-0]

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 102 or Zoology 105 or equivalent. [3-0; 3-0]

Anthropology

301. (3) Indians of British Columbia.—An examination of the relations between Indian and non-Indian cultures, with special reference to current Indian situations and their anthropological background. [3-0; 3-0]

Pathology

375. (1½) Allied Health Professions Course.

Physical Education and Recreation

203. (1) Conditioning Programmes (men/women).—Conditioning exercises, fitness assessment, adaptation of exercise programmes, teaching methods and techniques.

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]

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]

Zoology

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 102, 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. [2-2; 2-2]

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 Second and Third Years	—	304 hours	3 units
12 weeks between Third and Fourth Years	—	456 hours	3½ units
16 weeks at end of Fourth Year	—	608 hours	4½ units
Included within academic years (see curriculum)		675 hours.	

General Professional Information

Upon successful completion of sixteen weeks of internship following graduation, a student is eligible to apply for membership in the Canadian Association of Occupational Therapists and/or 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 180, Ontario.

The Canadian Association of Occupational Therapists,
57 Bloor Street West,
Toronto 189, 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.

Awards and Financial Assistance

(Subject to change)

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 should be consulted by all students who wish to obtain information or to submit applications. It should be noted that most awards do not require the submission of an application. Applications for bursaries must be submitted by July 15 to the Dean of Inter-Faculty and Student Affairs, on forms obtainable from his office.

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), 895 West Tenth Avenue, 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 financial 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 $50.00 for a student in Second or Third Year, will be awarded to the applicant deemed most worthy of financial assistance. Applications invited before January 15 each year, to the School of Rehabilitation Medicine, University of British Columbia, Vancouver 8, B.C.

The Comitas Club Bursary.—A bursary of $250.00 gift of the Comitas Club of Vancouver, whose object is to help cerebral-palsied children, will be offered to students in training as therapists in the School of Rehabilitation Medicine. The award will be made to a student with promise in this field, who is worthy and deserving of financial assistance.

The Helen Grimmer Scholarship in Rehabilitation Medicine.—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 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.

PRIZES

Mrs. Therese Astell Book Prize.—A memorial book prize presented by the Canadian Physiotherapy Association (B.C. Branch) to the student with the highest standing in the Third Year.

British Columbia Society of Occupational Therapists Book Prize awarded to a student in the graduating year for general proficiency in Rehabilitation Medicine.

Canadian Physiotherapy Association Book Prize.—awarded to the student with the highest standing in the final year of Rehabilitation Medicine.

Canadian Physiotherapy Association (B.C. Branch) Book Prize awarded for General Proficiency in the final year of Rehabilitation Medicine.

Canadian Association of Occupational Therapists Book Prize awarded to the student with the highest standing in the final year in Occupational Therapy subjects in the course in Rehabilitation Medicine.

The Dean of the Faculty of Medicine's Prize.—$100.00 to the student with the highest standing in the graduating year.

THE FACULTY OF PHARMACEUTICAL SCIENCES

ACADEMIC STAFF

BERNARD E. RIEDEL, C.D., B.Sc., M.Sc. (Alta.), Ph.D. (Biochem.) (Western Ontario), 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 Dean of the Faculty.

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), Professor of Pharmaceutical Chemistry.

TERENCE H. BROWN, B.S.P. (Brit. Col.), M.S., Ph.D. (Wash.), Associate Professor of Pharmaceutical Chemistry.

JOHN N. HLYNKA, B.Sc. (Pharm.), M.Sc., Ph.D. (Alta.), Associate Professor of Clinical Pharmacy.

JOHN H. MCNEILL, B.Sc., M.Sc., (Alta.), Ph.D. (Mich.), Associate Professor of Pharmacology.

ALAN G. MITCHELL, B.Pharm., Ph.D. (London), M.P.S., Associate Professor of Pharmaceutics.

JANIS O. RUNIKIS, B.S., M.S., Ph.D. (Wash.), Associate Professor of Pharmaceutics.

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.

ALLAN M. GOODEVE, Phm.B. (Toronto), B.S.P. (Sask.), M.Sc.Phm. (Toronto), Ph.D. (Purdue), Assistant Professor of Pharmacognosy.

J. GLEN MOIR, B.S.P. (Brit. Col.), M.S. (Michigan), Assistant Professor of Hospital Pharmacy.

BASIL D. ROUFOGALIS, B.Pharm., M.Pharm., Ph.D. (Sydney, Australia), Assistant Professor of Pharmaceutical Chemistry. (Medical Research Council Scholar).

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.), Senior Instructor in Pharmaceutics.

MRS. GWENDOLYN F. Q. L. CHAN, B.S.P., M.S.P., Ph.D. (Brit. Col.), Lecturer in Pharmaceutical Chemistry.

ROSEMAREE GENTLES, B.S.P. (Sask.), Lecturer in Pharmaceutics.

KENNETH E. HAUGEN, B.S.P. (Brit. Col.), Lecturer in Pharmaceutics.

ANNE M. LEATHEM, B.S.P., M.Sc. (Brit. Col.), Lecturer in Pharmacology and Clinical Pharmacy.

MISS NATALIE L. PAWLOVICH, B.S.P., M.Sc. (Sask.), Lecturer in Pharmaceutics.

MISS ELAINE YAKIMETS, B.Sc. (Pharm.), Master in Hospital Pharmacy (Alta.), Lecturer in Clinical Pharmacy.

ADELE RUNIKIS, B.S.P. (Brit. Col.), Pharmacist, Psychiatric Unit.

PETER W. BELL, B.Sc. (Pharm.) (Manitoba), M.B.A. (Western Ontario), Lecturer (Part-time).

LEROY C. FEVANG, B.S.P., M.B.A. (Brit. Col.), Lecturer (Part-time).

GORDON B. HEWITT, B.A., B.S.P., M.Ed. (Brit. Col.), Lecturer (Part-time) and Director, Continuing Education, Pharmacy.

MISS KAREN L. PYLATUK, B.Sc. (Pharm.) (Brit. Col.), Pharmacist (University Health Services Pharmacy), Lecturer in Pharmaceutics (Part-time).

MRS. LOUANNE TWAITES, Assistant Pharmacist, Psychiatric Unit.

MISS GILLIAN A. WILLIS, Ph.C., M.P.S. (Great Britain), Lecturer in Pharmaceutics (Part-time).

DAVID DUPLESSIS, B.S.P. (Brit. Col.), Honorary Clinical Instructor, Director of Pharmaceutical Services, Lions Gate Hospital.

PERCY CUNNINGHAM, Honorary Clinical Instructor, Director of Pharmaceutical Services, Vancouver General Hospital.

JOHN W. DANCEY, Honorary Clinical Instructor, Assistant Director, Pharmaceutical Services, Vancouver General Hospital.

A. WHITNEY MATTHEWS, B.Sc. (Pharm.) M.Sc. (Alta.), Ph.D. (Florida). LL.D. (Alta.), D.Sc. (Brit. Col.), Dean Emeritus.

Clinical Instructors

ARCHIE BAKER, B.S.P. (Brit. Col.).
WILLIAM F. BAKER, B.S.P. (Brit. Col.).
RONALD J. BEGG, Ph.C.
BERT BURLISON, Ph.C.
ANDREW E. DAEM, B.S.P. (Brit. Col.).
WILLIAM E. ERWIN, B.S.P. (Brit. Col.).
KENNETH R. FEE, Ph.C.
GEORGE FISHER, C.D., Ph.C.
HAROLD A. GARRETT, Ph.C.
MAURICE B. HARPER, B.S.P. (Brit. Col.).
W. JAMES INCE, Ph.C.
LEONARD E. MARKS, B.S.P. (Brit. Col.).
OTIS J. MCNIELL, Ph.C.
ELMER S. MEIER, Ph.C.
EDWARD S. MORAN, B.S.P. (Brit. Col.).
CECIL A. MUNRO, Ph.C.
ROBERT Y. PORTE, B.S.P. (Brit. Col.).
CLARENCE RAE, Ph.C.
JAMES SHARP, B.S.P. (Brit. Col.).
HARRY E. G. STEWART, Ph.C.
TREVOR M. WATSON, B.A., B.S.P. (Brit. Col.).
FREDERICK W. WILEY, B.S.P. (Brit. Col.).
CHARLES WILLET, B.S.P. (Brit. Col.).
HAROLD R. WILLIAMSON, B.S.P. (Brit. Col.).
MARGUERITE M. YEE, B.S.P. (Brit. Col.).
ANDREW A. YOUNG, B.S.P. (Brit. Col.).
ERNEST L. ZACHARIAS, B.S.P. (Brit. Col.).

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., Research Professor of Poultry Science.

W. D. KITTS, M.S.A. (Brit. Col.), Ph.D. (Iowa State), Professor and Chairman, Division of Animal Science.

C. R KRISHNAMURTI, M.V.Sc. (Madras), Ph.D. (Alta.), Assistant Professor, Department 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.), Director of the Office of Interprofessional Education in the Health Sciences and Associate Professor, Health Care and Epidemiology.

MARGARET S. M. NEYLAN, B.N. (McGill), M.A. (Brit. Col.), Associate Professor, Nursing.

Members of Faculty representing other Departments:

J. J. STOCK, B.S.A. (Ont. Agric. Coll.), M.Sc., Ph.D. (McGill); S. H. ZBARSKY, B.A. (Sask.), M.A., Ph.D. (Toronto); W. E. YEOMENS, B.A. (Mount Allison), M.A. (Toronto); E. PIERS, B.Sc., Ph.D. (Alta.); J. B. WARREN, B.A. (Wash), M.B.A. (Calif.), C. F. CRAMER, M.S. (New Mexico), Ph.D. (Calif.).

Members of Faculty representing the Profession:

WILLIAM F. BAKER, B.S.P. (Brit. Col.).
BLAKE E. MORROW, B.S.P. (Brit. Col.).

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 degrees of Master of Science (M.Sc.) and Doctor of Philosophy (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 community pharmacies 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 Association of Faculties of Pharmacy of Canada.

Admission

The general requirements for admission to the University are given in General Information.

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 work taken in an approved college or 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; English 100; Mathematics 100 and 121; one of Physics 105, 110, 115 or 120, or Biology 101 or 102, 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 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.

All necessary educational documents and an Application for Admission form must be submitted by June 30 for all students registering in the Faculty of Pharmaceutical Sciences for the first time.

Financial Assistance

A list of Fellowships, Scholarships, Bursaries and Loans will be found in the Awards and Financial Assistance section of the calendar. In general, application must be made to the Dean of Inter-Faculty and Student Affairs.

Graduate Studies.

For details of Graduate Studies see the Faculty of Graduate Studies section of the calendar.

See the General Information section of the calendar for:

(i) fees
(ii) graduation
(iii) withdrawal
(iv) examinations and advancement
(v) examination results
(vi) review of assigned standing
(vii) supplementals and examinations
(viii) transcript of academic record
(ix) attendance

Requirements for Licensing

The possession of a B.Sc.(Pharm.) does not, in itself, confer the right to practise pharmacy in any province of Canada. In order to practise Pharmacy in the Province of British Columbia it is necessary to be registered as a member of the Pharmaceutical Association of the Province. 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 become a registered student of the Association before commencing his period of practical training. It is recommended that students register with the Pharmaceutical Association of the Province of British Columbia during their first year in the Faculty of Pharmaceutical Sciences.

Details of these requirements may be obtained from the Registrar of the Pharmaceutical Association, 1400 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. Information relative to the dates of examinations, application forms, etc., may be obtained through the Dean's office.

Attendance, Examinations and Advancement

1. A student in any year taking a full programme of studies who does not pass in at least sixty per cent of it will be required to withdraw from the University for at least a year. A student taking a partial programme of studies who does not pass all of it will be required to withdraw.
2. Students who fail for a second time in a year's work will be required to withdraw.
3. Students who have failed to complete the requirements of any one year may be permitted to register only in courses in the succeeding year for which they have the necessary prerequisites.
4. Students will not be permitted to register in more than eighteen units in any one year without the special permission of the Dean.
5. 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.
6. Term essays and examination papers may be refused a passing mark if they are noticeably deficient in English.

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 has obtained a final grade of not less than 40 per cent. Notice will be sent to students to whom such supplemental examinations have been granted.
2. In any one session no candidate will normally be granted supplemental privileges in more than 3 units.
3. A student who has failed in more than 6 units of a required year's work will be considered to have failed in the work of that year, and will not 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 least 50 per cent. 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 per cent. Similarly, the overall average will not be changed if a subject already passed is written for higher standing.
5. 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.

CURRICULUM

First Year

Subject	First Term Lect.	First Term Lab.	Second Term Lect.	Second Term Lab.
Chem. 205, Physical Inorganic and Analytical Chemistry	3	4	3	4
[2]Chem. 230, Organic Chemistry	3	3	3	3
[1]Biology 101 or 102, Principles of Biology	3	3	3	3
Pharm. 110, Pharmaceutics I	3	3	3	3
[1]Physics 105, 110, 115 or 120	3	3	3	3
English 150, Composition or non-Science elective	2	0	2	0
Elective	3	0	3	0

[1]The student presenting Physics as an entrance requirement will take Biology in this year and vice-versa.

[2]Chemistry 230 is a prerequisite for all subsequent Pharmacy courses with the exception of Pharmacy 350.

Second Year

Subject	First Term Lect.	First Term Lab.	Second Term Lect.	Second Term Lab.
[1]Anatomy 390, Basic Human Anatomy	3	0	3	0
Biochem. 410, Outlines of Biochemistry	3	0	3	0
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
Elective	3	0	3	0

[1]Enrolment may be limited due to lack of space.

Third Year

Subject	First Term Lect.	First Term Lab.	Second Term Lect.	Second Term Lab.
Pharm. 310, Pharmaceutics III	3	3	3	3
Pharm. 320, Organic Medicinal Products	3	0	3	0
Pharm. 325, Pharmaceutical Chemistry	3	4	3	4
Pharm. 340, General Pharmacology	3	3	3	3
Pharm. 345, Biological Products	0	0	2	0
Pharm. 350, Pharmaceutical Law, Ethics and Pharmaceutical Organizations	2	0	2	0
Pathology 375, Introduction to Human Pathology	1	0	1	0
Elective	2	0	2	0

Fourth Year

Subject	First Term Lect.	First Term Lab.	Second Term Lect.	Second Term Lab.
Pharm. 410, Biopharmaceutics	2	0	2	0
Pharm. 411, Applied Pharmaceutics	0	3	0	3
Pharm. 440, Applied Pharmacology	2	0	2	0
†Electives (see below) minimum 13 units	—	—	—	—

†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.

Areas of Interest

1. Community Pharmacy.
2. Hospital Pharmacy.
3. Governmental and Industrial Pharmacy.
4. Graduate Studies.
5. Radio Pharmacy.

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]

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]

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. [3-3; 3-3]

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. [0-0; 2-4]

414. (3) Problems in Pharmaceutics and Biopharmaceutics.—Individual assignments involving library and laboratory investigation of problems involved in the development of pharmaceutical dosage forms. [0-6; 0-6]

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. [2-4; 2-4]

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. [3-0; 3-0]

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 and Chemistry 230. [3-4; 3-4]

420. (2) Drug Identification and Synthesis.—The lecture material will cover a broad range of synthetic methods of drug production on a laboratory and industrial scale. The laboratory will involve the synthesis and pharmacologic testing of representative groups of drugs. [1-3; 1-3]

424. (2) Quality Control.—A survey course involving discussions of various methods of analysis and control. Selected demonstrations will be given to illustrate various procedures. [2-0; 2-0]

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. (Prerequisite: Pharmacy 320). [2-0; 2-0]

Pharmacognosy

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: Pharmacy 320 and 340). [2-0; 2-0]

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]

345. (1) Biological Products.—A study of the main classes of biological products of pharmaceutical and medicinal importance. [0-0; 2-0]

435. (1) Pesticides.—Physiological action and chemical properties of insecticides, rodenticides, weedicides, etc. (This course is the same as Plant Science 435. [2-0; 0-0]

440. (2) Applied Pharmacology.—Therapeutic applications of drugs. Important diseases and the role of drugs in their treatment will be discussed. Emphasis will be placed on potential dangers and possible toxic reactions of drugs. Various types of literature dealing with drug therapy will be studied and oral reports presented. Prerequisite: Pharmacy 340. [2-0; 2-0]

444. (3) Problems in Pharmacology.—Individual assignments involving library and laboratory investigation of certain aspects of drug action. [0-6; 0-6]

445. (1) Animal Hygiene.—Management and disease prevention; drugs used in common animal and poultry diseases. [0-0; 2-0]

Pharmacy Administration

350. (2) Pharmaceutical Law Ethics and Pharmaceutical Organizations.—Early legislation pertaining to pharmacy; Provincial and Federal legislation affecting the practice of pharmacy; ethical principles and responsibilities, and the historical development of contemporary pharmaceutical organizations. [2-0; 2-0]

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. [2-0; 1-3]

455. (2) Community Health.—The relationship of the practising pharmacist to community health and community health practices. [2-0; 2-0]

Hospital Pharmacy Residency Programme

Specialized postgraduate hospital pharmacy training (52 weeks) is available through Hospital Pharmacy Residency Training Programs in accredited B.C. hospitals, in affiliation with the Faculty of Pharmaceutical Sciences. Further information is available upon request from the Faculty of Pharmaceutical Sciences.

Radiopharmacy Residency

Specialized postgraduate training in the application and handling of radio pharmaceuticals used in therapy is offered by the Vancouver General Hospital in affiliation with the Faculty of Pharmaceutical Sciences. Further information is available upon request from the Faculty of Pharmaceutical Sciences.

Courses for Graduate Studies

500. (3) Pharmaceutical Research Techniques.—A lecture and laboratory course dealing with a variety of modern physical, chemical and biological techniques currently used in pharmaceutical research.

510. (1) Advanced Pharmaceutics I.—A study of physical and chemical properties of pharmaceutical systems with emphasis on formulation and preparative aspects.

511. (1) Advanced Pharmaceutics II.—A study of problems in pharmaceutics with emphasis on biopharmaceutical aspects.

512. (1) Advanced Pharmaceutics III.—A study of problems in pharmaceutics with emphasis on aspects of quality evaluation.

521. (1) Advanced Medicinal Chemistry I.—A study of the underlying physical and chemical properties of importance in medicinal chemistry.

522. (1) Advanced Medicinal Chemistry II.—Selected topics of current interest in medicinal chemistry. The subject matter may change each year and will cover the recent theoretical advances in the field of medicinal chemistry.

530. (2) Advanced Pharmacognosy.—A detailed study of selected compounds of biological origin useful in the fields of Pharmacy and Medicine.

540. (1) Topics in Pharmacology.—Lectures and supervised studies in selected areas of pharmacology.

541. (1) Drug Metabolism.—The biotransformation of drugs, pesticides, carcinogens and other foreign chemicals in animals and humans. The biochemical mechanisms and current method of research will be stressed.

542. (1) Pharmacology of the Nervous System.—A course comprised of lectures, assigned readings and conferences which may deal with methods of investigating drug effects on synaptic transmissions, screening techniques employed in neuropharmacology, and studies concerned with the mechanism of action of drugs affecting the nervous system.

548. (1) Seminar.—Attendance at regular seminars throughout the session and presentation of one or more papers on selected topics.

549. (3-6) Master's Thesis.

550. (1-3) Directed Studies.

649. Doctor of Philosophy Thesis.

Courses from Other Faculties:

Anatomy
390. (3) Basic Human Anatomy.

Biochemistry
410. (3) Outlines of Biochemistry.
411. (1½) Biochemistry Laboratory.

Biology
101. (3) Principles of Biology.
102. (3) Principles of Biology.

Chemistry
205. (3) Physical-Inorganic and Analytical Chemistry.
230. (3) Organic Chemistry.

Commerce
369. (3) Drug Store Retailing.
459. (3) Introduction to Accounting.

English
150. (2) Composition.
305. (2) Literature of Ideas.

Microbiology
201. (3) Principles of Microbiology.

Pathology
375. (1) Introduction to Human Pathology.

Physics
105 (3), 110 (3), 115 (3) or 120 (3).

Physiology
301. (3) Human Physiology.
302. (1½) Human Physiology Laboratory.

Plant Science
435. (1-1½) Pesticides.

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 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. 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.

The British Columbia Pharmacists' Society Scholarship.

The Burroughs Wellcome Scholarship.

The Canadian Foundation for the Advancement of Pharmacy Scholarships.

The Canadian Pharmaceutical Association Centennial Scholarship.

The Charles E. Frosst Scholarship.

The Cunningham Prize in Pharmacy.

The Cunningham Scholarship in Pharmacy.

The Dean E. L. Woods Memorial Prize (donated by the Pharmaceutical Association of the Province of British Columbia).

The Edith and Jacob Buckshon Memorial Prize.

The George E. K. MacDonald Memorial Prize in Pharmacy.

The Horner Gold Medal for Pharmacy.

The Merck Sharp & Dohme Awards.

The National Drug and Chemical Company of Canada Ltd. B.C. Drugs Division, Scholarship.

The Parke, Davis & Company Ltd. Awards.

The Pharmaceutical Association of the Province of British Columbia Scholarship.

The Pharmaceutical Association of the Province of British Columbia Entrance Scholarship.

The Poulenc Gold Medal.

The Poulenc Scholarship in Pharmacy.

The Upjohn Company of Canada Scholarship.

The W. Elgin Turnbull Memorial Scholarship.

Bursaries

The Alvin Cunningham Bursary.

The Dean A. W. Matthews Testimonial Bursary.

The Hoffman-LaRoche Canadian Centennial Bursary.

The John MacRae Memorial Bursary.

The Ladies Pharmaceutical Auxiliary Bursary in Pharmacy.

The Ladies Pharmaceutical Auxiliary (Victoria) Bursaries.

The Lambda Kappa Sigma Alumni Bursary.

Municipal Chapter, I.O.D.E. Bursary in Pharmaceutical Sciences.

The Pharmaceutical Association of the Province of British Columbia Entrance Bursary.

The Sam Bass Bursary.

The Sam and Jake Bass Bursary.

The Sea Going Hacks Bursary.

Loan Funds

The Dean E. L. Woods Memorial Loan Fund.

The G. T. Cunningham Memorial Loan Fund.

The Pharmaceutical Association of the Province of British Columbia Student Aid Fund.

Special Awards

The Aubrey A. Brown Memorial Award in Pharmacy (donated by the Canadian Foundation for the Advancement of Pharmacy).

The E. L. Woods Memorial Prize in Pharmacy (donated by the Canadian Foundation for the Advancement of Pharmacy).

The Centennial Pharmacy Scholarship.

For Graduate Study

The Canadian Foundation for the Advancement of Pharmacy Graduate Study Fellowship.

The Canadian Foundation for the Advancement of Pharmacy Fellowships in Hospital Pharmacy.

The Geigy Pharmacy Scholarship.

The H. C. LePatourel Fellowship in Hospital Pharmacy.

The Pfizer Fellowship in Hospital Pharmacy.

The Warner-Lambert Research Fellowship in Pharmacy.

The Stanley Drug Products' Scholarship.

THE FACULTY OF SCIENCE

FACULTY OF SCIENCE

GEORGE M. VOLKOFF, M.B.E., M.A. (Brit. Col.), Ph.D. (Calif.), D.Sc. (Brit. Col.), F.R.S.C., Professor and Dean of the Faculty.

N. J. DIVINSKY, B.Sc. (Manitoba), M.Sc., Ph.D. (Chicago), Professor of Mathematics and Assistant Dean of the Faculty.

CYRIL V. FINNEGAN, B.A. (Bates), M.S., Ph.D. (Notre Dame), Professor of Zoology and Assistant Dean of the Faculty.

Department of Biochemistry—See Faculty of Medicine.

Department of Botany

Professor and Head of the Department

R. F. SCAGEL, M.A. (Brit. Col.), Ph.D. (Calif.), F.R.S.C., F.L.S., Curator of the Phycological Herbarium.

Professors

R. J. BANDONI, B.S. (Nevada), M.S., Ph.D. (Iowa), Curator of the Mycological Herbarium.

KATHLEEN M. COLE, M.A. (Brit. Col.), Ph.D. (Smith).

V. J. KRAJINA, D.Sc. (Charles', Prague).

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Professor and Head of the Department
J. J. R. CAMPBELL, B.S.A. (Brit. Col.), Ph.D. (Cornell), F.R.S.C.

Professors
D. M. MCLEAN, B.Sc., M.D. (Melbourne), F.R.C.P.(C).
C. C. WALDEN, B.A., M.A. (Sask.), Ph.D. (Minn.). (Honorary)

Associate Professors
J. E. BISMANIS, M.D., Dip. Bact. (U. of Latvia, Riga), C.R.C.P.(C).
T. H. BLACKBURN, B.A., M.Sc. (Trinity), Ph.D. (Aberdeen).
MRS. AUDREY F. GRONLUND, B.A., M.Sc., Ph.D. (Brit. Col.).
MRS. JULIA LEVY, B.A. (Brit. Col.), Ph.D. (London).
J. J. STOCK, B.S.A. (Ont. Agric. Coll.), M.Sc., Ph.D. (McGill).
R. A. J. WARREN, B.Sc. (Birmingham), M.Sc. (Brit. Col.), Ph.D. (Calif.).

Assistant Professors
J. B. HUDSON, B.Sc., M.Sc. (London), Ph.D. (Alta.).
E. E. ISHIGURO, M.Sc. (San Francisco State), Ph.D. (Illinois).

D. G. KILBURN, B.A.Sc. (Brit. Col.), Ph.D. (London).
B. C. MCBRIDE, M.Sc. (Brit. Col.), Ph.D. (Illinois).
R. C. MILLER, JR., M.Sc. (Penn. State), Ph.D. (Penn.).
MISS DELFA SYEKLOCHA, B.A. (Brit. Col.), M.Sc., Ph.D. (McGill).
G. WEEKS, B.Sc., Ph.D. (Birmingham). (Visiting)

Clinical Professor
E. J. BOWMER, M.C., M.D. (Liverpool), M.R.C.S.; L.R.C.P. (London), C.R.C.P.(C).

Clinical Associate Professors
W. H. COCKROFT, M.D., D.P.H. (Toronto), C.R.C.P.(C).
G. D. M. KETTYLS, B.Sc., M.D. (Alberta), D.P.H. (Toronto), C.R.C.P.(C).
F. J. ROBERTS, B.A., M.D. (Sask.), F.R.C.P.(C).

Clinical Assistant Professors
MRS. ERICA P. CRICHTON, M.D. (Glas.), C.R.C.P.(C).
MISS BARBARA L. ROBINSON, M.D. (Alta.), C.R.C.P.(C).

Department of Physiology—See Faculty of Medicine.

Department of Physics

Professor and Acting Head of the Department
KENNETH C. MANN, O.B.E., B.A. (Sask.), M.A., Ph.D. (Toronto).
GORDON M. SHRUM, O.B.E., M.M., E.D., M.A., Ph.D. (Toronto), D.Sc. (Brit. Col.), F.R.S.C. (Honorary)

Professors
A. J. BARNARD, M.Sc. (Rhodes, S.A.), Ph.D. (Glasgow).
ROBERT BARRIE, B.Sc., Ph.D. (Glasgow).
M. BLOOM, M.Sc. (McGill), Ph.D. (Illinois), F.R.S.C.
RONALD E. BURGESS, B.Sc., D.Sc. (London), F.R.S.C.
R. W. BURLING, M.Sc. (New Zeal.), Ph.D. (London).
A. M. CROOKER, B.A. (McMaster), M.A., Ph.D. (Toronto).
F. L. CURZON, B.Sc., A.R.C.S., D.I.C., Ph.D. (London).
F. W. DALBY, B.Sc. (Alta.), M.A. (Brit. Col.), Ph.D. (Ohio State).
K. L. ERDMAN, B.A., M.Sc. (Alta.), Ph.D. (Brit. Col.).
A. V. GOLD, B.Sc. (Edin.), Ph.D. (Cantab.).
G. M. GRIFFITHS, B.A.Sc. (Toronto), M.A., Ph.D. (Brit. Col.).
HERBERT P. GUSH, B.E., M.A. (Sask.), Ph.D. (Toronto).
GARTH JONES, B.A., M.Sc., Ph.D. (Brit. Col.).
FRIEDRICH A. KAEMPFFER, Dipl.Phys., Dr. Rer. Nat. (Göttingen).
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ROY NODWELL, B.E. (Sask.), M.A.Sc., Ph.D. (Brit. Col.).
W. OPECHOWSKI, Mag.Fil. (Warsaw), F.R.S.C.
GEORGE L. PICKARD, M.B.E., M.A., D.Phil. (Oxon.), F.R.S.C., Director of the Institute of Oceanography.
M. H. L. PRYCE, M.A. (Cantab.), Ph.D. (Princeton), F.R.S. Acting Director of the Institute of Astronomy and Space Science.
P. RASTALL, B.S., Ph.D. (Manchester).
L. DE SOBRINO, M.Sc., Sc.D. (M.I.T.).
ROBERT W. STEWART, M.Sc. (Queen's), Ph.D. (Cantab.), F.R.S., F.R.S.C. (Honorary)
E. W. VOGT, M.Sc. (Man.), Ph.D. (Princeton), F.R.S.C.
GEORGE M. VOLKOFF, M.B.E., M.A. (Brit. Col.), Ph.D. (Calif.), D.Sc. (Brit. Col.), F.R.S.C., Dean of the Faculty of Science.
J. B. WARREN, B.Sc., D.I.C., Ph.D. (London), F.Inst.P., F.R.S.C.
B. L. WHITE, B.Sc. (New Zealand), D.I.C., Ph.D. (London).
D. Ll. WILLIAMS, B.Sc. (N. Wales), Ph.D. (Cantab).

Associate Professors
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E. G. AULD, M.A.Sc. (Brit. Col.), Ph.D. (Southampton).
J. W. BICHARD, B.A.Sc. (Toronto), Ph.D. (Notre Dame).
M. K. CRADDOCK, M.A., D.Phil. (Oxon.).
W. N. HARDY, B.Sc., Ph.D. (Brit. Col.).
ROGER HOWARD, B.Sc., Ph.D. (Nott.).
P. H. LEBLOND, B.A. (Laval), B.Sc. (McGill), Ph.D. (Brit. Col.).
J. M. MCMILLAN, M.Sc. (Brit. Col.), Ph.D. (McGill).
P. M. MARTIN, B.Sc., Ph.D. (Glasgow).
P. W. MATTHEWS, B.Sc., Ph.D. (Bristol).
D. F. MEASDAY, M.A., D.Phil. (Oxon.).
M. MIYAKE, B.S. (Drexel), M.S., Ph.D. (Washington).
I. OZIER, B.A. (Toronto), A.M., Ph.D. (Harvard).
G. S. POND, B.Sc., Ph.D. (Brit. Col.).
C. F. SCHWERDTFEGER, B.S. (Villanova), Ph.D. (Notre Dame).
W. L. H. SHUTER, M.Sc. (Rhodes), Ph.D. (Manchester).
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D. S. BEDER, B.Sc. (McGill), Ph.D. (Cal. Tech.).
J. F. CAROLAN, A.B. (Princeton), Ph.D. (Maryland).
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D. JOHNSON, M.Sc., Ph.D. (Brit. Col.). (Visiting)
R. R. JOHNSON, B.Phys., M.S., Ph.D. (Minnesota).
J. MEYER, Dr. Rer. Nat. (Kiel).
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M. SALOMON, M.S. (Argentina), Ph.D. (Uppsala). (Visiting)
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A. BURGESS, B.Sc. (R.M.C.).
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J. GRABOWSKI, M.Sc., Ph.D. (Cracow).
D. HEALEY, M.Sc. (Brit. Col.), Ph.D. (Stanford).
R. HOLTHAM, B.A. (Cantab.), Ph.D. (Bristol).
M. HORN, Dipl. Phys. (Munich), Ph.D. (Brit. Col.).
C. H. Q. INGRAM, M.A., D.Phil. (Oxon.).
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D. V. LITVIN, M.Sc., Ph.D. (Technion, Haifa).
S. MIKOSHIBA, M.Sc. (Tokyo Inst. Tech.), Ph.D. (Alta.).
T. J. MULLIGAN, B.S. (Hampden-Sydney College, Va.), Ph.D. (Florida State).
M. PEZULET, B.Sc., D.Sc. (Laval).
A. D. RUSSELL, B.Sc. (M.I.T.), M.Sc., Ph.D. (Illinois).
P. STANGEBY, M.Sc. (Toronto), D.Phil. (Oxon.).
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C. VERMETTE, M.A.Sc. (Brit. Col.), Ph.D. (Alta.)
M. VERSCHUEREN, B.Sc., Dr. Sc. (Louvain).

Lecturers from the Department of Geophysics
D. E. SMYLIE, B.Sc., M.A., Ph.D. (Toronto), Associate Professor.

Department of Zoology

Professor and Head of the Department
PETER A. LARKIN, M.A. (Sask.), D.Phil. (Oxon.), F.R.C.S.

Professors
A. B. ACTON, M.A., D.Phil. (Oxon.).
JAMES R. ADAMS, M.Sc., Ph.D. (McGill).
DENNIS H. CHITTY, B.A. (Toronto), M.A., D.Phil. (Oxon.), F.R.S.C.
IAN MCTAGGART COWAN, S.M., B.A. (Brit. Col.), Ph.D. (Calif.), LL.D. (Alta.), F.R.S.C. Dean of the Faculty of Graduate Studies.
PAUL A. DEHNEL, M.A., Ph.D. (Calif.).
IAN EFFORD, B.Sc. (London), D.Phil. (Oxon).
CYRIL V. FINNEGAN, B.A. (Bates), M.S., Ph.D. (Notre Dame), Chairman, Life Sciences Council and Assistant Dean, Faculty of Science.
H. D. FISHER, B.A., M.A. (Brit. Col.), Ph.D. (McGill).
W. S. HOAR, B.A. (New Brunswick), M.A. (Western Ontario), Ph.D. (Boston), D.Sc. (New Brunswick and Memorial), F.R.S.C.
C. S. HOLLING, M.Sc. (Toronto), Ph.D. (Brit. Col.), Director of the Institute of Animal Resource Ecology.
JULIUS KANE, B.A. (Brooklyn College), Ph.D. (New York).
A. M. PERKS, M.A. (Cantab.), (Oxon.), Ph.D. (St. Andrews).
J. E. PHILLIPS, M.Sc. (Dalhousie), Ph.D. (Cantab.).
GEOFFREY G. E. SCUDDER, B.Sc. (Wales), D.Phil. (Oxon.), F.R.E.S., Curator of the Spencer Entomological Museum.
H. F. STICH, B.A. (Jena), Ph.D. (Wurzburg).
D. SUZUKI, B.A. (Amherst), Ph.D. (Chicago).
N. J. WILIMOVSKY, B.S., M.A. (Mich.), Ph.D. (Stanford), Curator of the Ichthyological Museum.

Associate Professors
NELLY AUERSPERG, M.D. (Washington), Ph.D. (Brit. Col.).
JAMES F. BENDELL, B.A. (Toronto), Ph.D. (Brit. Col.).
THOMAS H. CAREFOOT, M.Sc. (Brit. Col.), Ph.D. (Wales).
PETER FORD, B.Sc., Ph.D. (London), F.Z.S., F.L.S.
P. W. HOCHACHKA, B.Sc. (Alta.), M.Sc. (Dalhousie), Ph.D. (Duke).
DAVID R. JONES, B.Sc. (Southampton), Ph.D. (East Anglia).
C. J. KREBS, M.A., Ph.D. (Brit. Col.).
A. G. LEWIS, B.Sc., M.Sc. (Miami), Ph.D. (Hawaii).
N. R. LILEY, M.A., D.Phil. (Oxon.).
J. D. MCPHAIL, M.Sc. (Brit. Col.), Ph.D. (McGill).
H. C. NORDAN, B.S.A., M.A. (Brit. Col.), Ph.D. (Oregon State).
T. G. NORTHCOTE, M.A., Ph.D. (Brit. Col.).
D. J. RANDALL, B.Sc., Ph.D. (Southampton).
J. MARY TAYLOR, B.A. (Smith), M.A., Ph.D. (Calif.), Curator of the Vertebrate Museum.
C. F. WEHRHAHN, M.Sc. (Alberta), Ph.D. (Calif.).

Assistant Professors
J. D. BERGER, A.M., Ph.D. (Indiana).
R. H. DRENT, M.A. (Brit. Col.), Ph.D. (Groningen).
J. R. HARGER, M.Sc. (Auckland), Ph.D. (Calif.).
D. G. HOLM, B.Sc. (Brit. Col.), Ph.D. (Connecticut).
MARY JACKSON, B.A. (Toronto), M.A. (Brit. Col.).
H. E. KASINSKY, A.B. (Columbia College, N.Y.), Ph.D. (Calif.).
JOHN R. KREBS, B.A., D.Phil. (Oxon.).
C. J. WALTERS, B.S. (Humboldt State), M.S., Ph.D. (Colorado State).

Senior Instructors
P. ELLICKSON, M.Sc. (Brit. Col.).
MISS ALINE B. REDLICH, M.A. (Brit. Col.).

Part-time Lecturers
R. C. JEFFREY, M.A. (Brit. Col.).
S. C. P. REYNOLDS, B.A. (Dublin), M.Sc. (Simon Fraser).

Research Associates
N. I. ANTIA, B.Sc. (Bombay), Ph.D. (Zurich).
H. L. CHING, B.A., M.S., Ph.D. (Nebraska).
J. C. DAVIS, M.Sc., Ph.D. (Brit. Col.).
EDWARD M. DONALDSON, B.Sc. (Sheffield), Ph.D. (Brit. Col.).
MARYANNE R. HUGHES, B.A. (Harpur College), M.A., Ph.D. (Duke).
R. R. PARKER, B.Sc. (Washington), Ph.D. (Brit. Col.).
W. E. VAN STONE, Ph.D. (McGill).

Visiting Lecturers
J. M. CULLEN, M.A., D.Phil. (Oxon.).
J. W. LEWIS, B.Sc., Ph.D. (Wales).
G. L. MARCH, B.Sc., Ph.D. (Simon Fraser).

Honorary Lecturer
J. R. CALAPRICE, M.Sc., Ph.D. (Calif).

Postdoctoral Fellows
B. K. BURNISON, M.Sc., Ph.D. (Oregon State).
K. FUJII, M.Sc. (Kyoto), Ph.D. (Kansas).
M. FITZ-EARLE, M.Sc., Ph.D. (Toronto).
K. J. HALL, B.Sc., Ph.D. (Wisconsin).
L. HALL, B.Sc. (Buckwell), Ph.D. (Wisconsin).
D. D. JONES, M.S., Ph.D. (Calif., Davis).
K. PEREZ, M.Sc., Ph.D. (N. Carolina State).
C. POODRY, M.Sc., Ph.D. (Case Western Reserve).
T. STRASCHURSKA, Ph.D. (Nencki Inst., Warsaw).
D. G. S. WRIGHT, M.Sc., Ph.D. (Guelph).

Lecturer from other Departments
KENNETH GRAHAM, B.A. (Brit. Col.), M.Sc. (McGill), Ph.D. (Toronto), Professor of Forestry.

THE FACULTY OF SCIENCE

The B.Sc. degree can be earned in the following fields:

ASTRONOMY	GEOLOGY
BIOCHEMISTRY	GEOPHYSICS
BIOLOGY	MATHEMATICS
BOTANY	MICROBIOLOGY
CHEMISTRY	PHYSICS
COMPUTER SCIENCE	PHYSIOLOGY
GEOGRAPHY	ZOOLOGY

For information about the M.Sc. and Ph.D. degrees see Graduate Studies.

To earn a B.Sc. students must follow one of the following three programs:

Honours: This program involves intense specialization in a single field or a combination of fields. It is the normal road to graduate study. It requires maintenance of a high academic standing and may involve preparation of a graduating thesis.

Majors: This program involves specialization in a single field or a combination of fields. It may lead to graduate study if sufficiently high standing is obtained.

General: This program involves a broad education in science. It is not recommended for students who may want to go on to graduate study. However, with careful planning and sufficiently high standing it is possible to go on to graduate study, but this would normally involve losing at least one year.

Admission Requirements:

Apart from the usual university entrance requirements (see General Information section) students from Grade 12, British Columbia Schools, should have a Science Specialty in their Academic-Technical Program. They are strongly advised as a MINIMUM, to have Chemistry 11, Biology 11, Physics 11 and Mathematics 12. In addition students must have one of Chemistry 12, Physics 12 or Biology 12 and if possible it should be in the area they plan to specialize in at the University.

Without Chemistry 11 and Physics 11 (or their equivalent) students may face major difficulties in earning their B.Sc. degree in the usual four year period or in gaining admission to Applied Science.

Students with educational documents issued outside the Province of British Columbia must pay an application for admission fee of $10.

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.

Registration:

The following is only a summary of the registration procedures for science students. Complete information may be obtained from the brochure mailed to the student with his authorization to register form.

a) *First-year students:* All first-year students must obtain program approval from an adviser designated by the Dean. Such program approval together with scheduling of courses and completion of registration will be carried out

during Registration Week. Students may consult the Dean's office in person or by mail, for program advice or approval, before Registration Week, if they so desire. However they will still have to appear during Registration Week for scheduling.

b) *Second, Third and Fourth-year students:* Students proposing to undertake an honours, pre-honours or major program must consult a departmental adviser designated by the department of their field of specialization. Students planning to undertake a general program must consult an adviser designated by the Dean. Returning students are advised to obtain program advice before the end of the spring term.

c) *All years:* After two weeks of lectures except in very special circumstances and with the permission of the Dean, no student may change the program for which he is registered. Students who are registered for more than 15 units, and who wish to drop some courses, may do so during the first month of lectures, as long as they continue to take at least 15 units.

All changes in course registration must be made by the student at the Registrar's office. Program changes must be approved by the Head of the Department concerned and then by the Dean before submission to the Registrar's office. A student may not take courses for which he has not registered, and will be considered as having failed in all courses dropped without permission.

Credits

The normal pattern for a student is to take 15 units per winter session, usually consisting of 5 courses each of 3 units value. Combinations of 1, 1½ and 2 unit courses are also quite normal. After 4 winter sessions the student with 60 units credit usually earns a B.Sc.

For the honours program and for very good students, more than 15 units in at least two of the winter sessions should be undertaken. No student may take more than 18 units per winter session without special permission of the Dean. Students who have failed a course in one winter session will not be allowed to attempt more than 15 units in their next winter session.

No student may take less than 15 units per winter session without special permission of the Dean. Students who are permitted to do so should keep in mind that they are not eligible for scholarships or loans in that session, and may encounter timetable difficulties in later years.

Students will not receive university credit for secondary school courses taken among the required credits or even as extra credits. They may receive advance placement however and students should consult the department concerned.

After registering at U.B.C. students will normally receive university credit only for courses taken at U.B.C. in winter or summer session.

Summer Session Credits:

These may be combined with winter session credits to make up deficiencies or to graduate in less than 4 years. Note that the maximum credit for any one summer session is 6 units, and that it is not possible to take two laboratory science courses in the same summer session.

Faculty Requirement for B.Sc.:

(a) General or Major program: 60 units. Honours program: 66 units.

(b) At least 36 units must be in Science courses.

(c) At least 9 units must be in Arts courses (i.e. English 100 and at least 6 other units in Arts courses).

(d) At least 21 units must be in courses numbered 300 or higher, and of these, at least 15 units must be in Science courses.

(e) Only Science and Arts courses may be counted for credit except with permission of the Dean.

(f) Students are responsible for selecting their program to meet all the faculty and departmental requirements. Students who have interrupted their studies may find that requirements have changed since the period of their previous enrolment. They must consult the Dean as to their program.

(g) Students who are accepted by transfer from other institutions must complete all further courses at U.B.C. The University normally will not grant a degree for residence of less than two regular winter sessions (or equivalent).

(h) All students must complete their final year in residence at U.B.C. (i.e. 15 units in one regular winter session at U.B.C., or 9 units in one regular winter session at U.B.C. and 6 units subsequently).

First Year:

Every first year student must take (or have advanced credit or placement in):

1. MATHEMATICS 100 and 121
2. CHEMISTRY 110 or 120 or 103
3. PHYSICS 110 or 115 or 120 or 105
4. ENGLISH 100

AND 5. BIOLOGY 101 or 102 or GEOGRAPHY 101 or GEOLOGY 105 or an Arts elective chosen from:

(see Faculty of Arts section for more details)

ANTHROPOLOGY 100
ASIAN STUDIES 105, 115, 206
CHINESE 100
CLASSICAL STUDIES 100
CREATIVE WRITING 202
ECONOMICS 101, 130 and 140
FINE ARTS 125
FRENCH 100, 110, 115, 120
GEOGRAPHY 200 and 201
GERMAN 100, 110, 120
GREEK 100
HEBREW 100
HISTORY 100-199
ITALIAN 100
JAPANESE 100
LATIN 100, 110, 120
LINGUISTICS 100
MUSIC 100, 107, 120,
PHILOSOPHY 100
POLISH 110
PSYCHOLOGY 100
RELIGIOUS STUDIES 100
RUSSIAN 100, 110
SOCIOLOGY 100
SPANISH 100
THEATRE 120

Notes

(1) Certain Major and Honours programs require that the fifth course be in Science. Specifically, Biology 101 or 102 is required in the first year for a Major or Honours in the Life Sciences (Biochemistry, Biology, Botany, Microbiology, Physiology and Zoology); Geography 101 or Biology 101 or 102 or Geology 105 is required for a Major or Honours in Geography; Geology 105 is required for a Major or Honours in Geology or Geophysics; and General programme students should take Biology 101 or 102 or Geology 105 in their first year. 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 enter the Faculty of Applied Science are reminded that their fifth course must be an Arts elective. They are also reminded that Chemistry 103 is not acceptable.

(3) Students intending to enter Forestry, Medicine, Dentistry, or Pharmacy should consult these Faculties for entrance requirements.

(4) Students intending to enter Nursing or Dental Hygiene will be admitted into first year Science without their taking Mathematics 100 and 121 or first year Physics but they should keep in mind that they cannot go on in Science should their other plans fail, unless they make up these deficiences.

(5) 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 French, German or Russian (or French 12 or German 12) is required before the graduating year.

(6) Advanced credit or advanced placement may be granted where appropriate when the equivalent of any or all of these courses is completed at another institution.

Second, Third and Fourth Year:

Honours Program: A student must consult the Head of the Department at the beginning of the Second year and each subsequent year concerning the Honours program. The sequence of courses is given under departmental headings in the calendar.

Major Program: Students should select courses in consultation with the departmental advisers at the beginning of the Second year and each subsequent year. The sequence of courses is given under departmental headings in the calendar.

General Program: A student in the General Program who has completed the First year must select his courses as follows:

(1) Biology 101 or 102 and either Geography 101 or Geology 105 must be taken, preferably sometime during the first two years.

(2) Of the minimum number of units in Science 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 department in a different area, and at least 3 units in a department in an area different from the preceding two. One of these three areas must be Life Science. The five available areas are:

1. Chemistry
2. Physics
3. Mathematics and Computer Science
4. Earth Science (Astronomy, Geography, Geology, Geophysics)
5. Life Science (Biochemistry, Biology, Botany, Microbiology, Physiology, Zoology).

Examinations:

Winter session exams are held in December and April. The April exams are held in all courses (except finals at Christmas) and are obligatory for all students. The December exams are held in all first and second year courses and, except where special exemption has been granted by the Dean, in all third and fourth year courses. They are also obligatory for all students.

A passing grade is 50% or higher. Second class is 65% to 79% and first class is 80% to 100%. Marks over 100% are rarely given.

Passing the final exam may not in itself be sufficient to pass a given course. Students may be denied a passing grade for unsatisfactory work during the session or if their essays, laboratory reports or exam papers are deficient in English. Furthermore, in any Science course which has both laboratory work and written exams, students must complete and pass both parts to pass the course. If a student fails the laboratory work he may not even be allowed to sit for the final written exam.

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 from the final examinations.

In general students who pass a course can use it as a prerequisite for a subsequent course in that subject. However departments do have the right to bar entrance to their third year courses to students who obtain only a bare 50% in their second year prerequisite course or courses. Students should write the supplemental exam for higher standing if it is necessary for them to use the course as a prerequisite.

Unsatisfactory Standing:

A student taking a program of 9 or more units must pass at least 9 units of course work in order to obtain credit for the successful portion of his work. Otherwise he will receive no unit credit whatsoever (even in the courses passed) and will be required to withdraw from the University for at least one year. Such students, in first and second year, will not be permitted to re-enrol at U.B.C. to repeat the studies of their failed year. They will be considered for re-admission if they have completed satisfactorily at least two semesters at a college (or the equivalent) subsequent to their failure at U.B.C.

A student taking a program of less than 9 units in any year must pass all of it or be subject to the conditions of the previous paragraph.

Third and fourth year students who fail a year and are forced to withdraw, may be re-admitted at a later date if their appeal is supported by the Admissions Committee and upheld by the Senate.

A student who fails his year but passes in some courses can consider the passed subject matter completed and may go on to more advanced work in those passed subjects if and when he is permitted to re-enrol in the Faculty.

A student in any year who fails for the second time either in repeating a year or in a later year, will be required by Senate to withdraw permanently.

A student taking a full program in first year who obtains credit for only 9 units will be re-admitted on probation but during the subsequent session may be required to withdraw at any time for unsatisfactory progress.

Any student whose academic record, as determined by tests and exams of the first term, is unsatisfactory, may be required to withdraw for the remainder of the session.

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 program of studies or training, or for any other reason which is deemed to show that withdrawal is in the interests of the student, or the University, or both.

No course may be repeated more than once without special permission of the Dean.

Compassion and Welfare:

Applications for special consideration on account of illness or domestic affliction must be submitted in writing to the Dean as soon as possible after the close of the exam period.

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.

See General Information for regulations concerning review of assigned grade.

Supplemental Examinations:

(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) Supplemental examinations are given in August. Students who fail a final examination in December, cannot take a supplemental examination before August because this privilege, if granted, is based on the student's complete academic record, and this cannot be determined until after the final examinations in April.

(3) 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 a higher standing.

(4) 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.

See General Information for regulations concerning:

(i) Supplemental examination
(ii) transcript of academic record
(iii) withdrawal
(iv) graduation
(v) fees

See Awards and Financial Assistance for information on scholarships, bursaries and loans.

Graduation Standing:

A graduating student's transcript may have two kinds of commendation: a Faculty one based on his best 30 units credited toward the third and fourth year, and a Departmental commendation determined by the departments of his major subjects.

The Faculty commendation is expressed as *first class* (80% or higher) or *second class* (65% to 79%). The Departmental commendation is expressed as *distinction* or *high distinction.*

It is possible to satisfy the requirements of a Major in two separate departments or a Major in one department and an Honours in another department. If this *is* done, then both Majors or both the Major and the Honours will be so noted on the transcript.

Combined B.Sc. Degree and M.D. or D.M.D. Degree Program:

Students who have completed the third year in the Faculty of Science at U.B.C. and the first year in the Faculty of Medicine or the Faculty of Dentistry also at U.B.C., 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 the approval of the Dean of Science receive the appropriate B.Sc. degree.

Students on the combined degree program registered in the first year of the Faculty of Medicine or the Faculty of Dentistry who have already obtained satisfactory standing in Biochemistry 410 (or the equivalent) and Physiology 400 (or the equivalent) may with the approval of the Dean of Medicine or the Dean of Dentistry and the Dean of Science substitute equivalent units of appropriate course work. Students expecting to qualify for an Honours B.Sc. degree in Biochemistry, Physiology or other science departments must, in addition, meet the Honours requirement of that department and obtain the prior approval of the head of the science department concerned.

All students in Dentistry or Medicine wishing to qualify for the B.Sc. degree on the combined degree program, must file a copy of their program in first year Dentistry or Medicine with the Dean of Science by September 15 of the year preceding the year of the congregation at which they plan to qualify for the B.Sc. degree.

Combined Biology and Forest Biology Program:

A program 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.

COURSE NOTATIONS

The number of units assigned to a course is given in round brackets immediately following the course number. Thus 200 (3) under Astronomy indicates that Astronomy 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]

An asterisk (*) indicates alternate weeks.

Pairing List

Students may obtain credit for at most *one* course in each of the following groups:

Chemistry

1. Chemistry 103, 110, 120
2. Chemistry 205, 208, 210, 220
3. Chemistry 203, 230, 253
4. Chemistry 303, 330
5. Chemistry 304, 305, 156
6. Chemistry 311, 352
7. Chemistry 315, 320
8. Chemistry 315, 321
9. Chemistry 415, 427
10. Chemistry 415, 423
11. Chemistry 304, 305, 257
12. Chemistry 407, 257

Life Sciences

1. Biology 101	Biology 102 Biology 310 Zoology 310
2. Biology 300	Plant Science 321 Mathematics 205 Mathematics 305
3. Biology 301	Plant Science 322 Forestry 430 Mathematics 305
4. Biology 323	Biology 321/322
5. Biology 334	Biology 335 Animal Science 313 Plant Science 313 Forestry 302
6. Biology 422	Soil Science 311
7. Microbiology 200 (201)	Microbiology 417
8. Zoology 301	Marine Science 410
9. Zoology 307/308	Zoology 303 Physiology 301/302 (or 303) Physiology 400 (for 3 units)
10. Zoology 413	Microbiology 426
11. Anatomy 400	Anatomy 390

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 section of the calendar.

Requirements for the B.Sc. degree in Astronomy:—

Major		Combined Honours Astronomy and Physics	
First			
Mathematics 100	(2)	For Students presenting Physics 12:†	
Mathematics 121	(1)	Physics 120	(3)
Physics 110 (or 105, 115, or 120)	(3)	Mathematics 100	(2)
Chemistry 120 (or 110 or 103)	(3)	Mathematics 121	(1)
English 100	(3)	Chemistry 120 (preferably), or 110 or 103	(3)
Non Science Elective*	(3)	English 100	(3)
		Non-Science Elective	(3)
	(15)	Total Units	(15)
Second			
Mathematics 120, 200, 221	(5)	Admission Requirements: A clear pass from First Year, with at least Second Class standing in Physics 120, Mathematics and Chemistry.	
Mathematics 222 (or 220)	(1)	Physics 204	(3)
Geophysics 201 (or Physics 200)	(2)	Physics 209	(1)
Physics 219	(1)	Physics 220	(2)
Elective**	(3)	Mathematics 120, 200, 221	(5)
Non Science Elective	(3)	Mathematics 222 (or 220)	(1)
		Science Elective**	(3)
		Non-Science Elective	(3)
	(15)	Total Units	(18)
Third			
Astronomy 320	(3)	Astronomy 320	(3)
Mathematics 301	(3)	Mathematics 300 or 301	(3)
Physics 300	(2)	Physics 301	(2)
Physics 308	(2)	Physics 302	(1)
Physics 318	(1)	Physics 306	(2)
Physics 319	(1)	Physics 308	(2)
Elective‡	(3)	Physics 309	(1)
		Physics 310	(1)
	(15)	Total Units	(15)
Fourth			
Physics 400	(3)	Astronomy 420***	(3)
Astronomy 420	(3)	Mathematics 300, 301, or 400	(3)
Astronomy 421, 431	(2)	Physics 401	(2)
Physics 413	(3)	Physics 402	(3)
One 3-unit course in Mathematics or Computer Science numbered 300 or above (other than Mathematics 301)	(3)	Physics 403	(3)
		4 units from:	
		Astronomy 421	(1)
		Astronomy 431	(1)
		Astronomy 449	(1-3)
		Physics 409	(3)
Elective	(1)	Physics 449	(1-3)
	(15)	Total Units	(18)

*Students wishing to preserve entry into a Geophysics programme should take Geology 105 and postpone the Non-Science elective until Third Year.
†Students without Physics 12 may enter this programme by taking a modified First and Second year (see Physics).
**Recommended—Astronomy 200.
‡Recommended: Chemistry 205, 210, 220; Computer Science 210; Geophysics 302.
***Astronomy 500 may be substituted for Astronomy 420 with permission of the Head of the Department.

200. (3) Astronomy.—An introduction to many aspects of Astronomy, including: cosmology, galaxies and quasars, stellar structure and evolution, white dwarfs and neutron stars, the solar system, and radio astronomy. Prerequisite: First Year Physics course. Mathematics 200 (concurrently). [3-0; 3-0]

320. (3) Astronomical Dynamics.—Newtonian dynamics applied to the solar system, emphasizing the two-body problem and including an introduction to the theory of perturbations; the motion of stars within the Galaxy and the stability of star clusters. Prerequisites: Physics 200 or equivalent. Mathematics 301 or equivalent (concurrently). [3-0; 3-0]

420. (3) Review of Modern Astronomy.—A discussion of topics of current interest in astronomy and astrophysics, including: the structure and evolution of stars, nucleosynthesis, galaxies and quasars, the interstellar medium, and cosmology. Prerequisites: Physics 400 or equivalent (concurrently). [3-0; 3-0]

421. (1) Astronomical and Astrophysical Measurements.—Astronomical instrumentation for satellite and ground-based optical and radio observations, theory of measurement of stellar spectra and radiative flux and applications to understanding stellar masses, temperatures, magnetic fields, galactic structure, and interstellar material. Prerequisites: Physics 308 or equivalent, Mathematics 301 or equivalent (concurrently). [1-0; 1-0]

431. (1) Astronomical Laboratory.—Experiments in the use of basic measuring instruments, study of stellar spectra, photometric records, star charts, use of 12-inch reflector for observations. Prerequisites: Astronomy 421 (concurrently). [0-3; 0-3]

449. (1-3) Directed Research in Astronomy.—The student will investigate a research problem under the direction of a staff member. (If elected for 3 units, a thesis will be required.)

General Course

310. (3) (Also Geophysics 310). Exploring the Universe.—A discussion of

modern topics of Astronomy and Geophysics without the use of advanced mathematics. The topics covered will include: cosmology; galaxies and quasars; stellar evolution; pulsars and "black holes"; radio and X-ray astronomy; origin of the solar system and age of the earth; space exploration; the earth's magnetic field; continental drift; and ice ages. This course is open only to students not registered in the Faculty of Science or Applied Science. No background in science or mathematics is required. Credit will be given for only one of Astronomy 310, Geophysics 310. [3-0; 3-0]

Graduate Courses

500. (3) Principles of Modern Astronomy.—An introduction to the physical processes occurring in the stars, the interstellar medium, and in our own and other galaxies. (Fourth-year honours students may elect this course with special permission of the Head of department.) Prerequisites: fourth year Physics honours program, or permission of the Head of department.

501. (2) Topics in Geophysics and Astronomy.—Selected detailed discussions of the physics and the chemistry of the earth-moon system, complete solar system, and galaxies.

515. (2-3) Stellar Astronomy.—The study of the structure of stellar interiors and stellar atmospheres and the physical processes occurring in them; the interpretation of stellar spectra; nucleosynthesis, and related problems.

520. (1-3) Directed Studies in Geophysics or Astronomy.

561. (2-3) Observational 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. Students will be given experiments to perform involving the use of equipment in the department.

563. (2) Galactic Astronomy.—The study of the structure and content of our galaxy as determined by optical and radio observations. The study of physical processes occurring in the interstellar medium.

549. (6) M.Sc. Thesis.

649. Ph.D. Thesis.

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 section of the 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:

Major

First Year		Second Year	
Biology 101 or 102	(3)	Biology 200	(1½)
Chemistry 110 or 120	(3)	Chemistry 205, 210 or 220	(3)
Mathematics 100 and 121	(3)	Chemistry 230 (or 203)	(3)
Physics 105, 110, 115, or 120	(3)	Mathematics 200	(2)
English 100	(3)	Elective	(2½)
		Microbiology 200 (recommended)	(3)
	(15)		(15)
Third Year		**Fourth Year**	
Biochemistry 410	(3)	Physiology 301/302 or Zoology 304 and electives chosen in consultation with the Department	(15)
Biochemistry 411	(1½)		
Chemistry 305 (or 304)	(3)		
Chemistry 330	(3)		
Electives chosen in consultation with the Department	(4½)		
	(15)		

Honours

First Year		Second Year	
Biology 101 or 102	(3)	Biology 200	(1½)
Chemistry 110 or 120	(3)	Chemistry 210 or 220	(3)
Mathematics 100 and 121	(3)	Chemistry 203	(3)
Physics 105, 110, 115, or 120	(3)	Mathematics 200	(2)
English 100	(3)	Microbiology 200 (recommended)	(3)
		3 units of Arts	(3)
		1½ units of Science*	(1½)
	(15)		(17)
Third Year		**Fourth Year**	
Biochemistry 410	(3)	Biochemistry 430	(1)
Biochemistry 411	(1½)	Biochemistry 449	(3)
Chemistry 303	(2)	Biochemistry 500	(1)
Chemistry 305	(3)	Biochemistry 501	(1-3)
3 units of Arts	(3)	Chemistry 403, 411 and 423	(3)
4½ units of Science*	(4½)	6 units of electives	(6)
	(17)	Plus electives to total	(17)

Suggested—

*Science electives:

Biology 300	(1½)	Biochemistry 506	(1½)	Microbiology 323	(3)
Biology 301	(1½)	Biochemistry 507	(1½)	Microbiology 402	(1½)
Biology 330	(3)	Botany 435	(3)	Microbiology 405	(3)
Biology 334	(1½)	Chemistry 407	(1)	Microbiology 409	(1½)
Biology 340	(1½)	Chemistry 413	(1)	Physiology 301	(3)
Biochemistry 500	(1)	Chemistry 416	(1)	Physiology 302	(1½)
Biochemistry 501	(1-3)	Computer Science 200	(1½)	Physiology 303	(1½)
Biochemistry 502	(1½)	Mathematics 140	(1)	Zoology 203	(1½)
Biochemistry 503	(1½)	Mathematics 205	(2)	Zoology 204	(1½)
Biochemistry 504	(1½)			Zoology 307 and 308	(3)
Biochemistry 505	(1½)				

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%). [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]

412. (3) Biochemistry Conferences.—A series of conferences correlating biochemistry with selected clinical topics. [0-3; 0-3]

430. (1) Perspectives in Biochemistry.—A seminar course on the history of biochemistry. Prerequisites: Biochemistry 410 (and 411) or equivalent.

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) Biochemical Methods.—Lectures on advanced biochemical techniques and their application to biochemical problems.

501. (1-3) Advanced Biochemistry Laboratory.—A laboratory course in advanced biochemical techniques. Biochemistry 500 or its equivalent is required. Students are strongly recommended to take Biochemistry 500 and Biochemistry 501 concurrently. Admission to Biochemistry 501 is limited and 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 1972-73 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 1972-73 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 1972-73 and alternate years.

505. (1½) Biochemistry of Carbohydrates.—The pathways, reactions, regulatory mechanisms and dynamic control of carbohydrate and energy metabolism. Given in 1973-74 and alternate years.

506 (1½) Biochemistry of Lipids.—Modern concepts of the metabolism and biochemical function of fats, phospholipids and cholesterol. Given 1973-74 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 1973-74 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. Inquiries should be directed to the Chairman, Room 2340, Biological Sciences Building. 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. **Note: Biology 101 or Biology 102 (or equivalent) is prerequisite to all Biology courses, except Biology 310, Biology 311 and Biology 313.**

Ecology: Students interested in a programme in ecology may take a course of study in Botany, Zoology or Biology (General Biology, Option III—see below). Recommendations on the selection of courses can be obtained from ecology advisors in Botany, Zoology or the Biology programme.

Requirements for the B.Sc. degree:

Majors and Honours

First Year		Second Year	
Biology 101 or 102	(3)	Biology 200	(1½)
Chemistry 110, 120 or 103	(3)	Biology 201	(1½)
Mathematics 100	(2)	Chemistry 230, (203)	(3)
Mathematics 121	(1)	Electives* chosen from:	
Physics 105 or 110 or 115 or 120	(3)	Arts	(3)
English 100	(3)	Botany 209[a]	(1½)
		Botany 210[a]	(1½)
		Chemistry 210 (220, 205)	(3)
		Comp. Science 210	(3)
		Geology 105[a]	(3)
		Mathematics 120[b]	(1)
		Mathematics 200[b]	(2)
		Mathematics 205[b]	(2)
		Mathematics 221[b]	(2)
		Mathematics 222[b]	(1)
		Microbiology 200, or 201[ac]	(3)
		Zoology 203[a]	(1½)
		Zoology 204[a]	(1½)
	(15)		(15)

* The B.Sc. programme must include at least nine (9) units of Arts courses (including English 100) to qualify for graduation.

[a] Courses recommended in the General Biology Option.

[b] Courses recommended in the Mathematical Biology Option.

[c] Course recommended in the Genetics Option.

Options

Third and Fourth Year

Below are listed recommended combinations of courses in a number of generally recognized divisions of biology. Further information may be obtained from the office of the Biology Chairman.

I. Cell Biology:

Major: Biology 300 (1½), 330 (3), 334 (1½); Electives selected from Group I (15); Electives* (9).

Honours: Biology 300 (1½), 330 (3), 334 (1½), 449 (3); Electives selected from Group I (6); Electives selected in consultation with Biology Chairman (Cell Biology Advisers) (15); Electives* (6).

II. Genetics:

Major: Biology 300 (1½), 330 (3), 334 (1½); Biochemistry 410 (3); Electives selected from Group II (9); Electives* (12).

Honours: Biology 300 (1½), 330 (3), 334 (1½), 449 (3); Biochemistry 410 (3); Electives selected in consultation with Biology Chairman (Genetics Advisers) (15); Electives* (9).

III. General Biology:

Major: Biology 300 (1½), 321 (1½), 322 (1½), 334 (1½); Electives selected from Group III** (15); Electives* (9).

Honours: Biology 300 (1½), 321 (1½), 322 (1½), 334 (1½), 449 (3); Electives selected from Group III** (6); Electives selected in consultation with Biology Chairman (General Biology Advisers**) (15); Electives* (6).

IV. Mathematical Biology:

Major: Mathematics 301 (3); Electives selected from Group IV-A (6); Electives selected from Group IV-B (6); Electives selected from Groups IV-A and IV-B (9); Electives* (6).

Honours: Biology 449 (3); Mathematics 301 (3); Electives selected from Group IV-A (6); Electives* selected from Group IV-B (9); Electives* selected in consultation with Biology Chairman (Mathematical Biology Advisers) (15).

V. Marine Biology:

Major: Biology 300 (1½), 334 (1½); Botany 305 (3); Zoology 301 (3) or 305 (1½); Electives selected from Group V-A (6); Electives selected from Groups V-A and V-B (9); Electives* (6; or 7½).

Honours: Biology 300 (1½), 334 (1½), 449 (3); Botany 305 (3); Zoology 301 (3) or 305 (1½); Electives selected from Group V-A (6); Electives* selected in consultation with Biology Chairman (Marine Biology Advisers***) (15); Electives* (3; or 4½).

* The B.Sc. programme must include at least nine (9) units of Arts courses (including English 100) to qualify for graduation.

** In the General Biology Option, no more than nine (9) units of 300/400 level courses may be taken in any one of the Life Sciences Departments.

*** Students may consult also directly with the Heads of Departments of Botany and Zoology concerning the selection of electives in Marine Biology.

Recommended Electives
Third and Fourth Years

Group I.
Biology 301 (1½), 302 (1½), 315 (3), 340 (1½) 422 (1½); Biochemistry 410 (3), 411 (1½); Botany 308 (1½), 309 (1½), 330 (3), 335 (1½), 435 (3), 436 (2); Chemistry 205, 210 or 220 (3), 303 (2), 305 (3), 310/320 (3), 311/312 (3), 330 (3), 335 (3), 405 (1), 406 (1), 411 (1), 413 (1); Microbiology 321 (3), 324 (1½), 325 (1½), 402 (1½) 405 (3), 408 (1½), 409 (1½); Physics 200/219 (3); Physiology 301 (3), 302 (1½); Zoology 307/308 (3), 417 (3), 418 (1½), 419 (1½) 420 (1½), 424 (1½), 425 (3).

Group II.
Biology 340 (1½); Botany 335 (1½), 436 (2); Microbiology 324 (1½), 325 (1½), 409 (1½); Zoology 402 (1½), 417 (3), 425 (3).

Group III.
Biology 301 (1½), 302 (1½), 315 (3), 405 (1½), 422 (1½); Botany 302 (3) 305 (3), 306 (1½), 307 (1½), 308 (1½), 309 (1½), 330 (3), 426 (1½), 427 (1½), 435 (3), 436 (2), 440 (3); Biochemistry 410 (3); Geology 203 (1½), 210 (3) or 300 (1½), 304 (3), 414 (1½); Microbiology 321 (3), 324 (1½), 325 (1½), 405 (3); Plant Science 322 (1½), Soil Science 414 (1½); Zoology 301 (3) or 305 (1½), 306 (1½), 307 (1½), 311 (1½), 323 (1½), 400 (3), 401 (3), 402 (1½), 410 (1½), 413 (3), 421 (3).

Group IV.
A. Mathematics 300 (3), 305 (3), 310 (3), 311 (3), 312 (1), 318 (3), 405 (3); Comp. Sci. 302 (3).
B. Biology 301 (1½), 302 (1½), 315 (3), 321 (1½), 322 (1½), 330 (3), 334 (1½), 405 (1½), 422 (1½), 448 (1-3); Botany 302 (3), 305 (3), 306 (1½), 307 (1½), 308 (1½), 309 (1½), 330 (3); Zoology 305 (1½); 306 (1½), 307 (1½), 311 (1½), 401 (3), 413 (3), 425 (3).

Group V.
A. Biology 301 (1½), 302 (1½), 315 (3), 321 (1½), 322 (1½), 330 (3), 405 (1½); Geology 203 (1½), 206 (1½), 210 (3) or 300 (1½), 304 (3), 414 (1½); Zoology 306 (1½), 323 (1½).
B. Biology 405 (1½), 422 (1½), 448 (1-3); Biochemistry 410 (3), 411 (1½); Botany 330 (3), 420 (3), 426 (1½), 427 (1½); Geography 212 (1½), 311 (1½); Oceanography 400 (1), 401 (1), 402 (1), 404 (1); Zoology 401 (3), 402 (1½), 413 (3), 414 (1½), 415 (3), 428 (1½), 429 (1½); Marine Science* 400 (3), 410 (3), 420 (3), 430 (3).

*Certain courses may be offered at the Western Canadian Universities' Marine Biological Laboratory (Bamfield, Vancouver Island) at which time they may be taken in the summer term preceding the registration for the Fourth Year in the Marine Biology Option.

Combined Biology and Chemistry Honours

First Year		Second Year	
Biology 101 or 102	(3)	Biology 200	(1½)
Chemistry 110 or 120	(3)	Biology 201	(1½)
Mathematics 100 and 121	(3)	Chemistry 205 or 210 or 220	(3)
Physics 105 or 110 or 115 or 120	(3)	Chemistry 203	(3)
English 100	(3)	Mathematics 200	(2)
		Biology Elective*	(3)
		Elective (Arts)	(3)
	(15)		(17)

Third Year		Fourth Year	
Biology 334	(1½)	Biochemistry 410	(3)
Biology 330	(3)	Chemistry 310 and 320 or 335	(3)
Chemistry 303	(2)	Chemistry 312 or 405 and 406 or 407	(2)
Chemistry 305	(3)	Chemistry 403 and 422	(2)
Chemistry 311 and 321	(2)	Chemistry Elective**	(1)
Microbiology 200	(3)	Biology Elective***	(2½)
Elective (Arts)	(3)	Biology or Chemistry 449	(3)
	(17½)		(16½)

*Organismal: one of Zoology 203/204; Zoology 311/410; Biology 315.

**Chemistry, 400-level course.

***One of Botany 209/210; Botany 302; Botany 305 suggested.

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).

Combined Biology and Forest Biology Honours Programme

First Year		Second Year	
Biology 101 or 102	(3)	Biology 200	(1½)
Chemistry 110 or 120 (or 103)	(3)	Biology 201	(1½)
Mathematics 100	(2)	Chemistry 230	(3)
Mathematics 121	(1)	Forestry 111	(1½)
Physics 105, 110, 115, or 120	(3)	Forestry 204	(1½)
English 100	(3)	Forestry 270	(2)
		Soil Science 200	(1½)
		Geography 214	(1½)
		Arts	(3)
	(15)		(17)

Third Year		Fourth Year	
Biology 300	(1½)	Biology 449	(3)
Biology 334 or Forestry 302	(1½)	Life Science Elective	(3)
Biology 330 or Botany 330, or Zoology 307/308	(3)	Life Science or Forestry Elective	(6)
Biology 321/322	(3)	Electives	(5)
Forestry 304	(2)		
Forestry 307	(3)		
Arts	(3)		
	(17)		(17)

Biology Programme

Primarily for First Year Students

Either Biology 101 or Biology 102 is the prerequisite for admission to Majors or Honours programmes in the Life Sciences Departments. Either course will suffice to meet the First Year Biology requirement of the Faculties, or Schools, of Agricultural Sciences, Forestry, Dentistry, Home Economics, Medicine, Nursing, Pharmaceutical Sciences, Physical Education & Recreation, Psychology and Rehabilitation Medicine. Since Biology 101 and Biology 102 are ultimately equivalent in achievement, credit may be obtained for only *one*, either Biology 101 or Biology 102, not for both.

101. (3) Principles of Biology.—Open *only* to students who have *not* received credit for Biology 11, or the equivalent; attendance is required at a one (1) hour tutorial period each week. 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. [3-3-1; 3-3-1]

102. (3) Principles of Biology.—Open *only* to students who have received credit for Biology 11 (or Biology 11 and 12), or the equivalent. (Optional tutorials of one (1) hour per week are available.) 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 the environment. A comparative approach to the unity and diversity of organisms will be stressed. (3-3; 3-3)

Note: Students who have satisfactorily completed Biology 11, or the equivalent, may write a placement examination in general biology in September during the week of registration. If this examination is passed, the student will be granted exemption from Biology 102 and may subsequently be admitted to courses requiring Biology 102 as a prerequisite. Students wishing to sit for the placement examination must apply in writing to: The Chairman, Biology 101, Department of Zoology, The University of British Columbia.

Note: Biology 100 from Grade 13 in British Columbia will *not* be accepted as equivalent to Biology 102; however, Botany 105 or Zoology 105 will be accepted as equivalent for prerequisite purposes.

Note: Biology 101 or Biology 102 (or equivalent) is prerequisite to *all* Biology courses, except Biology 310, Biology 311 and Biology 313.

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 or 102. [3-0-0; 0-0-0]

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 or 102, Biology 200 and concurrent registration in Chemistry 230 or 203. May not be taken for credit concurrent with, or following enrollment in, Biochemistry 410. [0-0-0; 3-0-0]

300. (1½) Biometrics.—Introduction to statistical procedures applied to biological research. Prerequisites: Math 100 and 121 or the equivalent. Credit will not be given for Biology 300 and Plant Science 321, Mathematics 205 or Mathematics 305. [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. Credit will not be given for Biology 301 and Plant Science 322, Forestry 430 or Mathematics 305. [0-0; 3-0]

302. (1½) Microscopy and Histology.—An introduction to the theory of microscopy, to micro-technique and to the tissues of plants and animals. Emphasis in the lectures will be placed on General Histology, i.e., the structure, function, development, and location of tissues as well as a comparison between plant and animal tissues. [2-3; 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 or 102 and Biology 310. Not for credit in Life Science Departments. [0-0-0; 3-0-2]

311. (1½) Ecology and Man.—A review of ecological theory and research methods and some of the ecological problems confronting man today. Primarily for students of third and fourth years in the Faculty of Arts. Not for credit in Life Science Departments. [3-0-2; 0-0-0]

313. (1½) Elementary Molecular Biology.—An introductory course in molecular biology primarily for Arts students. Basic principles of molecular biology and the historical developments based on bacterial and bacterial viruses as model systems; function of DNA and RNA; recent discoveries in the field of viruses and cancer and their implications. No prerequisites. Not for credit in the Faculty of Science. [3-0; 0-0]

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. [2-3; 2-3]

321. (1½) Population and Community Biology-I—The study of populations of organisms and the factors which limit their distribution and abundance; the study of plant and animal communities with particular reference to ecological relationships. The discussion will be primarily qualitative and designed to indicate the principles of population and community biology. [3-0; 0-0]

322. (1½) Population and Community Biology-II.—A *quantitative* treatment of the major lines of investigation in population and community biology. Some major topics are: population processes and interrelations, problems in sampling, community structure, ecosystem dynamics. Biology 321, or equivalent, and Biology 300 are strongly recommended as prerequisite. [0-0; 3-0]

323. (3) General Ecology—A study of the broad principles concerning the structure and dynamics of ecosystems. This involves understanding of biotic and abiotic factors, their interrelationships, the vulnerability of the ecosystem to change, and the influence of man and his activities on the ecosystem. The laboratory (field trips) will be used to enrich this understanding and will involve the identification and analysis of the biota of local ecosystems. **Offered in the Summer Session only.** (Credit will be allowed for only one of Biology 323 and Biology 321/322.)

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. [2-3; 2-3]

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. Credit will not be given for Biology 334 and Animal Science 313, Plant Science 313 or Forestry 302. [3-0-2; 0-0-0]

335. (3) Principles of Genetics.—An introduction to the basic principles of heredity, with emphasis on the physical and chemical structure and function of genetic material. The laboratory will emphasize the resolution of hereditary phenomena by genetic crosses and chromosome studies. **Offered in the Summer Session only.** (Credit will be allowed for only one of Biology 335 and 334).

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. [0-0; 2-4]

405. (1½) Marine Ecology.—A study of the relationship of marine biotic communities to the environment. It is recommended that students have taken Zoology 301 or 305, and Botany 305 or their equivalents. [0-0; 2-3]

422. (1½) Microbial Ecology.—Diversity in microbial metabolism. Autotrophy. Biogeological cycles. Diversity in morphology, its ecological significance; regulation of differentiation. Microbial interactions with themselves, plants, animals and man. (This course is the same as Soil Science 311.) [2-2-1; 0-0-0]

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 honours students in biology, after consultation with the Chairman and with permission of the appropriate supervisor. Presentation of a thesis and an oral examination are required.

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. Open to qualified undergraduate students with permission of instructor.

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.

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. Open to fourth year Life Sciences students, with permission of instructor.

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.

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.

548. (1-3) Advanced Topics in Biology.

549. (6) Master's Thesis.

Marine Science

Certain of the following courses may be offered at the Western Canadian Universities' Marine Biological Laboratories (WCUMBS) on Vancouver Island (Bamfield) during the Summer Session. Details may be obtained by writing the WCUMBS Representative, c/o Dean of Science, University of British Columbia.

400. (3) Directed Studies.—A course of directed studies under the supervision of a member of faculty. The study will involve a research project approved by the supervisor in the field of interest of the student, and will be designed to take maximum advantage of the laboratory and/or field opportunities offered by the Marine Station. **(Note:** the member of faculty supervising the study may be a member of the teaching staff participating in the curriculum offered at the Marine Station; a member of faculty of W.C.U.M.B.S. spending the summer at the Marine Station as a research investigator; or the student may be indirectly under the supervision of a member of faculty at one of the members of W.C.U.M.B.S.)

410. (3) Marine Invertebrate Zoology.—A survey of the marine phyla, with emphasis on the benthnic fauna in the vicinity of the Marine Station. The course includes lectures, laboratory periods, field collection, identification and observation. Emphasis is placed on the study of living specimens in the laboratory and in the field. (Credit will be allowed for only one of Marine Science 410 and Zoology 301.)

420. (3) Marine Phycology.—A survey of the marine algae, with emphasis on the benthic forms in the vicinity of the Marine Station. The course includes lectures, laboratory periods, field collection, identification and observation. Emphasis is placed on the study of living specimens in the laboratory and in the field.

430. (3) Marine Ecology.—An analytical approach to biotic associations in the marine environment. Opportunities will be provided for study of the intertidal realm in exposed and protected areas, and of beaches and estuaries, in the vicinity of the Marine Station; plankton studies and investigations of the subtidal and benthic environments by diving and dredging are envisaged.

Botany

Honours and Major programmes are available in Botany. The prescribed courses and electives are given below for each year. In selecting electives it is suggested that students should not take Botany courses to the exclusion of other related subjects. Botany Department advisors should be consulted before the beginning of each year.

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 section of the calendar.

Certain courses in Marine Science (see end of Biology section) offered at the Western Canadian Universities' Marine Biological Society's Laboratory at Bamfield, Vancouver Island, may be taken for credit in the summer term.

Students interested in a programme in ecology can take a course of study in Botany, Zoology or Biology (General Biology, Option III). Recommendations on the selection of courses can be obtained from ecology advisors in Botany, Zoology or the Biology programme.

Requirements for the B.Sc. degree:

Major

First Year		Second Year	
Biology 101 or 102	(3)	Biology 200	(1½)
Physics 105, 110, 115, or 120	(3)	Biology 201	(1½)
Chemistry 110 (120 or 103)	(3)	Botany 209	(1½)
Mathematics 100 and 121	(3)	Botany 210	(1½)
English 100	(3)	Chemistry 230	(3)
		Elective (Arts)	(3)
		Elective*	(3)
	(15)		(15)

Third Year and **Fourth Year** (30 units)

Botany 330	(3)
Biology 300 or Pl. Sci. 321	(1½)
Biology 321	(1½)
Biology 334	(1½)

10½ additional units in Science, 6 of which must be in Botany.
12 units of elective* courses (of which 3 must be in Arts).

Honours

First Year		Second Year	
Biology 101 or 102	(3)	Biology 200	(1½)
Physics 105, 110, 115, or 120	(3)	Biology 201	(1½)
Chemistry 110 (120 or 103)	(3)	Botany 209	(1½)
Mathematics 100 and 121	(3)	Botany 210	(1½)
English 100	(3)	Chemistry 230	(3)
		Elective (Arts)	(3)
		Elective*	(3)
	(15)		(15)

Third Year	and	Fourth Year (36 units)
Botany 330		(3)
Botany 449		(3)
Biology 300		(1½)
or Pl. Sc. 321		(1½)
Biology 321		(1½)
Biology 334		(1½)

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 102 (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. [2-3; 0-0]

210. (1½) Vascular Plants.—A comparative study of pteridophytes, gymnosperms and angiosperms, integrating form, function and ecology. [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. A plant collection should be made prior to start of course following consultation with instructor. [2-4; 2-4]

305. (3) Biology of Algae.—A systematic survey of the algae, considering thier morphology, physiology, and ecology. [2-3-1*; 2-3-1*]

306. (1½) Structure and Evolution of the Bryophyta.—A study of evolution, taxonomy and morphology of mosses, liverworts and hornworts with emphasis on living plants in their environment. [2-2; 0-0]

307. (1½) Structure and Evolution of Ferns and Fern-allies.—Anatomy, morphology and relationships of the ferns and fern-allies, with assessment of both fossil and extant taxa. [0-0; 2-2]

308. (1½) Structure and Reproduction of Fungi.—A systematic survey of slime molds and fungi. [2-3; 0-0]

309. (1½) Physiology and Ecology of Fungi.—Fungal nutrition and exploitation of the environment. Prerequisite: Botany 308. [0-0; 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. [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. [2-3-1; 2-3-1]

335. (1½) Plant Genetics.—The evolution of basic concepts in plant genetics including discussion of recent developments and methods. Prerequisite: Biology 334. [0-0; 2-3]

402. (1½) Plant Anatomy.—Internal structure and organization of vascular plants. Prerequisite: Botany 210 or Biology 302, or permission of the Head of Department. [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. (Not offered in 1972-73.) [2-3; 2-3]

426. (2) Plant Synecology.—A quantitative approach to the study of plant communities emphasizing the analysis, description, and classification of vegetation; community and continuum concepts; plant succession and climax; vegetation and environmental relationships. A consideration of the biogeoclimatic zones of British Columbia is included. Prerequisites: Biology 321 and 322. Biology 300 (or equivalent) and Botany 302 are recommended. [3-3; 0-0]

427. (2) Plant Autecology.—Relationships between plants and their physical and biotic environment. Emphasis is placed on adaptive structural and functional features which link the individual plant to its specific environment and the forms of energy and mass transfer and transformation within the ecosystem. Prerequisite: Biology 321 and 322. Soil Science 414 and Botany 330 are recommended. [0-0; 3-3]

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 203 or 230 and either Biology 201 or Biochemistry 410. [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. (Not offered in 1972/73.) [2-4; 0-0]

440. (3) Palaeobotany and Palynology.—A study of plant macrofossils and microfossils emphasizing phylogenetic relationships of major taxa. Prerequisite: Botany 210, or equivalent. (Given in 1972/73 and alternate years.) [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.

510. (3) Marine Phycology.—Collection, identification, ecology and life histories of algae; emphasis on marine benthonic forms. Prerequisite: Botany 305. (Given in 1973/74 and alternate years.)

511. (3) Freshwater Phycology.—Collection, culture techniques, identification, ecology and life histories of the freshwater forms. (Given in 1972/73 and alternate years.)

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. (Not offered in 1972/73.)

513. (2) Cytology of Marine Algae.—A cytomorphological study of marine algae, including a detailed discussion of nuclei and chromosomes. (Not offered in 1972/73.)

515. (3) Advanced Mycology.—Systematics, life histories and ecology of fungi. Emphasis on terrestrial groups in the first term; aquatic fungi in the second term. Prerequisite: A course in Introductory Mycology. [1-4; 1-4]

520. (3) Phytogeography.—Historical and floristic plant geography. The pattern, dynamics and ecology of plant distributions. Terrestrial plants stressed. (Not offered in 1972/73.)

525. (3) Advanced Plant Autecology.

526. (3) Advanced Plant Synecology.—(Not offered in 1972/73.)

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. 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. (Given 1973/74 and alternate years. 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 1973/74 and alternate years.)

531. (3) Advanced Plant Physiology II.—Studies of water relations, mineral nutrition, translocation, growth and development in plants. (Given in 1972/73 and alternate years).

540. (3) Advanced Paleontology and Palynology.—Detailed studies of plant macro- and microfossils and phylogenetical and paleoecological interpretations. (Given in 1972/73 and alternate years.)

541. (3) Structure and Development of Pteridophytes and Gymnosperms. (Given in 1973/74 and alternate years.)

542. (3) Structure and Development of Angiosperms.—(Given in 1973/74 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 1973/74 and alternate years.)

546. (1-3) Advanced Topics in Botany.

549. (3-6) Master's Thesis.

649. Ph.D. Thesis.

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 section of the 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	(3)	Chemistry 210 or 220	(3)
Mathematics 100 and 121	(3)	Chemistry 203	(3)
Physics 105 or 110 or 115 or 120	(3)	Mathematics 200 and 221	(4)
English 100	(3)	Physics 200 and 219 or 204 and 209	(3-4)
Additional units	(3)	Optional additional elective from: Mathematics, Physics, or other approved courses.	(1-2)
		Additional units	(3)
	(15)		(18)
Third Year		**Fourth Year**	
Chemistry 303	(2)	Chemistry 401	(1)
Chemistry 304	(2)	Chemistry 403	(1)
Chemistry 310	(2)	Chemistry 404	(1)
Chemistry 311	(1)	Chemistry 407	(1)
Chemistry 312	(2)	Chemistry 415	(2)
Chemistry 315	(2)	Chemistry 449	(3)
Chemistry 324	(1)	*Additional Chemistry units	(3-6)
Mathematics 301 or an approved elective in science	(3)	Additional units	(3-0)
Additional units	(3)		
	(18)		(15)

*Chosen from Chemistry 405, 406, 410, 411, 413, 414, 416, 417, 418, 419 and 420.

Note: Reading knowledge of French, German or Russian is highly desirable. Students who have taken French in High School should take German or Russian.

Major

First Year		Second Year	
Chemistry 110 or 120	(3)	Chemistry 210 or 220	(3)
Mathematics 100 and 121	(3)	Chemistry 203	(3)
Physics 105 or 110 or 115 or 120	(3)	Mathematics 200 and 221	(4)
English 100	(3)	Physics 200 and 219	(3)
Additional units	(3)	Additional units	(2)
	(15)		(15)
Third Year		**Fourth Year**	
Chemistry 304	(2)	Chemistry 311	(1)
Chemistry 310	(2)	Chemistry 312	(2)
Chemistry 320	(1)	Chemistry 321	(1)
Chemistry 324	(1)	*Chemistry 330 or	(3)
Mathematics 301 or an approved elective in science	(3)	**Chemistry 403 and either 422 or 423	(2)
*Additional units	(6)	***Additional Chemistry units	(2-3)
		Additional units	(6)
	(15)		(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.

*If not taken in third year.
**If 303 was taken in third year.
***Chosen from one-unit fourth-year courses.

Combined Chemistry and Physics Honours

First Year		Second Year	
Chemistry 110 or 120	(3)	Chemistry 210 or 220	(3)
Mathematics 100 and 121	(3)	Chemistry 203	(3)
Physics 105 or 110 or 115 or 120	(3)	Physics 204	(3)
English 100	(3)	Physics 209	(1)
Additional units	(3)	Physics 220 (or 210)	(2)
	(15)	Mathematics 200 and 221	(4)
			(16)
Third Year		**Fourth Year**	
Chemistry 304	(2)	Chemistry 401	(1)
Chemistry 310	(2)	Chemistry 404	(1)
Chemistry 312	(2)	Chemistry 407	(1)
Chemistry 320	(1)	Chemistry 427	(1)
Chemistry 324	(1)	*Chemistry additional units	(2)
Physics 301	(2)	Physics 402	(3)
Physics 308	(2)	Physics additional units	(5)
Physics 309	(1)	Additional units	(4)
Physics 310	(1)		
Mathematics 301	(3)		
	(17)		(18)

*Chosen from one-unit fourth-year courses.

Combined Chemistry and Mathematics Honours

First Year		Second Year	
Chemistry 110 or 120	(3)	Chemistry 210 or 220	(3)
Mathematics 100, 120, 121	(4)	Chemistry 203	(3)
Physics 105, 110, 115 or 120	(3)	Mathematics 200	(2)
English 100	(3)	Mathematics 220	(1)
Additional units	(3)	Mathematics 221	(2)
		Mathematics 222	(1)
		Approved Physics Course	(3)
		Elective	(3)
	(16)		(18)
Third Year		**Fourth Year**	
Chemistry 304	(2)	Chemistry 401	(1)
Chemistry 310	(2)	Chemistry 404	(1)
Chemistry 312	(2)	Chemistry 407	(1)
Chemistry 320	(1)	Chemistry 427	(1)
Chemistry 324	(1)	Chemistry additional courses	(3)
Mathematics 320	(3)	Approved Mathematics courses	(6)
Mathematics 322	(3)	Additional courses	(3)
Mathematics 321 or 300	(3)		
	(17)		(16)

Combined Biology and Chemistry Honours

First Year		Second Year	
Biology 101 or 102	(3)	Biology 200	(1½)
Chemistry 110 or 120	(3)	Biology 201	(1½)
Mathematics 100 and 121	(3)	Chemistry 205 or 210 or 220	(3)
Physics 105 or 110 or 115 or 120	(3)	Chemistry 203	(3)
English 100	(3)	Mathematics 200	(2)
		Biology Elective*	(3)
		Elective (Arts)	(3)
	(15)		(17)
Third Year		**Fourth Year**	
Biology 334	(1½)	Biochemistry 410	(3)
Biology 330	(3)	Chemistry 310 and 320 or 335	(3)
Chemistry 303	(2)	Chemistry 312 or 405 and 406 or 407	(2)
Chemistry 305	(3)	Chemistry 403 and 422	(2)
Chemistry 311 and 321	(2)	Chemistry Elective**	(1)
Microbiology 200	(3)	Biology Elective***	(2½)
Elective (Arts)	(3)	Biology or Chemistry 449	(3)
	(17½)		(16½)

***Organismal:** one of Zoology 203/204; Zoology 311/410; Biology 315.
**Chemistry, 400-level course.
***One of Botany 209/210; Botany 302; Botany 305 suggested.

Primarily for First Year Students

Chemistry 103 is intended to fill the requirements for a first year Chemistry course for students who normally either take no further chemistry or will follow the route of Chemistry 205 (see requirements below, however), Chemistry 305, Chemistry 230 and Chemistry 330. Admission to Chemistry 103 is open to students with *either* Chemistry 11 *or* Chemistry 12 credit.

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]

Chemistry 110 *or* Chemistry 120 is the normal prerequisite for admission to science programmes and to the Faculty of Applied Science. The difference between the two lies in the background of the student: those students with credit for Chemistry 11 only, take Chemistry 110 while those with credit for Chemistry 12 take Chemistry 120. Both require Mathematics 100 and 121 and a first year Physics course as corequisites.

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 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 University of British Columbia are assumed to have read Sienko and Plane, *Chemistry,* 3rd Edition (for students entering 205, 208, or 230) or Mahan, *College Chemistry* (for students entering 203, 210 or 220).

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 or Majors in Chemistry. Prerequisites: Chemistry 110, 120 (or 103 with standing of 65%). Credit will not be given for both Chemistry 205 and 208, 210 or 220. [3-4; 3-4]

208. (3) Physical and Inorganic Coordination Chemistry.—Basic thermodynamics and kinetics, solution and phase equilibria, phase rule, thermochemistry. Inorganic crystal and coordination chemistry. This course is intended for students in geological, metallurgical and related sciences and is not intended for Honours or Majors in Chemistry. Prerequisites: Chemistry 103 or 110 or 120. Credit will not be given for both Chemistry 208 and 205, 210 or 220. [3-4; 3-4]

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 200 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 200 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 321 (with Chemistry 311).

303. (2) Introductory Physical Organic Chemistry.—Conformational analysis, active methylene compounds, reaction intermediates, aromaticity and molecular rearrangements. Prerequisites: Chemistry 203. [2-0; 2-0]

304. (2) Physical Chemistry.—Chemical thermodynamics; chemical equilibria; phase equilibria and colligative properties; electro chemistry; chemical kinetics; surface chemistry and the physical chemistry of macromolecules. Prerequisites: Chemistry 210 or 220 (or Physics 200) and Mathematics 200. Chemistry 324 must be taken concurrently. Mathematics 301 taken concurrently is recommended. [2-0; 2-0]

305. (3) Physical Chemistry for Biologists.—Elementary thermodynamics, thermochemistry, and electrochemistry; chemical equilibria; chemical reaction rates, especially enzyme kinetics and fast reaction techniques; colloid science, diffusion phenomena; methods for determining molecular weight, size, and shape of macromolecules in solution. Prerequisites: Chemistry 210 or 220 or 205. Mathematics 200 is strongly recommended. [3-4*-2*; 3-4*-2*]

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, 208, 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. [0-4*-2*; 0-4*-2*]

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]

335. (3) Inorganic Chemistry for Biological Sciences.—A treatment of those parts of inorganic chemistry which are of especial importance to living systems, together with the physico-chemical methods used in their investigation. Prerequisites: Chemistry 230 (or 203) and 205 (or 210 or 220). Credit will not be given for both Chemistry 310 and 335. [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 422 or 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. Prerequisites: Chemistry 210 or 220. [2-0; 0-0]

403. (1) Advanced Organic Chemistry.—Heterocyclic compounds, spectroscopic methods; and photochemical reactions in organic chemistry. Prerequisites: Chemistry 303. Credit will not be given for both 330 and 403. [2-0; 0-0]

404. (1) Advanced Inorganic Chemistry.—Chemistry of selected groups of inorganic compounds, considered in relation to electronic and molecular structures. Prerequisites: Chemistry 310. [2-0; 0-0]

405. (1) Biophysical Chemistry.—A survey of techniques and systems with emphasis on the basic physical chemistry involved in the study of macromolecules. Prerequisites: Chemistry 203 or 230 and 304 or 305. [0-0; 2-0]

406. (1) Polymer Chemistry.—Structure and availability of monomers; Propagation mechanisms; synthesis of polymers with predetermined properties; measurement and interpretation of physical properties of polymers. Prerequisites: 203 or 230, and 304 or 305. [2-0; 0-0]

407. (1) Advanced Physical Chemistry.—Introductory statistical thermodynamics; chemical kinetics, including catalysis and photochemistry. Prerequisite: Chemistry 304. [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 defects in chemical reactivity. Prerequisites: Chemistry 210 or 220. [0-0; 2-0]

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. Prerequisites: Chemistry 303 or 330. [0-0; 2-0]

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. Prerequisites: Chemistry 303 or 330. [0-0; 2-0]

414. (1) Coordination Chemistry.—The bonding, stability and stereochemistry of coordination compounds, and the mechanisms of their reactions. Prerequisite: Chemistry 401. [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. [0-8; 0-8]

416. (1) Physical Organic Chemistry.—Substituent effects, solvent effects, energetics and catalysis in organic reactions. Prerequisites: Chemistry 303. [0-0; 2-0]

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. Prerequisite: Chemistry 310. **[0-0; 2-0]**

419. (1) Chemical Thermodynamics.—Chemical potentials of nonelectrolyte solutions; ideal, regular and real solution. Electrolyte solutions; Debye-Hückel theory. Thermodynamics of electrochemical systems; cells, membrane equilibria. Thermodynamics of surfaces. Statistical Thermodynamics. Prerequisite: Chemistry 407. [0-0; 2-0]

420. (1) Molecular Spectroscopy.—A detailed study of rotational, vibrational and electronic spectroscopy. Prerequisites: Chemistry 312 and 401, previously or concurrently. [0-0; 2-0]

422. (1) Intermediate Organic Chemistry Laboratory.—Intermediate analytical and preparative techniques in organic chemistry. Corequisite: Chemistry 403. This course is not available to students who have obtained credit for Chemistry 330 or Chemistry 315. [0-4; 0-4]

423. (1) Advanced Organic Chemistry Laboratory.—Advanced analytical and preparative techniques in organic chemistry. Corequisite: Chemistry 403. Prerequisite: Chemistry 315. 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. Prerequisite: Chemistry 324. Chemistry 312 or 407 must be taken concurrently. This course is not available to students who are eligible to take Chemistry 415. [0-4; 0-4]

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.

509. (1) Electron and Photon Impact Spectroscopy.—A study of u-v and X-ray photoelectron spectroscopy, electron, scattering, Penning ionization spectroscopy, mass spectra and the theory of ion fragmentation.

510. (1) Magnetic Resonance.—Theories for relaxation with special reference to nuclear magnetic resonance, electron spin resonance, and multiple resonance techniques. Application of both transient and steady-state magnetic resonance to the elucidation of chemical and biochemical problems.

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.

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) Nuclear Chemistry.—An advanced course. Nuclear rotational and vibrational structure, angular correlation theory, nuclear reactions and scattering theory, nuclear synthesis and the trans-uranic elements, mesonic atoms and molecules, muonium chemistry.

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. (9) M.Sc. Thesis.

649. Ph.D. Thesis.

Computer Science

The department offers opportunities for study leading to bachelor's, master's and doctor's degrees. For information on the M.Sc. and Ph.D. degree courses, see Graduate Studies.

Requirements for the B.Sc. degree:

Major and Honours Program

First Year		Second Year	
English 100	(3)	Computer Science 210	(3)
Mathematics 100	(2)	Mathematics 120	(1)
Mathematics 121	(1)	Mathematics 200	(2)
Physics 105, 110, 115 or 120	(3)	Mathematics 221	(2)
Chemistry 103, 110, or 120	(3)	Mathematics 222	(1)
Elective	(3)	Electives	(6)
	(15)		(15)

Note: For students taking first year prior to 1969/70 and second year prior to 1970/71, equivalent Mathematics courses are Mathematics 120, 200, and 202.

Major Program Third and Fourth Years	
Computer Science 302	(3)
Computer Science 310	(3)
*Other Computer Science courses numbered 300 or higher	(9)
†Mathematics courses numbered 300 or higher	(6)
**Electives	(9)
	(30)

†Mathematics courses in linear algebra, probability, differential equations, numerical analysis, and statistics are recommended.

*For Major students, it is recommended that at least two of the optional Computer Science Courses be chosen from application areas (e.g., Computer Science 400, 402, 404, 405).

**One or two appropriate courses from other fields of possible computer applications are suggested (e.g. E.E. 256).

Honours Program Third and Fourth Years	
Computer Science 302	(3)
Computer Science 310	(3)
Computer Science 311	(3)
Computer Science 421	(3)
Other Computer Science courses numbered 400 or higher	(9)
†*Mathematics courses numbered 300 or higher	(9)
*Electives	(6)
	(36)

†Mathematics courses in linear algebra, probability, differential equations, numerical analysis, and statistics are recommended.

*Among them, courses in logic, foundations of Mathematics, and E.E. 256 are strongly recommended.

Combined Honours in Computer Science and Mathematics

First Year		Second Year	
English 100	(3)	Computer Science 210	(3)
Mathematics 100, 120†, 121	(4)	Mathematics 200, 220, 221, 222	(6)
Chemistry 110 or 120	(3)	Electives*	(6)
Physics 105, 110, 115 or 120	(3)		
Elective*	(3)		
	(16)		(15)
Third Year		**Fourth Year**	
Computer Science 302, 310, 311	(9)	Computer Science 421	(3)
Mathematics 320, 322	(6)	Other Computer Science courses numbered 400 and above	(3)
Mathematics 300 or 321	(3)	Two courses from Mathematics 400, 420, 421, 422, 423, 424, 425	(6)
		Electives	(5)
	(18)		(17)

†May be deferred to second year.
*Students must select at least 6 of these 9 elective units in Arts course.

Computer Science 200 and Computer Science 201 are intended primarily for students wanting a one-term course in one aspect of Computer Science or for students who lack the prerequisites for Computer Science 210.

N.B. Credit may be obtained for only one of Computer Science 201, 251 and 210. Computer Science 200 may be taken for credit in conjunction with either Computer Science 201 or 251, but not with 210.

200. (1½) Elements of Computer Science.—Computer organization, comparison of natural and programming languages, algorithms, typical applications to numerical and non-numerical problems, selected topics in Computer Science. 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. [0-0; 3-1]

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. Prerequisite: Former Mathematics 120, or new Mathematics 100 and 121, or equivalent. [3-1; 3-1]

302. (3) Numerical Computation I.—Discussion of numerical techniques for basic mathematical processes. Solution of linear equations, including analysis of roundoff errors; algorithms for the symmetric eigenproblem; solving nonlinear scalar equations; approximation of functions, including least squares and splines; numerical integration; Monte Carlo methods; introduction to the numerical solution of differential equations. Prerequisites: C.Sc. 201 or 210 or 251, Math. 200 and 221. [3-1; 3-1]

310. (3) Advanced Programming and Data Processing.—Assembly language programming. Data structures and data processing: table searching, sorting, lists and list processing. Organization of computer systems: input-output systems, assemblers, interpreters, compilers. Prerequisite: C.Sc. 210. [3-1; 3-1]

311. (3) Programming Languages.—Formal language definition, properties of languages, introduction to compilation algorithms. Comparison of programming languages and implementation problems. Languages for list and text processing. Prerequisite: At least second class in C.Sc. 210. [3-1; 3-1]

400. (3) Applied Combinatorial Analysis.—Generating functions, recurrence relations, enumeration, theory of graphs, networks, matching in graphs, block

designs, computer applications. Prerequisite: C.Sc. 310 (or former C.Sc. 300) and fourth year standing or consent of the Head of Department. [3-0; 3-0]

402. (3) Numerical Computation II.—Investigation of numerical techniques for more sophisticated mathematical processes. Solution of the unsymmetric eigenproblem; algorithms for nonlinear systems of equations, including Newton's method; numerical methods for initial and boundary value problems in ordinary differential equations, including stability of multistep methods and shooting techniques. Prerequisites: C.Sc. 302 and one of Math 300, 320, or permission of the Head of Department. [3-1; 3-1]

404. (3) Introduction to Information Retrieval.—Information dissemination process: classification and analysis, retrieval and evaluation. Input operations: encoding, query statement formulation. File organization. Search strategy: association coefficients, search and look-up operations. Output operation: relevance feedback, query modification. Query languages. Retrieval evaluation: determination recall and precision, determination of recall value. Prerequisite: C.Sc. 310 (or former C.Sc. 300) some knowledge of probability theory. [3-0; 3-0]

405. (3) Simulation and Optimization.—Linear, integer, and dynamic programming. Scheduling. Branch and bound techniques. Critical path methods. Flows through networks. Queuing theory. Multistage decision-making processes. Monte Carlo methods. Techniques of simulation. Prerequisite: C.Sc. 201 or 210, Math. 200, 205 and 221 or consent of the Head of Department. [3-0; 3-0]

410. (3) Systems Programming.—Computer file 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: C.Sc. 310 (or former C.Sc. 300). [3-0; 3-0]

411. (3) Compiler Design.—Programme language structures. Translation, loading, execution and storage allocation. Compilation of expressions and statements. Syntax-directed methods. Error diagnostics. Object code optimization techniques. Compile-time and run-time administration. Prerequisite: C.Sc. 311 (or former C.Sc. 300). [3-0; 3-0]

421. (3) Introduction to Formal Systems.—Nerve nets and finite automata. Turing machines, computability, and recursive function theory. Formal algorithms, Markov algorithms. Natural and formal languages. Prerequisite: Third year completed with at least second class average standing or consent of the Head of Department. [3-0; 3-0]

422. (3) Introduction to Artificial Intelligence.—Game-playing programs; learning machines; tree-searching; pattern recognition; heuristic programming; self-organizing systems. Prerequisite: C.Sc. 310, (or former C.Sc. 300). [3-0; 3-0]

448. (3) Directed Studies in Computer Science.—Open ordinarily to Honours students in Computer Science, with the permission of the Head of the Department. The course may consist of supervised reading, participation in a seminar, and one or more programming projects.

Graduate Courses

Not all of these courses will be offered in any given year.

501. (1½) Theory of Automata I.
502. (1½) Artificial Intelligence I.
503. (1½) Computational Linguistics I.
504. (1½) Information Retrieval.
505. (1½) Simulation Methods.
506. (1½) Graphic Data Processing.
507. (1½) Information Theory.
508. (1½) Computer Systems.
509. (1½) Advanced Programming Languages I.
510. (1½) Numerical Methods in Partial Differential Equations I.
520. (1½) Numerical Methods in Partial Differential Equations II.
521. (1½) Theory of Automata II.
522. (1½) Artificial Intelligence II.
523. (1½) Computational Linguistics II.
527. (1½) Coding Theory.
529. (1½) Advanced Programming Languages II.
530. (1–3) Topics in Information Processing.
531. (1–3) Topics in Theory of Automata.
532. (1–3) Topics in Artificial Intelligence.
534. (1–3) Topics in Information Retrieval.
535. (1–3) Topics in Simulation.
537. (1–3) Topics in Coding and Information Theory.
538. (1–3) Topics in Computer Systems.
540. (1–3) Topics in Applied Combinatorial Analysis.
542. (1-3) Topics in Numerical Computation.
549. (3–6) Thesis for Master's Degree.
649. Thesis for Ph.D. Degree.

Geography

The department offers opportunities for study leading to bachelor's, master's and doctoral degrees. For information on the Ph.D. and M.A. degree courses, see the Graduate Studies section of the calendar. For information on the B.A. degree courses, see the Faculty of Arts section of the calendar.

Requirements for the B.Sc. degree:

Students entering the Major, Honours or Combined Honours program should obtain details of the structure of Geography undergraduate courses from the departmental office.

Students registered in the B.Sc. program in Geography cannot obtain Arts credit for any Geography courses.

Major

First Year		Second Year	
English 100	(3)	Geography 212/213	(3)
Mathematics 100/121	(3)	Soil Science 200 or Geology 206† or Biology 321*	(1½)
Physics 105, 110, 115, or 120	(3)	Physics 156**	(1½)
Chemistry 103, 110, or 120	(3)	Mathematics 200/221/205	(6)
Geography 101	(3)	Arts Elective	(3)
	(15)		(15)

Major

Third Year		Fourth Year	
Geography 379	(1½)	4½ units from: Geography 411/414, Geology 412	(4½)
2 of Geography 311, 313, 316	(3)	Geography 401	(3)
2 of Geography 370, 372, 375	(3)	1½ units from: Geography 345/ Geography Regional courses	(1½)
1 of Geography 315, 366, 462, 417	(1½)	Science Elective	(3)
Mathematics 301	(3)	Free Elective	(3)
Arts Elective	(3)		(15)
	(15)		

†Requires permission of Head of Department of Geology.

*Requires Biology 101 or 102 or equivalent.

**Students wishing to take 16½ units in their second year should take Physics 156 *and* Chemistry 156 *or* Physics 200/219 *or* Chemistry 208 *or* Chemistry 210 *or* Chemistry 220.

Honours — Focus Climatology

First Year		Second Year	
English 100	(3)	Geography 212/213	(3)
Mathematics 100/121	(3)	Soil Science 200 or Biology 321*	(1½)
Physics 105, 110, 115, or 120	(3)	Mathematics 200/221/205	(6)
Chemistry 103, 110, or 120	(3)	Geophysics 201/Physics 219, or Physics 200/219	(3)
Geography 101 or Biology 101 or 102	(3)	Arts Elective	(3)
	(15)		(16½)

Third Year		Fourth Year	
Geography 311	(1½)	Geography 345	(1½)
Geography 313	(1½)	Physics 441	(1)
Geography 375	(1½)	Oceanography 400/401	(2)
Geography 379	(1½)	Geography 411	(3)
Geography 370 or 372	(1½)	Geography 401	(3)
Mathematics 301	(3)	Geography 449	(1½)
One of Soil Science 413/414, Botany 330/425, or Forestry 312/405	(3)	Science Elective	(3)
Arts Elective	(3)	Free Elective	(3)
	(16½)		(18)

*Requires Biology 101 or 102 or equivalent.

Combined Honours Geography and Geology — Focus Geomorphology

First Year		Second Year	
English 100	(3)	Geography 212/213	(3)
Mathematics 100/121	(3)	Geology 206* or Soil Science 200	(1½)
Physics 105, 110, 115, or 120	(3)	Mathematics 200/221/205	(6)
Chemistry 103, 110, or 120	(3)	One of Geophysics 201/ Physics 219, Physics 200/219, Chemistry 208, 210 or 220, Physics 156/ Chemistry 156	(3)
Geography 101 or Geology 105	(3)	Arts Elective	(3)
	(15)		(16½)

Third Year		Fourth Year	
Geography 313/ Geology 412	(4½)	Geography 414	(1½)
2 of Geography 370, 372, 375	(3)	Geology 304	(3)
Geography 379	(1½)	Geography 401	(3)
Mathematics 301	(3)	Geography 449/345 or Geology 449	(3)
One of Physics 316, Chemistry 310/320, Chemistry 304/334, Mathematics 305	(3)	Arts Elective	(3)
Geology 300/317	(3)	Free Elective	(3)
	(18)		(16½)

*Students who have not taken Geology 105 must take Geology 206 and must, at the end of Geography 101 consult the Head of either the Geography or Geology Department regarding supplementary reading.

Although there will be a major core of common courses, sufficient flexibility will be permitted so that either a Geography or a Geology bias is possible.

The following courses have Science credit. Other Geography courses mentioned in the above programs are described in the Arts section of the calendar.

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]

212. (1½) Introduction to Climatology.—An introduction to the atmospheric variables and the processes governing their distributions in the Earth-Atmosphere system. Atomspheric energy, moisture and motion. Weather disturbances and the climate of North America. Prerequisite: Geography 101, or permission of the Head of Department. [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 or permission of the Head of Department [0-0; 2-2]

311. (1½) Climatology.—Spatial and temporal variations of the heat and water balances in the Earth-Atmosphere system. Especially solar and infra-red radiation and their measurement. Air pollution climatology including atmospheric controls and effects. Air pollution models. Prerequisite: Geography 212 or permission of the Head of Department. [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. [0-0; 2-2]

316. (1½) Trace Elements and the Human Environment.—Physical environmental factors in human ecology with emphasis upon the role of trace elements in environmental epidemiology. Laboratory work on water, soil and vegetal sampling, to enable students to carry out studies of trace elements in relation to agriculture, forestry, mining or epidemiology. (Not for credit in the Life Science departments; credit to other Science students will be allowed for only one of Biology 311 and Geography 316.) [2-2; 0-0]

379. (1½) Physical Geography Field Course.—Field practice, surveying techniques, field instrumentation and mapping of elements of the physical environment. The course will include two hours of lectures per week during the Spring term of the student's third year and two weeks' residence at a field camp prior to the commencement of the student's fourth year. A fee of $75 will be charged to cover the cost of accommodation and food; students will be responsible for the transportation to and from the field camp and for liability insurance. Students should pre-register with the Department of Geography during the first term of their third year; they will not obtain credit until their fourth year. Prerequisite: Geography 212 or 213. [0-0; 2-0]

411. (1½-3) Microclimatology.—Microscale balances of energy and mass. Solar and infra-red radiation, soil heat flux and the turbulent transport of heat, water vapour and momentum in the lower atmosphere. The microclimate of snow, water, soil, plant and urban surfaces. Instrumentation and field techniques. Prerequisite: Geography 311 or permission of the Head of Department. [3-0; 0-0]

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). [2-2; 0-0]

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 section of the 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. A combined Honours programme in Geophysics and Geology is also available and listed under Geophysics. A combined Honours programme in Geography and Geology is listed under Geography.

Requirements for the B.Sc. degree:

Major

First Year		Second Year	
Chemistry 120 or 110 (or 103)	(3)	Chemistry 208	(3)
English 100	(3)	Geology 203	(1½)
Geology 105	(3)	Geology 206	(1½)
Mathematics 100 and 121	(3)	Geology 210	(3)
Physics 110 or 115 or 120 (or 105)	(3)	Mathematics 200 and 221	(4)
		Geophysics 201 and Physics 219 or Biology 101 or 102	(3)
	(15)		(16)

Third and Fourth Years

Geology 304	(3)	Non Science electives	(6)
Geology 320	(3)	Free electives	(17)
			(29)

Honours

First Year		Second Year	
Chemistry 120 or 110 (or 103)	(3)	Chemistry 208	(3)
English 100	(3)	Geology 203	(1½)
Geology 105	(3)	Geology 206	(1½)
Mathematics 100 and 121	(3)	Geology 210	(3)
Physics 110 or 115 or 120 (or 105)	(3)	Mathematics 200 and 221	(4)
		Geophysics 201 and Physics 219 or Biology 101 or 102	(3)
	(15)		(16)

Third and Fourth Years

Geology 304	(3)	Other geology courses numbered 300 or higher	(12)
Geology 320	(3)	Non Science elective	(6)
Geology 410	(1½)	Free elective	(6½)
Geology 449	(3)		(35)

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 a Department of Geology advisor.

Only the following courses are normally open to General Course students: Geol. 105, 203, 206, 300, 317, 324 and 412.

Geology students may wish to select some of their elective courses from Civil Engineering 250, Geography 212, 213, 312, 313, 316, 366, 370, 372, Oceanography 400, 403, 404, and Biology 300 and 301 or Plant Science 321 and 322. Credit will not be given for both Geography 213 plus 313 and Geology 412.

105. (3) Physical and Historical Geology.—Origin and structure of the earth, materials of the earth, diastrophism, erosion, land forms, mineral deposits, petroleum, natural gas, coal, ground water, fossils, meteorites, engineering and environmental geology, history of the earth and the development of life. [3-2; 3-2]

203. (1½) Principles of Paleontology.—Fossils as evidences of ancient living populations; deductions based on the fossil record, species concept in paleontology, evolution of selected animals and plants. Prerequisites: Geology 105 or 150. [2-2; 0-0]

206. (1½) Sedimentology.—Introduction to sediments and sedimentary rocks: composition, texture, structure, depositional environments, facies, correlation. Prerequisite: Geology 203. [0-0; 2-2]

210. (3) Mineralogy.—Fundamentals of Crystal Chemistry as Applied to Minerals. Introduction to Crystallography. Physical and Chemical Properties of Minerals. Determinative Mineralogy. Mineral Relationship. Prerequisite: Geology 105 or 150; Chemistry 103, 110 or 120; Physics 105, 110, 115, or 120. [2-3; 2-3]

300. (1½) Introduction to Mineralogy.—Methods of identification of minerals; the common rock forming and ore minerals. Not for credit for students in Geology or Geological Engineering. Prerequisite: Geology 105 or 150. [2-2; 0-0]

304. (3) Introduction to Stratigraphy and Structural Geology.—General principles of stratigraphy and descriptive structural geology. Prerequisites: Geology 105 or 150; and 300 or 210. [2-3; 2-3]

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. [2-0; 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. [0-0; 2-0]

312. (1) Environmental Geology.—Lectures, seminars, and problem sessions in the selection and evaluation of geologic data useful in the physical planning of urban areas, waste disposal, water resource projects, and problems connected with extraction of mineral resources in and adjacent to urbanizing regions. Prerequisites: Geology 105 or 150. [0-0; 2-0]

317. (1½) Petrology.—The common rocks, their minerals and the processes that formed them. Not for credit for students in Geology or Geological Engineering. Prerequisite: Geology 300 or 210 and 304 to precede or accompany. [0-0; 2-2]

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. Prerequisites: Geology 210 to precede or accompany. [2-2; 2-2]

324. (3) Introductory Geochemistry.—Origin, distribution, and cycles of chemical elements in the earth; application to pollution and prospecting. Prerequisites: Geology 105 or 150, Chemistry 208 or Physics 156 and Chemistry 156. Geology 210 (or 300) and 304 to precede or accompany. [2-2; 2-2]

402. (1½) Stratigraphy of the Western Cordillera.—Geologic history and stratigraphic sequence of the western Cordillera including the eugeosyncline and transitional area of British Columbia, Alaska and the northwestern United States. Lecture, seminars, field trips. Prerequisites: Geology 203, 206, and 304. [2-2; 0-0]

403. (1½) Petrology of Chemical and Bioclastic Rocks.—Origin of limestone, dolomite, chert, jasper and organic silica rocks; study of their textures, structures, composition, geochemistry, organic constituents, diagenesis, contribution to the geological record, economic exploitation and use. Laboratory studies of thin sections, insoluble residues, staining and peels; field trip. Prerequisites: Geology 304, 320. (Not offered in 1972/73.) [0-0; 2-2]

404. (1½) Structural Geology.—Studies of natural deformation using advanced techniques. Prerequisites: Geology 304 and 320. [2-2; 0-0]

405. (1) Topics in General Geology.—Major recent advances in geology, current controversies, unifying concepts. Normally restricted to Fourth Year and Graduate Students. [1-0; 1-0]

407. (3) Petrology.—The descriptive and interpretative study of igneous and metamorphic rocks. Prerequisites: Geology 320. [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. Prerequisites: Geology 304; 317 or 320 must precede or accompany. [3-0; 3-0]

409. (2) Mineralography.—Study and recognition of the opaque minerals by the reflecting microscope. Prerequisites: Geology 320; Geology 408 must precede or accompany. [1-3; 0-4]

410. (1½) Field Geology.—Methods of observing, recording, and correlating geological facts in the field. Prerequisites: Geology 210, 304, and 320. Civil Engineering 250 is strongly recommended. Two hours a week in the second term and three weeks in the field at the close of examinations in the spring of the Third Year. As facilities are limited admission is restricted to Honours and Engineering students. Students in the Majors program may be admitted by permission of the Head of Department if space is available. The fee of $100 is to be paid in January. The fee covers room, board, and instruction at the Field School for 3 weeks. Transportation to and from the Field School and liability insurance are the responsibilities of the students. Students taking this course in their Fourth Year and who require credits from this course for graduation will not graduate at the Spring Convocation.

412. (3) Geomorphology I.—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. Prerequisite: Geology 304. [2-2; 2-2]

414. (1½) Stratigraphic Paleontology.—The time concept in stratigraphy as exemplified by the major fossil groups; zonal assemblages and facies fossils of successive periods and epochs. Prerequisite: Geology 203, 304. [0-0; 2-3]

419. (1½) Stratigraphy and Sedimentation.—Description and interpretation of ancient and modern sediments, with emphasis on the origin, composition, textures, structures, diagenesis and chemistry of terrigenous sediments and coals. Prerequisites: Geology 320. [2-2; 0-0]

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.

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 and mineral deposits. (Given in 1973/74 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 1974/75 and alternate years.

519. (1½) Seminar in Sedimentology.—Principles of sedimentation as applied to modern and ancient deposits. (Not offered in 1972/73.)

520. (1½) Problems in Sedimentology.—Directed studies of sediments and sedimentary rocks. Prerequisite: Geology 403 or 419 or equivalent.

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 203 and 414.

524. (3) Advanced Geochemistry (Mineral Research).—Study of approved problems, using advanced techniques. Prerequisite: Geology 324 or equivalent.

526. (3) Mineral Deposits.—Seminar; character, origin, and structure of mineral deposits, with empasis on ore deposits.

531. (3) Advanced Invertebrate Paleontology.—Selected groups of fossils, special problems of paleontology, paleontological techniques. Prerequisites: Geology 203 and 414.

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.

534. (1½) Mechanics of Natural Deformation.—Lectures and laboratory problems.

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 203. (Given in 1972/73 and alternate years.)

543. (1½) Advanced Mineralogy.—Seminars and lectures. Advanced study of the crystal chemistry of minerals.

544. (1½) Rheology and Analysis of Natural Deformation.—Lectures and laboratory and/or problems.

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. (1½) Structure and Properties of Crystals and Crystal Aggregates.—Seminar and laboratory.

555. (1) Advanced Igneous Petrology.—Seminar.

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.

575. (1) Geological Phase Equilibrium.—Seminar and problems.

585. (1) Equilibria in Mineral Systems.—Seminar and problems.

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 section of the calendar. Astronomy courses offered by the Department are listed under Astronomy.

Requirements for the B.Sc. degree in Geophysics:

Majors			
First Year		**Second Year**	
Mathematics 100	(2)	Mathematics 200	(2)
Mathematics 121	(1)	Mathematics 221	(2)
Physics 110 (or 105, 115, or 120)	(3)	Geophysics 201 (or Physics 200)	(2)
Chemistry 120 (110 or 103)	(3)	Physics 219	(1)
Geology 105*	(3)	Geology 210	(3)
English 100	(3)	Elective	(5)
	(15)		(15)

Third Year		Fourth Year	
Geophysics 301	(3)	Geophysics 415	(3)
Geophysics 302	(3)	Geophysics 402	(1)
Mathematics 301	(3)	Geology 304	(3)
Physics 300	(2)	At least one of:	
Physics 319	(1)	Physics 316 (or Astronomy 320)	
Elective	(3)	Physics 400	
		Physics 413	(3)
		Electives	(5)
	(15)		(15)

Honours

First Year		Second Year	
Math 100	(2)	Math 200	(2)
Math 121	(1)	Math 221	(2)
Physics 120 (105, 110 or 115)	(3)	Geology 210	(3)
Chemistry 120 (110 or 103)	(3)	Physics 204	(3)
Geology 105*	(3)	Physics 209	(1)
English 100	(3)	Electives	(6)
	(15)		(17)
Third Year		**Fourth Year**	
Math 120	(1)	Geophysics 415	(3)
Math 301	(3)	Geophysics 449	(3)
Geophysics 301	(3)	Mathematics 300	(3)
Geophysics 302	(3)	Physics 402	(3)
Physics 301	(2)	Geology 304	(3)
Physics 309	(1)	Geology 320	(3)
Elective	(3)		
	(16)		(18)

Combined Honours Geophysics and Physics

First Year		Second Year	
Mathematics 100	(2)	Mathematics 120, 200, 221	(5)
Mathematics 121	(1)	Mathematics 222 (or 220)	(1)
Physics 120 (or 105, 110, or 115)	(3)	Physics 204	(3)
Chemistry 120 (110 or 103)	(3)	Physics 220 (or 210)	(2)
Elective (Geology 105 recommended)**	(3)	Physics 209	(1)
English 100	(3)	Arts (elec.)	(6)
	(15)		(18)
Third Year		**Fourth Year**	
Geophysics 302	(3)	Geophysics 415†	(3)
Geophysics 301 (or Physics 308 and 310)	(3)	Geophysics 449 (or Physics 409)	(3)
Mathematics 301	(3)	Mathematics 300	(3)
Physics 301, 309	(3)	Physics 401	(2)
Physics 306	(2)	Physics 402	(3)
Physics 413	(3)	Physics 457 (or 406 and one of 405, 408)	(2)
	(17)		(16)

Combined Honours Geology and Geophysics

First Year		Second Year	
Mathematics 100	(2)	Mathematics 120, 200, 221	(5)
Mathematics 121	(1)	Geophysics 201 (or Physics 200)	(2)
Physics 120 (or 105, 110, or 115)	(3)	Physics 219	(1)
Chemistry 120 (110 or 103)	(3)	Geology 304	(3)
Geology 105*	(3)	Geology 210	(3)
English 100	(3)	Elective (Arts)	(3)
	(15)		(17)
Third Year		**Fourth Year**	
Geophysics 301	(3)	Geophysics 415	(3)
Geophysics 302	(3)	One of:	
Mathematics 301	(3)	Geophysics 402	(1)
Physics 300	(2)	or	
Physics 319	(1)	Geophysics 449	(3)
Geology 320	(3)	Mathematics 300	(3)
Geology 309	(1)	One of:	
Geology 311	(1)	Geology 408	
		Geology 404, 419	(3)
		One of:	
		Astronomy 320	
		Physics 316	
		Physics 400	
		Physics 413	(3)
		Electives	(2-4)
	(17)		(17)

*Special arrangements can be made for students who have been unable to take this course in the first year.

**Students who do not have credit for Geol. 105 by the end of the second year will experience difficulty transferring to the Geophysics Majors program.

†Those students who have not taken Geol. 105 must consult the Geophysics Department for an alternative.

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 (or Physics 156). Prerequisite: Mathematics 200 (concurrently), Physics 110 (105, 115 or 120), Physics 219 recommended (concurrently). [2-0; 2-0]

301. (3) Waves and Seismology.—Ray theory; principles of reflection and refraction seismology; wave equation and its solutions; elasticity; interference, diffraction and polarization of waves. Examples will be directed towards geophysical applications. Prerequisites: Geophysics 201 or Physics 200, or equivalent; Mathematics 301 or equivalent (concurrently). [3-2*-0; 3-2*-0]

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 301 or equivalent (concurrently). [3-0-2*; 3-0-2*]

400. (3) Applied Physics of the Earth.—Instrumentation, application and limitations of the gravity, magnetic, electrical, electromagnetic and seismic methods. Presentation in the context of the physics of the Earth. (Not for those in geophysics programs.) [2-3; 2-3]

402. (1) Applied Geophysics Laboratory.—Field surveys, laboratory experiments and problem sessions in the gravity, magnetic, electrical and electromagnetic methods and the instrumentation of geophysical prospecting. Corequisite: Geophysics 415. [0-3; 0-3]

403. (1) Geochronology.—A description of age determination techniques, and the application of these techniques to geological problems. [0-0-; 2-0]

412. (2) Geomagnetism and Space Plasma Physics.—Fundamentals of plasma dynamics; analysis of geomagnetic field; dynamo theory; the solar wind and the magnetosphere; whistlers and geomagnetic micropulsations; ionospheric currents and transient geomagnetic variations. Prerequisites: Physics 301 (or equivalent) and Mathematics 301 (or equivalent). (This course may not be given each year.) [2-0; 2-0]

415. (3) Geophysical Analysis.—Analysis of geophysical data and instrumentation. Techniques discussed will include: optimum and inverse filtering, power spectrum analysis, and correlation methods; the quantititative interpretation of potential field measurements with emphasis on gravity, magnetic, electric, and electromagnetic surveys. Analysis and calibration of geophysical instrumentation: seismometers, magnetometers, electromagnetic and other systems. Prerequisites: Physics 300 (or equivalent), Mathematics 301 (or equivalent).

449. (3) Directed Research and Thesis.—This course is available only to students enrolled in Honours Geophysics programmes.

General Course

310. (3) (Also Astronomy 310). **Exploring the Universe.**—A discussion of modern topics of Astronomy and Geophysics without the use of advanced mathematics. The topics covered will include: cosmology; galaxies and quasars; stellar evolution; pulsars and "black holes"; radio and X-ray astronomy; origin of the solar system and the age of the earth; space exploration; the earth's magnetic field; continental drift; and ice ages. This course is open only to students not registered in the Faculty of Science or Applied Science. No background in science or mathematics is required. Credit will be given for only one of Astronomy 310, Geophysics 310. [3-0; 3-0]

Graduate Courses

500. (3) Principles of Modern Astronomy.—An introduction to the physical processes occurring in the stars, the interstellar medium, and in our own and other galaxies. Prerequisites: Fourth year Physics honours program, or permission of the department.

501. (2) Topics in Geophysics and Astronomy.—Selected detailed discussions of the physics and the chemistry of the earth-moon system, complete solar system, and galaxies.

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.—Description of the geomagnetic field, dynamo theory of the origin of the geomagnetic field; transient magnetic variation; 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.—Lectures and seminars on applications of statistical communication theory to analysis of geophysical data; time series analysis, optimum linear systems, and decision theory.

520. (1-3) Directed Studies in Geophysics or 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.

Mathematics

The department offers opportunities for study leading to doctor's, master's and bachelor's degrees. For information on the Ph.D., M.A., and M.Sc. degree courses, see the Graduate Studies section of the calendar. For information on the B.A. degree course, see the Faculty of Arts section of the calendar.

Requirements for the B.Sc. degree:

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.

All mathematics students should consult an adviser in the mathematics department as soon as possible in their first year.

The student should note that the first digit in the number of a course is intended to convey the level of mathematical maturity at which the course is conducted rather than the year in which it must be taken.

A student will be denied entry into a third year course if he obtains only 50% in a prerequisite second year course.

Major	
Math 100, 120, 121	(4)
200, 221, 222	(5)
And 12 units of Math courses numbered 300 and above	(12)
	(21)

Although the student is advised to take Math 100, 120, 121 in his first year and Math 200, 221, 222 in his second year, he is free to delay taking some of these courses until later. However, he should note that Mathematics 120, 121 are prerequisites for certain second year courses. Accordingly, he should consult an adviser in the Mathematics Department as soon as possible in his first year.

Honours	
Math 100, 120, 121	(4)
200, 220, 221, 222	(6)
320, 322, and one of 300, 321	(9)
Two from 400, 420, 421, 422, 423, 424, 425	(6)
And an additional 6 units of Math numbered 300 and above*	(6)
	(31)

To permit himself maximum flexibility of choice in his fourth year, the student is advised to take the sequences indicated above in his first three years. However, he is free to take courses in any order he wishes subject only to meeting the prerequisites indicated for the various courses. Those students intending to do graduate work in mathematics should take at least two of 400, 420, 421, 422.

*In the 1972-73 session, Mathematics credit will be given for Computer Science 402.

Combined Honours in Mathematics and Another Subject	
Mathematics:	
Math 100, 120, 121	(4)
200, 220, 221, 222	(6)
320, 322, and one of 300, 321	(9)
Two from 400, 420, 421, 422 423, 424, 425	(6)
	(25)
Other subject: as determined by the other department, but no more than 15 required units in third and fourth years combined.	

100. (2) Calculus I.—Ideas, techniques and applications of differentiation and integration. Prerequisite: Mathematics 12. [2-1; 2-1]

120. (1) Introduction to Analysis I.—Discussion of some concepts underlying Calculus such as induction, greatest lower bound, least upper bound, sequence, limit, continuity and proofs of theorems. Prerequisite: Mathematics 100 which may be taken concurrently when Mathematics 120 is taken in the Spring term. [2-0; 0-0] or [0-0; 2-0]

121. (1) Introduction to Linear Algebra.—Systems of linear equations, vectors, geometry of two and three dimensions. Prerequisite: Mathematics 12. [2-0; 0-0] or [0-0; 2-0]

130. (3) Finite Combinatorial Mathematics.—Intended primarily for students not in the faculty of science who wish to have some exposure to mathematical thinking. At the discretion of the instructor, the course will discuss such topics as: permutations, combinations, the binomial theorem, probability, graphs, properties of numbers, geometric configurations, etc. Prerequisite: Mathematics 11 or the equivalent. This course will not be accepted as a prerequisite to Mathematics 120, 151, 155, 156, 200, 205, 220, 221, 222. [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, network flows, etc. Prerequisite: Mathematics 121. [2-0; 0-0] or [0-0; 2-0]

200. (2) Calculus II.—Differentiation and integration of functions of several variables, surfaces, curves, line and surface integrals, applications. Prerequisite: Mathematics 100 and 121. It is recommended that Mathematics 221 be taken concurrently. [2-0; 2-0]

205. (2) Introduction to Probability and Statistics.—Probability, conditional probability, random variables, discrete and continuous probability distributions, applications to statistical problems such as sampling, estimation, tests of hypotheses. Intended primarily for students interested in applying probability and statistics to the study of real phenomena. Prerequisite: Mathematics 100 and 121. [2-0; 2-0]

220. (1) Introduction to Analysis II.—Continuity and differentiability of vector-valued functions, proofs and deeper discussion of theorems used in Mathematics 200. Prerequisite: Mathematics 200, full standing in the previous year and at least second class in Mathematics 100, 120. Mathematics 200 may be taken concurrently when Mathematics 220 is taken in the Spring term. [2-0; 0-0] or [0-0; 2-0]

221. (2) Linear Transformations in Euclidean Space.—Vector Spaces; linear transformations; matrices; eigenvalues; orthogonality; inner product; symmetric and orthogonal transformations; diagonalization; quadratic curves and surfaces. Prerequisite: Mathematics 121. [2-0; 2-0]

222. (1) Elementary Algebra.—Complex numbers, polynomials, roots, factorization, fields. Prerequisite: Mathematics 121. [2-0; 0-0] or [0-0; 2-0]

300. (3) Applied Analysis I.—Complex variables with applications including Laplace transform, Fourier analysis, and one or more topics chosen from special functions, calculus of variations, tensor analysis and group theory. Prerequisite: Math. 200 and 221. Corequisite: Math. 220 in the fall term. (Students who have taken 301 are exempt from this corequisite). [3-0; 3-0]

301. (3) Ordinary Differential Equations.—First order equations, linear equations and systems with applications, power series solutions, eigenfunctions, orthogonal polynomials, stability. Credit will not be given for both 301 and 410. Prerequisites: Mathematics 200 and 221. [3-0; 3-0]

305. (3) Statistics.—Statistical inference, hypothesis testing, non-parametric methods, correlation and regression, introduction to the design of experiments, elements of utility theory, sequential analysis, special topics of applied interest. Prerequisite: Mathematics 200 and 205. [3-0; 3-0]

310. (3) Geometry.—Euclid's axioms, projective geometry, other systems, elements of combinatorial topology. Prerequisite: Mathematics 221 and Corequisite 222. [3-0; 3-0]

311. (3) Elementary Number Theory and Algebraic Concepts.—Fundam-

ental theorem of arithmetic, the primes, congruences, quadratic residues, other topics. Prerequisites: Mathematics 221 and 222. [3-0; 3-0]

312. (1) Construction of the Number System.—The natural numbers, Peano's axioms, rationals, reals, complex numbers. Prerequisite: Mathematics 120 and 222. [2-0; 0-0] or [0-0; 2-0]

318. (3) Discrete Random Processes.—Discrete sample spaces and random variables, axioms for probability, Bayes' theorem, recurrent events, introduction to Markov chains, special topics. While not technically advanced, the topics discussed require some mathematical maturity for their appreciation. Prerequisite: 6 units of mathematical courses. [3-0; 3-0]

320. (3) Real Variables.—Topological properties of the line and Euclidean space, uniform convergence, power series, Fourier series, Weierstrass theorem, Ascoli theorem. Prerequisite: At least second class in Mathematics 200, 220, 221. [3-0; 3-0]

321. (3) Modern Vector Analysis.—Functions on R^n to R^m, differentiability, implicit function theorem, differential forms, integration on chains, Stokes' theorem, manifolds in Euclidean space, applications to differential geometry. Prerequisite: At least second class in Mathematics 200, 220, 221. [3-0; 3-0]

322. (3) Fundamental Concepts of Algebra.—Linear, multilinear algebra and introduction to abstract algebra. Prerequisite: At least second class in Mathematics 221 and 222. [3-0; 3-0]

400. (3) Applied Analysis II.—Laplace's, wave, diffusion equations, conformal mapping; transform techniques; integral equations; asymptotic methods; physical applications. Prerequisites: Mathematics 300 and 301. In exeptional circumstances students without Mathematics 301 but with at least second class in Mathematics 300 may be admitted with the consent of the head of Department. [3-0; 3-0]

405. (3) Design of Experiments.—Design of experiments, the general linear hypothesis, regression theory, construction and analysis of experimental designs, classificatory problems. Prerequisite: Mathematics 221 and 305. [3-2; 3-2]

406. (3) Introduction to Mathematical Statistics.—Multivariate normal distribution, sampling theory, estimation, interval estimation, hypothesis testing, sequential analysis, statistical decision theory, linear regression, one and two way analysis of variance. Intended primarily for students interested in pursuing graduate studies in Mathematical Statistics. Prerequisite: Mathematics 320. Students with at least second class in Mathematics 200, 221 and either 205 or 318 may be admitted with the consent of the Head of Department. [3-0; 3-0]

412. (2) Elements of Set Theory.—Primitive notions of set theory, Russell's paradox, set operations, relations and functions, cardinals, Cantor-Schroder-Bernstein theorem, ordinals, well ordering. Prerequisite: 12 units of Mathematics courses (Mathematics 312 is recommended). Not offered 1972-73. [2-0; 2-0]

413. (3) Introduction to Mathematical Logic.—Predicate calculus; languages and structures; theories; proofs; models; completeness theorem. Recursive functions; decision problems; Goedel's incompleteness theorem. Prerequisite: At least 12 units of mathematics or consent of head of department. [3-0; 3-0]

418. (3) Introduction to Probability Theory.—Probability theory, discrete random variables, recurrent events, renewal theory, random walks, Markov chains, continuous random variables, probability distributions, characteristic problem, infinitely divisible laws, special topics. Prerequisite: Mathematics 320. Students with at least second class in Mathematics 200, 221 and 318 may be admitted with the consent of the head of the department. [3-0; 3-0]

420. (3) Real Analysis.—Metric spaces, normed vector spaces, compactness, completeness, Baire Category, Lebesgue-Stieltjes measures, integration, differentation, linear functionals, Riesz representation, study of lp Lp, C([0;1]) as examples of Hilbert and Banach spaces. Prerequisite: At least second class in Mathematics 320. [2-0; 2-0]

421. (3) Complex Analysis.—An introduction to the theory of analytic functions of a complex variable. Prerequisite: At least second class in Mathematics 320 and 321. [2-0; 2-0]

422. (3) Abstract Algebra.—Groups, rings, fields and Galois theory, special topics. Prerequisite: At least second class in Mathematics 322. [2-0; 2-0]

423. (3) Introduction to the Theory of Differential Equations.—Existence and uniqueness theorems for systems of ordinary differential equations; first order partial differential equations; elliptic, parabolic, and hyperbolic equations. characteristics; Cauchy-Kowalewski theorem; boundary and eigenvalue problems; eigenfunction expansions. Prerequisite: At least second class in 320. [2-0; 2-0]

424. (3) Introduction to Differential Geometry.—Manifolds, flows, morphisms, critical points, curvature and geodisics (mainly for surfaces). Prerequisite: At least second class in Mathematics 320 and 321. [2-0; 2-0]

425. (3) Introduction to Algebric Topology.—Homotopy, covering spaces, homology, surfaces, manifolds. Prerequisite: At least second class in Mathematics 320, 321, 322. Not offered in 1972-73. [2-0; 2-0]

430. (1-3) Special Topics in Analysis.—The student should consult the Mathematics Department for the particular topics offered in a given year. May not be offered in 1972-73. [3-0; 3-0]

431. (1-3) Special Topics in Geometry.—The student should consult the Mathematics Department for the particular topics offered in a given year. May not be offered in 1972-73. [3-0; 3-0]

432. (1-3) Special Topics in Algebra.—The student should consult the Mathematics Department for the particular topics offered in a given year. May not be offered in 1972-73. [3-0; 3-0]

445. (1) Seminar on History of Mathematics.—Weekly lectures by various members of the Mathematics Department and advanced students on the historical development of some aspect of Mathematics. Intended primarily to acquaint serious students of Mathematics (undergraduate and graduate) with the historical background of their field. Prerequisite: 12 units of Mathematics courses. [1-0; 1-0]

449. (1-3) Honours Seminar.—Independent reading by Honours students in Mathematics under the direction of a faculty member.

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) Commutative Algebra.

510. (3) Homological Algebra.

511. (3) Algebraic Topology.

512. (3) Theory of Groups.

513. (3) Topological Groups.

514. (3) Nonlinear Differential Equations.

515. (3) Integral Equations.

516. (3) Harmonic Analysis.

517. (3) Complex Analysis.

518. (3) Probability.

519. (3) Statistics.

520. (3) Numerical Analysis.

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.

527. (3) Theory of Elasticity.

528. (3) Methods of Applied Mathematics.

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.

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 section of the calendar.

Requirements for the B.Sc. Degree:

Major

First Year		Second Year	
English 100	(3)	Chemistry 230	(3)
Biology 101 or 102	(3)	Microbiology 200 (201)	(3)
Mathematics 100 and 121	(3)	Science (elec.)	(6)
Physics 110 (105, 115 or 120)	(3)	Arts elective	(3)
Chemistry 110 (120 or 103)	(3)		
	(15)		(15)
Third Year		**Fourth Year**	
Biochemistry 410	(3)	Microbiology 448	(3)
Microbiology 321	(3)	6 units from:	(6)
Microbiology 324	(1½)	Microbiology 307	
Microbiology 325	(1½)	Microbiology 308	
Biology 334	(1½)	Microbiology 402	
Elective	(1½)	Microbiology 403	
Arts elective	(3)	Microbiology 405	
		Microbiology 408	
		Microbiology 409	
		Microbiology 411	
		Microbiology 418	
		Microbiology 430	
		Biology 422	
		Electives	(6)
	(15)		(15)

Honours

First Year		Second Year	
English 100	(3)	Chemistry 230	(3)
Biology 101 or 102	(3)	Microbiology 200 (201)	(3)
Mathematics 100 and 121	(3)	Science (elec.)	(6)
Physics 110 (105, 115 or 120)	(3)	Arts (elec.)	(3)
Chemistry 110 (120 or 103)	(3)		
	(15)		(15)
Third Year		**Fourth Year**	
Biochemistry 410	(3)	Microbiology 430	(3)
Microbiology 321	(3)	Microbiology 449	(3)
Microbiology 324	(1½)	9 units from:	(9)
Microbiology 325	(1½)	Microbiology 307	
Biology 334	(1½)	Microbiology 308	
Science (elec.)*	(4½)	Microbiology 402	
Arts (elec.)	(3)	Microbiology 403	
		Microbiology 405	
		Microbiology 408	
		Microbiology 409	
		Microbiology 411	
		Microbiology 418	
		Biology 422	
		Elective	(3)
	(18)		(18)

*Recommended Science electives:

Biology 300	(1½)	Botany 309	(1½)	Computer Science 201	(1½)
Biology 301	(1½)	Biochemistry 411	(1½)	Computer Science 210	(3)
Biology 315	(3)				
Biology 330	(3)	Chemistry 205	(3)	Microbiology 307	(1½)
Biology 340	(1½)	Chemistry 305	(3)	Microbiology 308	(1½)
Biology 400	(1½)	Chemistry 330	(3)		
Biology 401	(1½)	Chemistry 335	(3)		
Biology 422	(1½)	Chemistry 405	(1)	Zoology 413	(3)
Botany 305	(3)	Computer Science		Zoology 420	(3)
Botany 308	(1½)	200	(1½)	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 417 and 418. 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 201. [3-2; 3-2]

307. (1½) Bacteriology 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 production of antibiotics, alcohol, vitamins, etc. [0-0; 2-2]

321. (3) Microbiological Techniques.—Procedures and principles associated with the metabolism, genetics and characterization of microorganisms; instrumentation is stressed. Prerequisite: Biochemistry 410, Biology 334 and Microbiology 324 and 325 must precede or be taken concurrently. [0-4-2; 0-4-2]

324. (1½) Bacterial Cytology and Growth.—Structure and function in bacterial cells; mechanism and regulation of cell division; effects of cultural conditions on growth, chemical composition, enzyme complement and cellular differentiation; bases for growth at environmental extremes Prerequisites: Biochemistry 410, to be taken concurrently; Microbiology 200 or 201. [3-0; 0-0]

325. (1½) Introductory Bacterial Genetics.—Differentation, mutations and genetic transfer in bacteria. Prerequisite: Biochemistry 410 and Biology 334. [0-0; 3-0]

402. (1½) 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. Prerequisite: Biochemistry 410. [2-3; 0-0]

403. (1½) 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.—Selected topics in bacterial physiology and relevant methodology. Laboratory projects 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 to their structure, mode of replication and identification. Latent virus infections and oncogenic viruses. Mechanisms of antiviral defenses. [2-4; 0-0]

409. (1½) Bacterial Viruses.—A general outline of bacterial viruses with emphasis on topics of current interest, e.g. host controlled modification, RNA phages, control systems in lysogenic and lytic responses. [0-0; 2-4]

411. (1½) Pathogenic Fungi.—Morphology, physiology and immunology of fungi with special emphasis on pathogenic species. [0-0; 2-2]

417. (1½) Principles of 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; methods of culture and isolation. Permission of the head of the department required. (Credit will not be given for both Microbiology 417 and 200 (201)). [2-1; 0-0]

418. (1½). Industrial Microbiology.—Industrial utilization of microorganisms, technology of large-scale cultivation, discussion of selected processes and research procedures. Prerequisite: Microbiology 200 (201) or 417. [0-0; 2-1]

430. (3) Seminar in Bacteriological Literature.—Reviews and critical discussions of selected topics. Compulsory for Honours students.

448. (3) Directed Research.—In the final year of the Majors programme. The results are to be presented in a research report.

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 1972-73 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 1972-73 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 1973-74 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, methods of spread, laboratory diagnostic procedures, morphological properties, biophysical and biochemical aspects, virus-cell interactions, insect viruses, plant viruses. To be taken only with 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.

Oceanography

Oceanography is the study of the sea, and five courses are offered to introduce students to the physical, chemical, biological and geological aspects. These courses are open to Fourth Year students majoring or taking Honours courses in the sciences. Students wishing to register for them must first obtain permission from the Director of the Institute of Oceanography. More advanced courses are offered at the graduate level.

400. (1) Introduction to Synoptic Oceanography.—Survey of oceanic circulation, distribution of temperature and salinity, energy budget. [2-0; 0-0]

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. [2-0; 0-0]

402. (1) Introduction to Chemical Oceanography.—The composition of sea water, biochemical and chemical factors affecting its variation, determination of selected constituents. [2-0; 0-0]

403. (1) Introduction to Biological Oceanography.—Occurrence and distribution of marine plants and animals in relation to oceanographic factors. For students other than those in the biological sciences. Prerequisite: Oceanography 400. [0-0; 2-0]

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. Prerequisite: Oceanography 400. [0-0; 2-0]

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 section of the calendar.

Before registering for each of the Second, Third and Fourth years, every student who intends to commence or continue either the Physics Major, or any Honours Programme in Physics must obtain formal Programme Approval from a Physics Departmental Advisor and file a copy thereof in the office at Hebb 11. This may be sought as soon as the student has received his "Authorization to Register" form and his previous year's Statement of Marks (which should be presented). General Course students are invited to consult a Departmental Advisor concerning appropriate courses.

First Year — All Physics Programmes

Physics 105, 110, 115, or 120 (See Note #1)	(3)
Mathematics 100(2) and 121(1) (See Note #2)	(3)
Chemistry 120, 110, or 103	(3)
English 100	(3)
Non-Science Elective (See Note #3)	(3)
Total Units (See Note #2)	(15)

Notes:

#1: **Physics 105** is open only to students who have **not** received credit for B.C. Secondary School Physics 11 or for any equivalent or higher physics course.

Physics 110 prerequisite is B.C. Secondary School Physics 11 or equivalent. Physics 110 is not open to students who have received credit for Physics 12 or an equivalent course higher than Physics 11.

Physics 115 prerequisite is B.C. Secondary School Physics 12.

Physics 120 prerequisites are B.C. Secondary School Physics 12 **and** approval by a Physics Departmental Advisor.

#2: **Mathematics 120 (1)** must also be carried in First Year by students intending to qualify for admission in the Second Year to Combined Honours Physics and Mathematics; for other students Mathematics 120 in First Year is optional. If this course is taken, required units in First Year will total 16.

#3: It is recommended that students intending to qualify for admission in the Second Year to Combined Honours Physics and Geophysics take Geology 105 (3) in the First Year; such students may postpone their required Non-Science Electives until the Second Year.

The Physics Major

First Year		Second Year	
Physics* 120, 115, 110 or 105	(3)	Physics 200	(2)
Mathematics 100(2) and 121(1)	(3)	Physics 219	(1)
Chemistry 120, 110 or 103	(3)	Mathematics 200	(2)
English 100	(3)	Mathematics 221	(2)
Non-Science Elective	(3)	Mathematics 222	(1)
		Electives	(7)
Total Units	(15)	Total Units	(15)

*See Notes under "First Year — All Physics Programmes", concerning applicable choice of First Year Physics Course, and consult appropriate course descriptions.

Third Year		Fourth Year	
Physics 300	(2)	Physics 400	(3)
Physics 308	(2)	Physics 413	(3)
Physics 316**	(3)	One 3-unit course in Mathematics or in Computer Science numbered 300 or above	(3)
Physics 318	(1)		
Physics 319	(1)	Electives‡	(6)
Mathematics 301	(3)		
Elective†	(3)		
Total Units	(15)	Total Units	(15)

**Credit may not be received for both Physics 316 and either of Physics 210 or 220.

†Physics course electives in Third Year are Physics 312 (2), Physics 326 (3) and Physics 441 (1).

‡If additional Physics courses are to be elected in Fourth year, Physics 312 (2), 411 (2) and 419 (2) are recommended. Physics 326 (3) and 441 (1) are also available. Exceptional Physics Major students may be admitted to one or more of Physics 306 (2); Physics 402 (3), 405 (1); 406 (1); 408 (1), and to Physics 409 (3) (in lieu of Physics 419) upon receiving special approval from the appropriate course instructor(s).

Honours in Physics

First Year	
Physics* 120, 115, 110 or 105	(3)
Mathematics 100	(2)
Mathematics 121	(1)
Chemistry 120, 110, or 103	(3)
English 100	(3)
Non-Science Elective	(3)
Total Units	(15)

*See Notes under "First Year — All Physics Programmes", concerning applicable choice of First Year Physics Course, and consult appropriate course descriptions.

Second Year*	
Admission Requirements: A clear pass from First Year with an overall Second Class standing, or at least Second Class standing in each First Year Physics, Chemistry and Mathematics course.	
Physics 204	(3)
Physics 209	(1)
Physics 220 (for students presenting U.B.C. Physics 120), or Physics 210	(2)
Mathematics 120	(1)
Mathematics 200	(2)
Mathematics 221	(2)
Mathematics 222	(1)
Science Elective	(3)
Non-Science Elective	(3)
Total Units	(18)

An average standing of at least 65% must be obtained in each year to remain in the Honours Programme.

Third Year	
Physics 301	(2)
Physics 302	(1)
Physics 306	(2)
Physics 308	(2)
Physics 309	(1)
Physics 310	(1)
Mathematics 300	(3)
Mathematics 301	(3)
Elective*	(1-3)
Total Units	(16-18)

Fourth Year	
Physics 401	(2)
Physics 402	(3)
Physics 403	(3)
Physics 406	(1)
Physics 408(1) or 405 (1)	(1)
Physics 409	(3)
Mathematics 400	(3)
Elective*	(2-0)
Total Units	(18-16)

*A total of 3 elective units must be taken in the combined Third and Fourth years. These 3 units may be divided between the Third and Fourth years.

Combined Honours in Physics and Mathematics*

First Year	
As for Honours Physics (15), but also including Mathematics 120. Total Units (16).	

Second Year	
Physics 204	(3)
Physics 209	(1)
Physics 220 (for students presenting U.B.C. Physics 120), or Physics 210	(2)
Mathematics 200	(2)
Mathematics 220	(1)
Mathematics 221	(2)
Mathematics 222	(1)
Science Elective	(3)
Non-Science Elective	(3)
Total Units	(18)

Third Year	
Physics 301	(2)
Physics 306	(2)
Physics 308	(2)
Two of Physics 302, 309, 310	(2)
Mathematics 320	(3)
Mathematics 322	(3)
Mathematics 300 or 321	(3)
Total Units	(17)

Fourth Year	
Physics 402	(3)
Physics 403	(3)
Physics 406	(1)
Two of Mathematics 400, 420, 421, 422, 423, 424, 425	(6)
Elective	(3)
Total Units	(16)

*See Mathematics for language requirement.

Combined Honours in Physics and Geophysics

First Year	Second Year
As for "All Physics Programmes" (15) but recommending Geology 105 in lieu of the "Non-Science Elective."	As for Honours Physics (18), but replacing "Science Elective" by a second Non-Science Elective.

Third Year	
Physics 301	(2)
Physics 306	(2)
Physics 308 (2) *and* Physics 310 (1), *or* Geophysics 301 (3)	(3)
Physics 309	(1)
Physics 413	(3)
Geophysics 302	(3)
Mathematics 301	(3)
Total Units	(17)

Fourth Year	
Physics 401	(2)
Physics 402	(3)
Physics 457 (or 406 and one of 405, 408)	(2)
Physics 409 or Geophysics 449	(3)
Geophysics 415	(3)
Mathematics 300	(3)
Total Units	(16)

Combined Honours in Physics and Astronomy

First Year		Second Year	
As for Honours Physics	(15)	As for Honours Physics	(18)

Third Year	
Physics 301	(2)
Physics 302	(1)
Physics 306	(2)
Physics 308	(2)
Physics 309	(1)
Physics 310	(1)
Astronomy 320	(3)
Mathematics 300 or 301	(3)
Total Units	(15)

Fourth Year	
Physics 401	(2)
Physics 402	(3)
Physics 403	(3)
Astronomy 420*	(3)
Four units from: Astron. 421 (1); 431 (1); 449 (1-3); Physics 409 (3); 449 (1-3)	(4)
Mathematics 300, 301 or 400	(3)
Total Units	(18)

*Astronomy 500 may be substituted with permission of the Head of the Department.

Combined Honours in Physics and Chemistry

First Year	
As for "All Physics Programmes" but including Chemistry 120 or 110 (15).	

Second Year	
Physics 204	(3)
Physics 209	(1)
Physics 220 (or 210)	(2)
Chemistry 203	(3)
Chemistry 220 (or 210)	(3)
Mathematics 200	(2)
Mathematics 221	(2)
Total Units	(16)

Third Year	
Physics 301	(2)
Physics 308	(2)
Physics 309	(1)
Physics 310	(1)
Chemistry 304	(2)
Chemistry 310	(2)
Chemistry 312	(2)
Chemistry 320	(1)
Chemistry 324	(1)
Mathematics 301	(3)
Total Units	(17)

Fourth Year	
Physics 402	(3)
Physics (per consultation)	(5)
Chemistry 401	(1)
Chemistry 404	(1)
Chemistry 407	(1)
Chemistry 427	(1)
Chemistry (per consultation)	(2)
Non-Science Electives	(4)
Total Units	(18)

Combined Honours in Physics and a Subject Other Than Mathematics, Geophysics, Astronomy, or Chemistry

First Year	
As for Honours Physics (15).	

Second Year	
Physics 204	(3)
Physics 209	(1)
Physics 220 (or 210)	(2)
Mathematics 200	(2)
Mathematics 221	(2)
Other Department*	(2-5)
Non-Science Elective	(3)
Total Units*	(15-18)

Third Year	
Physics 301	(2)
Physics 306	(2)
Physics 308	(2)
Physics 309	(1)
Physics 310	(1)
Mathematics 301	(3)
Other Department*	(4-7)
Total Units*	(15-18)

Fourth Year	
Physics 402	(3)
Physics (per consultation)	(4)
Mathematics 300	(3)
Other Department*	(6-8)
Total Units*	(16-18)

*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 with the exception of Physics 330. Credit will be given for only **one** of the various First Year Physics courses at the University of B.C., or for an equivalent lecture-and-laboratory Physics course which was taken at another institution. Registered students, requesting University of B.C. credit for a content-equivalent Physics course taken at an institution which did not require the laboratory, may remedy the deficiency by enrolling for and passing the U.B.C. First Year Physics Laboratory course. (Such students should apply to the Physics Laboratory Office, Room 11, Hebb Building, immediately following sessional registration.)

Academic credit for one of Physics 105, 110, 115 or 120 is a prerequisite for admission to the Physics Honours Programmes, the Physics Major Programme, or for entrance into the Faculty of Applied Science. Physics 120, and a clear First Year pass with either overall Second Class standing in 15 units, *or* at least a clear First Year pass with not less than Second Class standing in *each* of Physics 120, Mathematics 100, Mathematics 121, and a First Year Chemistry course, is the *desired* prerequisite for admission to the Second Year Pre-Honours Programmes in Physics. However, students who were not permitted to take Physics 120 may substitute the First Year Physics course for which they received *academic credit,* provided *all* other minimum requirements as stated were also met.

Physics 105 is intended only for students who *have not* received credit for B.C. Secondary School Physics 11 (or 91) or for any equivalent or higher Physics course. Students who *have* received such credit may *not* receive academic credit from taking Physics 105. (Such students may earn credit only for the First Year Physics course appropriate to their academic records, as further outlined below.)

Physics 110 is intended for students who have received credit for *only* B.C. Secondary School Physics 11 (or 91) or for an equivalent course. Academic credit for Physics 110 will *not* be granted to students who have received credit for B.C. Secondary School Physics 12 (or 92) or an equivalent course.

Physics 115 is intended for students who have received credit for B.C. Secondary School Physics 12 (or 92). However, such students who achieved at least Second Class standing (65% or higher) in Physics 12 (or 92) and who are otherwise also well-prepared are encouraged to apply for enrolment in Physics 120.

Physics 120 is open only to students who have received credit for B.C. Secondary School Physics 12 (or 92) with First Class or high Second Class standing, and who are particularly interested in and challenged by physical science and/or its application to other fields or disciplines. Enrolment in the course is limited. Special permission to enroll in Physics 120 must be granted by a Physics Departmental Advisor, who will accept only best-qualified candidates on the basis of clearly-documented academic records.

105. (3) Elementary Physics.—Mechanics including kinematics, dynamics of a particle, energy, momentum, central forces, gravitation; wave motion and optics; heat and simple kinetic theory; electric charge and current; the simple concept of the atom and nuclear physics. Mathematics 100 and 121 must precede or be taken concurrently with this course. Physics 105 is intended only for students who have *not* received credit for B.C. Secondary School Physics 11 (or 91) or for any equivalent or higher Physics course. Students who have received such credit may not receive academic credit for Physics 105. [3-3*-2*; 3-3*-2*]

110. (3) Mechanics, Electricity and Atomic Structure.—Particle kinematics and dynamics; rigid body dynamics; work and energy concept; 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. Prerequisite: B.C. Secondary School Physics 11 (or 91). Mathematics 100 and 121 must precede or be taken concurrently with Physics 110. The course is intended for students who have *not* received credit for B.C. Secondary School Physics 12 (or 92) or an equivalent course. Students who *have* received such credit may *not* receive academic credit for Physics 110. [3-3*-2*; 3-3*-2*]

115. (3) Wave Motion, Mechanics and Electricity.—Wave motion, sound and light; Newtonian mechanics of particles and rigid bodies; electricity and magnetism; atomic structure; laboratory exercises in the fields of mechanics, optics, electricity and radioactivity. Prerequisite: B.C. Secondary School Physics 12 (or 92). Mathematics 100 and 121 must precede or be taken concurrently with this course. [2-3-1; 2-3-1]

120. (3) Matter and Mechanics.—The structure and properties of matter; gravitational, electromagnetic and nuclear forces; Newtonian mechanics of particles and rigid bodies; laboratory investigations emphasizing the use of electrical instruments (Geiger counter, cathode ray oscilloscope, microwave apparatus, etc.). Prerequisite: B.C. Secondary School Physics 12 (or 92) with First or high Second Class standing, plus permission of a Physics Departmental Advisor. Mathematics 100 and 121 must precede or be taken concurrently with this course. [2-3-1; 2-3-1]

Primarily for Second Year Students

Either Physics 204 plus 220 or 210, *or* Physics 200 (or Geophysics 201), is prerequisite for most 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 U.B.C. Physics 120) or Physics 210 (if they hold credit for one of Physics 105, 110, 115 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 "Honours in Physics." Students offering high standing in a First Year Physics course (with laboratory) equivalent to Physics 110 from another institution, are admitted if their overall academic record is acceptable.

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 105, 110 or 115; Mathematics 200 and 221 (may be taken concurrently). Pre-Honours students with credit for U.B.C. Physics 120 must enroll in Physics 220 instead of Physics 210. [2-0-1; 2-0-1]

220. (2) Mechanics and Special Relativity.—(Intended in place of Physics 210 for Pre-Honours students who have taken U.B.C. Physics 120.) Classical mechanics in inertial frames will be replaced by selected special topics. Prerequisites: Physics 120; Mathematics 200 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 105, 110, 115, 120 or an equivalent course (including laboratory), are prerequisite.

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 105, 110, 115, 120 or equivalent, or permission of the Physics Department; Mathematics 200 and 221 (may be taken concurrently). [2-0-1; 2-0-1]

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; 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, spectroscopy and 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. (3) Introductory Quantum Mechanics.—An introduction to quantum mechanics with applications to atomic, solid state, and nuclear physics. [3-0-0; 3-0-0]

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. [0-0-0; 2-0-0]

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 turbulent flow, non-linear effects. Prerequisite: Physics 406. [0-0-0; 2-0-0]

409. (3) Experimental Physics.—Advanced laboratory course with experiments in solid state, nuclear, low temperature and resonance physics, emphasizing modern techniques. Textbook: Melissinos, *"Experiments in Modern Physics"*. [0-6-0; 0-6-0]

449. (1-3) Directed Studies.—With approval of the Head of the Physics Department, studies under the direction of a staff member may be arranged.

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); 413 (403); 316 (210 or 220); 318 (310); 319 (309); 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 200. [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. (Credit may not be obtained for *both* Physics 316 and either Physics 210 or 220.) [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. [0-3-1*; 0-3-1*]

326. (3) Optics, Vibrations and Acoustics.—An intermediate course treating the physics and psychophysics of the artificial environment. Illumination, photometry, geometrical and physical optics, radiation and colour phenomena; elasticity; mechanical vibrations, waves, acoustics, elementary heat transfer. Prerequisite: one of Physics 105, 110, 115, 120 or equivalent. Corequisite: Mathematics 200. [3-3*-0; 3-3*-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.) [1-4-0]

430. (3) Recent Developments in Physics.—This course is available for credit only in the Faculty of Education. It consists of lectures and demonstrations 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 200 or equivalent. [2-0-0; 0-0-0]

Primarily for Pre-Architecture, Education and General Course Students

326. (3) Optics, Vibrations and Acoustics.—An intermediate course treating the physics and psychophysics of the artificial environment. Illumination, photometry, geometrical and physical optics, radiation and color phenomena; elasticity; mechanical vibrations, waves, acoustics, elementary heat transfer. Prerequisite: One of 105, 110, 115, 120 or equivalent; corequisite: Mathematics 200. [3-3*-0; 3-3*-0]

Primarily for Students in the Faculty of Arts or the Faculty of Education

330. (3) Elements of Physics.—A survey of physics from Newton to the present, emphasizing concepts and de-emphasizing mathematics. Examines description of motion, gravitation, Newton's Laws, relativity, electromagnetism and quantum mechanics. Prerequisite: full standing in the Second or higher Year. This course is open only to students not registered in the Faculty of Science or the Faculty of Applied Science. (Credit for Physics 330 will not be granted toward the B.Sc. or B.A.Sc. degree.) [3-0-0; 3-0-0]

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. [2-0-0; 2-0-0]

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. [2-0-0; 2-0-0]

503. (1) Electromagnetic Theory.—A deductive presentation of the classical theory of electrons and its relation to the macroscopic electromagnetic theory. Prerequisite: Physics 401 or 411. [2-0-0; 0-0-0]

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. [2-0-0; 2-0-0]

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. [2-0-0; 2-0-0]

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. [2-0-0; 2-0-0]

509. (1) Theory of Measurements. — Probability, statistical distributions, significance tests, least squares, experimental design, numerical techniques. [2-0-0; 0-0-0]

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. [1-0-0; 1-0-0]

511. (1) Advanced Magnetism.—Spin hamiltonian, theory of ferro- and antiferromagnetism, nuclear magnetic resonance, relaxation in spin systems. Prerequisites: Physics 501 and 506. [2-0-0; 0-0-0]

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. [0-0-0; 2-0-0]

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 or 411. [0-0-0; 2-0-0]

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. [1-0-0; 1-0-0]

516. (2) Statistical Mechanics.—Ensemble theory (classical and quantum mechanical). Fluctuations. Response to external perturbations. Non-equilibrium statistical mechanics. Prerequisite: Physics 403, 413 or 455. [2-0-0; 2-0-0]

517. (1) Introduction to Low Temperature Physics.—Cryogenic techniques and instrumentation. Some aspects of superconductors and liquid helium. [1-0-0; 1-0-0]

518. (1) Introduction to Superconductivity.—Thermodynamics and electrodynamics. Josephson effect. Applications. Elements of microscopic theory. [1-0-0; 1-0-0]

519. (1) Molecular Spectroscopy.—Theory of Raman effect and infra-red absorption. Vibrational spectra of polyatomic molecules. Chemical applications. [2-0-0; 0-0-0]

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.* [2-0-0; 2-0-0]

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. [2-0-0; 2-0-0]

522. (2) Nuclear Physics.—Selected topics in low and intermediate energy nuclear physics. Prerequisites: Physics 501 and 505. Offered in alternate years beginning in 1972.) [2-0-0; 2-0-0]

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. [0-0-0; 2-0-0]

526. (2) Intermediate Quantum Mechanics.—Intended primarily for experimental physicists. The Dirac Equation and its physical consequences. Elementary quantum theory of radiation. Elementary field-theory techniques for the physics of many-body systems. Selected topics in more advanced non-relativistic quantum mechanics. Prerequisite: Physics 501. [2-0-0; 2-0-0]

527. (1) Theoretical Nuclear Physics.—Selected topics from current nuclear theory. Prerequisites: Physics 501 and 505. [0-0-0; 2-0-0]

528. (2) Elementary Particle Physics.—Selected topics in high energy physics. Prerequisites: Physics 501 and 505. Offered in alternate years beginning in 1973. [2-0-0; 2-0-0]

529. (2) Advanced Quantum Mechanics.—Selected topics in relativistic quantum mechanics, quantum field theory, and theories of elementary particles. Prerequisites: Physics 501 and 514. [2-0-0; 2-0-0]

530. (1) General Relativity Theory.—Primarily for students interested in theoretical physics. Prerequisites: Physics 503 and 514. [1-0-0; 1-0-0]

531. (1) Advanced Plasma Physics.—Selected topics from current research in plasma physics—seminar course. [1-0-0; 1-0-0]

532. (2) Plasma Dynamics.—The magnetohydrodynamic formulation of plasma dynamics including the effects of diffusion, viscosity, thermal conduction and ionization phenomena on plasma motion. [2-0-0; 2-0-0]

533. (1) Laser Physics.—Selected topics: modes, threshold conditions, inversion methods, line shapes, and pulse forms. [1-0-0; 1-0-0]

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. (1) Waves and Tides.—Surface and internal gravity waves; radiation stress and longshore currents; seiches; tides in estuaries and coastal regions.

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 1972-73 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.

542. (1) Waves in Rotating Fluids.—Inertial and Rossby waves and their role in time-dependent behavior of the ocean.

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. [1-0-0; 1-0-0]

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. [1-0-0; 1-0-0]

649. Ph.D. Thesis.

Note: Attention of students interested in Biophysics is drawn to Anatomy 505 and 506. See Faculty of Medicine section of the calendar.

Physiology

The department offers opportunities for study leading to doctoral, master's and bachelor's degrees (Honours only). For information on the Ph.D. and M.Sc. degree programmes, see the Faculty of Graduate Studies section of the calendar. For further information on other courses within the department, consult the Faculty of Medicine section of the calendar.

Biology 101 (or 102), Chemistry 110, 120 or 103; 203 or 230; Mathematics 100 and 121 and Physics 105, 110, 115, or 120 are prerequisite to all courses in Physiology.

Biochemistry 410 and Physiology 301 and 302 or 303 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:

Honours

First Year		Second Year	
Biology 101 (or 102)	(3)	Chemistry 205 (220 or 210)	(3)
Chemistry 110 or (103 or 120)	(3)	Chemistry 230 (or 203)	(3)
English 100	(3)	Biology 200	(1½)
Mathematics 100 and 121	(3)	Biology 201	(1½)
Physics 105, 110, 115 or 120	(3)	Arts elective	(3)
		Science electives	(6)
	(15)		(18)
Third Year		**Fourth Year**	
Biochemistry 410, 411	(4½)	2 courses from	
Biology 330	(3)	Physiology 421-427	(3)
Physiology 301	(3)	Physiology 430	(3)
Physiology 303	(1½)	Physiology 440	(1½)
Arts or Science elective	(4½)	Physiology 449	(3)
		2 Electives	(6)
	16½)		16½)

Combined Honours B.Sc.-M.D. or D.M.D.

First and Second Year as above

Third Year		Fourth Year	
Biochemistry 410, 411	(4½)	Anatomy 400	(3)
Biology 330	(3)	Anatomy 401	(3)
Physiology 301	(3)	2 courses from	
Physiology 303	(1½)	Physiology 421-424 and 427	(3)
Arts or Science	(4½)	Physiology 430	(3)
Electives		Physiology 440	(1½)
		Physiology 449	(3)
	16½)		16½)

List of electives acceptable for the Honours Programme in Physiology:

Biology 334, 340 (Fundamental Genetics, Principles of Cytology)
Biology 300, 301 (Biometrics I and II)
Biochemistry 412 (Conferences in biochemistry)
Computer Science 210 (or 200 and 201) (Introduction to Computers. Automatic Programming)
*Chemistry 305 (Physical Chemistry)
*Chemistry 335 (Inorganic Chemistry)
*Zoology 203 (Comparative Morphology)
*Zoology 204 (Development Biology)
*Recommended courses.

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 428 (Comparative Physiology)

301. (3) Human Physiology.—A lecture course on body function with particular reference to man. Normally taken concurrently with Physiology 302. Credit will normally be given for only one of the following: Physiology 301 and 302, 303; Zoology 303 or Zoology 307, 308. Prerequisites: Biology 101 or 102, 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. [0-3; 0-3]

303. (1½) Laboratory in Human Physiology (Honours).—A laboratory course in the techniques and principles of human physiology which is intended primarily for honours and graduate students. This course must be taken in conjunction with Physiology 301. Enrollment limited and subject to the consent of the Department. Students will be given credit for only one of Physiology 302 and 303. [0-3; 0-3]

Physiology 301 or Zoology 307, and Biochemistry 410, or the equivalents and the consent of the Head of Department are required for all courses numbered 421-427. These courses are primarily intended for graduate students and Honours students in Physiology.

421. (1½) Advanced Topics in Renal Physiology.—A lecture and seminar course in which certain aspects of this field will be considered in detail. Not offered in 1972-73. [3-0; 0-0]

422. (1½) Advanced Topics in Cardiovascular Physiology.—A lecture and seminar course. Not offered in 1972-73. [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. Not offered in 1972-73. [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. (1974-75.) [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. (1973-74.) [0-0; 3-0]

427. (1½) Advanced Topics in Respiratory Physiology.—A lecture and seminar course (1973-74). [3-0; 0-0]

Physiology 303 or the equivalent, and the consent of the Department are required for the following laboratory course in which enrollment will be limited.

430. (3) Advanced Laboratory in Physiology.—A laboratory course giving training in the methods, techniques and use of instruments required for physiological investigation. Each year a number of exercises will be included which will be relevant to the advanced topics (421-427) being taught in that year. [0-6; 0-6]

440. (1½) Seminar.—Open to Honours students in physiology and graduate students. [2-0; 2-0]

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 or 303, 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.

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 section of the calendar.

Students interested in a programme in **Ecology** can follow a course of study in Botany, Zoology or Biology (General Biology, Option III). Recommendations on the selection of courses can be obtained from ecology advisors in Botany, Zoology or the Biology programme.

Requirements for the B.Sc. Degree:

First-Year Major and Honours

The programme is identical with the first year Biology programme.

Major

Second Year		Third Year		Fourth Year	
Arts option	(3)	Arts option	(3)	Biology 300	(1½)
Biology 200	(1½)	Biology 321	(1½)	As advised, but to include 6 units of Science of which 3 must be Zoology*	
Biology 201	(1½)	Biology 334	(1½)		
Zoology 203	(1½)	Zoology 301	(3)		
Zoology 204	(1½)	or Zoology 305 plus Zoology Option	(1½) (1½)		
Chemistry 230	(3)	Zoology 307	(1½)		
Option	(3)	Zoology 308	(1½)		
		Option	(3)		
	(15)		(15)		(15)

Honours

Second Year		Third Year		Fourth Year	
Arts option	(3)	Arts option	(3)	Biology 300	(1½)
Biology 200	(1½)	Biology 321	(1½)	Zoology 449	(3)
Biology 201	(1½)	Biology 334	(1½)	plus 12 units of Science of which 6 must be Zoology*	(12)
Zoology 203	(1½)	Zoology 301	(3)		
Zoology 204	(1½)	or Zoology 305 plus Zoology Option	(1½) (1½)	Option	(1½)
Chemistry 230	(3)	Zoology 307	(1½)		
Option	(3)	Zoology 308	(1½)		
		Zoology 349	(3)		
		Option	(3)		
	(15)		(18)		(18)

*Note: Biology courses may be substituted for Zoology in the fourth year.

Note: Biology 101 or 102 is a prerequisite to all the following courses with the exception of Zoology 310 and 400. 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. [2-3; 0-0]

204. (1½) Development Biology.—Animal development and its underlying causal principles; introductory embryology. [0-0; 2-3]

301. (3) Invertebrate Zoology.—Morphology; taxonomy; life histories of invertebrates with special reference to marine forms. Prerequisite: Zoology 202 or 203 or permission of instructor. [2-3; 2-3]

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 102 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. Students will get credit for one only of Zoology 303 and 307/308. [2-2; 2-2]

305. (1½) Invertebrate Zoology.—An introduction to the invertebrate phyla. [2-3; 0-0]

306. (1½) Vertebrate Zoology.—The origins and classification of the vertebrates, and the functional significance of the evolution of organ systems in terms of adaptation to the environment. Prerequisite: Zoology 203. [0-0; 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. Students will get credit for one only of Zoology 303 and 307/308. [2-0; 2-0]

308. (1½) Physiology Laboratory A.—Experiments in organismic physiology. [0-4; 0-4]

310. (1½) Comparative Biology of Reproduction.—Lectures on the comparative biology of animal reproduction with particular reference to the physiology of human reproduction. Primarily for credit in the third and fourth years in the Faculty of Arts. Not offered for credit in the Life Sciences departments. Credit will not be given for both Biology 101 or 102 and Zoology 310. [0-0-0; 3-0-2]

311. (1½) Introduction to Entomology.—A survey of the structure, classification and biology of insects, with an introduction to spiders, mites and ticks. [0-0; 2-3]

323. (1½) Introduction to Comparative Ethology.—An introduction to the study of animal behaviour with special emphasis on social behaviour. Prerequisite: Zoology 203 or consent of Instructor. [0-0; 3-0]

348. (1½ or 3) Zoology Tutorial.—Tutorials in one (1½ units, one term) or two (3 units, two terms) core areas in Zoology. Students should consult with the tutorial adviser in the Department of Zoology for assignment to tutor(s) specializing in the area(s) selected by the student.

349. (3) Current Research in Zoology.—A seminar course to introduce the third year honours zoology students to four areas of current research: (a) cell-developmental biology; (b) community-population biology; (c) comparative physiology and biochemistry; (d) systematics and evolution. Discussions will be organized by several faculty members with particular reference to current research within the department. Students will be required to consult original papers and relate specific problems to the broader background of the various disciplines. They will also be required to attend the weekly departmental seminars and to read a number of pertinent papers prior to the seminar. [1-0-3; 1-0-3]

400. (3) Principles and History of Biology.—Lectures and seminars on the revolutions of the seventeenth and nineteenth centuries, and on the problems of discovery in science. Restricted to 50 students, who must have permission of the instructor. No other prerequisite. [3-0; 3-0]

401. (3) Experimental Ecology.—Theoretical and experimental analysis of the basic principles in population dynamics, behavioural ecology and community structure and discussions of recent advances. Prerequisite: Consent of the instructor. [2-4; 2-4]

402. (1½) Evolution.—A critical appraisal of the evidence for evolution; a consideration of the basic principles of natural selection and the nature and origin of species and higher categories. Prerequisites: Third Year major or honours, or permission of the Instructor. [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. (Not given 1972/73.) [0-0; 2-3]

413. (3) Introductory Parasitology.—Classification, morphology, life histories of animal parasites affecting domestic and wild animals and man. [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. (1972-73 and alternate years.) [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. Prerequisite: Zoology 306 or equivalent (can be taken concurrently). [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. [2-3; 2-3]

417. (3) Morphogenesis.—The causal factors and mechanisms involved in the development of animals. Prerequisite: Zoology 204. [3-0; 3-0]

418. (1½) Experimental Cytology.—The study of living animal cells. The theme of this course is the impact of *in vivo* techniques on the study of cellular differentiation. Prerequisite: Biology 200 and Zoology 204. (Not given in 1972/73). [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. [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. (Not given 1972/73). [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. [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. [2-3; 2-3]

424. (1½) Comparative Histology and Histophysiology.—Fundamental tissues; selected experiments on environmental and pathological effects on tissue and organ architecture. [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. [3-3; 3-3]

428. (1½) Comparative Physiology.—Organ functions in various phyla with interpretations in terms of ecology and phylogeny. [2-0; 2-0]

429. (1½) Physiology Laboratory B.—Experiments in general and cellular physiology. (Not given in 1972/73) [0-4; 0-4]

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: Biology courses are also accepted as credit in Zoology.

Note: Certain courses in Marine Science (see end of Biology section) offered at the Western Canadian Universities' Marine Biological Society's Laboratory at Bamfield, Vancouver Island, may be taken for credit in the summer term.

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. Mr. Larkin, Mr. Wilimovsky.

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; 507, 508, 509, 511, 515, 517, 520, 525, 526, 530, 532 will be offered in 1972-73 and alternate years; 503, 510, 512, 516, 522, 531 will be offered in 1973-74 and alternate years; others as required.

500. Special Advanced Courses.—Special advanced courses correlated with the work for the thesis may be arranged for a graduate student upon the approval in writing of the Head of the Department. The credit will not be more than 3 units in any one such course.

502. (1-3) Advanced Ecology.—Current problems in theoretical and applied ecology explored to reveal the common principles of concept and method underlying the ecology of a variety of animals and plants. Seminar of one unit with two additional units from Forestry 508, Plant Science 531, Zoology 517, 527 or from special interest workshops. Faculty from Agricultural Sciences, Forestry, Resource Ecology and Zoology.

503. (3) Comparative Physiology.—Selected topics in animal physiology. Permission of instructors. 1973-74 and alternate years.

504. (1½) Ethology Seminar.—Current problems in animal behaviour. Prerequisites: Consent of the Instructor.

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.

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. (1972-73 and alternate years.)

507. (2) Zoogeography.—Factors of distribution. Faunal histories. Faunistical and description zoogeography, distribution of biotic communities. (1972-73 and alternate years.)

508. (2) Endocrinology.—Lectures and directed studies of the endocrinology of vertebrates. Registration by permission of instructor. (1972-73 and alternate years.)

509. (1½) Population Genetics.—An introduction to the genetics of animal populations. (1972-73 and alternate years.)

510. (1½) Developmental Genetics.—Recent advances in the study of mechanisms of the genetic control of development. (1973-74 and alternate years.)

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. (Not given 1972-73.)

512. (2) Marine Invertebrate Zoology.—Life histories, ecology and systematics of marine invertebrates. (1973-74 and alternate years.)

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. (1972-73 and alternate years.)

516. (3) Advanced Entomology.—Lectures and directed studies of advanced entomological problems. (Not given 1972-73.)

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. (Given as required.)

520. (3) Limnology.—The ecology of inland waters emphasizing aspects of production, eutrophication and pollution in lakes and streams. (1972-73 and alternate years.)

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. Prerequisite: Zoology 415.

522. (2) Limnology Seminar.—Current problems and recent advances in limnology. Prerequisite: Zoology 502, or by permission. (1973-74 and alternate years.)

525. (1½) Problems in Systematics and Evolution.—Seminar discussions of selected topics. (1972-73 and alternate years.)

526. (1) Marine Zoogeography.—A discussion of the factors affecting the distribution of marine organisms and the nature of the various marine zoogeographic regions. (1972-73 and alternate years.)

527. (2) Theoretical Population Dynamics.—Discussion of dynamics of exploited populations and related theoretical ecology. Emphasis will be placed on mathematical models and their application to population problems. (Recommended to be taken in conjunction with Zoology 502.)

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.

529. (3) Ichthyology B.—A survey similar in treatment to Zoology 528 but covering primarily the Perciform fishes. Prerequisite: Permission of the Instructor.

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. (1973-74 and alternate years.)

531. (2) Ornithology.—Phylogeny, morphology and biology of birds; factors affecting their abundance and distribution. (1973-74 and alternate years.)

532. (2) Mammalogy.—Phylogeny, morphology, and biology of mammals; factors affecting their abundance and distribution. (1972-73 and alternate years.)

533. (2) Problems in Wildlife Management.

549. (6) M.Sc. Thesis.

649. Ph.D. Thesis.

AWARDS AND FINANCIAL ASSISTANCE

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 the Committee, 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.

7. Scholarships, fellowships, and bursaries under the jurisdiction of the University will be applied against sessional fees. Awards 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 postponing attendance. Postponement of University Entrance scholarships will be granted on medical grounds only. Application for postponement must be made to the Chairman, Joint Faculty Committee on Prizes, Scholarships and Bursaries.

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.

10. 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 conditions, 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.Sc.(Agric.) 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 three years of study in the Faculty of Law. In addition, the Society will pay the student'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 Pharmaceutical Sciences—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 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 medal, the gift of the Canadian Institute of Forestry, will be awarded to the student in the graduating class in Forestry 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 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 M.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.

The British Columbia Professional Recreation Society Prize—An award of $50 and a framed certificate, gift of the British Columbia Professional Recreation Society, will be awarded to the Head of the Graduating Class for the degree of Bachelor of Recreation Education (B.R.E.).

The College of Dental Surgeons of British Columbia Gold Medal in Dental Hygiene—A gold medal, gift of the College of Dental Surgeons of British Columbia, will be awarded annually to the top graduating student in the dental hygiene program.

The Dean of Medicine's Prize (School of Rehabilitation Medicine)—This prize is offered to the Final Year student with highest standing for the degree of B.S.R.

AWARDS FOR GRADUATE STUDY AND RESEARCH

Graduates proceeding to Librarianship, Social Work or Teacher Training should consult the Librarianship, Social Work and Education/Teacher Training sections 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, page U142-162. For most of these awards, special applications must be submitted.

The Alan B. Clemons Award in Audiology and Speech Sciences—In memory of Alan B. Clemons, speech pathologist, this prize has been established by his wife and family. It will be awarded annually, on the recommendation of a departmental committee, for distinction in the field of Audiology and Speech Pathology to a graduate student demonstrating the greatest proficiency in clinical competency.

The Alan Boag Scholarship—See "General" Scholarship section.

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 British Columbia 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—See "Arts" Scholarship section.

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 Pharmaceutical Sciences.

CBC Prizes in Television and Radio Writing—See "General" Scholarship section.

The Certified General Accountants Association of Canada Scholarship—In order to stimulate scholarship and research in the general area of business administration and, particularly, in the field of accountancy, the Certified General Accountants Association of Canada 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 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.

The Cloverdale-Langley University Women's Club Scholarship—The Cloverdale-Langley University Women's Club offers a scholarship of $100 to a mature woman student of the Langley or Surrey District who wishes to return to University for graduate studies on a full or part-time basis. Details are available from the Scholarship and Bursary Office, Room 207, Buchanan Bldg.

The Council of the Forest Industries of British Columbia Fellowship in Wood Science—This research fellowship, the gift of the Council of the Forest Industries of British Columbia, provides $4,000 annually for the support of research studies in wood science at the University of British Columbia. Up to $3,600 will be awarded to the recipient, the balance to be used for equipment, materials and supplies essential to his research. The fellowship will be awarded to a candidate who intends working with some aspect of wood in the solid state and upon the recommendation of the appropriate departments and the approval of the University Scholarship Committee.

The Don Buckland Memorial Scholarship in Forest Pathology—As a memorial 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. A. Maxwell Evans Award—The Dr. A. Maxwell Evans Award has been established to honour the first Medical Director of the British Columbia Cancer Treatment and Research Foundation, for his distinguished service and contribution to cancer treatment in British Columbia. The object of the award is to give young members of the medical profession an opportunity to acquire a wider knowledge of cancer in medicine and the career potentials available in the cancer field. The award of $2,000 is to be offered annually to an undergraduate medical student or recent medical graduate to permit him to work in the clinical or research facilities of the British Columbia Cancer Institute.

The Dr. Joyce Hallamore Scholarship—See Arts Scholarship section of Calendar.

The Dr. and Mrs. J. E. Kania Scholarship—See "Engineering" Scholarship section.

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 or Canadian 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 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—See "General" Scholarships.

Financial Executives Institute Graduate Scholarship—To encourage graduate studies in Controllership and Financial Management, the Vancouver Chapter, Financial Executives Institute, provides a scholarship of $125. The scholarship will be awarded in the first term, annually, upon the recommendation of the Faculty, to a graduate student with a high previous academic record who is interested in the Accounting and Finance seminars at the University of British Columbia.

The Finning Tractor & Equipment Co. Ltd. Graduate Scholarship—A scholarship of $500, 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 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 and the H. R. MacMillan Family Fund, 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 PhD. 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 Geigy (Canada) Pharmaceuticals Scholarship—A scholarship of $500 donated by Geigy Pharmaceuticals will be awarded annually to an outstanding graduate of a Faculty of Pharmacy in Canada who is beginning a program of graduate study in the Faculty of Pharmaceutical Sciences at the University of British Columbia.

The Ghent Davis Memorial Scholarship—See "Commerce" Scholarship section.

The George S. Allen Memorial Scholarship—As a memorial to Dr. George S. Allen, distinguished teacher, administrator and scientist, his many friends have established a fund from which the annual income of about $400 will be awarded annually as a scholarship for graduate study in the fields of fire science or silviculture, at this University. Preference will be given to a graduate forester who has demonstrated interest and ability and whose studies will be materially furthered by financial support.

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 H. R. MacMillan Family Fellowships—Through the generosity of H. R. MacMillan, C.B.E., D.Sc., LL.D., and the H. R. MacMillan Family Fund, forty-five fellowships, each in the amount of $3,200 per annum, are offered to outstanding students admitted as candidates for the Ph.D. degree and proceeding with full-time studies at the University of B.C. To be eligible a candidate must be a Canadian citizen, and have an undergraduate average of at least 75% with the 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. A candidate accepting an award must agree to remain in Canada for a reasonable period following completion of 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 James Coates Memorial Scholarship—This scholarship has been established by Redstone Mines Limited as a memorial to James Coates, a graduate student in geology at the University of British Columbia, who, during his brief professional career made an outstanding contribution to our knowledge of the geology of the Redstone copperbelt in the Northwest Territories. The amount of this scholarship is $800 and it is to be awarded annually to a graduate student in the Department of Geology whose research is in a field related to economic geology.

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.

The Kaiser Resources Ltd. Fellowship—A grant of $5,000 per annum for these years from Kaiser Resources 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 not more than 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 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 not exceed 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. Applications for Fellowships tenable in 1973-74 must be received by August 31, 1972.

(b) Killam Postdoctoral Fellowship—These awards, each in a 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. Applications for awards tenable in 1972-73 must be received by February 15th, 1972.

(c) Killam Predoctoral Scholarships—These awards, each in a range of up to $3200, are open to outstanding graduates of any institution for full time study and research leading to a doctorate at the University of B.C. The fellowships 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 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 University Scholarship Committee, Room 207, Buchanan Bldg., 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 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, and the H. R. MacMillan Family Fund, 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 advance 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 Leslie G. J. Wong Memorial Scholarship—This scholarship, in memory of Leslie G. J. Wong, pays tribute to his qualities of scholarship and interest in the business community. Out of the proceeds of a fund raised by his many friends, a scholarship shall be awarded annually to an outstanding graduate student who is doing work at the Master's or Doctoral level in the Faculty of Commerce and Business Administration. The recipient shall be known as the Leslie Wong Scholar. The award will be made on the basis of academic standing, personal qualities, and interest and participation in business and community affairs, on the recommendation of the Dean of Faculty of Commerce and Business Administration and his faculty. Applications, on forms available at the Office of the Scholarship and Bursary Committee, must be received not later than May 15.

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—See "Arts" Scholarship section.

The McLean Fraser Memorial Fellowships—Three fellowships of $1000 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—See "General" Scholarship section.

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 and the H. R. MacMillan Family Fund, 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.

Oppenheimer Bros. & Company Centennial Scholarship—As on page 40.

The Panco Poultry Research Awards—See "Agricultural Sciences" Scholarship section.

The Pfizer Fellowship in Hospital Pharmacy—Through the generosity of Pfizer Co. Ltd., a fellowship of $500 is open annually to graduates in Pharmacy. This award will enable the winner to further his practical experience through a one year residency in hospital pharmacy. 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 $1000, **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 Richard Claxton Palmer Scholarship—This scholarship of $500 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 Agricultural Sciences 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 depart-

ments 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 Standard Oil Company of British Columbia Limited Fellowship—For research the Standard Oil Company of British Columbia Limited offers a fellowship of $2500 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 Stanley Drug Products Ltd. Scholarship—A scholarship of $500, donated by Stanley Drug Products Ltd. of North Vancouver, will be awarded annually to a student engaged in graduate study in the Faculty of Pharmaceutical Sciences. In selecting the winner preference will be given to students whose research interest lies in the area of Pharmaceutics, and in particular, in some aspect of Pharmaceutical Manufacturing.

The T. Halpert-Scanderbeg Memorial Scholarship—See "Arts" Scholarship section.

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 $1000-$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, Agricultural Sciences, 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 Vancouver City Savings Credit Union Scholarships—Three scholarships of $400 each, gift of the Vancouver City Savings Credit Union, will be awarded in the session 1972-73. Two of these awards are offered to graduate students in the field of finance, Faculty of Commerce and Business Administration, and will be awarded on the recommendation of the Faculty of Commerce and Business Administration. The third award is offered in Regional and Community Planning, and will be awarded on the recommendation of the Director.

The VanDusen Graduate Fellowships in Forestry—Two fellowships of up to $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—See "Arts" Scholarship section.

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 Scholarship Committee, Room 207, Buchanan Building, 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 Walter W. Jeffrey Memorial Scholarship—A scholarship of $100 has been endowed by Mrs. Jeffrey and friends in memory of Dr. Jeffrey, an Associate Professor in the Faculty of Forestry, who lost his life in an aircraft accident in August, 1969 while taking part in a water resources study for the Department of Indian Affairs and Northern Development. In recognition of his special interest in forest hydrology, and his devoted efforts in establishing interdisciplinary studies at the University of British Columbia, this scholarship will be awarded annually to a graduate student engaged in interdisciplinary studies related to water resources. In making the award, consideration will be given not only to academic standing, but also to personal qualities, character, interest and promise in interdisciplinary land use research. If in any one year a suitable candidate is not found the scholarship may not be awarded.

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 William Rea Scholarship in Television—A scholarship of $1500 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 University Scholarship Committee, Room 207, Buchanan Bldg., 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 Fellowship Award—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.

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, 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, Librarianship, Medicine, Nursing, Pharmaceutical Sciences, and Rehabilitation Medicine.

3. Attention of all students is drawn to the Government of B.C. and general awards described under "General" Scholarship section, to the Rhodes Scholarship, and other awards listed under "Awards made by Other Institutions." Attention of students in the graduating years is called to the awards listed under "Awards made by Other Institutions."

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 necessary.*

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.

6. Unless the Calendar announcement indicates otherwise, undergraduate scholarships are not awarded to students entering the university for the first time from outside British Columbia. They become eligible for consideration after attending the University of B.C. for a full winter session.

GENERAL

The Government of the Province of British Columbia Scholarships—These awards are available to students who are residents of British Columbia and who are enrolled in Grade XII of a British Columbia secondary school, or in a designated post-secondary educational institution within this Province, and who are beginning or continuing a programme of studies leading to the first degree or diploma awarded in a particular faculty or technology. Also eligible are students holding an acceptable undergraduate degree who are undertaking full teacher training in this Province, or students in dentistry, library science, law, medicine and social work at the University of British Columbia. These awards are not available to students who are enrolled in graduate studies, nor to those who are registered as "qualifying" or "unclassified".

The maximum number of provincial scholarships granted in any year is determined by taking 17% of all full-time Grade XII Academic-Technical students in British Columbia Secondary Schools and 17% of the full-time undergraduate enrolment in the universities and public colleges of the Province and in the British Columbia Institute of Technology. Grade XII students compete on the basis of departmental scholarship examinations. Students attending post-secondary institutions compete in accordance with the requirements of the institutions concerned.

Scholarship values are based on the tuition fee for the next session of undergraduate study. Students attending institutions operating on a two-term academic year receive a percentage of the basic tuition fee for that year; students attending a semester-type institution receive a percentage of the basic tuition fee for a single semester, and have the opportunity to compete at the end of each semester.

The maximum number of awards is sub-divided as follows:

(a) Scholarships of three-quarters of the basic tuition fee are awarded to the highest ranking eligible students up to FIVE per cent of the full-time enrolment in Grade XII and in each of the designated institutions.

(b) Scholarships of one-half of the basic tuition fee are made available to the next highest ranking SIX per cent of the full-time enrolment; and

(c) One Third basic tuition fee scholarships are granted to the next following highest ranking SIX per cent of the full-time enrolment.

It must be noted that no scholarships are awarded to senior secondary school or undergraduate applicants with grade averages of less than 70% or its equivalent.

Full details concerning the Government of British Columbia Scholarships, and the correct application procedures may be obtained from their schools by students currently registered in Grade XII, and from the Financial Aid Officer of the institution in the case of students currently registered in a designated post-secondary educational institution.

Students currently enrolled at the University of B.C. must submit forms of application for these awards before March 15. Late applications will not be considered.

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 $300, 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.

Andres Wines Ltd. Scholarship—A scholarship of $500, gift of Andres Wines Ltd., will be awarded to an undergraduate who is proceeding to his final year. This award will be made to a student with high standing who has interests in the wine industry, in microbiology, engineering, agriculture or commerce. The award will be made by the Scholarship Committee of the University in consultation with the donors.

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 Beta Sigma Phi Scholarship—A scholarship of $500, gift of Beta Sigma Phi, is offered to students in attendance at the University of B.C. in a full program of studies leading to an undergraduate degree in art, music or literature. The scholarship will be awarded to a promising student with an outstanding record of academic achievement.

The British Columbia Hotels Association Scholarships—Six scholarships of $300 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 Geographer's Undergraduate Award—An annual award made by the Association to the graduating student in Honours Geography 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.

Charles A. and Jane C. A. Banks Foundation Scholarships and Loans—This Foundation was established from a bequest to the University by the late Honourable Charles A. Banks who, during his term as Lieutenant Governor of the Province, was official Visitor of this University. This contribution, which provides support for worthy and deserving students, is striking evidence of his generosity, and that of his wife, and of their concern for the welfare of others. In accordance with the terms of the bequest one-half of the annual income provides loans for students in any year or faculty, and the other half provides scholarships in the fields of science and engineering. Scholarships and loans are awarded by the Joint Faculty Committee on Prizes, Scholarships, Bursaries and Loans in accordance with University practice.

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 nineteen 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, Soil Science, Agronomy. Students must apply to the University of B.C. by April 15th on forms obtainable from the Scholarship Committee, Room 207, Buchanan Bldg., 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 1971. 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 1972-73 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 The Scholarship Committee, Room 207, Buchanan Bldg., 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 370 371, 372 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 Grant Redford Memorial Prize in Playwriting—A prize of $100 will be awarded for the best original play for the stage written by a graduate or undergraduate student while enrolled in the University. The award will be made by the Department of Creative Writing to which entries must be submitted by April 1st. For thirty years before his death in 1965, Grant Redford was a widely published writer of fiction, poetry and drama. A teacher of literature and a mentor to young writers, he was an inspiration through his own dedication to the art of writing and through his perceptive but wisely tempered criticism. This prize is established in his memory.

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 University Scholarship Committee, Room 207, Buchanan Building, 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 Trustee, 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 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 International 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 University Scholarship Committee, Room 207, Buchanan Bldg., 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 Thomas P. Mayes Scholarship under "General" Scholarship section.)

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.

J. 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 friends of Professor Joseph A. Crumb, will be awarded annually to the student submitting the best graduating essay in the Honours Programme in Economics.

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.

J. 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 and her daughter, Miss C. 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 Mack Eastman United Nations Award—This prize of $100, given in memory of Dr. S. Mack Eastman, is available to all students in the University. This prize will be awarded for the best essay on an issue current in the United Nations or any of the affiliated organizations. Students intending to compete for this prize should submit their essays to the Scholarship and Bursary office, Room 207, Buchanan Building, University of B.C., not later than March 31.

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, Agricultural Sciences, 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 Max and Lillian Freeman Memorial Scholarship—As a memorial to Max and Lillian Freeman, their sons, all graduates of the University of B.C., have established a scholarship. In the amount of $250, this scholarship will be awarded annually to a student with excellent academic standing who has completed one year of study and is proceeding to a higher undergraduate year.

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 Scholarship Committee, Room 207, Buchanan Bldg., University of B.C., must be received not later than May 31st.

The Percy W. Perris Scholarship Fund—The annual income from this Fund, established and endowed by Percy W. Perris, Chase, B.C., provides a scholarship or scholarships for students beginning or continuing studies at the University of B.C. The recipients of these awards will be selected by the University from students whose homes are in school district No. 20 (Salmon Arm). The selection will be made on the basis of academic standing, personal qualities, and need. The scholarships may be used for study toward a degree in any faculty or area of study.

The Rayonier Canada (B.C.) Limited Special Scholarships—Two scholarships of $500 each, the gift of Rayonier Canada Limited, are offered annually to sons and daughters of employees of the Company in attendance at the University. The awards will normally be made to the students obtaining the highest **standing in the First Year of University work and proceeding to further undergraduate study. If, in the opinion of the University, however, no** student in the First Year obtains sufficiently high standing, the scholarships **will be similarly offered to an eligible student in the Second, Third, Fourth** and higher years, in that order. Candidates who are eligible for these awards **should submit their names and details of family service with the Company** to the Scholarship Committee, Room 207, Buchanan Bldg., University of B.C., not later than April 30th.

The Retail Clerks Union, Local 1518, Scholarships—The Retail 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 normally be made to the applicants with the highest standing in the final examinations. Students entering from Grade XII 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 Scholarship Committee, Room 207, Buchanan Bldg., 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.

The Russell A. Bankson Prize for Long Fiction—A prize of $100 will be awarded for the best original work of long fiction (novella or novel) written by a graduate or undergraduate student while enrolled in the University. The award will be made by the Department of Creative Writing to which entries must be submitted by April 1st. For more than sixty years, Russell A. Bankson has written about the people and events of the Pacific Northwest. In stories, essays, articles, histories, biographies and especially novellas and novels, he has captured the excitement lived by the cowboys, miners, loggers, ranchers and road builders who met the challenge of this frontier. This prize is established in his honor.

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. Applicants must be residents of New Westminster, Surrey, North Delta, Burnaby, Coquitlam or Port Coquitlam. 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 undergraduates, 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 Scholarship Committee, Room 207, Buchanan Bldg., University of B.C., Vancouver 8, B.C.

The Sons of Norway Scholarships—District Lodge No. 7—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 member of a British Columbia Sons of Norway Lodge. Application must be by letter, addressed to the Sons of Norway Scholarship Committee, c/o Scholarship and Bursary Committee, Room 207, Buchanan Bldg., University of B.C., Vancouver 8, B.C. The letter of application must (1) indicate the applicant's eligibility with respect to membership 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 Southern California UBC Alumni Scholarship—A scholarship of $500, gift of the Southern California UBC Alumni, is offered, with preference in the following order, to a student (a) whose home is in Southern California; (b) whose home is in the United States; (c) at the discretion of the University. The award will be made on the basis of academic standing, personal qualities, and need.

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, Q.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 Scholarship and Bursary Committee, 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 Scholarship, described under "General" Scholarship section.

The Thorleif Larsen Memorial Scholarship—This scholarship of $130, 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.

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 Scholarship Committee, Room 207, Buchanan Bldg., 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 the Scholarship Office, Applicants will be considered on the basis of academic standing, personal qualities, and need for financial assistance. Preference will be given to a candidate who has been active in the Society.

The Vancouver Police Force Scholarship—See "High School Graduation Scholarships."

The Walter C. and Marianne 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 $350, 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.

The William M. Mercer Memorial Scholarship in Arts and Science (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 established an annual scholarship of $250. This scholarship will be awarded to a student in Arts or Science who is entering the penultimate or final year with a good background of courses in economics and mathematics (including actuarial science). Special preference will be given to students who have sat for actuarial exams leading to Fellowship in the Canadian Institute of Actuaries and to students who, after graduation, propose to enter the field of employee benefit plans or actuarial science. A student who receives the award in the Third Year will not be precluded from receiving it again in the Final Year.

In Agricultural Sciences

The Agricultural Pesticide Society Prize—A cash prize of $50 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.

B.C. Council of Garden Clubs Horticultural Scholarship—A scholarship of $100, the gift of the B.C. Council of Garden Clubs, is offered in the Faculty of Agricultural Sciences to a student in the graduating year who is specializing in horticulture. The award will be made on the basis of a demonstrated interest and ability in that area of study. In the event that two students are considered to be equal, consideration will be given to the need for financial assistance.

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 —See "Engineering" Scholarship section.

The Canadian Society of Animal Production Book Prize—This prize, the gift of the Canadian Society of Animal Production, will be awarded on the recommendation of the Faculty of Agricultural Sciences to an outstanding student in the graduating class in one of the fields of Animal Science, Poultry Science, Nutrition or Food Science.

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, consideration 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.

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 Jacob Biely Scholarship—In recognition of his personal contribution to the University of British Columbia, as well as his numerous scientific contributions in the field of Poultry Science, the many friends and admirers of Professor Jacob Biely have established a $300 scholarship to be awarded annually to a student in Poultry Science. The award will be made by the University Scholarship Committee on the recommendation of the Department of Poultry Science.

The Nabob Scholarships in Food Technology—Two scholarships of $500 each are given annually by Nabob Foods Limited, a subsidiary 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 Scholarship Committee, Room 207, Buchanan Bldg., 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.

In Architecture

Architectural Institute of British Columbia Greater Vancouver Chapter Medal—A medal is to be awarded each year to a student in the graduating class who, in the opinion of the faculty, exhibits outstanding imagination, innovation or ingenuity in extending and developing the field of architecture. The donors wish to encourage a deepening of the understanding of the nature of architecture and its relationship to other academic disciplines. The medal will be known as the AIBC Greater Vancouver Chapter Medal.

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 grades 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 Ernest Wilby Memorial Scholarship—A scholarship of $500, given by the Royal Architectural Institute of Canada, will be awarded in 1972 to a student entering the penultimate year. The recipient will be selected on the basis of definite promise and talent in his work and on need of financial assistance.

George S. Whillans Memorial Scholarship and Trophy—A scholarship of $250 is offered by the B.C. Chapter, Northwest Lath and 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.

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.

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 under "General" Scholarship section.

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 whose standing as determined by means of an essay competition is the 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 1971-72.

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.

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 the People's Republic of China and Canada. 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 Scholarship Committee Office, Room 207, Buchanan Bldg., and must be submitted not later than July 1st.

The Daniel Buchanan Scholarship in Mathematics—See "Science" Scholarship section.

The Dante Alighieri Society of Vancouver Prize—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. Joyce Hallamore Scholarship—A scholarship of approximately $1200, established by a bequest from the late Dr. Joyce Hallamore, will be awarded annually to a student or students for proficiency in the field of German Language and Literature.

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 general 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 General in Vancouver, are available for students in the upper years showing proficiency in German.

The Honours Economics Scholarship—This scholarship of $400, the gift of AVG Management Science, Ltd., will be awarded to the most outstanding student in the Third Year of the Honours Programme who is proceeding to the Final Year in this programme. (Not offered in 1972.)

The Italian Scholarship—This scholarship of $180 will be awarded annually to an undergraduate of outstanding ability specializing in Italian.

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 under "Awards for Graduate Study and Research" section.

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 being 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 or an allied field 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.

The Prizes of the Ambassador of Switzerland—These book prizes will be awarded in the session 1972-73 to an outstanding student of French Language and Literature, to a student with high standing in German, and to a student with high standing in Italian.

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.

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.

The 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 $140, 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 AVG Management Science Ltd., and named in honour of the first Head of the Department of Economics, is offered to the student in the First or Second Year of Arts who, in the opinion of the Department, is the most outstanding in Economics 200 or 202, and who proceeds to Economics 300, or 332 and 342. Awarded in the Fall. (Not offered in 1972.)

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 303, 326, 329, 420, 426).

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

Alltrans Express Ltd. Scholarship—A scholarship of $250, gift of Alltrans Express 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, personal 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 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.

Certified General Accountants' Association of British Columbia Continuing Education Scholarship—A scholarship of $250, the gift of the Association, is offered annually to a deserving student who is enrolled in the C.G.A. Financial Management programme. The award is made on the recommendation of the Dean.

The David House Memorial Scholarship—This scholarship is dedicated to the memory of David House, a Second Year Commerce student intending to study law, who died tragically in July, 1968, while travelling in Greece. It is in tribute to his personal qualities and character that his friends, with the co-operation of the Commerce Undergraduate Society, have established this scholarship, to be awarded annually to the student in the Second Year of Commerce who attains the highest average of those intending to proceed to the Commerce-Law option. The value of the award is $100.

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—See "Engineering" Scholarship section.

The Ghent Davis Memorial Scholarship—A scholarship in the amount of $1000, 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 or more students.

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.

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—The Harold A. Jones Memorial Scholarship is donated by Seaspan International Ltd. (an organization integrating Vancouver Tug Boat Co. Ltd. and Island Tug & Barge Limited, both pioneer companies in marine transportation on the B.C. coast) as a memorial to Harold A. Jones, who was President of Vancouver Tug Boat Co. Ltd. from 1924 to 1956. This scholarship serves not only to pay tribute to Mr. Jones' contribution to the company, but also to give recognition to his interest and participation, both public and personal, in all matters pertaining to coastwise shipping. The scholarship for $750 is to be awarded annually to an outstanding student entering the final year in the faculty of Commerce and Business Administration 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 given their tuition fees for each of the Third and Fourth Years and guaranteed employment with the Company in the summer periods, the Christmas vacations, and at other times, such as Saturdays. Subject to satisfactory performance, they will, on graduation, be given an opportunity for an executive career with the Company. Further information may be obtained from the offices of the Dean of Commerce and Business of Administration. Inquiry should be made not later than January 15th.

The Institute of Chartered Accountants of British Columbia Desmond O'Brien Memorial Scholarship—This scholarship of $600 has been established as a memorial to the late Desmond O'Brien, F.C.A. by the Institute as a tribute to his contribution to the accounting profession in British Columbia and in Canada. The award will be made on the recommendation of the Faculty to a student enrolled in the Licentiate of Accounting programme who has high academic standing and is deserving of financial assistance. At the discretion of the Faculty the sum may be divided between two or more students.

The Irving George Chertkow Memorial Scholarship—A trust fund of $3,000 was established under the will of the late Irving G. Chertkow, C.A., to provide a scholarship in the Faculty of Commerce and Business Administration. The Faculty may award the proceeds of this fund annually to a student in any year of the undergraduate programme, who has achieved high scholastic standing. Should two candidates have similar academic standing, preference will be given to a student in the Accounting Option.

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.

The Marsh and McLennan Limited Scholarship in Commerce—As a mark of Canada's Centennial Year, Marsh and McLennan Limited 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 Scholarships—Two scholarships 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.

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 $500, 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 may be offered 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.

Phillips, Hager & North Ltd. Scholarship—A scholarship of $1,000, the gift of Phillips, Hager & North Ltd., is offered annually to students in Commerce. The award will be based firstly on the financial circumstances of those eligible and secondly on their academic standing. The scholarship is to be awarded on the recommendation of the Faculty, and at their discretion the total amount may be divided into two scholarships.

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 register as a student 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.

Real Estate Board of Greater Vancouver Scholarship—A scholarship of $500, gift of the Real Estate Board of Greater Vancouver, 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.

The Robert H. Wilson Scholarship—A scholarship of $500, gift of the Okanagan-Mainline Real Estate Board, is 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.

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.

R. W. Bonner Scholarship—This scholarship of $250, the gift of the Realtor Division of the Real Estate Institute of British Columbia, is offered annually to an undergraduate or graduate student in Commerce and Business Ad-

ministration who is taking the Real Estate program, has high academic standing and is deserving of assistance to further his education. The award will be made on the recommendation of the Faculty of Commerce and Business Administration of the University of British Columbia.

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.

The T. Eaton Co. Limited Scholarship in Marketing—A scholarship of $500, the gift of the T. Eaton Co. Limited, will be available annually in the Faculty of Commerce and Business Administration. Final selection for this award will be be made by the Faculty of an outstanding undergraduate in Marketing who has completed the Third Year and is proceeding to the Fourth Year. If in any year no suitable candidate is available, the selection will be made from students of the Graduate Faculty in the Marketing area.

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 embarking on 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 $250. 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 & Co. Scholarship in Accounting—A scholarship of $300, the gift of Winspear, Higgins, Stevenson & Co., 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 Ando Laboratories Limited Scholarship in Dentistry—This award of $300, gift of Ando Laboratories Limited, will be made annually, upon the recommendation of the Faculty of Dentistry, to the dental student who has completed his second year program with superior academic standing and has demonstrated excellence in technical and clinical operative procedures, as judged by the Department of Restorative Dentistry.

The B.C. Dental Hygienists' Association Prize—This prize of $50, gift of the B.C. Dental Hygienists' Association, will be awarded annually to a dental hygiene student who has obtained a good academic record during her First Year course of study. The award will be made on recommendation of the Faculty.

The B.C. Dental Hygienists' Association Clinical Award—This award of $50, gift of the B.C. Dental Hygienists' Association, will be made annually to a dental hygiene student who, at the completion of the First Year course of study, has demonstrated proficiency in clinical dental hygiene. The award will be made on recommendation of the Faculty.

The B.C. Dentists' Wives' Association Book Award—A textbook in the field of Periodontics up to the value of $25 is offered annually by the B.C. Dentists' Wives' Association to the first year Dental Hygiene student who achieves the highest standing in the course in Human Biology (D. H. 202).

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 Toronto, Ontario, 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 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 College of Dental Surgeons of B.C. Scholarships—Two scholarships of $100 each, the gift of the College of Dental Surgeons of B.C., will be awarded annually to the two leading students in the Dental Hygiene Program at the completion of their first year of study. The awards will be made on the recommendation of the Faculty.

The C. U. & C. Health Services Society Scholarship in Dentistry—A scholarship of $500, gift of the C. U. & C. Health Services Society, is offered to students entering the Final Year in the Faculty of Dentistry and proceeding to the degree of D.M.D. It is open to students who have sound academic standing and need for financial assistance. Selection of the winner will be made by the Joint Faculty Committee on Prizes, Scholarships, and Bursaries in consultation with the Dean of Dentistry.

The Dr. Lorin O. Lind Memorial Scholarship—This scholarship, established as a memorial to Dr. Lind by his friends and colleagues, will be

awarded annually to the Third Year dental student who is outstanding in clinical restorative dentistry.

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 Matthew J. Waterman Dental Hygiene Clinical Award—This award of $25 will be made annually to the dental hygiene student who, at the completion of the first year course of study, demonstrates the most outstanding performance in clinical dental hygiene.

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 (College of Dental Surgeons of B.C.)—As a memorial to Robert D. Sheret and to mark the esteem and affection in which he was held, the College of Dental Surgeons of B.C. 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 through the School of Home Economics and the Faculty of Education. This scholarship will be awarded preferably for the Final Year. Applications are required by May 15th.

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 the Scholarship Office, Room 207, Buchanan Bldg., University of B.C., 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 son, G. N. Munro, his daughter, Doreen Marie Reid, 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 for the session 1972-73 to an outstanding student who needs financial assistance and who is proceeding to teacher training.

Grolier Student Award Library—A prize consisting of five sets of books, including the New Book of Knowledge, Encyclopedia Canadiana & Guide, Book of Popular Science & Guide, Lands and Peoples, and Standard Encyclopedic Dictionary, and a bookcase, is offered by Grolier Limited, Toronto. This prize will be awarded to an outstanding student graduating in the elementary teaching field, Faculty of Education.

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. McLenaghen Scholarship—See "Home Economics" Scholarship section.

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 1972-73, three scholarships will be available.

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 $350 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 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 Scholarship and Bursary Office, 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 Scholarship Committee, Room 207, Buchanan Bldg., 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 Alfred Flook Memorial Scholarship—As a memorial to Alfred Flook (B.A.Sc., Chemical Engineering, U.B.C., 1970), members of his class, with assistance from the Department of Chemical Engineering and several Companies, have established a fund. From this fund a scholarship will be awarded annually to a student completing the Third Year of Chemical Engineering and proceeding to the Final Year. The award will be made on the basis of (1) active participation in student or departmental affairs in Chemical Engineering, (2) pleasing personal qualities and ability to cooperate with others, and only as a deciding factor for those who qualify with respect to (1) and (2), on scholarship ability and financial need. The scholarship will be awarded on the recommendation of the Head of the Department of Chemical Engineering and the Student President or like officer of the Fourth Year Chemical Engineering Class.

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 1971, 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 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—See "Science" Scholarship section.

The Association of Professional Engineers' Prizes—Book prizes, each of $50, are offered by the Association of Professional Engineers of the Province in competition to students in the Fourth Year of the Faculty of Applied Science. One such prize is awarded in each branch of engineering selected by the faculty to the student who, in the opinion of the Department concerned, shows great promise, particularly through his report-writing ability.

The Austin C. Taylor Memorial Scholarship—A scholarship of $300, 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 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), 79 (Tofino); or (3) the area comprised of School Districts 65 (Cowichan), 66 (Lake Cowichan), 67 (Ladysmith), 69 (Parksville). 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 Scholarship Office, Room 207, Buchanan Bldg., University of B.C., by March 15th.

British Columbia Hydro and Power Authority Undergraduate Scholarships in Engineering—Ten scholarships of $250 each are offered by British Columbia Hydro and Power Authority to students in the various branches of engineering. Five of the scholarships will be available to students who, in the fall, will proceed to the Final Year, and five 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.

Canada Cement Lafarge Ltd. Scholarship in Civil Engineering—A scholarship of $500, the gift of Canada Cement Lafarge 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 being given to those with outstanding records in structural design, concrete design, or foundation courses.

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—See "Science" Scholarship section.

Chevron Standard Limited Undergraduate Scholarships—See "Science" Scholarship section.

The Corporation of Land Surveyors of the Province of British Columbia 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 Land Surveyors of the Province of British Columbia 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. H. de Jong, Department of Civil Engineering, University of B.C.

The Don Carpenter I.E.E.E. Scholarship—This scholarship is provided by a bequest from Clara Laverne Carpenter to honour her husband, Don Carpenter, 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 Student Prize—The Engineering Institute of Canada offers an annual prize donated by the Life Members' Organization of the Institute, to each of the twenty-four degree granting Canadian Universities of which the University of British Columbia is one. The prize consists of a bronze medal known as "The Engineering Institute of Canada Life Members' Medal" and a two-year membership in the Institute, one year as a student member and the other as an associate member. The prize is 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 of that year and in particular for his activities in the EIC Student Section 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—Four scholarships of $500 each, the gift of Finning Tractor & Equipment Co. Ltd., are offered to Third or Fourth Year students. Of these scholarships, one will be awarded in each of Commerce, Mechanical Engineering, Civil Engineering and Forestry. At least one of the awards will be given each year to an out-of-town student. These awards are available to sons and daughters of employees of Finning Tractor & Equipment Co. Ltd. or other students who because of their academic record are deserving of assistance. 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 $200, 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 Puxon 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 Puxon. 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 $200 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.

International Nickel Company of Canada, Limited, Participating Scholarships—International Nickel provides annually at Canadian universities fifty awards to students entering the penultimate year of a baccalaureate programme in Chemistry, Geology, and Chemical, Civil, Electrical, Geological, Mechanical, Metallurgical or Mining Engineering. Applications are especially solicited from students in Geology, Mining, Extractive Metallurgy and Physical Chemistry. No more than two applications will be considered from any one department.

Applicants must be Canadian Citizens or possess landed immigrant status; be physically fit, and demonstrate an interest in practical affairs consistent with vocation in industry; be currently attending a Canadian University in a full-time programme qualifying for admittance to the penultimate year; and be nominated by the chairman of the department in which he will study. Each award provides for tuition and fees, and a grant of $300.00 for miscellaneous expenses. The recipient will also have an opportunity to undertake an orientation course with the Company in operations allied to his field of study during the summer vacation period preceding receipt of the award. Compensation for summer assignments will be made at current Company student rates. An aid to education supplement of $500.00 is also provided for the department in which the student is enrolled. The Scholarship may be renewed for the final year. Brochures and application forms may be obtained from the Student Awards' Office or from the Administrator of Educational Affairs, The International Nickel Company of Canada, Limited, P.O. Box 44, Toronto-Dominion Centre, Toronto 111, Ontario. Applications must be received by the Company from the university not later than January 7.

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 Mineral 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 Scholarship and Bursary Office before January 31st.

The Lambert Scholarship—A scholarship of $400, in memory 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—See "Awards for Graduate Study and Research" section.

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. Although the fund was established to provide a scholarship to be awarded as outlined above, it can be used for other purposes to assist and encourage students to enter mineral engineering. The disposition and 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 Scholarship—As a memorial to Anna Margaret Armstrong, this scholarship has 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. In the amount of $500, it is offered annually to women students entering the penultimate year of an undergraduate degree programme in any branch of engineerig, in honours chemistry, or in honours physics. It will be awarded primarily on the basis of academic standing.

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 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 $1,000, 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 Scholarship Office, Room 207, Buchanan Bldg., 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—This scholarship of $500, offered annually by Rayonier Canada Limited, is available to students in Third Year Chemical Engineering who are proceeding to the Final Year. The award will be made to a student 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 Ltd. Scholarship in Civil Engineering—A scholarship of $200, the gift of the firm of Read Jones Christoffersen Ltd., 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 Schlumberger of Canada Scholarship—The Schlumberger of Canada Scholarship in the amount of Five Hundred Dollars ($500.00) is based on superior academic ability and is tenable in third or fourth year Electrical, Mechanical, Petroleum or Geological Engineering, or in the fourth or fifth year in honours Physics, honours Geology, or honours Mathematics and Physics. A matching grant of Five Hundred Dollars ($500.00) will also be donated to the University.

The Society of Chemical Industry Merit Awards—See "Science" Scholarship section.

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. (Not given in 1972-73.)

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, $75, and $50, together with three merit awards of $25 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 Scholarship office, Room 207, Buchanan Bldg., 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. 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 Scholarship office, Room 207, Buchanan Bldg., by March 15th.

In Forestry

The Association of British Columbia Professional Foresters Prizes—Three prizes of the value of $25, $50, and $125 are offered by the Association of British Columbia Professional 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 248) in Second Year Forestry, and one of $50 for the best summer essay (Forestry 348) in Third Year Forestry. A prize of $125 is awarded for the best B.S.F. Thesis (Forestry 499). The successful essays and thesis may be made available by the Faculty to the Council and Members of the Association.

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 equivalent, and is proceeding to First Year Forestry at this University. Students wishing to be considered for this scholarship must apply before May 15th.

Commonwealth Forestry Bureau Book Prize—This prize, comprising a year's subscription to *Forestry Abstracts*, is awarded annually to an outstanding student completing a course of studies at each of the centres of higher forestry education in the Commonwealth.

The Council of Forest Industries Scholarship—The Council of Forest Industries has established a scholarship amounting to $300 per annum to encourage and support undergraduate study in the Faculty of Forestry. This scholarship is available to students registered in second or higher year at the University of British Columbia. The award will be made on the basis of the recommendation of the Faculty of Forestry. In making the award, scholastic standing and participation in student and university affairs will be taken into account. This scholarship was originally established as the British Columbia Loggers Association Forest Protection Scholarship. Since its amalgamation with other forest industry associations, the B.C.L.A. is known as the Forestry and Logging Division of the Council of Forest Industries of British Columbia.

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—See "Engineering" Scholarship section.

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 Harry Hobson Memorial Prize—As a memorial to Harry Hobson, his colleagues and friends have established an annual prize of $50 to be awarded to the student with the highest standing in Forestry 263.

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 of $50. This prize will be awarded annually to the most outstanding student in the forest pathology portion of Forestry 307.

The Kaiser Resources Ltd. Prize in Conservation and Rehabilitation—A prize of $250 to be awarded to a member of the graduating class in Forestry who has best demonstrated capacity in the fields of conservation and environmental maintenance and rehabilitation, through academic performance in related subject areas and, additionally, has given evidence of commitment to this field.

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—See "Science" Scholarship section.

Prince George Forestry Scholarship—A scholarship of $200, donated by Industrial Forestry Service Ltd., is offered annually to a student entering First or Second Year Forestry with at least Second Class standing, who graduated from a Prince George Secondary School or College or obtained Forestry Entrance requirements at the College of New Caledonia. It will be awarded by the University of B.C. Scholarship Committee. Applications should be submitted to the University of British Columbia by July 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 entering First or Second Year Forestry.

Proficiency Prize in Dendrology (Forestry III)—A prize of $200 is open to students in the Faculty of Forestry registered in Forestry III (Dendrology). This prize will be awarded to the student obtaining highest standing in the course at the close of the regular session.

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 scholarship. This scholarship, in the amount of $60, 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—Through a gift of $250 from the Truck Loggers Association, two scholarships of equal value are available for students entering First Year Forestry. These scholarships will be awarded to students with high standing who are worthy and deserving of encouragement and assistance.

The William McMahan Scholarships—See "Engineering" Scholarship section.

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—See "Education and Teacher Training" Scholarship section.

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 scholarship 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—See "High School Graduation Scholarship" section.

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, Speton and Phillips Scholarship—This scholarship of $300, gift of Armstrong, Brawner, Speton and Phillips, 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 & Murphy Scholarship—A scholarship of $300, gift of Campney & 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. Scholarships—Two scholarships of $100 each, gift of C.H.A.P. Copy Ltd., are offered annually in the Faculty of Law to the students obtaining the highest standing in "Administrative Law" and "Jurisprudence".

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 $300, gift of Farris, Farris, 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, 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 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 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, Grey, Easton & Co. Scholarship—This scholarship of $100, the gift of Harper, Grey, Easton & 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 Senator 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 League 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 Lord Denning Scholarship—Class of '48—A scholarship maintained by a fund contributed by the members of the first graduating class on the occasion of the visit of Lord Denning, the Master of the Rolls, to the 20th Anniversary Reunion of the class is to be awarded to a student proceeding to Second or Third Year Law for scholastic achievement and contribution to the activities and welfare of the Law School.

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.

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 plus certain case books produced by Best Printer Co. The awards offered are (a) the Malcolm MacIntyre Proficiency Prize, which will be awarded to a student in any year with good overall standing; (b) the Malcolm MacIntyre Prize in Legal Institutions; for highest standing in Legal Institutions 1 (First Year); and (c) the Malcolm MacIntyre Succession Prize, for highest standing in Succession (Third Year).

Meyer Waldman Scholarship in Law—A scholarship of $100, given in memory of Meyer Waldman by his son, Dr. Roy Waldman, is offered in the Faculty of Law. This scholarship will be awarded to a student with good academic standing, who is deserving in every respect of encouragement to continue his course.

The Mike Edwards Memorial Scholarship—A scholarship of $200, offered by his friends to honour the memory of the late Mike Edwards, will be awarded annually on the basis of financial need and enthusiasm for, and an intrepid approach to, Civil Litigation and the Practice of Criminal Law.

The Norman MacKenzie Prize in Public International Law—In honour of Dr. Norman MacKenzie a prize of $125, established and endowed by Walter H. Gage, 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, 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 University of British Columbia Law Review. 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 April 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 $50, 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.

The Thorsteinsson, Mitchell, Little & O'Keefe Prize (Highest Standing in Taxation)—A prize of $250, gift of Thorsteinsson, Mitchell, Little & O'Keefe, will be awarded in the Faculty of Law to the student receiving the highest mark in Taxation.

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 $100, 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 essay, film or other presentation on a psychiatric subject.

The B.C. Branch of the Federation of Medical Women of Canada Scholarship—A scholarship of $200, the gift of the B.C. Branch of the Federation of Medical Women of Canada, 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 Prizes—A prize of $125, gift of the B.C. Oto-ophthalmological Society, is offered annually to the final year student

who, during his academic years, 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 three 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 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.

Charles E. Frosst Medical Scholarship—A scholarship of $500 will be awarded annually to the final year student who, in the opinion of the awards committee, has shown most promise in the field of therapeutics. A suitably inscribed bronze medal will also be presented to each year's winner.

The Charles Leonard Gorvich and Abraham Shuer Memorial Scholarship—To honour the memory of Charles Leonard Gorvich and Abraham Shuer, 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-Geigy Summer Research Scholarship—A scholarship has been made available in the sum of $1,200 by the Pharmaceuticals Division of CIBA-Geigy Canada Ltd., to support a medical student in pursuit of a research project in Canada. The scholarship will be awarded by the Awards Committee of the Faculty of Medicine and will be designed to support a student for approximately a three-month period of research during the summer vacation.

The CIBA-Geigy 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.

CIBA Student Awards—This prize, gift of CIBA Pharmaceuticals (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 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.

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, 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. and Mrs. S. Schaffer Memorial Award—An award of $700 annually will be given to a postgraduate or undergraduate student attending the Medical School of the University of British Columbia. Nomination of this scholar will be on the recommendation of Dr. Dwight Irving Peretz and the Dean of the Faculty of Medicine.

The Dr. Frank Porter Patterson Memorial Scholarship—This scholarship of $150 has been established by the Primrose Conservative League 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 higher year.

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 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.

Dr. Joseph Nicholas Sankey Scholarship Fund—This fund, established by a bequest from the late Elsie Lavina Sankey, provides bursaries or scholarships to the total of $2800 annually to aid medical students for study and/or research in the field of surgery. Awards will be made on the recommendation of the Department of Surgery.

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. Paul Alexander Donaldson Scholarship—Established in memory of Dr. Paul Donaldson, a member of the Class of 1969, who died during his last year of medical school but, because of previous high achievement, was awarded a post humous degree. As a tribute to his accomplishment and

personal dedication, this scholarship has been donated by classmates, friends and family. It will be awarded to a Third Year student who, in the opinion of the faculty, has shown outstanding academic achievement and personal qualities over his years in Medical School.

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 administrative 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 Third 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 resident in Kamloops School District No. 24. 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 the medical course, or for similar purposes.

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 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 a student in his Third Year who has performed in outstanding fashion in Surgery, 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.

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 Canada Prize in Paediatrics—A prize of $125, the gift of Mead Johnson Canada, 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 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

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 Northwest Association of Physical Medicine and Rehabilitation Award—An annual award of $50, an appropriate Certificate, and a two-year subscription to the Archives of Physical Medicine and Rehabilitation, will be made to a first, second or third year medical student who in the course of his regular or elective clinical work has demonstrated a unique sensitivity to the problems of patients with physical, social, cultural or vocational handicaps or who has demonstrated excellence in the pursuit of a research project in any one of these areas.

The Osler Society of Vancouver Scholarship—This scholarship in the sum of $400, the gift of the Osler Society of Vancouver, will be awarded annually to the student who is proceeding to the Third Year and who, in the opinion of the Faculty, has the most outstanding record in the study of physical diagnosis.

The Parke, Davis & Company Ltd. Awards (Medicine)—Through the generosity of Parke, Davis & Company Ltd. four awards, each consisting of the illustrated history entitled Great Moments in Medicine, will be awarded to outstanding students in the Faculty of 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.

Ronald S. Toban Memorial Scholarship—A scholarship of $100, gift of Dr. and Mrs. L. A. Levy and Mr. Stephen Bernstein, in memory of Ronald S. Toban, is offered to a student in the second year of Medicine proceeding to the third year. The award will be made to a student with a good over-all record who is outstanding in the field of internal medicine.

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 Samuel and Rebecca Nemetz, will be awarded in 1972 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 Tommy Diespecker Memorial Medical Scholarship—This scholarship, the gift of the friends of Tommy Diespecker, and in the amount of $100 per annum, is awarded to the Third Year medical student obtaining the highest standing in the field of clinical microscopy (haematology). The winner will be selected by the Faculty of Medicine.

The Triple Entente Chapter, I.O.D.E., Scholarship in Medicine—This scholarship, the gift of the Triple Entente Chapter, I.O.D.E., was offered to women students entering the penultimate year of the program leading to the M.D. degree. In the amount of $500 a year for two years, it was awarded by the Joint Faculty Committee on Prizes, Scholarships, and Bursaries on the basis of academic standing, promise, personal qualities, and need.

The Vancouver General Hospital Department of Family Medicine Prize—This prize of $100, donated by the Department of Family Medicine of the Vancouver General Hospital, will be awarded annually to the student in the first year class in Medicine who presents the best family report in the Preclinical Sessions course.

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 Department of Music Scholarship—One or more scholarships established by proceeds from special concerts will be awarded annually at the discretion of the Department of Music to a student exhibiting proficiency and promise in performance. Primary consideration will be given to those entering the Music program.

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 1971-72. It is open to students entering Music for the first time and majoring in Piano.

The Friends of Chamber Music Scholarship—A scholarship of $150, 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 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 John Emerson Memorial Scholarship—A scholarship of $50, established in memory of John Emerson by members of ACTRA, will be awarded annually at the discretion of the Music Faculty to an upper-division student showing promise in musical theatre.

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 CHQM, 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—See "General" Scholarship section.

The Triple Entente Chapter, I.O.D.E., Scholarship in Music—This scholarship, the gift of the Triple Entente Chapter, I.O.D.E., was offered to women students entering the penultimate year of the program leading to the degree of B.Mus. In the amount of $500 a year for two years, it was awarded by the Joint Faculty Committee on Prizes, Scholarships and Bursaries on the basis of academic standing, promise, personal qualities, and need.

In Nursing

The Edith M. Rainbow Prize—A prize of $100, gift of Dr. and Mrs. J. H. G. Smith in memory of Edith Rainbow, is offered to students in the Final Year

of the course for the degree of B.S.N. It will be awarded to the student with highest standing who entered the University as an R.N.

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 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 Scholarships —A scholarship of $500 will be given annually to a student entering Third Year of the Nursing program, and a scholarship of $250 will be awarded annually to a student entering the Second Year. These awards are the gift of the Nursing Division of the University of British Columbia Alumni Association and will be awarded on the basis of academic standing, demonstrated potential for nursing, 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 Pharmacological Basis of Therapeutics,* will be awarded to an outstanding student of the graduating class in Pharmaceutical Sciences.

The British Columbia Pharmacists' 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 Canadian Pharmaceutical Association Centennial Scholarship—This scholarship, given jointly by the Canadian Pharmaceutical Association and the Pharmaceutical Association of the Province of British Columbia, and with travel expenses arranged by Mr. L. G. Elliott, of Elliott-Marion Co., 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 award will be based on academic ability and outstanding contribution to the undergraduate life of the Faculty.

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 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 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 Parmaceutical Sciences 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., Scholarship—A scholarship of $250, the gift of National Drug and Chemical Company of Canada Ltd., will be awarded annually to the student who obtains highest standing in the examinations of First Year Pharmaceutical Sciences and is proceeding to the Second Year.

The Parke, Davis & Company Ltd. Awards (Pharmacy)—Through the generosity of Parke, Davis & Company Ltd., four 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 Pharmaceutical Sciences 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 First Year Science or its equivalent.

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 (Option B) 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. or B.R.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 of $140 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 elegible 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

Canadian Association of Occupational Therapists Book Prize—This prize is offered by the Canadian Association of Occupational Therapists to a graduating student in the final examination in the theory of Occupational Therapy.

The Helen Grimmer Scholarship in Physiotherapy—A scholarship of $150, 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.

Mrs. Therese Astell Book Prize—This is a memorial book prize presented by the Canadian Physiotherapy Association (B.C. Branch) to the student with the highest standing in Third Year.

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 to the most outstanding student in the Third Year of Rehabilitation Medicine who is proceeding to the Final Year.

In Science

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 Carling Breweries Limited Scholarships—Five scholarships, for $350 each, provided by the Carling Breweries Limited on behalf of the Carling Conservation Club are offered to students in the field of Wildlife Conservation who are continuing their studies at the University in the third or higher years. They will be awarded on the recommendation of the Department of Zoology to students with good academic standing who have demonstrated an interest in the conservation of wildlife and an aptitude for investigating problems in this area.

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 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. A. C. Skerl Memorial Scholarship in Geology—A graduate of Imperial College, London and an associate of The Royal School of Mines, "Gus" Skerl, as he was popularly known, had a distinguished career in geological work in Africa, the Philippines and Canada. Interned with his wife and family in the Philippines after the Japanese invasion, he succeeded during four years of notable hardship in saving lives among fellow prisoners by ingenious methods of recovering nutrition from waste materials. This scholarship, established by his wife, honours his memory. It is offered to Second or Third Year students. The award will be made on the basis of interest and proficiency in the field of Geology.

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.

International Nickel Company of Canada, Limited, Participating Scholarships—See "Engineering" Scholarship Section.

The Joel Harold Marcoe Memorial Scholarship—As a memorial to Joel Harold Marcoe, who attended the University from 1961 to 1963, this scholar-

ship 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—See "Forestry" Scholarship Section.

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 in "Awards for Graduate Study and Research" section.

The Lorraine Schwartz Prize in Statistics and Probability—In memory of Dr. Lorraine 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 Scholarship—See "Engineering" Scholarship section.

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 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 Scholarship and Bursary Office by March 15th.

The Prince George Scholarship—See "Forestry" Scholarship section.

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 with a minimum requirement of 75% in that year.

The Stephen Kenneth Nelson Memorial Scholarship—See "Engineering" Scholarship section.

The Truck Loggers' Association Scholarships—See "Forestry Scholarship" section.

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 Beatrice Wellington Gonzales Memorial Scholarship in Social Work—This scholarship, established and endowed as a memorial to Beatrice Wellington Gonzales (B.A., UBC) by Dr. and Mrs. W. G. Wellington, will be awarded annually to a deserving senior undergraduate in Social Work. It serves to mark the unflagging service of Miss Gonzales to others, through her teaching, as in Canada, or as a dedicated field officer in various League of Nations and United Nations agencies. In particular, it commemorates her strenuous and successful efforts to protect and salvage the lives of political refugees in Europe prior to and during World War II. In making this award, special consideration will be given to students who, like Miss Gonzales, are concerned about the plight of individuals.

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.

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 $400 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 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 or Third 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 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.

British Columbia Forest Products Limited Entrance Scholarships—Ten scholarships of $400 each are offered by British Columbia Forest Products Limited to legal dependants 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 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 ten 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 scholarships must complete the General Application for Scholarship form, which may be obtained from the Scholarship Office, Room 207, Buchanan Bldg., 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. Postponement of attendance at the University of B.C., Simon Fraser University or the University of Victoria may be granted to a scholarship winner, but for only certified medical reasons, and then only for a period of one year. Application for such postponement must be made to Scholarship and Bursary Office, Room 207, Buchanan Bldg., University of B.C., Vancouver 8, B.C., at the time the award is made.

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) who, in the session 1972-73 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 be 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 the Scholarship Office, Room 207, Buchanan Bldg., University of B.C., Vancouver 8, B.C. The completed form should be returned to that office 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 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.

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.

The Dairy Industry Credit Union Scholarship—A scholarship of $250 is offered annually by the Dairy Industry Credit Union to students who are proceeding to the University of B.C. or Simon Fraser University from Grade XII 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 Dairy Industry 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 Scholarship Office, Room 207, Buchanan Bldg., University of B.C., a letter indicating his or her connection with Dairy Industry 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. The Dairy Industry 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. An additional scholarship of $250 is also available for a student proceeding from secondary school to B.C.I.T. or a regional college in B.C. Application is to be as indicated above.

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 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 Scholarship Office, Room 207, Buchanan Bldg., 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 examinations. However, consideration may also be given to the grades obtained in the other subjects 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 proceeding in the fall from Grade XII of secondary school to a full programme of studies at the University of British Columbia, Simon Fraser University, University of Victoria, Notre Dame University, or any accredited Regional College in B.C. 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 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.

The Federation of Telephone Workers of British Columbia, Traffic Division Scholarship—The Federation of Telephone Workers of British Columbia, Traffic 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 proceeding in the fall from Grade XII of secondary school to a full programme of studies at the University of British Columbia, University of Victoria, or Simon Fraser University. 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 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 of B.C., 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. Applications must contain details of family service with the Federation and other pertinent information. For the application form write to the Scholarship Office, Room 207, Buchanan Bldg., University of B.C. Application must be made by May 15th.

Forbes George Vernon Memorial Scholarship—This scholarship, established by a bequest from the late Beatrice Alma Ashley Furber, will be awarded annually on the basis of general proficiency, character and leadership to a student, normally resident in the City of Vernon or its environs, entering the University of British Columbia in a full program of studies leading to a degree in any field.

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 Scholarship Office, Room 207, Buchanan Bldg., 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 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 Scholarship Office, Room 207, Buchanan Bldg., must be submitted to the University not later than May 15th.

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). Two of these scholarships are available for attendance at the University of Alberta, University of Lethbridge, or the University of Calgary, and three 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 or the equivalent for the first time, and entering from Grade XII 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 by the 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 to Woodward's by July 15th. Applicants must include the official transcript of their 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, directly to the Administrator of Student Awards Office, University of Alberta, Edmonton by the Alberta applicants, or to the Chairman, Joint Faculty Committee on Prizes, Scholarships and Bursaries, University of B.C., Vancouver 8, B.C., by the B.C. applicants.

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 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 Scholarship Office, Room 207, Buchanan Bldg., University of B.C., 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 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 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, Simon Fraser University, or a Regional College in B.C. 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 Scholarship Committee, Room 207, Buchanan Bldg., University of B.C., Vancouver 8, B.C. 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. Two additional scholarships of $300 each are offered for students proceeding from secondary school to a vocational school in B.C. Application is made as indicated above.

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 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 Scholarship Office, Room 207, Buchanan Bldg., University of B.C., should reach the University not later than May 15th.

Japanese-Canadian Citizens' Association B.C. Centennial Scholarship—A scholarship of $150, the gift of the British Columbia Japanese-Canadian Citizen's Association, is offered annually to a Japanese-Canadian student residing in British Columbia and proceeding from Grade XII 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.

Labatt Breweries of British Columbia Limited Scholarships—Two scholarships of $400 each provided by Labatt Breweries of British Columbia Limited are available for students who are resident in British Columbia and who are proceeding directly from Grade XII 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 community affairs. 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 Scholarship Office at the University of B.C. by 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 or attending the University of British Columbia, or some other university or college of recognized standing within the Province, 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.

Molson Brewery B.C. Ltd. Scholarships—Approximately five scholarships of $350 each provided by Molson Brewery B.C. Ltd. are available for students who are resident in British Columbia and who are proceeding directly from Grade XII 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 community affairs. These awards are intended for students whose homes are the remoter parts of the Province, and not for those resident in or near Vancouver and New Westminster. 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 Scholarship Office, Room 207, Buchanan Bldg., University of B.C. by May 15th.

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.

Norman MacKenzie Alumni Scholarship Fund—Alumni contributions to the 1971 Alumni Fund 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) to the University of B.C. Two or more scholarships may be awarded in each of thirty areas based on groups of School Districts. Winners will be selected by special Alumni Screening Committees in each area representing the University and the Alumni Association. Application forms may be obtained from the Scholarship Office, Room 207, Buchanan Bldg., 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.

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 to a full course of University studies. Three scholarships of approximately equal value are provided for attendance at the University of British Columbia, the University of Victoria, Simon Fraser University, the British Columbia Institute of Technology, or as may be recommended. 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 the Scholarship Office, University of B.C., Vancouver 8, B.C. The completed application must be returned to the Scholarship Office 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.

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 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 Piping Industry Journeyman Training and Industry Promotion Fund Scholarship—Two scholarships of $500 each, provided by the Trustee Board of the Journeymen Training and General Industry Promotion Fund, are 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 scholarships will be awarded to the candidates who, in the opinion of the University, have the highest academic standing. To compete for the scholarships a candidate must (1) obtain from the Scholarship Office, Room 207, Buchanan Bldg., 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, 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 awards if candidates do not obtain sufficiently high standing or if they receive other major awards.

Real Estate Board of Greater Vancouver Scholarships—Five scholarships of $500 each are offered in competition by the Real Estate Board of Greater Vancouver to Grade XII 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, the British Columbia Institute of Technology, or Capilano College. 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.

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, a Regional College in British Columbia, 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 scholarship will normally be awarded to the eligible applican 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. In case of a tie, the decision will rest with the Selection Committee. No awards 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 Scholarship Committee, University of British Columbia, of their intention to compete.

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, a Regional College in British Columbia 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. In the case of a tie, the decision will rest with the Selection Committee. 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 Scholarship Committee, University of British Columbia, of their intention to compete. Essential details of family service with the Company must also be supplied.

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 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 Scholarship Office, Room 207, Buchanan Bldg., 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.

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 proceeeding in the fall from Grade XII to studies leading to a degree in any field. This scholarship is also open to students who intend to proceed to a Regional College or B.C.I.T. under the following qualifying conditions:

1. That the applicant must take two consecutive semesters of work at the Regional College.
2. That the applicant must take a full programme of work each semester in courses that will give him the equivalent of one full year of University credit at one of the universities in B.C.
3. That the courses taken must be in a programme that will lead to a degree offered by one of the universities in B.C.

Students who wish to compete must complete the General Application for Scholarship Form, obtainable from the Scholarship and Bursary Office, University of B.C., Vancouver 8, B.C. It must be received at the University by May 30th. The application must state the name of the applicant's parents, one of whom must be currently employed by the Company, or have been employed for a minimum of one full year and then retired. Brief details of their service with the Company should also be supplied. All candidates must write the Government of B.C. Grade XII 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—See "General" Scholarship section.

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 $250 to $700 each, will be awarded to students with high academic standing in Grade XII 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 finanical 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 Scholarship Office, Room 207, Buchanan Bldg., University of B.C.

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 The Scholarship Office, Room 207, Buchanan Bldg., 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. 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 and 86;

Area 2—School Districts 12 to 17 inclusive, 21, 22, 23, 77, 89;

Area 3—School Districts 24 to 31 inclusive, 57, 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, Templeton, 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, 87, 88;

Area 12—School District 61;

Area 13—School Districts 62 to 72 inclusive, 84, 85.

If the top ranking student in any of the above categories receives another award, declines the 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. In the event of a tie the University reserves the right to award a scholarship on the basis of additional factors. Winners, when notified by the University, must confirm their acceptance immediately. Postponement will be granted on medical grounds only.

UBC Royal Institution Entrance Scholarships—Six general proficiency scholarships of $200 will be awarded by the University of B.C. on the results of the Grade XII 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 The Scholarship Office, Room 207, Buchanan Bldg., 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.

University of British Columbia Employees, Society No. 116, Scholarship—A scholarship of $350, the gift of the University of British Columbia Employees, Society 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 Scholarship Committee, Room 207, Buchanan Bldg., must be submitted to the University not later than June 30th.

The Vancouver Elementary School Teachers' Association Scholarships—See "Education and Teacher Training" Scholarship section.

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 Scholarship Office, Room 207, Buchanan Bldg., must be submitted to the University not later than May 15th.

The Vancouver Federal Employees Credit Union Harold Pocock Memorial Scholarship—A scholarship of $500, 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 Federal Government residing in the Province of British Columbia or of such other 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 in secondary 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 extra-curricular activities and of his and his parents' financial circumstances. At least two confidential letters of reference, from teachers or others who are acquainted with the candidate's academic record and participation in activities of the school or community, and submitted in sealed enevlopes, must be forwarded with the completed application form.

Vancouver General Unit, Local 180, Scholarships—Two scholarships of $350 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 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 Scholarship Office, Room 207, Buchanan Bldg., 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. 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 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 secondary school 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 Sun Regional College Entrance Scholarships for Sun Carriers—The Vancouver Sun offers annually three scholarships of $250 each to students proceeding in the fall from Grade XII to the first year at a public regional college in B.C., in a full programme of studies (comprising two consecutive semesters or the equivalent) in courses leading to a University degree. To be eligible an applicant must have been a carrier of The Vancouver Sun for at least two consecutive years and must write the Scholarship Examinations conducted in June by the Department of Education, B.C. The scholarships will normally be awarded to the three qualified applicants who rank highest in these examinations, but standing obtained in other subjects taken during the year may be considered, and always in case of a tie. A winner who ranks in the top 10% of the students in the College he has attended and who proceeds to the second year of the College in a full programme of studies leading to a university degree will be granted a renewal in the same amount. A winner who, after completion of one or two years of College, transfers to a full course of studies at a public University in B.C., and who ranks in the top 10%, at the time of transfer, among the students of his Year in the College, will qualify for a further scholarship of $500. For continued attendance at this University he may then be eligible for up to two further renewals until he obtains his first undergraduate degree. Renewal each year is conditional upon his ranking in the top 10% of students in the Year and Faculty in which he is registered. A candidate for these awards must apply on the "General Application Form", which may be obtained from, and must be returned by May 15th to, the Scholarship Office, Room 207, Buchanan Building, University of B.C., Vancouver 8, B.C. The application must be accompanied by the service certificate of The Vancouver Sun.

The Vancouver Sun Scholarships for Sun Carriers—The Vancouver Sun offers annually 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 consecutive 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, and always in case of a tie. 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 the Scholarship Office, Room 207, Buchanan Bldg., 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 Sun 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 consecutive 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 the Scholarship Office, Room 207, Buchanan Bldg., 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. and Marianne Koerner Scholarship in Creative Writing—This scholarship of $500, the gift of Walter C. and Marianne Koerner, is open in competition to students in Grade XII in British Columbia secondary schools beginning studies in any faculty at the Universtiy of B.C., Vancouver, in the fall of 1970. 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. and Marianne Koerner Creative Writing Scholarship, c/o Scholarship Office, Room 207, Buchanan Bldg., 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 $150, $100, 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 Latin—Through the generosity of Mr. W. H. MacInnes of Vancouver, scholarships of $150, $100, and $50 respectively are available to the three students entering the University of British Columbia in September with highest standing in Latin 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 $150, $100, 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

Scholarship in the Diploma Programme in Adult Education—In 1972-73 one scholarship provided by the Center for Continuing Education is offered to students who undertake the Faculty of Education-Center for Continuing Education Diploma Programme in Adult Education. Selection of the winner will be made by the Faculty of Education and the Center for Continuing Education 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 award, financial circumstances of the candidate may also be considered. The specific amount and terms of the award are as follows: one scholarship of $200 available to students who will be in a full-time residence for one academic year.

In Summer Session

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 at the University. The award will be made by the Scholarship Committee to a student in the Third or higher year who has an outstanding record in one or more of the fields of psychology, philosophy, and education.

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 1972, 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 (See "Loan Funds" section).

BURSARIES

For The Winter Session

Applications for bursaries awarded by the University and tenable in the winter session, must be received by the Scholarship and Bursary Office, Room 207, Buchanan Bldg., University of B.C., not later than July 15th. Application forms may be obtained at the Scholarship and Bursary Office 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.

Province of British Columbia Bursaries—The Government of the Province of British Columbia annually provides funds to assist British Columbia students resident in the Province, to commence or to continue an acceptable full-time programme of post-secondary study at designated post-secondary educational institutions in the Province. Under special circumstances a bursary may be made available to a student from British Columbia who is pursuing a course of acceptable professional study at a designated institution in another Province of Canada when that course is one not provided within British Columbia.

To qualify for the grant of a bursary (money that does not have to be repaid) a student must have achieved an average of 65% or higher on a full course load in the last complete year of secondary or post-secondary undergraduate study without a failure in any subject comprising the full course load. For a student entering the first year of post-secondary studies from Grade XII, the qualifying course load is not less than six subjects. For an undergraduate proceeding to a higher undergraduate year, the qualifying course load consists of 15 units or 30 semester hours, in two consecutive terms or semesters. These bursaries are not granted to students in graduate studies, nor to those who are registered as "qualifying" or "unclassified".

Provincial Bursaries are available only to those students who demonstrate definite financial need and who are proceeding to an acceptable full programme of post-secondary study comprising two consecutive terms or semesters in a specified university, public college or the British Columbia Institute of Technology. Separate application for a bursary is not made. The grant of a bursary will be considered on the basis of information provided on the form entitled "APPLICATION FOR FINANCIAL ASSISTANCE FROM PUBLIC FUNDS" which will be submitted by every student seeking financial aid, whether by Provincial Bursary, or Canada Student Loan, or both.

Grade XII students may obtain the necessary application form and instructions from the Principal or Counsellor at the secondary schools. Post-Secondary students will obtain the form and instructions from the Financial Aid Officer of the institution they are attending. Applicants must take careful note of the submission dates stated on the application form. Late applications will not be considered for the grant of a bursary, but this does not affect the issue of a loan. Applications for financial assistance must be submitted to the Financial Aid Officer of the institution to be attended by the applicant.

It is suggested that students at the University of British Columbia obtain application forms and information about submission dates during the month of June by writing to the Scholarship and Bursary Office, Room 207, Buchanan Bldg., University of B.C., Vancouver 8, B.C.

University Bursaries—For the session of 1972-73 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 Scholarship and Bursary Office, Room 207, Buchanan Building, University of B.C., must be received not later than July 15th.

Agricultural Bursary (Anonymous)—This bursary of $100 is offered in the session of 1972-73 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 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 $135, 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.

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 and for those interested in Ukrainian culture, 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 $400, 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 1972-73 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 American Woman's Club Bursary (Special)—A bursary of $250, gift of the American Woman's Club, is available for native B.C. Indian women students. The recipient will be selected by the Dean of Women.

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. Dentists' Wives' Association Bursaries—A number of bursaries, the gift of the B.C. Dentists' Wives' Association, are offered annually to 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 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 $500, the gift of the B.C. Society of Internal Medicine, will be awarded annually to a student in the Faculty of Medicine. The award will be made to a student who needs financial assistance.

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 and Albert O. Koch Memorial Endowment Bursary—This bursary, of annual value of $200, the gift of Mr. Albert O. Koch (deceased), Mr. and Mrs. Wilfred H. Becker, and Dr. and Mrs. David T. Zack, 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.

Best Printer Co. Ltd. Bursary in Animal Science—A bursary of $150, the gift of Best Printer Co. Ltd., Vancouver, is offered to a student in the field of animal science who has a special interest in the care and treatment of domestic animals. The award will be made to a student who has good academic standing and needs financial assistance.

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, 1973.

British Columbia Forest Products Limited Bursaries—Bursaries to a total of $8000, each with a maximum value of $300, are offered by British Columbia Forest Products Limited to qualified legal dependents 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 Scholarship and Bursary Office, Room 207, Buchanan Bldg., University of B.C. This application must be received by the University of B.C. not later than July 15th 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 Scholarship and Bursary Office, Room 207, Buchanan Bldg., 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 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 Salmon Derby Research Bursaries—In 1971-72 two bursaries of $500 each were given to graduate students doing research in topics related to salmon biology and management. Similar awards may be offered in 1972-73.

The British Columbia Sugar Refining Company, Limited Bursaries—Bursaries to the total of $3,500, the gift of The British Columbia Sugar Refining Company, Limited, are available annually for students in Agricultural Sciences, Chemistry, Mechanical and Chemical Engineering, and Home Economics. Winners of these awards will be selected from recommendations submitted by the departments concerned at the discretion of the Scholarship Committee and awards may be made to undergraduates in the upper two years of undergraduate work.

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 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 Canadian Anaesthetists' Society, British Columbia Division, Bursary—One bursary of $100, the gift of the British Columbia Division of the Canadian Anaesthetists' Society and given to honour the memory of Dr. Colin A. Sands, is offered to students in the Faculty of Medicine. It will be awarded to a worthy and deserving student who has a good record, shows promise, and needs assistance. Those who are assisted by this bursary, 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 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 Scholarship and Bursary Office must be submitted to the University not later than July 15th.

The Canadian Forest Products Ltd. Bursary Fund—Bursaries to the total of $3,000 per annum, gift of the Canadian Forest Products Ltd., will be awarded annually to students at the University of British Columbia proceeding in a full programme of studies to an undergraduate degree in any field. The awards will be made at the discretion of the University to students with satisfactory academic records who have need for financial assistance.

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 Cattermole-Trethewey Bursary—A bursary, the gift of Robert Kenny, is offered to students in Forestry. An award of $150 will be available in each of the sessions 1971-72, 1972-73, 1973-74. The award will be made to a deserving undergraduate beginning or continuing studies in the Faculty of Forestry.

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.

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 Chapter, Bursary—A bursary of $250, the gift of the Vancouver chapter of the Institute of Chartered Life Underwriters of Canada, will be offered in 1972-73 to students who are proceeding to the Third Year in any faculty. The award will be made to a student whose academic standing, character, and need for financial assistance are judged to be meritorious.

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 College of Dental Surgeons of B.C. Bursaries—The College of Dental Surgeons of B.C. 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 Comitas Club Bursary—A bursary of $250, 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 Rehabilitation 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 Council of Forest Industries Bursary in Forestry—The Council of Forest Industries' Bursary in Forestry, amounting to $300 per annum, was originally established by the British Columbia Loggers Association as an award to a student registered in 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, and must have a scholastic average of at least 65% in the preceding two years of univesity study. He must also have been engaged for at least one summer session, or the equivalent thereof, in employment in the Forest Industry. Since its amalgamation with other forest industry associations, the B.C.L.A. is known as the Forestry and Logging Division of the Council of Forest Industries of British Columbia.

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 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 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 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.

The Dean Finlayson Bursary—This bursary has been established as a memorial to Dr. J. N. Finlayson by his family and friends. After graduating from McGill, he served successively with distinction as a Civil Engineer in private practice, and as a Professor of Civil Engineering at Dalhousie University and later at the University of Manitoba. Appointed Dean of the Faculty of Applied Science at the University of B.C. in 1936, he maintained and enhanced the already enviable reputation of the Faculty and was chiefly responsible for the planning of the present Engineering Building. On retirement in 1950 he was awarded the degree of Doctor of Science, Honoris Causa. This bursary will be awarded annually in the amount of $100 to a student in Civil Engineering who has good standing and 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.

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 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.

Dominion Construction Co. Ltd Bursaries—Two bursaries of $250 each, gift of Dominion Construction Co. Ltd., are offered to students in Civil Engineering. Of these bursaries one will be awarded to a student in the Fourth Year and the other to a student in the Third Year. The awards will be made to students deserving of assistance who are taking either the Materials and Construction or the Structures option.

The Donald Buckland Memorial Bursary Fund—The Donald Buckland Memorial Bursary Fund is sponsored by the Canadian National Institute for the Blind. Donald Channing Buckland, a graduate and distinguished Faculty member of the University of British Columbia, was himself overtaken by blindness a few years before his untimely death. This fund will be administered by a special committee representing the Institute and the University, and will be used to assist blind students attending the University of British Columbia. Awards will be made only to those who show evidence of ability and promise. Applications should be sent to the CNIB Office, 350 East 36th Ave., Vancouver 15, by July 31, for the ensuing academic year.

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 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. Joseph J. Schachter Bursary in Home Economics—A bursary of $100, provided by a fund established by Dr. Joseph J. Schachter of Saskatoon, is offered annually in the School of Home Economics. It will be awarded to a student with good academic standing who needs and deserves financial assistance. The student who receives this award is requested to repay the bursary if and when circumstances in the future permit. (Not offered in 1972-73.)

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 Education Students' Association Bursaries—Four bursaries of $75 each are offered as follows. Three awards, one to a student in each of Elementary Education, Secondary Education, and at large in the Faculty of Education, are available to students who have been active within the Society for its benefit and who have need. The fourth award is offered to students who have transferred to the Faculty of Education, the basis of selection primarily being need. The awards will be made in January by the Education Students' Association Council. Applications should be submitted in December to the Council.

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 Elizabeth J. Pullen Bursaries—Through a bequest from the late Elizabeth J. Pullen (B.A., UBC, 1941), bursaries to the total of approximately $350 are available to students in the Faculty of Medicine who are worthy and deserving of 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 Bursaries—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 $350, 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 undergraduates 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 Frank Noakes Memorial Fund—As a memorial to Dr. Frank Noakes and in tribute to his leadership in Electrical Engineering education in Canada, his former students, colleagues and friends have established this Fund to provide bursaries to undergraduate students in Electrical Engineering. Awards will be made on the recommendation of a joint faculty-student committee of the Department. They will be made on the basis of financial need and com-

mitment to electrical engineering as demonstrated by academic performance and extracurricular activity. Recipients of awards are asked to assume a moral obligation to reimburse this Fund, if and when circumstances permit.

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. Nesbitt Bursary—This bursary of annual value $250, established as a memorial to her husband by the late Ellen Emma Nesbitt, will be awarded to an undergraduate of good ability who needs financial assistance.

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 1972-73. 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.

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.

Government of B.C. Bursaries—See "B.C. Government Bursaries" in Bursary section.

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 Graduating Classes of 1970 Bursary—This bursary, established and endowed by the Graduating Classes of 1970, will be awarded annually to a student or students in any year and faculty. Special consideration will be given to those with physical handicaps.

The Grahame M. Budge Rugby Award—A bursary of $250, gift of Grahame M. Budge, is offered annually to a full-time registered student who is a member of the Varsity Rugby team. The award will be made on or about February 1st of each year, on the basis of academic ability, qualities of character, and demonstrated proficiency in rugby. 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 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 those 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, the B.C. Institute of Technology, or one of the Regional Colleges in B.C. 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 Grade XII, then to undergraduates in the second year of studies. In order to be considered, a candidate must obtain from the Scholarship and Bursary Office, 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. Each application must be accompanied by a transcript of the student's academic record at the academic institution most recently attended. If the Grade XII record is not immediately available it must be forwarded at the first opportunity.

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 Scholarship and Bursary Office, 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 IBM (Canada) Ltd., 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 competed 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.

Intercontinental Packers Limited Bursary—A bursary of $200 is offered annually by Intercontinental Packers Limited for research related to problems of the meat industry. The award is open to a student, or students, in the field of animal science.

Interior B.C. Dental Association Bursary—A bursary of $400, 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 $400, 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 secondary 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 $125 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 J. Fyfe-Smith Memorial Bursary—A bursary of $500, gift of Florence Fyfe-Smith in memory of her father, is offered to a student in the Faculty of Agricultural Sciences who has shown an interest in ornamental horticulture. The award will be made on the recommendation of the Departemnt of Plant Science.

The John B. Macdonald Alumni Bursaries—In honor of Dr. John B. Macdonald, President of the University of B.C. from 1962 to 1967, sixteen bursaries of $350 will be awarded to students entering the University of B.C. in the fall from the regional colleges in British Columbia. Selection of the winners will be based on academic ability and financial need.

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 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 $375. 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 Joseph Black Bursary Fund—Bursaries from this fund, established by a bequest from the late Joseph Black, Vancouver, will be awarded annually to students with good academic standing who, because of their financial circumstances and personal qualities and character, are deserving of assistance.

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 women 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 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 $200, 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 nurse in the Second or Third Year 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 Bursaries. 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 Bursaries in Pharmacy—Three Bursaries of $100 each, the gift of the Ladies Pharmaceutical Auxiliary, Lower Mainland, is available 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 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 Lambda Kappa Sigma Alumnae Bursary—A bursary of $100, donated by the Alpha Lambda Chapter of Lambda Kappa Sigma Fraternity, will be available in the 1972-73 session to assist a female pharmacy student, with preference given to a member of the Fraternity 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 $100, the gift of Lieut-Col. Cecil Merrit, 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 Louie Stirk Bursary—A bursary of approximately $250 is offered annually to assist a student in any year and faculty who is in need of financial assistance. This bursary was established by a bequest from the late Louie Stirk.

The Mary G. Fyfe-Smith Memorial 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.

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 $150, 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 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.

The Myer Wine Bursary—A bursary of $50, a gift in memory of 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 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 Scholarship and Bursary Office, Room 207, Buchanan Bldg., 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 and Port Coquitlam. 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 Bursaries—Two bursaries of $250 each, gift of the North Shore Medical Society, are available for students in the Faculty of Medicine who have good academic standing and need financial assistance to proceed with their courses. They will be awarded to students whose permanent residences are and have been for some time in the City or District of North Vancouver, or the District of West Vancouver.

Okanagan Valley Medical Bursaries—Bursaries of $500 a year, a gift of the Medical Staffs of the Okanagan Valley, are offered annually to students entering First, Second, and Third Year Medicine at U.B.C. The winners will be selected by the Faculty of Medicine on the basis of financial need and promise of success in a medical career. The bursary will not automatically be renewable but winners are encouraged to re-apply. 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 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. Applicants must apply on the University Bursary Forms, obtainable from the University of B.C., 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.

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 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 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 Training 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 Mr. and 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.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.

Rehabilitation Medicine Award—This award, of approximately $50, was established by the Staff, Students, and Graduates of the School of Rehabilitation Medicine. It will be awarded annually in January to a student in Fourth Year. The ward will be given on the basis of good academic standing and overall personal qualities. Financial circumstances may also be considered. Selection will be made upon recommendation by the Rehabilitation Medicine Awards Committee. Applications should be submitted to the School of Rehabilitation Medicine each September.

The Retail Wholesale & Department Store Union Local 580 Bursaries—Two bursaries of $250 each are offered by the Retail Wholesale & Department Store Union Local 580 to active members, or sons, daughters and legal wards of active members of the Union in good standing. They are open in competition to applicants who are proceeding from Grade XII to studies at the University of British Columbia, the University of Victoria, or Simon Fraser University, or to a regional college 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). 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 these bursaries must obtain the University Bursary Form from the Scholarship and Bursary Office, Room 207, Buchanan Bldg., 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 consultation 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 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.

Rhoda Cohen Memorial Bursary—A gift of the Vancouver Section of the National Council of Jewish Women of Canada, this bursary of $100 will be awarded to a student in the Teacher Training Course with a desire and the ability to specialize in Family Life Education.

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.

The Royal Arch Bursaries—Four or more bursaries, in the amount of $300 to $500 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 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 bursaries must (a) write the Government Scholarship Examinations conducted in June by the Department of Education, B.C.; (b) complete the University Bursary Form, which may be obtained from the Scholarship Office, Room 207, Buchanan Bldg., University of B.C. This application form, which is to be received by the University not later than July 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 the 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, including the net taxable income of parents for the past year. A letter from the Secretary of the Royal Arch Chapter confirming the details in (i) should be included. Candidates will be considered on the basis of the Scholarship Examinations and the grades obtained in the other courses taken during the year, and on their financial circumstances. If, in the opinion of the University, no applicant is suitably qualified, the award will be withheld.

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 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 $300, 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 Samuel David Leshgold Memorial Bursary—A bursary of $100, established as a memorial to Samuel David Leshgold by his wife, Katherine Leshgold, will be awarded annually to a student in the Faculty of Medicine proceeding to the M.D. degree. It will be awarded to a student who has need for financial assistance and has a good academic standing. Preference will be given to a student who has a special interest in the field of arthritis.

The Sam Zivot Memorial Bursary—As a memorial to Sam Zivot, and as a tribute to the esteem in which he was held, this bursary in the amount of $100 is offered by Mr. A. Kolberg. It will be awarded to a student in any year and faculty who not only has satisfactory academic standing but who has need of financial assistance.

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.

Saul Grand Bursary—This bursary of $250, 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 third or fourth year female student in the field of Government and Political Science. To be eligible a student must show maturity, need and a strong desire to participate actively in community and government affairs. This bursary is awarded in order to encourage women to become involved in politics.

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 Bursary—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 $200, endowed by friend 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 Agricultural Sciences 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 $500 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. (May not be offered in 1972-73.)

***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 to attendance at the University of B.C. (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 bursary application must be accompanied by a letter from the General Manager of Stry Credit Union, certifying that the applicant and his or her family meet the membership qualifications.

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 Scholarship and Bursary Office, must be received before July 15th.

The Suzanne H. Mullin Bursary Fund—Bursaries from this fund, established through a bequest from the late Suzanne H. Mullin, are available to students in the field of Public Health (Department of Health Care and Epidemiology, Faculty of Medicine). The awards will be made by the University Scholarship Committee in consultation with the Faculty of Medicine.

The Sydney Elizabeth Price Memorial Bursary—As a memorial to their daughter, Sydney Elizabeth Price, a student at U.B.C. from 1968 to 1970 in the Faculty of Arts, a bursary in the amount of $425 has been established by her parents, Mr. and Mrs. J. E. Price of Calgary, Alberta. This bursary will be awarded annually, on the basis of financial need, to a woman student entering her Third Year in the Faculty of Arts and taking a major or honours course in Political Science.

The Teachers of Home Economics Specialist Association Bursary—A bur-

sary of $200, gift of the Teachers of Home Economics Specialist Association, is offered to women students in British Columbia entering the 2nd year in the School of Home Economics or the Faculty of Education majoring in Home Economics. Selection of the recipient will be made on the basis of academic standing; aptitude for and promise in teaching in the field of Home Economics; personal qualities and character; and interest and participation in school and community affairs. The financial circumstances of the applicant may also be a factor. Students should apply on the University Bursary Form, obtainable after June 1st from the Scholarship, Bursary and Loan Office, Room 207, Buchanan Building, U.B.C. The application form must be returned not later than 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.

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—Gift of Totem Park Residence Association, bursaries are offered annually to students who reside in Totem Park Residence, in any year and faculty, and who are in need of financial assistance.

The UBC Alumni Bursary Fund—A minimum of $15,400 has been made available and such additional funds as are allocated from time to time by the Alumni Association Board of Management to provide bursaries for students beginning or continuing attendance at the University of B.C. and who are graduates of secondary schools of the Province. The awards will be made to students with sound academic standing who have need for financial assistance. Special consideration will be given to applicants for the Norman MacKenzie Alumni Scholarships.

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 Scholarship and Bursary Office.

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 1972-73 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.

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 Municipal & Regional Employees Union Bursary—This bursary of $300, established by the Vancouver Municipal & Regional Employees Union, is open annually to members of the Union and to sons, daughters and legal dependents of members, who, at the time the award is made, have held membership in the Union for at least two years. It will be awarded by the University, in consultation with the Union, 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 Scholarship and Bursary Office, Room 207, Buchanan Bldg., University of B.C. It must reach the University by July 15th.

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, 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.

Vancouver Section of the National Council of Jewish Women of Canada Bursary—A bursary of $100 for a mature part-time female student in any faculty. To be eligible the student should be returning to university with the intent of completing an academic program and must show need.

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 $250, **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 $200, 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 $300, 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 Walter D. Frith Student Aid Fund, 1969—The annual income from this fund, established by a bequest from the late Bessie Churchill Frith, provides scholarships and bursaries for deserving students attending the University of British Columbia.

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 Scholarship and Bursary Office.

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 $1000, the gift of Weldwood of Canada Limited, are offered to Forestry 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—One bursary of $1000, is provided annually 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 of secondary school to a full programme of studies at the University of B.C., Simon Fraser University, or the University of Victoria. For purpose of qualification, "employees" shall include students having part time employment with the Company while attending secondary school and who are still employed. 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 Scholarship and Bursary Office, Room 207, Buchanan Bldg., 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 1972-73 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 $450 will be awarded to a student who has completed at least one year of work in the Faculty of Agricultural Sciences, 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.

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 Scholarship and Bursary Office, Room 207, Buchanan Bldg., University of B.C., 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 Scholarship, Bursary and Loan Office, 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

The Government of Canada Student Loans Plan—This is a plan introduced by the Federal Government to assist students who, without loan assistance, would be unable to pursue full time post secondary studies at a specified educational institution. The maximum loan for an academic year is $1,400. Total loans to any student cannot exceed $9,800. A loan of up to $700 may be authorized for a single semester which is part of a longer programme of study. Borrowers under the plan are required to repay principal and interest by regular monthly instalments. Payments commence six months after the borrower ceases to be a full time student at a specified educational institution. No payments are made while the borrower is a full time student nor for six months thereafter. Interest during this period is paid by the Federal Government on behalf of the student. Need for loan assistance is determined by Provincial Loan Authorities in accordance with administrative criteria established for use throughout Canada. A parental contribution table is an integral part of the criteria and it is applied in all cases where the student has not established financial independence by having married, or having completed successfully four full years of post-secondary education, or having reached the age of 21 years and having had at least twelve consecutive months' full time employment. Students are expected to save a substantial amount of any income from summer or other employment. Lack of funds due to unessential spending may not be considered as unavoidable need for loan assistance. Students who apply for loans should consider carefully the repayment obligation being undertaken. A student in need of a Canada Student Loan must, as a first step, obtain an application form from the institution he plans to attend. The application must be completed carefully and accurately by the student, and where applicable, by his parents. Applications require declarations by both the student and his parent that all information provided is correct. When the application is completed it must be submitted to the Financial Aid Officer of the British Columbia educational institution to be attended. Students planning to attend institutions outside of British Columbia will send applications directly to: Student Awards Branch, Division of Post-Secondary Services, Department of Education, Parliament Buildings, Victoria, B.C. University of B.C. students should obtain applica-

tion forms from and submit them to the Scholarship and Bursary Office, Room 207 Buchanan Bldg., University of B.C., 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.

Atlas Iron & Metals Ltd. Student Aid Fund—This fund, the gift of Atlas Iron & Metals Ltd., provides Loans for students with good standing who are in need of financial assistance.

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 C. Rikhoff Student Loan Fund—The funds from the Charles C. Rikhoff Student Loan Fund are to be loaned at interest for the purpose of assisting worthy and intelligent persons of limited means to obtain the benefits of higher education at the Univesrity of British Columbia. The donor of this fund is Mr. Charles C. Rikhoff.

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.

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 Scholarship, Bursary, and Loan Office, Room 207, Buchanan Bldg., 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.

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 Pharmaceutical Sciences.

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.

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. 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 Pharmaceutical Sciences.

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.

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 Miles and Vivian Brookes Student Aid Fund—This fund, established by Miles and Vivian Brookes, provides loans for students in any year and faculty who have satisfactory standing and need financial assistance.

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 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.

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 Scholarship, Bursary, and Loan Office, Room 207, Buchanan Bldg. Loans, which are interest-free 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 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:

Chapter A.P., P.E.O. Sisterhood	$ 50.00
Faculty Women's Club	$ 750.00
University Student Wives Association	$ 80.00
Miss M. M. Fallis	$ 50.00
Mrs. K. M. Von Sabiston	$ 50.00
Mrs. F. G. Buchanan	$ 20.00
	$1,000.00

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. Application must be made to the Scholarship, Bursary, and Loan Office, Room 207, Buchanan Bldg. Loans cannot be made until the beginning of summer session 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, KIP5NI Ontario. Completed applications must be submitted to arrive no later than the closing date. A comprehensive list of awards is published biennially by the Association. Among the sixty competitions in the list published in December, 1971, were the following:

Bank of Nova Scotia Bilingual Exchange Scholarships (for Graduate Students)—For any recognized degree course; value $3000 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 1st.

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.

Belgian Government Fellowships—Field of study: Physical sciences, mathematics, chemistry, biology, zoology, botany, geology, engineering, medical sciences, veterinary science and pharmacy, agronomy, economics, philology, philosophy and history. Also higher studies in the arts. Value: Return travel expenses, 7,000 BF monthly residence allowance, 250 BF monthly for the purchase of books with a maximum of 2,000 BF for the academic year, free railway tickets for travel in Belgium related to studies or research, insurance against accidents and illness for the holder of a fellowship and his family. Number: Unspecified. Duration: One academic year. Conditions: Candidates must have a practical knowledge of French or Dutch for specialized work and either these or English for other work. Candidates must be Canadian citizens who are graduates of a Canadian university or college which is a member or affiliated to a member of the AUCC. Candidates must be under 35 years of age by April 20th in year of competition. There is no age limit for research. Where tenable: Universities of Brussels, Ghent, Liège and Louvain; in university Faculties and Centres at institutions of higher learning and in various centres and laboratories. Closing date for receipt of completed applications: 31 December. Further information and application forms: Director of Awards, Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa, Ontario, K1P 5N1.

Bell Canada Centennial Fellowships—Field of study: Unrestricted, but preference given to subject areas relevant to the scientific, political, social or economic needs of Canada. *Restricted to those who are proceeding towards a Master's Degree.* Value: $3,500 to Fellow. $1,500 to the university (Fellow's tuition fees will be paid out of the $1,500) to help defray expenses associated with the university's graduate study programme. Number: Up to a total of 8 graduate fellowships will be given annually; 4 of which will be new awards. Renewal is not automatic but application for renewal will be considered by the Selection Committee. Duration: Fellowships are for a 12 month period beginning in the academic year in which they are awarded. Although an award may be renewed for a second year, such renewal is dependent upon proof of satisfactory progress and the decision of the Selection Committee. Conditions: Candidates must be Canadian citizens or must have held landed immigrant status for one year prior to submitting application. Landed immigrants are required to submit to the AUCC proof of their status. Applicants must be graduates of a university or college with standards accepted by the A.U.U.C. The fellowship holder is permitted to instruct or demonstrate for a maximum of 100 hours in the academic year, including preparation and presentation, if approved by the supervisor of the Fellow's programme. The Fellow may not hold concurrently other awards in excess of $600. On completion of the fellowship three copies of a thesis or reasonably detailed account of the work done, should be sent to the Director of Awards, Association of Universities and Colleges of Canada, who in turn will forward two copies to Bell Canada. *Bell Canada Fellowship is not applicable for studies at the doctoral level.* Where tenable: at any Canadian university or college which is a member, or affiliated to a member, of the Association of Universities and Colleges of Canada. Closing date: 1st March. Further information: Director of Awards, AUCC, 151 Slater Street, Ottawa 4, Ontario.

NOTE: Although this competition is open to any eligible candidate who wishes to apply, it is worth noting that because of the exceptionally large number of applications normally received, *students who are not in the top 10% of their class are unlikely to be successful.*

The Canada Scholarship at Cambridge—Sponsors: Cambridge University Canada Club and the Canadian Universities Society of Great Britain. Field of study: Humanities and social sciences: including Anglo Saxon, archaeology and anthropology, architecture and fine arts, classics, economics and politics, English, geography, history, law, music, Oriental studies, philosophy, social and political sciences, and theology. Value: £1,250 per annum, which includes the cost of return travel. Number: One—offered in alternate years. The next award will be tenable from October 1971 to October 1973. Duration: Two years. Conditions: Open to single male graduates in the humanities and social sciences who have already obtained a first degree form any institution which is a member or affiliated to a member of the Association of Universities and Colleges of Canada. The holder of the scholarship will take a Cambridge B.A. degree as an affiliated student. Affiliated students are allowed to complete the requirements for this degree in two years instead of the normal three. This scholarship offers an opportunity to a man of high academic ability, either to work in a new field, or to specialize in a course of study which he began in Canada. Where tenable: Peterhouse, Cambridge. Closing date: January 30th. Further information: Enquiries about the terms of the scholarship or about the courses available at Cambridge should be addressed to the Senior Tutor, Peterhouse, Cambridge. Application forms for scholarship should be obtained from: Director of Awards, AUCC, 151 Slater Street, Ottawa 4, Ontario.

Department of National Defence Scholarships and Fellowships Programme—Field of study: Military and strategic studies of interest to Canada and may comprise work in one or more of the following areas: National and international aspects of security, studies of strategic theory, alliances and United Nations, civil-military relations. Value: The annual value of a fellowship is $6,000 plus academic fees, plus return economy air fare for Fellow and immediate family, plus a supplementary allowance of $1,500 for married Fellows. The annual value of a scholarship is $4,000 plus academic fees. Number: 2 fellowships and 3 scholarships may be awarded annually. Duration: The duration of a fellowship is one year. Requests for renewal may, in exceptional cases, be considered by the selection committee. A scholarship is tenable for one year only, but may be renewed on evidence of satisfactory academic achievement. Conditions: Applicants must be Canadian citizens. If a naturalized citizen proof must be submitted. Candidates for a fellowship must, before closing date of the competition, hold a Ph.D. degree or equivalent level of knowledge or experience in the field considered adequate by the Selction Committee. A Fellow may not hold concurrently any other major award. Candidates for a scholarship must hold an Honours Bachelor's degree or its equivalent before taking up the award. Scholarship winners may not hold concurrently any other award in excess of a total value of $600 annually. Tenable: There will be no restriction upon the location where awards are tenable except that it must be suitable to the program of work to be undertaken. Further information and submission of application forms: Director of Awards, Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa, Ontario, K1P 5N1.

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 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.

German Academic Exchange Service Fellowships—Field of study: Unrestricted, except for pharmacy, chemical engineering and specialized fields

of agricultural research. Value: DM 500 to DM 800—approx. $137.50 to $220 per month (depending on the candidate's level of previous training) and return travel expenses, as well as free tuition, course fees and university examination fees. An initial grant of DM 400—approx. $110 will be given at the beginning of the fellowship for additional expenses together with a book purchase allowance given for each semester. In addition a monthly allowance of DM 200—approx. $55 will be given for a married student accompanied by wife or husband. For each child living in the Federal Republic of Germany the grantee will receive a monthly allowance of DM 50. Number: Eighteen. Duration: 12 months, commencing October 1st. Conditions: An applicant must be a Canadian citizen and a university graduate. An applicant must not be more than 32 years of age in the year of the competition. A language proficiency certificate from a recognized teacher of German is required. Candidates should have a good knowledge of German since the final admission of selected candidates to a German university is conditional upon passing another language examination at the host institution. Applicants must also submit, one complete typewritten curriculum vitae in German as well as one handwritten copy in English with three typewritten copies in English. Applicants in the *Fine Arts, Music* and *Architecture* are required to submit in addition the following: *Painting and graphic arts:* At least three works and several sketches (signed and dated). No photographs. *Sculpture:* Photographs taken of at least three works from different angles, and several sketches (signed and dated). *Music:* Tapes with a frequency of 9,5 sec/cm or 19 sec/cm (frequency 50 cycles) with indication of the pieces played (track and number) as well as exact position on the tape where each piece begins. The various pieces must be separated white leader tape. The date of recording should also be given. The tape should include several pieces from different music periods. Composers must submit scores and, when possible, tape recordings of their own compositions. The tape should be of good quality. Conductors must submit tape recordings of their own performance on an instrument as well as an orchestral performance under their own direction. *Architecture:* Design (blue print and photographs) and in addition at least one perspective drawing and one draft, designs (drafts) and other drawings and sketches which reveal the applicants' creative talent. Note: It is imperative that the students explain in detail what study or scientific research programme they wish to carry in Germany. Incomplete applications cannot be processed by the DAAD and result in the automatic rejection of the applicant. Candidates may not hold concurrently any other awards. Where tenable: Universities, technical universities, scientific institutions, and academies of art or music in the Federal Republic of West Germany. Closing date for receipt of completed applications: December 31st.

Gulf Oil Canada Limited Graduate Fellowships—Field of study: Fellowships will be awarded to candidates in engineering, chemistry, geology, geophysics, physics, mathematics and computer sciences, business and management studies, ecologically-oriented studies, and other sciences related to the petroleum industry. Value: Each fellowship is valued at $4,500 $3,500 to be paid to the successful candidate and $1,000 to the receiving university in which the Fellow is registered. Number: Nine graduate fellowships are to be awarded annually and the winners may, on the recommendation of their supervisor, re-apply in the competition in the following year. Conditions: Candidates must be Canadian citizens or have held landed immigrant status for one year prior to submitting application. Candidates must be graduates of a Canadian university or college which is a member, or affiliated to a member, of the Association of Universities and Colleges of Canada. Candidates for these awards will be expected to have achieved a high level of academic excellence as well as to have exhibited superior intellectual ability and judgement. Fellowship holders may not hold concurrently any other awards in excess of a total value of $500, nor may they undertake paid employment in the university unless such employment is approved by the supervisor of studies and does not exceed four hours per week including preparation time. On completion of fellowship two copies of a thesis or reasonably detailed account of the work done, should be sent to the Director of Awards, Association of Universities and Colleges of Canada which in turn will forward one copy to Gulf Oil Canada Limited. Where tenable: At any Canadian university or college which is a member, or affiliated to a member, of the Association of Universities and Colleges of Canada. Closing date for receipt of applications: 1st March. Further information: Director of Awards, AUCC, 151 Slater St., Ottawa 4, Ontario.

Hockey Canada Scholarships—Donor: Hockey Canada was established in 1969, as a result of the recommendations of the Task Force on Sports. This scholarship programme is intended to encourage young men in two equally important fronts—the pursuit of post-secondary education and the development of proficiency in the game of hockey. Field of study: Unrestricted, and at all levels of post-secondary education. Value: $2,000 annually. Number: Minimum of 10. Duration: Four consecutive years or until a university degree or community college diploma is obtained, whichever is the sooner, and provided the student establishes continuing eligibility with respect to academic and hockey progress. Conditions: These scholarships are open to candidates with outstanding hockey ability who are Canadian citizens or who have held landed immigrant status for at least one year and who have graduated or are about to graduate from a secondary school with an average of at least 65% in the year of graduation, or who are presently enrolled or have been enrolled in a post-secondary institution. Where tenable: Throughout Canada at any Community College; CEGEP; or University or College, which is a member or affiliated to a member of the Association of Universities and Colleges of Canada; having a viable hockey programme. Closing date for receipt of applications: April 30th. Further information and application forms: Director of Awards, AUCC, 151 Slater Street, Ottawa 4, Ontario.

Instituto Colombiano de Especializacion Tecnica en el Exterior (ICETEX) Fellowship—Field of study: Spanish-American linguistics and philology. Value: 50% of return passage, tuition, living allowance of 800.00 Colombian pesos (approximately $80.00) a month, and book allowance of 300.00 Colombian pesos. ICETEX is willing to consider increasing the monthly allowance to 900.00 Colombian pesos if the transportation expenses are paid by the applicant. Number: One. Duration: August 1 to July 31. Conditions: Candidates must be Canadian citizens who are graduates of a Canadian university or college which is a member or affiliated to a member of the Association of Universities of Canada. Where tenable: Caro and Cuervo Institute (Instituto Caro y Cuervo), Bogota, Colombia. Method of application: Further information and application forms should be requested directly from: Director of Awards, Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa, Ontario K1P 5N1. Closing date: Completed applications in quadruplicate are to be sent directly to the address above to arrive *not later than December 31*.

NOTE: A limited number of tuition-free places shall also be offered by ICETEX, tenable at the University of the Valley (Universidad del Valle) in Cali, Colombia, for graduate study in urban planning, economics, and drilling. The conditions, method of application, and the closing date for the receipt of applications for these places are the same as for the award described above.

Israeli Government Scholarships—Field of study: Unrestricted post-graduate or research studies, but it has been suggested that the Schools of Divinity, Archeology and Semitic Languages would be of particular interest to Canadian students. Value: Free tuition plus 480 Israeli pounds per month. The amount of the scholarship is sufficient for the maintenance of one person only and does not include travel expenses. Number: Unspecified. Duration: Nine to twelve months according to case. Conditions: The language of instruction is Hebrew. For research, generally, knowledge of English or French is needed with Hebrew being desirable but not essential. For research in natural sciences a thorough knowledge of English is essential. An intensive tuition free course in Hebrew beginning in July may be arranged, if necessary. Candidates must be Canadian citizens or hold landed immigrant status for at least one year prior to date of application. They must also hold a first degree from university and not be over 35 years of age in the year of competition. Where tenable: The Hebrew University, Jerusalem; Tel Aviv University, Tel Aviv; Bar-Ilan University, Ramat Gan; The Weizmann Institute of Science, Rehovoth; Technion, Israel Institute of Technology, Haifa. Closing date for receipt of completed applications: 31st December. Further information and application forms: Director of Awards, AUCC, 151 Slater Street, Ottawa, Ontario, K1P 5N1.

Poland-Unesco Fellowship in Slavonic Studies—Field of study: History of Poland, Polish philology and Slavonic philology. Value: Maintenance allowance of 2,400 zlotys per month (approx. $100), tuition fees, free lodging in a Polish university residence and medical services. Travel expenses not exceeding economy air fare and return plus two-thirds of wife's travel expenses are provided by The Canadian Commission for Unesco. Number: One. Duration: 12 months. Conditions: Candidates must have a university degree and a good knowledge of one of the following languages: French, English, German or Russian. A fair knowledge of Polish is also desirable. Preference will be given to candidates who have already carried out some research in their chosen field of study. Candidates must be Canadian citizens who are graduates of a Canadian university or college which is a member or affiliated to a member of the AUCC. Where tenable: Poland. Closing date for receipt of completed applications: 31st December. Further information and application forms: Director of Awards, Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa, K1P 5N1, Ontario.

Steel Company of Canada Limited Graduate Research Fellowships in Metallurgy—Four new awards of $5000 each ($4000 to the fellow and $1000 to the department of the receiving university); 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.

Swiss University Scholarships—Field of study: All fields, with the exception of music and fine arts. Value: Swiss Government will pay SFr. 650 (graduate) to 800 (post-graduate) (approx. $160 - $200) per month plus return fare at conclusion of scholarship, plus tuition fees, plus health and

accident insurance, and generally, a specific amount of study material. Number: Six. Duration: 10 months with possibility of renewal upon application. Conditions: Candidates must be Canadian citizens. Candidates must also have graduated or be about to graduate from a recognized university and have a definite plan of studies. A good knowledge of either French or German is required. Applicants who have followed a professional career for several years after termination of their studies as well as those who are more than 35 years of age will not, normally, be eligible. Preference will be given to single candidates because of the lack of proper lodging facilities for married scholars in the university cities of Switzerland. However, *upon request presented together with the application* and in certain instances, consideration may be given by Swiss authorities to married scholars. Candidates who plan to attend the Université de Zurich must submit a translation in French or German of their maturity certificate. Each scholar must submit, at the end of the tenure of the award, a brief report on their studies in Switzerland. Where tenable: Switzerland. Closing date for receipt of completed application forms: 31st December. Further information and application forms: Director of Awards, AUCC, 151 Slater Street, Ottawa, Ontario, K1P 5N1.

University Scholarships Offered by the Government of Finland—Field of study: Not restricted. Value: 750 Finnish marks per month. Tuition is free and also travel within Finland connected with the scholar's study programme if approved by the Ministry of Education. The award is intended to cover accommodation, meals, local transportation and other expenses. Number: One or two. Duration: One nine month scholarship or two 4½ month scholarships. Conditions: Candidates must be Canadian citizens who have obtained a first degree from a Canadian university. The applicant must have a working knowledge of Finnish, Swedish or German. Scholars must submit a report on their work to the Finnish Ministry of Education before or immediately after the conclusion of the scholarship period. Where tenable: Finland. Note: Transportation from Canada to Finland and back must be paid by the student himself. The Finnish Ministry of Education does not cover the possible medical expenses, thus it is recommended for the student before his departure to obtain an international medical and accident insurance. Closing date for receipt of completed applications: December 31st. Further information and application forms: Director of Awards, AUCC, 151 Slater Street, Ottawa, Ontario, K1P 5N1.

University Scholarships Offered by the Government of France—Field of study: All fields. Scientifics in particular. Value: 500 French francs per month (approx. $90) (possibly up to 750 French francs per month (approx. $135) for Ph.D. candidates), plus return economy air fare, free tuition and refund for medical, hospital and pharmaceutical expenses and various indemnities towards lodging, relevant travel expenses, thesis typing expenses, and the benefit of students privileges (university, restaurants, residences, cultural and social activities . . .). No funds are available for dependents. Students will therefore have to make other provision for any dependents who may accompany them. Number: Unspecified. Duration: One academic year with possibility of renewal upon request and satisfactory academic achievement. Conditions: This competition is open to Canadian citizens, or those who have held landed immigrant status for at least one year prior to submitting application. Candidates must have obtained a first degree from university before taking up the award. A good knowledge of French is essential. The scholarship may not be held concurrently with other awards. Age limit: Candidates who are more than 35 years of age are not eligible. Where tenable: In France. Further information and submission of applications for the University Scholarship Programme: Director of Awards, Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa, Ontario, K1P 5N1. Closing date for receipt of completed applications at the AUCC: December 31st.

NATIONAL RESEARCH COUNCIL OF CANADA
Office of Grants and Scholarships
1972-73

The National Research Council of Canada offers annually the following types of awards for advanced studies and/or research in science or engineering.

Postdoctorate Fellowships

Value: $6,400.00 for single and married fellows. $7,600.00 for married fellows 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 residing in Canada who has received his Ph.D. from a Canadian university.

Applications: Completed applications must be received by the Scholarships Officer, National Research Council of Canada, by 31 December preceding the competition which is held during the month of March.

Postdoctorate Fellowships

Value: $6,400.00 for single and married fellows. $7,600 for married fellows with children, plus travel.

Period of Tenure: Awarded for 12 months and renewals for a second year are frequent.

Place of Tenure: Laboratories of Departments and Agencies of the Canadian Government.

Age: The candidate must not have reached his 36th birthday by the 31st of March of the year in which the fellowship is to be taken up.

Citizenship: There are no restrictions regarding nationality of applicants, but successful candidates must meet all Canadian immigration requirements.

Applications: Completed applications must be received in the Postdoctorate Fellowships Office, National Research Council of Canada, by 15 January preceding the competition which is held in March.

Industrial Postdoctorate Fellowships

Value: The fellowship takes the form of a $7,200 subsidy towards the gross salary which is set up by the sponsoring company, plus travel.

Period of Tenure: Awarded for 12 months and may be renewed once.

Place of Tenure: In any Canadian company which agrees to participate in the program.

Age: The candidate must not have reached his 35th birthday.

Citizenship: A candidate must be a Canadian citizen or a landed immigrant who has received his Ph.D. from a Canadian university.

Applications: There is no formal deadline and applications will be received and considered throughout the year.

1967 Science Scholarships

Value: $5,300.00 plus academic tuition fees and travel. It also includes a Supervisor's grant.

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.

Applications: Completed applications must be received by the Scholarships Officer, National Research Council of Canada, by 31 December preceding the competition which is held during the month of March.

Note: Students must be proposed by a member of the faculty and invited to apply by their Head of Department.

Postgraduate Scholarships

(A) For 1st year of Graduate Studies:

Value: $3,800.00 plus travel.

Period of Tenure: Awarded for 12 months and not renewable.

Place of Tenure: In Canadian universities.

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 residing in Canada at the time of application. Landed immigrants must have completed one full academic year of studies and/or research at a Canadian university.

Applications: Completed applications must be received by the Scholarships Officer, National Research Council of Canada, by 31 December preceding the competition which is held during the month of March.

(B) For 2nd or Subsequent Year of Graduate Studies:

Value: $3,800.00 plus travel.

Period of Tenure: Awarded for 12 months and may be renewed twice.

Place of Tenure: In Canadian universities.

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 residing in Canada at the time of application. Landed immigrants must have completed one full academic year of studies and/or research at a Canadian university.

Applications: Completed applications must be received by the Scholarships Officer, National Research Council of Canada, by 31 December preceding the competition which is held during the month of March.

Bursaries

Value: $3,200.00 for 12 months.

Period of Tenure: Awarded for 12 months. A student may receive a maximum of 4 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.

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 residing in Canada at the time of application.

Applications: Interested students should direct all enquiries concerning method of application to their Head of Department.

Post Industrial Experience Research (PIER) Fellowships

Value: $6,400.00 for single and married Fellows. $7,600.00 for married Fellows with children, plus travel.

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 and laboratories of the Federal Government.

Age: No age restriction.

Citizenship: A candidate must be a Canadian citizen or a landed immigrant at the time of application.

Eligibility: A candidate must have a minimum 5 years industrial experience, involving the candidate's professional training, two of which must have been obtained in Canada.

Applications: Completed applications must be received by the Scholarships Officer, National Research Council of Canada, by 31 December preceding the competition which is held during the month of March.

Postgraduate Scholarships in Science, Librarianship and Documentation

Value: $3,800.00 plus travel.

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 at the time of application.

Eligibility: A candidate must have a degree in science or engineering.

Applications: Completed applications must be received by the Scholarships Officer, National Research Council of Canada, by 31 December preceding the competition which is held during the month of March.

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 approximately £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, 1972. **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, 1973.

He must have completed two years of university study by October 1st, 1972.

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;**
4. **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, 1972, and, if elected, to go to Oxford in October, 1973. Further information and application forms may be had from the Scholarship and Bursary Office, Room 207, Buchanan Building, University of British Columbia, Vancouver 8, B.C.

For Graduate Study

Canada Council Grants—The Canada Council offers fellowships and grants in the social sciences and humanities and a variety of assistance to professional artists.

In the Social Sciences and Humanities, Doctoral Fellowships and Leave and Research Fellowships are awarded by the Council through annual competitions, with specified deadlines each autumn. Applications for Research Grants are accepted at any time.

In the Arts, Autumn deadlines are also specified for Arts, Bursaries and Arts Awards. Applications for Short Term, Travel and Project Cost Grants are accepted throughout the year.

Under cultural exchange agreements between Canada and various foreign countries, the Council offers grants to Canadian universities in support of foreign professors, scholars and artists in all disciplines. The Canada-France cultural agreement also provides for grants to Canadian university professors in the humanities and social sciences who wish to conduct research in France. Applications in each program must be received at specified dates in late Fall.

In cooperation with the (U.S.) Foreign Area Fellowship Program, the Council also offers Training Fellowships in the Social Sciences for Canadian M.A. students who have a special interest in Latin America. Applications must be received by January 15.

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, P.O. Box 1047, Ottawa, K1P 5V8, as follows:

Awards Service—For annual competitions
Social Sciences and Humanities Division—For research grants
Arts Division—For short term grants for artists.

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.

Professional Fellowship $2500—This Fellowship is open to any woman holding a Degree from a Canadian university, whose domicile is in Canada, (a) who wishes to spend a year at an accredited library school, school of social work, college of education, or similar professional school; or (b) who wishes, after some years of experience in a chosen field or after a lapse of time away from formal study, to embark on a program leading to an advanced degree.

Information may be obtained from the Chairman of the Fellowships Committee, Mount Allison University, Box 69, Sackville, N.B. 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 130, 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.

Central Mortgage and Housing Corporation Fellowships in Urban and Regional Affairs—For the academic year 1972-73, up to 125 fellowships are offered by Central Mortgage and Housing Corporation for full-time graduate work in urban and regional studies. One hundred and fifteen fellowships are available for study at Canadian Universities and ten fellowships are available for study elsewhere. Fellowships are awarded for 12 months commencing in September 1972. Fellows receive a personal stipend of $3,900 and an allowance of $600 for each dependent child and the Fellow's tuition fees are paid to the University. The Fellowship is divided into three equal instalments covering the periods September - December, January - April, and May - August. Payment is made at the beginning of each period that the Fellow is certified by the University to be a full time graduate student in good standing. Tenure in Canada is open to Canadian citizens and landed immigrants of not less than 18 months; tenure outside of Canada is open to Canadian citzens. 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 and finance and management; community organization and planning; and urban enviromental 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 environmental 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 1972-73 must be submitted to C.M.H.C. not later than March 15, 1972, for study at Canadian Universities, and March 31, 1972, for study at universities outside Canada. The prospective candidate is to submit his application to his University in either case by March 1. Present holders of C.M.H.C. Fellowships will be advised by the Corporation of the procedures to be followed in applying for fellowship renewal. Information and application forms are available from: Administrative Officer, Policy Planning Division, Central Mortgage and Housing Corporation, Ottawa K1A OP7, Ontario.

Chevron Standard Limited Graduate Fellowships—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 showing an interest 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 Scholarship and Bursary Committee, 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.

CIL 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 101, P.Q.

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 award 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 may be made. These scholarships, which are tenable for two, or in certain areas, three years, are the value of £1000 p. a., of which £100 is to be regarded as an allowance toward fees and research expenses. Certain other allowances are also payable. 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 Scholarship and Bursary Office of the University of B.C. Inquiry should be made before the end of December.

French Government Book Prizes and Medals—Three book prizes and a medal, offered by the French Government, will be awarded to students in French on the recommendation of the Head of 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 or prospective graduate in the year of competition, 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 Canadian universities—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. 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 15 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. 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 Literature. 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, fifty international fellowships of $3000 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 1000 pounds sterling, a grant or grants (value to be determined by the heads of the project and the funds available), from the Jubilee Fund. 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.

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 Christine Irvine, Shirreff Hall, Dalhousie University, Halifax, Nova Scotia.

The International Nickel Graduate Research Fellowships in Engineering and Science—The International Nickel Company of Canada Limited provides annually a number of postgraduate fellowships tenable at Canadian universities 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 $4,500, of which $3,800 is payable to the fellow and $700 is placed at the disposal of the directing professor for necessary materials or equipment. 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 111, Ontario, not later than January 15. Not more than one application (either new or renewal) will be considered from any one department annually.

The Mackenzie King Travelling Scholarships—These scholarships of not less than $2500 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 1972 must be submitted by March 1st, 1972.

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. Awards of varying amounts per session will be made each year. Requests for application forms should be made after October 1st and completed by January 31st. Further information may be obtained from the Dean of Women.

Queen Elizabeth II British Columbia Centennial Scholarship—To commemorate the visit of Queen Elizabeth II to British Columbia in May, 1971, during the Centennial celebrations, the Government of the Province established the Queen Elizabeth II British Columbia Centennial Scholarship. The purpose of this scholarship is to enable selected British Columbians, who have graduated from a public university of the Province, to take further studies at approved universities (or equivalent institutions of higher learning) in the United Kingdom. The scholarship is administered through the Office of the Deputy Provincial Secretary by a special committee, headed by the Premier as Honorary Chairman. The special committee consists of representatives of the Provincial Secretary's office, the Department of Education, and each of the three public universities of the Province.

Number and value of scholarships—One scholarship is available each year for study, commencing in the fall of that year. Each scholarship has the total value of $5,000. Normally the scholarship will be awarded in the amount of $2,500 each year for two successive years of study, but the committee may, in exceptional circumstances, award the full sum of $5,000 for one year of study. A scholarship will not be renewed.

Eligibility and tenability—1. The scholarship will be awarded each year on a competitive basis to a graduate of Simon Fraser University, the University of British Columbia, or the University of Victoria

(a) whose final three years of academic courses leading to his or her first undergraduate degree were all taken in British Columbia;

(b) whose ordinary private domicile, home, or residence is, in the opinion of the Selection Committee, in British Columbia;

(c) who is a Canadian citizen; and

(d) who is not more than 25 years of age in the year in which he or she makes the application, although the Selection Committee reserves the right to make exceptions to this rule.

2. The Scholarship may be used only for full-time study in a full programme of studies at an approved university (or equivalent institution of higher learning) in the United Kingdom.

Basis of selection—1. Applicants should be persons of unusual worth and promise. The Selection Committee will make its selection on the basis of academic achievement, demonstrated aptitudes, personal qualities and character, interest and participation in university and community affairs, and proposed programmes of study.

2. All decisions made by the Selection Committee are final.

Successful candidates—A successful candidate may not accept other grants or awards unless approved by the Selection Committee. In accepting the award, a candidate assumes the responsibility of following the programme outlined in his or her application. The Selection Committee does not assume any responsibility for the admission or acceptance of a candidate by the institution where he or she proposes to study. If admission is not obtained, the award may be withdrawn.

At the conclusion of the period of tenure on the scholarship, the holder is requested to send a brief report on his or her progress to the Selection Committee.

Payment of scholarships—The scholarship will be paid in equal amounts at intervals of six months. The first payment will be available prior to commencement of study on the scholarship.

Submission of application—All inquiries, applications, and all documents pertaining to this scholarship must be forwarded to: The Deputy Provincial Secretary, Legislative Buildings, Victoria, British Columbia.

Applications for study commencing in the fall must be submitted by March 1 preceding. The application form may be obtained from the university.

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 grant-in 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 1972, 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 Scholarship and Bursary Office, Room 207, Buchanan Bldg., 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 in Science or Engineering—Shell Canada Limited provides a number of postgraduate scholarships tenable at universities in the United Kingdom as may be appropriate to the nature of studies which the scholar intends to pursue. Each scholarship is valued at £1600 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. 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 Scholarship and Bursary Office, Room 207, Buchanan Building, University of B.C., 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 four fellowships of $1500 each are available annually to Canadian students enrolled in a graduate business programme at Canadian universities, as well as one doctoral fellowship of $2000 tenable at any accredited university. Awards are to be granted to students whose programme indicates an interest in management accounting and accounting research. Selections are made by the Fellowship Selection Committee of the Society of Industrial Account-

ants. 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. The next award to be offered will be tenable for the academic year 1974-75.

Theological Education Fellowship Programs—One-year awards are available to enable students to study with expenses paid at any accredited theological college in the United States or Canada. Fellowships are for students with a Bachelor's degree, who are interested in the possibility of entering the ordained protestant ministry, but who are not already committed to this career. Students wishing information may contact Dr. R. M. Clark, Office of Academic Planning, Main Mall North Administration Building, before November 1st. Telephone: 228-2721.

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 the Faculty of Law. Applications must be in the hands of the Executive Director, 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 programme is under revision and at the time of publication the details of the awards are unknown. 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 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. Native Indian applicants must be from the Province of British Columbia and must be planning to enter one of the established universities or colleges in British Columbia, or some recognized technical school or other training centre. 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. Letters of application may be directed to: The Honorary Secretary, B.C. Indian Arts and Welfare Society, c/o Provincial Museum, Victoria, B.C.

B.C. Optometric Association Scholarships—The British Columbia Optometric Association awards two scholarships annually to British Columbia students enrolling in Year II of the School of Optometry, Faculty of Science, Waterloo University, Waterloo, Ontario. Each scholarship has a value of $250.

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.

British Columbia Association for the Mentally Retarded Bursaries—Bursaries in various amounts are offered by the British Columbia Association for the Mentally Retarded 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: British Columbia Association for the Mentally Retarded, Room 221, 119 West Pender Street, Vancouver, 3, British Columbia.

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 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.

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 Architectue in Canada. Winners will receive expenses to travel as a group to selected housing projects in Canada and abroad 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 $125 a week. Each student will be expected to submit a paper on the summer's tour and experience to the director of his school, and on receipt of this paper by C.M.H.C. through the director, will receive $750. 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.

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, Scholarship and Education Awards Committee, Cominco Ltd., Trail, B.C.

The Dr. Wickham, Dr. Mitchell, Dr. McLaughlin and Dr. Benoit Clinic Scholarship—A scholarship of $200, the gift of the Medical Clinic of Dr. T. Wickham, Dr. J. M. Mitchell, Dr. McLaughlin and Dr. Benoit 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, Malaspina College, 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 Phar-

macy 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.

Federation of Franco-Columbians Scholarship—An annual scholarship of $1,000 awarded by the Federation of Franco-Columbians to a candidate wishing to undertake a year of study in a French-language university, preferably in Canada. Priority will be given to a student registered at a British Columbia University, having completed the equivalent of two full years of university study, having sufficient knowledge of French to study profitably at a French language university, and intending to teach in the Province of British Columbia. Applications should be addressed to the Secretary of the Scholarship Committee, Federation of Franco-Columbians, 1013-B, Brunette, Maillardville, B.C. The application must include: a letter in which the candidate outlines his reasons for applying, a copy of his academic transcript, two letters of recommendation to be sent directly to the Secretary of the Scholarship Committee. Applications must be received by March 1st.

The IBM Canada Scholarship Programme—IBM Canada Limited offers four scholarships annually to be tenable at a Canadian University or its affiliated college which is a member of the Association of Universities and Colleges of Canada. The value of each scholarship is $1,000. Each scholarship is renewable, in an amount to be determined annually, for three further years or until the scholar obtains a first university degree, subject to maintenance by the holder of the necessary academic standing for progression from year to year. The competition is open to children of (a) regular employees; (b) retired employees; (c) deceased employees; (d) employees receiving Total and Permanent Disability benefits; (e) employees on authorized leave of absence. Selection of the winners will be made by a committee appointed by the Association of Universities and Colleges of Canada. Financial need will not be a factor in the selection. Winners will not be permitted to hold other scholarships. Awards, prizes and bursaries up to a maximum of $1,000 over four years may be accepted.

The Icelandic Canadian Club Scholarships—The Icelandic Canadian Club of British Columbia Scholarship Foundation 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, Suite 501, 625-5th Ave., New Westminster, B.C., or the committee's secretary: Miss Margaret Frederickson, 3449 West 42nd Ave., Vancouver, 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 until the attainment of a first degree or 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, or must have attained an average of 70% or more in a college year upon which application is based. Further information and application forms may be obtained from the Secretary, Committee on Higher Education, Imperial Oil Limited, 111 St. Clair Ave. West, Toronto 7, Ontario.

The Independent Order of Odd Fellows Joint 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.

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 in open 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, or to a person who is wholly supported by a member in good standing of Local 1-80. 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 is retired and was a member in good standing of Local 1-80 at the time of retirement, shall also be eligible.

In making the award, the Bursary Committee will be guided by the following:

1. The average marks obtained by the Grade XII student during that school term.
2. Indication of need.
3. All applicants must be on the university programme proceeding to any degree granting university, the B.C. Institute of Technology, or other accredited vocational or technical school to complete a course leading to establishing a career.

All those desiring to compete must notify the Financial Secretary of I.W.A. Local 1-80, 351 Brae Road, Duncan, B.C. by a letter not later than June 21, 1972. 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.

(5) The Dr. and Mrs. J. G. Jervis Memorial Scholarship—To be awarded to a graduate of Langley Secondary School, or Aldergrove Secondary School, proceeding to the first year of Veterinary training at a recognized university; or to a graduate of Langley Secondary School or Aldergrove Secondary School proceeding from Grade 12 or First Year University to the Faculty of Agricultural Sciences at the University of British Columbia or equivalent university; or proceeding from any year in the Faculty of Agricultural Sciences or Veterinary Training to the next year in that Faculty. Selection to be made by the Langley Scholarship Selection Committee on the basis of scholarship, high moral force of character, and need. Applicants need not have written Departmental Examinations, but preference may be given to those who do. Application to be made to the Chairman of the Langley or Aldergrove Secondary School Scholarship Guidance Committees on or before June 15. Scholarship to be awarded upon winner's acceptance at Veterinary school or University. If there is no suitable applicant in the current year, the scholarship will be held in the fund, to be awarded in a following year. If there is more than one applicant in the current year, the scholarship may not be divided, but must go to the most suitable candidate. If the winner of this scholarship subsequently wins an equivalent or better scholarship from a source outside the fund, this scholarship may revert to the next most suitable candidate. The amount of this scholarship will be equal to the accumulated interest on a specified endowment, to a maximum of $150.

(6) The Brian Nybeck Memorial Medical Scholarship (donated by Mr. and Mrs. J. I. Nybeck)—A scholarship of $100 to be awarded to a graduate of Langley Secondary School, or Aldergrove Secondary School, proceeding to the Second Year in the Faculty of Medicine at the University of British Columbia or equivalent university. Selection to be made by the Langley Scholarship Selection Committee on the basis of scholarship, high moral force of character, and need. Applicants need not have written Departmental Examinations, but preference may be given to those who do. Application to be made to the chairman of the Langley or Aldergrove Secondary School Scholarship Guidance Committees on or before June 15. Scholarships to be awarded upon winner's acceptance at the University of British Columbia or equivalent university. If there is no suitable applicant in the current year, the scholarship will be held in the Fund, to be awarded in a following year. If there is more than one applicant in the current year, the scholarship may not be divided but must go to the most suitable candidate. If the winner of this scholarship subsequently wins an equivalent or better scholarship from a source outside the fund, this scholarship may revert to the next most suitable candidate.

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 M. F. McGregor, University of B.C., a member 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, 320 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 held in late 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 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 participation 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 B.C. scholarships are open to students graduating from Secondary School and proceeding to studies at recognized institutes of higher learning. 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 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 graduating from secondary school and proceeding to studies at recognized institutes of higher learning. 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. Application forms, which must be submitted by May 31st each year, may be obtained from the Manager or Personnel Supervisor at each operating division, or from the Secretary, Scholarship Committee, MacMillan Bloedel Limited, 1075 West Georgia St., Vancouver 5, B.C.

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 British Columbia, Simon Fraser University, Notre Dame University of Nelson, University of Victoria, Regional Colleges, or the British Columbia Institute of Technology. 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, or 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 15th 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.

Prince George and District Dental Society Bursary—The Prince George and District Dental Society offers a bursary of $200 to a graduate of a Senior Secondary School in, or to a student whose permanent residence is in, that part of the County Cariboo herein called "Prince George District". The student must be planning to study Dentistry or be currently studying in a Faculty of Dentistry. 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 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. For application forms write to the Executive Secretary, RCE Memorial Scholarship Committee, c/o Director of Military Engineering, Canadian Forces Headquarters, Ottawa, Ontario, KIA OK2.

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 entering 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.

Sons of Norway Sleipner Lodge No. 8 Scholarship—This scholarship is open to members of Sleipner Lodge No. 8, Sons of Norway, who have completed the equivalent of First Year of University, preferably with an average of 65% or over. It is offered in competition for study in the Second, Third, or Fourth Year of study towards a degree in an accredited degree granting university in British Columbia. Further information may be obtained by writing to the Secretary, Sons of Norway, Sleipner Lodge No. 8, 2086 Kingsway, Vancouver 16, B.C. Inquiry should be made before August 15.

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.

The Summerland Scholarship—Two scholarships of $250 each, given by the citizens of Summerland, are available annually for students of Summerland Secondary 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 scholarships will be awarded to the applicants who, in the opinion of the Summerland Selection Committee, best exemplify the qualities of the all-round student.

The Westminster Regiment Association Scholarships—These scholarships (2), each of $250, the gift of the Westminster Regiment Association, will be awarded annually to worthy and deserving students who are continuing their 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 applicants may be in their 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 previous winners. 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 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. Letters of application giving information pertinent to the above qualifications 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 Student Loan Fund. This is designed to function as an emergency fund for students who have successfully completed the first term of their programme and will require funds to finance the subsequent terms. Loans are available to British Columbia residents currently enrolled in the libararianship programme at the University of British Columbia or elsewhere, or to any out-of-province student accepted by the U.B.C. School of Librarianship. Application forms and further information may be obtained from the Director, School of Librarianship, University of British Columbia, or from the Chairman, Student Loan Committee, British Columbia Library Association, 750 Burrard Street, Vancouver 1, B.C.

The Canadian Arthritis and Rheumatism Society Bursary Loans—The Canadian Arthritis and Rheumatism Society offers bursary loans of up to $400 per annum to students qualifying for second, third, or fourth year training in the School of Rehabilitation Medicine at U.B.C. Conditional upon employ-

ment with C.A.R.S., repayment of the loan may be waived. Particulars and application form may be obtained from: C.A.R.S., 895 West 10th Avenue, 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 Trustees, Harry F. Bennett Educational Fund, 2050 Mansfield St., Montreal 110, 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. 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 Secretariat, Federation of Medical Women of Canada, C.M.A. House, Box 8244, Ottawa, Canada, KIG3H7.

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. Applications for Summer School Loans must be in before May 1st. 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, Dr. Ruth White, 2395 West 18th Ave., Vancouver, 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 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 Division 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 Division 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.

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 lectureship assistance to the Division of Animal Science in furtherance of its work in relation to the dairy cattle industry and animal breeding.

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 Sharp 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 Rex V. Boughton Memorial Fund—As a memorial to Rex V. Boughton, the first Professor of Science Education at U.B.C., this fund, established by his wife and friends is intended to stimulate scholarship and research in Science Education as exemplified by Dr. Boughton while a member of Faculty. A grant will be made annually from the proceeds of the fund to an outstanding student, a distinguished visitor or within the Faculty for the promotion of improvement in Science Education. Recommendation for the award will be made annually by a committee formed in accordance with the terms of the fund. Applications must be submitted by May 15.

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.