CALENDAR

1974-1975

University of King's College

FOUNDED A.D. 1789

HALIFAX, NOVA SCOTIA

186th SESSION

'74

January

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

February

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

March

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

April

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

June

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

July

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

August

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

September

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

October

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

December

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

'75

January

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

February

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	

March

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

April

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

May

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

June

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

July

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

August

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

September

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

October

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

December

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

'76

January

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

February

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29						

March

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

April

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

May

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

June

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

July

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

August

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

September

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

October

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

November

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

December

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

TABLE OF CONTENTS

Almanac 5
Academic Staff 8
Admissions — Faculty of Arts and Science 13
Alexandra Society 33
Alumni Association 33
Awards 1973 35
Chapel 10
Constitution 9
Convocation, 1973 34
Degrees 10
Degree Programmes 37
Discipline 11
Divinity 22
Extension Courses 23
Fees 24
Historical Sketch 9
Institute of Pastoral Training 23
Library 10
Loan Fund 33
Officers of the University 6

Programmes of Study: 18, 41
- Arts and Science — General 18
- Foundation Year 4

Registration Procedure 4

Regulations: 15
- General Faculty 11
- University 26

Residences 26

Scholarships, Prizes, Bursaries: 28
- Arts and Science 30
- Divinity 27

Student Organizations 11
Student Services and Student Affairs 11

Registration Procedure

During the appropriate registration period specified in the Academic Calendar, King's Arts and Science students will go first to Dalhousie and then to the Registrar's office at King's to:
(a) submit approved selection of classes.
(b) pay fees. (Resident students will be assigned rooms.)

Almanac

July, 1974

Monday, 1
University holiday.

Tuesday, 2
Last day for receiving applications for admission to the Faculty of Arts and Science from transfer students and those who do not meet the normal admission requirements.

Summer School registration (2nd session).

Wednesday, 3
Summer School classes begin.

Monday, 29
Halifax Natal Day (University holiday).

August, 1974

Wednesday, 7
12 noon. Dartmouth Natal Day (University holiday).

Tuesday, 13
Last day for receiving applications for admission to full-time study in the Faculty of Arts and Science.

Friday, 16
Final day of classes, Summer School.

September, 1974

Monday, 2
University holiday.

Tuesday, 3
Last day for receiving applications for admission to part-time study in the Faculty of Arts and Science.

Monday, 9
Class and course approval, registration and payment of fees for *new full-time* students admitted to the Faculty of Arts and Science.

Tuesday, 10
Class and course approval, registration and payment of fees for *new full-time* students admitted to the Faculty of Arts and Science.

Wednesday, 11
Registration and payment of fees for *returning full-time* students and *part-time students* in the Faculty of Arts and Science.

Thursday, 12
Registration and payment of fees for *returning full-time* students and *part-time* students in the Faculty of Arts and Science.

Classes begin *Foundation Year Programme.*

Saturday, 14
Registration and payment of fees for *part-time and special* students in the Faculty of Arts and Science.

Monday, 16
Classes begin.

Sunday, 22
University Church Service — Chapel 4:30 p.m.

Monday, 23
First day for change of class or course.

Monday, 30
Last day for adding classes (except "B" classes).

October, 1974

Monday, 14
University holiday.

November, 1974

Monday, 11
University holiday.

Friday, 15
Last day for withdrawing from "A" classes without penalty.

December, 1974

Wednesday, 11
Last day of classes (regular and *Foundation Year Programme*).

Thursday, 12
Examinations begin.

Saturday, 21
Student holidays begin.

Wednesday, 25
University holiday.

Thursday, 26
University holiday.

January, 1975

Wednesday, 1
University holiday.

Thursday, 6
Classes resume (regular and *Foundation Year Programme*).

Monday, 20
Last day for adding "B" classes.

Thursday, 30
Last day for withdrawing from full-year or "C" classes.

Friday, 31
Munro Day (University holiday).

February, 1975

Saturday, 1
Dalhousie Winter Carnival (University holiday).

Wednesday, 12
Meeting of Convocation 8:00 p.m.

Monday, 24
Study break begins.

March, 1975

Monday, 3
Classes resume.

Monday, 10
Last day for withdrawing from "B" classes without penalty.

Friday, 28
Good Friday (University holiday).

April, 1975

Thursday, 3
Last day of lectures. (Arts & Science).

Tuesday, 8
Last day of classes *Foundation Year Programme.*

Awards Banquet.

Tuesday, 15
Examinations begin.

Monday, 30
Last day for submission of work, *Foundation Year Programme.*

May,.1975

Tuesday, 1
Last day for receiving applications for admission from foreign students (other than Americans).

Sunday, 11
11:00 a.m. Baccalaureate Service.

Wednesday, 14
Encaenia Day — King's Convocation — Arts and Science.

Thursday, 15
Dalhousie University Convocation.

Friday, 16
Dalhousie University Convocations.

Monday, 19
Victoria Day (University holiday).

Tuesday, 20
Summer School Registration (1st session).

Wednesday, 21
Summer School classes begin (1st session).

June, 1975

Friday, 27
First Summer School session ends.

Officers of the University: 1974-75

Patron

The Most Reverend the Lord Archbishop of Canterbury and Primate of All England.

Visitor

The Most Reverend the Lord Archbishop of Nova Scotia and Metropolitan of the Ecclesiastical Province of Canada.

Chancellor

The Hon. Mr. Justice R. A. Ritchie, Q.C., B.A. (Vind et Oxon.), D.C.L. (Vind) LL.D. (Dal.),
177 Coltrin, Rockcliffe Park, Ottawa

President and Vice-Chancellor

J. Graham Morgan, B.A. (Nott.), M.A. (McM.), D.Phil. (Oxon.),
6360 Coburg Rd., Halifax, N.S.

Board of Governors

The Most Rev. W. W. Davis, B.A., B.D., D.D., D.C.L.,
Chairman
5732 College Street, Halifax, N.S.

The Rt. Rev. H. L. Nutter, B.A., B.S.Litt., M.A., D.D., LL.D.,
Vice-Chairman
791 Brunswick Street, Fredericton, N.B.

The Rt. Rev. G. F. Arnold, M.A., B.D., D.D.,
Suffragan Bishop of Nova Scotia,
5732 College Street, Halifax, N.S.

J. Graham Morgan, B.A., M.A., D.Phil.,
President
6360 Coburg Road, Halifax, N.S.

Professor H. S. Granter, B.A., A.M.,
Vice-President
1171 Cartaret Street, Halifax, N.S.

H. MacKinley, C.A., B.A., B.Comm.,
Treasurer
3185 Mayfield Avenue, Halifax, N.S.

Diocese of Fredericton

The Ven. A. E. L. Caulfeild, B.A., L.S.T., D.D.,
139 Sydney Street, Saint John, N.B. (1975)

H. V. Frear, Esq.,
116 Princess St., Saint John, N.B. (1975)

The Rev. T. W. F. Crowther,
101 Alma St., Moncton, N.B. (1977)

Prof. L. P. Edwards, D.C.L.,
46 Grey St., Fredericton, N.B. (1977)

The Ven. Raymond H. Murphy, B.Th.,
426 King Ave., Bathurst, N.B. (1975)

The Very Rev. H. Rhodes Cooper, B.A., B.S.Litt., D.D.,
808 Brunswick St., Fredericton, N.B. (1977)

Diocese of Nova Scotia

His Honour Judge J. E. Hudson, B.A., LL.B., D.C.L.,
1651 Walnut St., Halifax, N.S. (1975)

E. W. Balcom, D.C.L.,
Port Dufferin, N.S. (1974)

Harold Vincent, B.C.L.,
830 McLean St., Halifax, N.S. (1974)

The Rev. Canon W. R. Harris, B.A., L.Th.,
6155 Chebucto Rd., Halifax, N.S. (1975)

Office Hours

Week days (Monday-Friday), 9:00 a.m.-5:00 p.m.
June, July, August (Monday-Friday), 9:00 a.m.-4:30 p.m.

E. H. Fisher, Esq.
5732 College St., Halifax, N.S. (1975)

The Ven. L. F. Hatfield, M.A., D.D.,
P.O. Box 83, Truro, N.S. (1974)

Alumni Association

Prof. Innis Christie, B.A., LL.B., LL.M.,
21 Bayview Rd., Halifax, N.S. (1974)

Robert J. Cram, B.A.,
P.O. Box 1057, Lunenburg, N.S. (1974)

John W. Fisher, LL.B.,
185 Bay St., Suite 706, Toronto, Ont. (1974)

The Rt. Rev. J. S. Wetmore, B.A., B.S.Litt., D.D.,
7 Fox Meadow Road, Scarsdale, N.Y., 10583, (1974)

Rev. E. G. Harris, B.A., B.S.Litt., B.D.,
21 Lynn Drive, Dartmouth, N.S. (1975)

R. V. Swetnam, Esq.,
6897 Tupper Grove, Halifax, N.S. (1975)

Her Honour Judge Sandra E. Oxner, B.A., LL.B.,
1354 Robie St., Halifax, N.S. (1975)

The Rev. D. F. L. Trivett, B.A., L.Th., B.D.,
1665 Oxford St., Halifax, N.S. (1975)

Faculty Representatives

C. L. Heighton, B.Sc., M.A., Ed.D.,
6570 Jubilee Rd., Halifax, N.S. (1975)

The Rev. F. G. Krieger, B.A., B.D.,
1040 Francklyn St., Halifax, N.S. (1974)

W. J. Hankey, B.A., M.A.,
University of King's College, Halifax, N.S. (1975)

J. F. Atherton, M.A., Ph.D.,
27 Purcell's Cove Rd., Boulderwood, Halifax, N.S. (1974)

Student Union Representatives

Gene Barrett, B.A.
Catherine Campbell
Torrance Kirby
Jane Spurr

Co-opted Members

G. R. K. Lynch, B.A., LL.B.,
Room 210, 5600 Sackville St., Halifax, N.S. (1977)

R. G. Smith, Esq.,
P.O. Box 2130, Halifax, N.S. (1977)

The Very Rev. E. B. N. Cochran, B.A., L.Th., D.D.,
5732 College St., Halifax, N.S. (1976)

Ralph V. Creighton, Esq.,
Rothesay, N.B. (1974)

Executive Committee

The Archbishop of Nova Scotia
The Bishop of Fredericton
The President
The Vice-President
The Treasurer
The Rt. Rev. G. F. Arnold
The Ven. A. E. L. Caulfeild
Dr. E. W. Balcom
Mr. G. R. K. Lynch
Mr. R. G. Smith
Miss Jane Spurr
Mr. R. V. A. Swetman
Dr. J. P. Atherton
Prof. L. P. Edwards
The Very Rev. Dr. H. R. Cooper

Representatives on Dalhousie University Board of Governors

G. R. K. Lynch, Esq.
R. G. Smith, Esq.

Representatives on the Governing Body of King's College School

The Very Rev. E. B. N. Cochran
Dr. J. P. Atherton

Governors Emeriti

D. S. Fisher, D.C.L.,
Rectory Lane, Sackville, N.B.

The Rev. Dr. D. F. Forrester,
"Corstorphine", Weymouth, N.S.

H. Ray Milner, Q.C., D.Cn.L., D.C.L., LL.D.,
1230-10040-104th Street, Edmonton, Alberta

Secretary to the Board of Governors

Miss E. D. Horlock, M.A.,
6411 South St., Apt. 32, Halifax, N.S.

Officers of Administration

J. Graham Morgan, B.A. (Nott.), M.A. (McM.), D. Phil. (Oxon.),
President

H. S. Granter, B.A. (Dal.), A.M. (Harvard),
Vice-President

Prof. W. J. Hankey, B.A. (Vind.), M.A. (Tor.),
Director, Foundation Year Programme

Miss Allison Conrod
Bursar

Mrs. G. S. Clark
Registrar

Mrs. J. E. Lane, B.A.
Librarian

The Rev. J. H. Graven, M.A. (Dal.), L.Th. (Vind.),
Divinity Secretary

Mrs. J. Murphy
Executive Secretary Alumni Association

Kenneth Clare, B.A.
Dean of Residence

Dean of Women
To be appointed

R. Shoveller
Director of Athletics

Officers of Convocation

The Hon. Mr. Justice R. A. Ritchie, Q.C., B.A. (Vind. et Oxon.), D.C.L. (Vind.), LL.D. (Dal.),
Chancellor

J. Graham Morgan, B.A. (Nott.), M.A. (McM.), D.Phil. (Oxon.),
Vice-Chancellor

The Rev. R. D. Crouse, B.A. (Vind.), S.T.B. (Harv.), M.Th. (Trin.), Ph.D. (Harv.),
Clerk

Chancellors of the University

The Very Rev. Edwin Gilpin, D.D., D.C.L., 1891-1897

Edward Jarvis Hodgson, D.C.L., 1897-1911

Sir Charles J. Townshend, D.C.L., 1912-1922.

The Most Rev. John HacKenley, D.D., 1937-1943

Hon. Ray Lawson, O.B.E., LL.D., D.Cn.L., D.C.L., 1948-1956

Lionel Avard Forsyth, Q.C., D.C.L., 1956-1958

H. Ray Milner, Q.C., D.Cn.L., D.C.L., ll.d., 1958-1963

Robert H. Morris, M.C., B.A., M.D., F.A.C.S., 1964-1969

Norman H. Gosse, M.D., C.M., D.Sc., D.C.L., LL.D., F.A.C.S., F.R.C.S.(C), 1971-1972

Mr. Justice Roland A. Ritchie, Q.C., B.A., D.C.L., LL.D., 1974-

Presidents and Vice-Presidents of the University

The Rev. Dr. William Cochran, 1789-1804
The Rev. Thomas Cox, 1804-1805
Rev. Dr. Charles Porter, 1805-1836
The Rev. Dr. George McCawley, 1836-1875
The Rev. Dr. John Dart, 1875-1885
The Rev. Dr. Isaac Brock, 1885-1889
The Rev. Dr. Charles Willets, 1889-1904
Dr. Ian Hannah, 1905-
The Rev. Dr. C. J. Boulden, 1905-1909
The Rev. Dr. T. M. Powell, 1909-1914
The Rev. Dr. T. S. Boyle, 1916-1924
The Rev. Dr. A. H. Moore, 1924-1937
The Rev. Dr. A. Stanley Walker, 1937-1953
The Rev. Dr. H. L. Puxley, 1954-1963
Dr. H. D. Smith, 1963-1969
Dr. F. Hilton Page, (Acting), 1969-1970
Dr. J. Graham Morgan, 1970

Academic Staff

King's Faculty of Arts and Science (1974-1975)

J. P. Atherton, M.A. (Oxon.), Ph.D. (Liverpool),
Associate Professor of Classics,
277 Purcell's Cove Rd., Boulderwood, Halifax, N.S.

R. MacGregor Dawson, B.A. (Trinity), M.A. (Tor.), B.Litt. (Oxon.),
Associate Professor of English,
941 Greenwood Ave., Halifax, N.S.

H. S. Granter, B.A. (Dal.), A.M. (Harvard),
Professor of History,
1171 Cartaret St., Halifax, N.S.

W. J. Hankey, B.A. (Vind.), M.A. (Tor.),
Assistant Professor of Humanities and Social Sciences and Director of Foundation Year Programme,
University of King's College, Halifax, N.S.

E. L. Heighton, B.Sc., M.A. (Dal.), Ed.D. (Virginia),
Associate Professor of Mathematics,
6270 Jubilee Rd., Halifax, N.S.

J. A. Lennon, B.A., M.A. (Tor.),
Lecturer in Humanities and Social Sciences,
University of King's College, Halifax, N.S.

J. G. Morgan, B.A. (Nott.), M.A. (McM.), D.Phil. (Oxon.),
President of the University, Associate Professor of Sociology and Anthropology,
6360 Coburg Rd., Halifax, N.S.

F. Hilton Page, M.A. (Tor.), D.D. (Pine Hill),
Professor of Philosophy,
1135 Rockcliffe St., Halifax, N.S.

C. J. Starnes, B.A. (Bishops), S.T.B. (Harv.), M.A. (McG.),
Lecturer in Humanities and Social Sciences,
Cherry Hill P.O., Lunenburg Co., N.S.

J. Stolzman, B.A. (Oreg.), M.S. (Fla. St.), Ph.D. (Oreg.),
Assistant Professor of Sociology and Anthropology,
6889 Quinpool Rd., Halifax, N.S.

H. G. Yesus, B.A. (Haile Selassie), M.A. (Illinois et Brandeis),
Lecturer in Humanities and Social Sciences,
University of King's College, Halifax, N.S.

Historical Sketch

The history of higher education in Canada began in 1789 with the founding at Windsor, Nova Scotia, of the University of King's College. At the time of its establishment it was with the exception of the fifteenth-century King's College in Cambridge and in Aberdeen, the only foundation of that name in existence. Although there had been a King's College, New York, chartered by George II in 1754, it did not survive the end of the colonial period in America and its re-organization in 1784 under the name of Columbia College was undertaken on an entirely different plan. The Loyalist political and religious principles upon which the New York seminary had been founded migrated, along with the Loyalists themselves, to Eastern Canada, and in 1802 a Royal Charter was granted by George III proclaiming King's College, Windsor, "The Mother of an University for the education and instruction of youth and students in Arts, to continue forever and to be called King's College."

Since that time, King's has maintained in Canada certain of the Oxford traditions. In 1920, when the original buildings were destroyed by fire, the University moved to Halifax, where, with the assistance of the Carnegie Corporation, new buildings were eventually erected on the campus of Dalhousie University. In 1930 it entered into partnership with Dalhousie which, with a Royal Charter dating from 1820, is the third of Canada's senior universities. This novel arrangement, by which the English and Scottish University traditions were united, is upheld by a special agreement under which the two have maintained joint faculties of Arts and Science, so that undergraduates of King's read for the B.A. and B.Sc. of Dalhousie, King's having left her own degree-granting powers in abeyance in these faculties.

In May, 1941, the King's College buildings were taken over by the Royal Canadian Navy as an Officer's Training Establishment, and during the next four years, until May, 1945, nearly 3100 officers were trained for sea duty with the R.C.N. The students and academic staff of King's carried on during this period through the kindness of Dalhousie University and Pine Hill Divinity Hall.

In July 1971, King's College entered into a partnership agreement with Pine Hill Divinity Hall (for the United Church of Canada) and the Corporation of the Roman Catholic Archdiocese of Halifax to found the Atlantic School of Theology. This unique institution provides ecumenical as well as denominational theological education for candidates for the ministry and for laymen. During 1974 the School expects to receive incorporation as a degree granting institution of higher education, at which time the work previously done by the Faculty of Divinity of King's College will be conducted by that School. King's will continue to grant degrees in Divinity on the recommendation of the General Synod of the Anglican Church, but will hold in abeyance its powers to grant degrees in Divinity in course. It will continue to grant the honorary degree of D.D.

A significant development in King's history began in the 1972/73 academic year with the introduction of the Foundation Year Programme for first year undergraduates, an integrated and interdisciplinary approach to undergraduate studies which is unique in Canadian higher education.

The University of King's College having entered an association with Dalhousie University, the students registered in Arts and Science attend classes jointly with Dalhousie students. These classes are given by Dalhousie professors on the King's Foundation, depending on the course taken. *The students of both institutions follow the same curriculum, take the same examinations, and must attain the same academic standard.* The University of King's College Foundation Year Programme, however, is available only to students registered with the University of King's College.

King's College is residential, on the Oxford and Cambridge pattern, and, in addition to the day students who live out, 125 men and 100 women can be accommodated in residence. Dinner in Prince Hall is formal with Latin grace; the wearing of academic dress is required of all members of the College *in statu pupillari* and the emphasis is everywhere upon the corporate life. The inestimable benefits of life in a small residential college are, in England at least, an accepted part of the "Oxbridge" tradition, but this is certainly not so in North America, where universities have in general followed either the German policy of having no residential facilities at all, or the English provincial plan of housing a proportion of the student body in "halls of residence" entirely separated from the university itself. The corporate life in King's thus emerges as something rare on the North American continent, since it is designed to educate "the whole man" and not simply to train him for specific examinations.

In addition to its athletic activities, the College runs a Debating Society, known as the "Quintilian", and a Dramatic Society which stages two plays each year. Daily services are held in the Chapel for those who wish to participate. Although the College is an Anglican foundation, there is no denominational bar aimed at the exclusion of non-Anglicans from membership of the College, either as lecturers or students. Members of Faculty may themselves be resident and function in the traditional manner as "dons" for the staircase (i.e. "bays"). The bays are named Chapel Bay, Middle Bay, Radical Bay, North Pole Bay, Cochran Bay, and The Angel's Roost. Alexandra Hall is the residence for women.

Now that there are many large overcrowded universities which find it difficult if not impossible to concentrate upon anything not strictly connected with a student's graduation at the earliest possible time, there is all the more reason for the encouragement of the small residential university wherein the future leaders of society may be educated towards the acceptance of social and moral responsibility. The education of such people must be conducted on an individual, not a mass, basis.

King's tries to be a miniature of the Christian ideal of the larger community. It is this, rather than any more superficial resemblance, which links King's with the older universities of Britain and makes it unusual in Canada.

Constitution

The Board of Governors is the Supreme Governing Body of the University. It consists of the Bishops of the Diocese of Nova Scotia and Fredericton, the President of the University, the Vice-President, the Treasurer, four members elected by the Faculty, together with eight members elected by the Alumni Association, four members by the Student Union, six by each of the Synods of Nova Scotia and Fredericton, and not more than eight co-opted members. The Governors have the management of the funds and property of the College, and the power of appointment of the President, professors and officials. The Board appoints an Executive Committee.

Convocation consists of the Chancellor and the Vice-Chancellor, together with all Bachelors of Divinity and Masters and Doctors of the University; Members of the Board of Governors and of the Faculty of Arts and Science who hold the degree of Master or Doctor from any recognized University; Fellows of the University and Bachelors of the University of five years' standing who are recognized by the Clerk of Convocation. All degrees are conferred by Convocation.

Exemptions Granted to King's College by Other Institutions

The University of Oxford exempts from Responsions an undergraduate in Arts of this University who has passed in the subjects of the second or a higher year. A Bachelor of Arts with Honours is further exempted from four terms of residence. The Trustees of Rhodes Scholarships exempt from the qualifying examination candidates who are exempt from Responsions by the University of Oxford.

Chapel

Regular chapel services are an integral part of the community life afforded by the University, and all students are invited to attend them. The times of service are announced at the beginning of each session and, while the Book of Common Prayer is used in the services in the chapel, students of all denominations are welcome and encouraged to attend. There is a morning and evening service every week day and a morning service on Sunday. The service before the evening meal on Wednesdays is a Communion Service with music, and is regarded as something of "a College Corporate Communion."

The University Chaplain is available to all students and conducts discussion groups for students and faculty.

General Discipline

The maintenance of discipline is in the hands of the College Board which is composed of the President, the Dean of Residence, the Dean of Women, President of the Students' Union, Chairman of the Men's Residence Council, Women's House President, three professors on the King's Foundation chosen annually by the Faculty. The students exercise a large measure of self-government in maintaining good order and discipline in the residences. Students conducting themselves in an unbecoming manner, within the precincts of the college, may be fined, suspended or expelled. When a student is expelled from residence there is no return of fees.

In keeping with the traditions of the College, students are expected to wear gowns when attending chapel, when seated for formal meals, and when calling upon the President of the University. Gowns may be obtained from the Dean of Women.

Students are expected to attend lectures and laboratories regularly and punctually and to perform all exercises assigned by the Faculty.

Dons in the Bays, the Dean of Men, the Dean of Women, the Chaplain, the Registrar, the Bursar, the Faculty, and the President are willing to help, counsel, and advise any student at any time, and will act as much as is within their power in the best interest of the students and the College.

King's College Library

King's College Library was founded in 1789. Just after the Royal Charter was granted to the College in 1802, Bishop Inglis sent his son to England with £250 to begin the purchase of books. The library grew steadily during the 19th century and was probably one of the best libraries in English-speaking Canada of the time. There were various benefactors over the years, chief of whom was Thomas Beamish Akins. From Mr. Akins the library received most of its rare collection of some 40 incunabula (books printed before 1500, that is, during the first fifty years since the invention of printing with movable type). This is a remarkable number of these very rare books to be found in such a small library.

King's Library is very rich in the field of English literature. Much of the credit for the development of this field must go to the late Professor Burns Martin. The Professor Burns Martin Memorial Fund continues to aid the library's growth in this area.

With the help of the William Inglis Morse Endowment for Canadiana, this important area of study is growing steadily as more and more works are being published about our country.

The largest proportion of books, however, is found in the field of Theology. This collection is large and comprehensive and is being constantly kept up to date. The John Haskell Laing Memorial Bequest helps with the purchase of books in this field.

Book purchases in the general field are aided by memorial funds to the following persons: the Hon. William Johnston Almon, Frances Hannah Haskell, James Stuart Martell, and Thomas Henry Hunt (Alumni Memorial).

The library is open Monday to Friday from 9:00 a.m. to 5:00 p.m. and 7:00 p.m. to 10:45 p.m. On Saturdays the hours are 9:00 a.m. to 12:00 noon. On Sundays 2-5 p.m. For part of the session the reading room will be open on Saturday from 2:00 to 5:00 p.m.

The student loan period for all books except those on reserve is one week.

Fines will be charged for overdue books at the rate of twenty-five cents a day for seven day books.

Students are given the privilege of borrowing books for the summer.

Degrees

The degrees of Doctor of Divinity and Doctor of Civil Law, may be conferred *honoris causa* in recognition of eminent literary, scientific, professional or public service.

The dignity and honour of Fellow may be conferred by the vote of Convocation upon any friend of the University for noteworthy services rendered on its behalf.

Convocation confers a Bachelor of Divinity and Associate of Theology (on recommendation of the Board of Examiners of the General Synod of the Anglican Church of Canada), and the Master of Sacred Theology in Pastoral Care on recommendation of the Graduate Studies Committee of the Institute of Pastoral Training. Convocation also awards the diploma of Associate of King's College (Nova Scotia).

Pre-professional work in Arts and Science by students intending to enter one of the Dalhousie professional schools may be taken as a student of King's College.

University Regulations

All students are required to report their local address while attending the University, to the Office of the Registrar, on or before October 1st. Subsequent changes must be reported promptly.

Place of Residence of Students
For the purpose of admission to the University the place of residence of a student is the place where he is domiciled. This is normally presumed to be the place (country, province, etc.) where the home of his parents or guardian is located. That place remains unchanged unless he takes steps that satisfy the Registrar that he has established a place of residence elsewhere.

Admission
No person under sixteen years of age is admitted to any class except by special permission of the Senate.

Special Cases: The University will consider for admission students who are lacking the normal high school preparation, provided that the applicant can show (by record, interviews, or possibly by taking additional tests) that his qualifications in other respects are acceptable.

Occasional students are those who wish to take one university class because of their interest in it. No class may be offered as a credit towards a degree or diploma, and no official transcript will be issued.

A student taking more than one class without credit towards a degree or diploma at Dalhousie-King's may be admitted, if qualified, as a special student.

Admission Ad Eundem Status: Students from other universities desiring to study at King's University may, on producing satisfactory certificates, be admitted with advanced standing and given credit for classes equivalent to those offered by Dalhousie-King's.

No student shall be admitted to a degree in a course in this university unless he has attended and passed in at least one year's work in the Faculty in question, and that essentially the last year of the degree course. In the Faculty of Arts and Science one year's work is interpreted to mean at least five classes of university grade.

Registration
All registered students are required to agree to obey all the regulations of the University already made or to be made, and to pay the required fees and deposits before entering any class or taking any examination.

Under no circumstances may a student register unless all previous accounts, including fees, library fines, and other fines, to the university have been paid.

Late Registration
Late registration in the Faculty of Arts and Science requires the approval of the Registrar.

Withdrawal
See the individual faculty regulations, and the Fee Section.

Discipline

The University reserves the right to suspend or dismiss a student and require him to withdraw from the University at any time if he fails to attain prescribed academic standards or if he has conducted himself in a manner that shows he is unfit, for a serious non-academic reason, to continue in attendance.

If a student is required by a Faculty to discontinue attendance in the Faculty solely because he has failed to maintain the required academic standing, he is not regarded as dismissed on grounds of general discipline and his right to be considered for admission to another faculty is unaffected.

When the work of a student is unsatisfactory, or his attendance is irregular without sufficient reason, he may be dismissed from one or more classes, or from the University.

No return of fees will be made to any student dismissed from classes, residence, or from the University.

Dalhousie Libraries

King's students enjoy the same privileges in the Dalhousie Libraries as Dalhousie students. For regulations and hours see the current Dalhousie calendar.

Other Libraries
Arrangements can be made for King's students to use the Halifax Public Library, the Nova Scotia Technical College Library, Pine Hill Library and the Provincial Legislative Library.

Conferring of Degrees

Successful candidates for degrees are ordinarily required to appear at Convocation in the proper academic costume to have the degree conferred upon them. However, any student may elect to have his degree conferred in absentia by giving formal notice to the Registrars of Dalhousie and King's before May 5.

STUDENT SERVICES AND STUDENT AFFAIRS

Student Employment

The Department of Manpower and Immigration, Manpower Division, in co-operation with the University, maintains a year-round Canada Manpower Centre on campus. (Student Union Building, Dalhousie). This is done to assist students in obtaining employment.

All students wishing assistance in obtaining part-time and summer work, or graduates seeking permanent employment, are urged to contact the Canada Manpower Centre early in the academic year.

There are opportunities for students to earn part of their college expenses by working in the Library, Gymnasium and Dining Hall.

Student Counselling Service

Students worried or anxious about any matter, whether a personal or learning problem, are invited to visit the Student Counselling Centre at Dalhousie, fourth floor of the Student Union Building. Counsellors with broad experience in assisting with problems offer a free confidential service to students.

Tutors

The student body has an academic committee which arranges tutorial services for students.

University Health Service

The university (Dalhousie) operates a health service and a small in-patient infirmary.

Further specialist services in a fully accredited medical centre are available when indicated.

Medical Care — Hospital Insurance
Students must be able to provide proof that they are properly enrolled in any Hospital-Medicare scheme in their home province in order to qualify for service. This applies particularly to residents of any province requiring a premium for Medicare Insurance.

Canadian students remaining in Nova Scotia less than twelve months have their hospitalization paid by their home province. For residents of Saskatchewan and Ontario (and any other provinces with similar regulations) this requires that the student's premium for hospitalization Medicare be paid at home while they are absent to study.

Non-Canadian students who have resided in Nova Scotia for more than three months and show intention of remaining more than twelve months are regarded as residents of Nova Scotia and hence qualify for N.S. Hospitalization and Medical Services Insurance.

Any student who is not covered by any of the above insurance, private insurance must be obtained. Advice and applications at special rates are available through the Health Clinic.

Registration Requirements
1. All students registering for the first time at the University may be required to submit a certificate of health. This requires the student's completion of a Student History form provided by the University Health Service to each applicant, and in the case of non-Canadians or individuals with health problems, having their personal physician complete the physical examination side of the same form.

2. All returning students are required to complete an annual medical questionnaire at the time of registration. Those who have been out for a year or more for any reason are required to submit a new health certificate.

3. Other examinations may be required of all students who are found on admission to be in low medical category, and also of students participating in major sports.

All information gained about a student by the Health Service is confidential and may not be released to anyone without signed permission by the student.

Tuberculin Tests
The tuberculin tests and reading is a requirement for registration for all students attending King's.

Emergency Treatment
In the event of a medical emergency students should telephone the University Health Service, 424-2172 or appear at the clinic in person.

Other Services
Further services or requirements may be announced at the time of registration.

The University Health Service does not provide the following:
(a) Medical or Surgical care other than that provided by, or arranged through, the University Health Service.
(b) X-ray or Laboratory service, except as authorized by the University Health Service.
(c) Medications. (Prescriptions, drugs, etc.).
(d) Dental treatment.
(e) Treatment for illness attributable to misconduct.
(f) Eyeglasses and examinations for same.
(g) Costs arising as a result of pre-existing condition.

Note:
The University Health Service will not pay accounts for hospital or medical service, including x-ray, laboratory service, rendered off-campus except in emergency cases or where prior approval was received.

Prescriptions
Medications prescribed by Health Service physicians or consultants to whom the student is referred by the Health Service are paid by a prepaid drug plan operated by the Student Union. *All other prescriptions are at the student's expense.*

Athletic Programme

All students in their first year of attendance at the University are encouraged to participate in some form of physical activity. Activities offered include field hockey, basketball, fencing, soccer, badminton, volleyball, swimming and hockey.

Non-Academic Student Activities

Students representing the College in non-academic activities must be in good standing. Those who are ineligible for such representation are as follows:
(a) Students on probation in any Faculty.
(b) Students registered for fewer than ten lectures per week, a period of two laboratory hours being regarded for this purpose as equivalent to one lecture.
(c) Students who have more than two failures in college subjects.

These regulations do not apply to the Dramatic Society.

Canadian Armed Forces

Subsidization Plans
The Regular Officer Training Plan (ROTP), Medical Officer Training Plan (MOTP) and the Dental Officer Training Plan (DOTP) are completely subsidized university plans covering tuition, books, medical services, monthly pay and summer employment for up to four years of undergraduate study. Successful applicants serve as commissioned officers in the Canadian Armed Forces for varying compulsory periods after graduation.

For further information on above plans, students should contact the

Canadian Forces Recruiting and Selection Unit,
Sir John Thompson Building,
1256 Barrington Street,
Halifax, Nova Scotia.
Phone: 422-5956 or 423-6945.

Children of War Dead (Education Assistance).

Children of War Dead (Education Assistance Act) provides fees and monthly allowances for children of veterans whose death was attributable to military service. Enquiries should be directed to the nearest District office of the Department of Veterans' Affairs.

Admissions

1. General Statement

For further information on admission to the Faculty of Arts and Science, visit, write or telephone: the Registrar's Office, University of King's College, Halifax.

Minimum age
No person under sixteen years of age is admitted except by special permission of the Senate.

Language requirement
Applicants for admission whose native language is not English must give evidence that they are proficient in spoken and written English. This may be done by presenting a certificate of having passed the English Language Test of the University of Michigan, which is administered in various centres throughout the world. Information may be obtained by writing to the English Language Institute, Testing and Certification Service, Ann Arbor, Michigan 48104, U.S.A.

Special cases
The University will consider for admission students who are lacking the normal high school preparation, including students who have been away from school for a number of years, provided they can show (from other evidence, through interview with a representative of the Admissions Office, possibly by taking special tests) that they possess qualities fitting them for university studies.

Definitions
(a) *Undergraduates* are students who are candidates for a Bachelor's degree, for a degree in a professional course, or for a diploma. (For details of admission to professional courses, see entries in the calendars of the faculties concerned).

(b) *Part-time students* are students registered for three full credit classes or less. Students registered for more than three full credit classes are *full-time students*).

(c) *Special students* are students who are not candidates for a degree or diploma but who wish to take one or more university classes. Such students may be admitted if qualified. There are two categories of special students: *no degree students*, who may receive credit for classes taken; and *auditors* or *audit students*, who receive no credit and to whom no official transcript is issued.

(d) *Matriculation standing: Senior matriculation* designates the level of studies attained by students who have successfully completed Grade XII in a public high school in Nova Scotia.

(e) *Credits: See General Faculty Regulations 2.*

2. Admission from High Schools in Nova Scotia

General
The normal minimum requirement for admission to King's College is completion of Province of Nova Scotia Grade XII examinations in the University Preparatory Programme, or the equivalent. In past years an average of 60% in Grade XII high school examinations, or Province of Nova Scotia Grade XII examinations, or the equivalent, was required. The same standard will apply in the current year. However, the Admissions Office does not apply criteria mechanically. It has discretionary power to admit students who do not meet the normal requirements, but who appear acceptable on other grounds. Any student who submits the necessary documents will be considered for admission. (See Application Procedure).

Early Admission
Students who have been receiving good marks (a general average of 65% or more) may be considered for admission while still in their Senior Matriculation year. Such students are encouraged to apply early in their last year at school.

Application Procedure
Candidates for admission to the Faculty of Arts and Science must submit a completed Application Form (available from the Admissions Office, or from most high schools) to the Registrar, King's College, as soon as possible after January 1st, and normally not later than August 15th. To complete the application, a candidate must provide:

(a) evidence of successful completion of Grades XI and XII in the University Preparatory Programme (senior Matriculation standing) from a public high school in Nova Scotia, or the equivalent, as shown in a certified high school record-transcript, Provincial Examination Certificate, or Principal's report;

(b) recommendations from teachers and principal;

Decisions on admission will be made known to applicants through the joint Admissions Office (Dalhousie-King's), as soon as possible after their credentials have been received and studied.

Preparation for Admission
Students wishing to study at King's College should choose their high school subjects from a University Preparatory Programme. They should read the sections of the Calendar headed *Degree Programmes and Programmes of Study*, and in particular, the description of the first-year programmes. Many departments make suggestions about high school preparation in the descriptions of their own introductory programmes. (These are found in the section entitled *Programmes of Study*). Students who lack preparation (in Grade XI and Grade XII) in Mathematics, English, and at least one other language may find themselves initially cut off from certain programmes. Guidance counsellors in high schools can also offer advice on the suitability of individual high school programmes. Another source of advice is the Registrar's Office, which will arrange interviews, whenever possible, between prospective students and members of the Faculty.

3. Admission from Outside Nova Scotia at Senior Matriculation Level

Deadlines for Receipt of Applications
Applications for admission from *any part of Canada or the USA* must be received by the Registrar's Office by August 16th in order to ensure prompt and efficient handling.

Applications from *all other countries* must be received by May 1st. (Students from Great Britain or the West Indies who write GCE qualifying examinations in June may request an extension of this deadline if they can ensure that their examination results will be available to the Admissions Office by August 21st; otherwise the May 1st deadline must apply.)

Application procedure and ways of appraising applications: as for students from Nova Scotia.

Equivalences
The following levels are considered equivalent to Senior Matriculation (Grade XII) in Nova Scotia:

Other Provinces of Canada
(a) Newfoundland: first year Memorial University.

(b) New Brunswick: the former Grade XIII; or first year at a recognized university or junior college which admits students from Grade XII in New Brunswick public high schools.*

(c) Prince Edward Island: first year at the University of Prince Edward Island.*

**Note:* Students from New Brunswick and Prince Edward Island who have high marks (i.e. averages of 70% and above in five subjects including English) in Grade XII in those Provinces may apply and be considered for admission to King's College.

(d) Quebec: Senior High School Leaving Certificate; or first year of CEGEP General programme; or first year of university Collegial programme.

(e) Ontario: Grade XIII (Secondary School Honour Graduation Diploma), or very high standing in Grade XII.

(f) Manitoba, Saskatchewan, Alberta, British Columbia: Grade XII.

Other Countries

(g) USA: first year at a recognized university or similar institution of higher learning (minimum: 30 semester hours). Students of lesser standing will be considered if they appear exceptionally well qualified, for example on the basis of CEEB scores or advanced placement work.

(h) Great Britain, West Indies, West Africa: General Certificate of Education with pass standing in at least five subjects, of which at least two must be at Advanced level, and one must be English.

(i) Hong Kong: GCE as for Great Britain; or University of Hong Kong Matriculation Certificate under same conditions as for GCE.

(j) India, Pakistan: Bachelor's degree with first or second-class standing from a recognized university; or in certain circumstances, first-class standing in the Intermediate examinations in Arts and Science, provided the candidate has passes at the university level in English, Mathematics and a language other than English.

(k) Countries not mentioned above: Write to the Registrar's Office.

4. Transfer from other Colleges and Universities

Deadlines for Receipt of Applications
Canada and the USA: August 16th.
Other countries: May 1st
Applications received after the above dates will be considered, but prompt processing cannot be assured.

Documents to be Submitted
a) Completed Application form (available from Registrar's Office).

b) Official academic transcripts (or certified copies) from all colleges and universities attended;

c) Copies of calendars (or similar publications) of all colleges and universities attended;

d) Certification of proficiency in English if the native language of the applicant is another language;

Transfer of Credits
Students who have attended a recognized junior college, or in Quebec a CEGEP or a two-year university Collegial Programme for at least one year, and can present satisfactory certificates may be granted Senior Matriculation standing provided the work has been done in approved academic courses. For work completed beyond the Senior Matriculation level, credit may be granted on admission for a maximum of five equivalent classes. Students who are admitted under these conditions can complete the requirements for a general degree in two years, or for an honours degree in three years. Such transfer is regularly accepted from the Convent of the Sacred Heart in Halifax, or the Nova Scotia Teachers' College, or Nova Scotia Agricultural College in Truro.

Students who have attended another recognized university to which they were admitted from a level below that of Senior Matriculation (Nova Scotia) may with satisfactory documents present five appropriate university credits in lieu of Senior Matriculation subjects in order to meet King's entrance requirements. Students from such a university who produce satisfactory certificates for more than five subjects, may be granted five credits for matriculation purposes and other credits for appropriate classes, within the limits of the *Regulations* set out below. Students who have attended another recognized university to which they were admitted from a level equivalent to that of Senior Matriculation (Nova Scotia) may, on presentation of satisfactory documentary evidence, be granted credits for appropriate classes, within the limits of the *Regulations* set out below.

General Regulations Concerning Transfer (See also *General Faculty Regulations*).

a) A student from another college or university who is not eligible for re-admission to that college or university on academic grounds will not be admitted to King's College.

b) No transfer credit will be granted for any class in which a final mark of less than C (or the equivalent) was obtained, or for any class in which a final mark was granted conditionally.

c) To graduate from King's College, all or the most important part of a student's academic work must be done here. This is interpreted to mean at least five full classes, of which at least three are in the candidate's area of specialization (normally classes taken at second-year level or higher).

d) A student in a King's honours programme must attend King's as a full-time student in his last two years, unless special permission to the contrary is obtained from the Committee on Studies.

e) No classes taken at another institution will be counted towards fulfilling the concentration requirement of the general Bachelor's degree or the principle subject requirement of an honours programme without specific approval from the departments concerned at Dalhousie.

f) Transfer credits may be granted only for classes equivalent to classes offered at King's, and only in subjects recognized as having standing in a faculty of Arts and Science.

General Faculty Regulations

Changes of Regulations usually become effective upon publication in the Calendar of the Faculty of Arts and Science.) Students are subject to changes in regulations and courses made after their first registration unless specifically excused by the Faculty. All enquiries about the regulations hereunder should be made to the Registrar. Any student suffering *undue hardship* from application of any of the regulations may appeal for relief through the Registrar to the Committee on Studies.

1. General

Admission to Classes
No student shall be admitted to a class until he has satisfied the regulations regarding entrance and complied with the *General University Regulations*.

Duration of Undergraduate Studies
A student is normally required to complete his undergraduate studies within ten years of his first registration.

Auditing
A full-time student registered in this university may, with the permission of the instructor concerned, audit any class in the Faculty of Arts and Science, provided that it is clearly understood that he will not be eligible to write examinations in the class and will not in any circumstances be granted credit for it.

Advanced Placement
A student possessing advanced knowledge of a subject, which he has acquired otherwise than at a university, will be encouraged to begin his studies in that subject at a level appropriate to his knowledge, as determined by the department concerned, and will be exempted from any classes which are normally prerequisites for the one to which he is admitted. However, the student must substitute for the exempted classes an equal number of other classes, not necessarily in the same subjects (i.e., he must complete at the University the full number of classes required for a general or an honours degree).

Counting of Classes toward Two Undergraduate Degrees
A student who holds one undergraduate degree (B.A., B.Sc., or B.Com.) and who wishes to gain a second undergraduate degree must fulfil the requirements of the second degree and meet the following stipulations:
a) only classes that are applicable to the course for the second degree may be counted for credit;
b) each class carried forward must bear a grade of C or higher;
c) a minimum of six new classes must be taken, of which four must be in a declared major subject;
d) a new area of concentration is to be chosen.

Note: Conversion of a General degree to an Honours degree (degree Programmes, section) does not involve the award of a second degree; hence it is not subject to this regulation.

Concurrent Registration at University of King's College and Another Educational Institution
Ordinarily no student may register at King's if concurrently taking work in another educational institution. Regulation 8 below outlines procedures to be followed to secure waiver of this general regulation. Regular exceptions are made with respect to registration at affiliated institutions.

Forced Withdrawal Consequent on Unsatisfactory Performance
When the work of a student becomes unsatisfactory his case will be discussed by the Committee on Studies which may require him to withdraw from the class or classes concerned and to be excluded from the relevant examinations, or may advise him to withdraw temporarily from the University or to reduce his class load.

2. Credit and Assessment

A credit toward a degree is earned in a full-credit class, a class in which typically there are two to three lecture hours weekly for the regular (September to May) academic year. Credits may be obtained for university-level studies
a) normally during the regular academic year; or exceptionally
b) during a summer session or by correspondence,
c) by transfer from other universities attended prior to entrance to University of King's College,
d) in other Faculties of Dalhousie, or
e) at other institutions while registered at King's.
Regulations governing each of these ways of earning credit are presented below in sections 4 through 8.

Gaining Credit
To gain credit toward a degree or diploma, a student must meet the requirements relevant to that degree or diploma and must appear at all examinations, prepare such essays, exercises, reports, etc. as may be prescribed and, in a class involving field or laboratory work, complete such work satisfactorily.

Credit Contingent on Settling Debts to the University
To gain credit, a student must settle all obligations to the University with respect to tuition and residence fees, bookstore debts, library fines, etc. (not later than April 30 for Spring Convocations).

Method of Assessment
In determining pass lists, the standings attained in prescribed class exercises, in field or laboratory work, and in the various examinations, may be taken into consideration by an instructor. Each instructor must ensure that students are informed of the method of evaluation to be used in a class within two weeks of the first meeting of the class; within four weeks after the beginning of each term the departmental chairmen must report to the Dean the method of evaluation to be used by each instructor in each class.

Grades
The passing grades are A+, A, A−, B+, B, B−, C and D. The failing grades are F/M and F.

Submission of Grades
On completion of a class, the instructor is required to submit grades to the Registrar, such grades to be based on the instructor's evaluation of the academic performance of the students in the class in question. Christmas grades must be submitted to the Registrar in 100-level full-year classes with enrolments in excess of 25 (on October 1); Christmas grades are normally submitted in other full-year classes. Christmas grades in classes other than A classes should be submitted as early as possible and in no event later than January 2nd; for "A" classes grades must be submitted by December 27th, (an "A" class is one given in the first term with the class ending in December).

Incomplete
Each student is expected to complete class work by the prescribed deadlines. Ordinarily there is no obligation for any instructor to extend such deadlines. Incomplete work in a class may not be completed for credit after September 1 following the academic year in which the class was taken, and no incomplete notation will be changed by the Registrar after that date.

Change of Grade
Correction of errors in the recording of a grade may be made at any time. The final date for grade changes for other reasons is September 1 following the academic year; such changes to be made only after the procedures for reassessment of a grade have been complied with.

Examinations and Tests
A period of roughly two weeks in the spring and one week in December will be set aside for the scheduling by the Registrar of formal written examinations. An instructor who wants an examination scheduled by the Registrar for his class must so inform the Registrar by October 15 for the Christmas period and February 15 for the Spring period. An instructor may also arrange his own examinations at a time and place of his choosing (including the formal examination periods), but with the understanding that in cases of conflict of examinations for an in-

dividual student, the Registrar's examination schedule takes priority. Instructors should avoid scheduling hour tests covering the work of the entire term during the last week of classes in the term.

Reassessment of a Grade
On payment of a fee, a student may appeal to the Registrar for reassessment of a grade in a class. The Registrar will direct the request to the Chairman of the Department concerned, who will ensure that the reassessment is carried out and reported to the Registrar. Conjoint examinations in the professional faculties will not be reassessed.

Special Examinations
Special examinations may be granted to students in case of genuine illness, supported by a medical certificate, or in other unusual or exceptional circumstances. Medical certificates must be submitted at the time of the illness and will normally not be accepted after a lapse of one week from the date of the examination. A student wishing to appear as a candidate at a special examination shall be required to give notice of his intention to the Registrar's Office on or before July 10. Students wishing to write at outside centres must apply by July 10.

Supplemental Examinations
A student is permitted to write a supplemental examination in one class which he failed provided that:
(a) he obtained a final grade of F/M;
(b) he has satisfied the requirements for the class (see Regulations);
(c) a final examination or test in the class in question accounted for at least forty percent of the final grade (the supplemental examination should — at the discretion of the department — constitute the same proportion of the final grade as did the final examination during the regular session);
(d) he has not failed his year.

The supplemental examination must be written in August immediately following the failure. It may not be deferred. Notice of intention to write, together with the required fee, must be presented to the Registrar's Office no later than July 10.

A student who fails to pass the supplemental examination can obtain credit for that class only by repeating it.

No more than one supplemental examination may be written by any student on the work of any one year.

No student may write both a supplemental examination and an examination at the end of the Summer School in the same class in the same year.

No supplemental examinations are allowed for classes taken at Summer School.

No more than five passes obtained as a result of supplemental examinations may be counted toward a degree.

Repetition of Classes not Passed
Except as provided in Regulation above, a student can gain credit only by repeating a class which he has not passed.

3. Merit Points and Minimum Standing

Merit points are awarded for each class as follows:

Grade	Points
A+, A, A−	3
B+, B, B−	2
C	1
D	0

Note that although D is a passing grade, no points are awarded. For fractional credit classes, corresponding fractional merit points are awarded. (e.g., in a half-credit class, an A would yield 1½ points). Students receiving credit for classes taken at another institution are not awarded points for those classes; the minima stated in the rules below are adjusted in proportion to the number of King's credits received relative to the number required.

Minimum Standing for a General Degree
In order to qualify for the award of a general degree, candidates must have obtained a minimum of ten merit points on the fifteen classes required. For all students graduating in 1976 and subsequently a minimum of twelve merit points on the fifteen classes required must be obtained. (Note that the rule on minimum standing stated in the 1972-1973 Calendar was not approved by Senate; if applied it would be more stringent than the regulation stated above).

General Degree with Distinction
A general degree will be awarded "With Distinction" to a student who has achieved an aggregate of 40 points in the 15 classes taken for his degree (or a proportional figure if he has taken more than 15 classes).

Minimum Standing for an Honours Degree
Students in honours courses are expected to maintain an overall standing of at least C in each year of study; if they fail to do so, they may be required by the Committee on Studies to transfer to a general degree course.

4. Regular Academic Year

Workload
Five classes shall be regarded as constituting a normal year's work for a student, and may not be exceeded without written permission from the Committee on Studies. Such permission will not normally be granted to any student who is in his first year of study or to any student who, in the preceding academic year, has failed any class or had an average of less than C.

Failed Year
A student is considered to have failed his year if he passes fewer than three of the full classes (or their equivalent) for which he is registered, unless:
(i) the year is the first he has spent at any university, when passes in only two classes are required;
(ii) he is taking engineering or engineering physics, when he is required to pass in not fewer than two-fifths of his classes in his first university year and three-fifths thereafter;
(iii) he is a part-time student, when he must pass at least one half-class.
The results reported in the pass lists of the academic year determine whether a student has passed or failed his year.

Penalty for Failed Year
(a) A student who has failed his year for the first occasion is required to reapply to the Faculty for consideration for readmission.
(b) A student who fails a year on two occasions will be ineligible to return to the University as either a full-time or a part-time student. Ordinarily an appeal will be allowed only if illness has seriously interrupted the student's studies and this is established by submission of a medical certificate from the physician attending the student to the Registrar at the time of the illness.

5. Summer School and Correspondence Classes

Limits on Credits
Up to five credits from Summer School and correspondence classes may be accepted towards the requirements for a degree, not more than two of them by correspondence. Such classes must have been passed at an adequate level and can be accepted only if they are closely equivalent in content to classes normally given at King's.

Maximum Workload
No student may take classes totalling more than one full credit in any one Summer School session. Not more than two full credits can be obtained at Summer School in any one academic year.

Exceptions will normally be granted by the Committee on Studies only in respect of attendance at a university which operates a trimester system or its equivalent.

In all cases, permission must be obtained in advance, following the procedure detailed below.

Credit for Summer School Classes at Other Institutions
A student wishing to take, at a university other than Dalhousie, a Summer School class to be counted for credit towards a Dalhousie-King's degree must:
(a) obtain an application form from the Office of the Registrar at Dalhousie University;
(b) obtain from the university he proposes to attend a full description of the Summer

School classes (or alternative classes) he wishes to take; usually the Summer School Calendar will suffice;

(c) make application to the Registrar of Dalhousie University and submit the class description of the class he wishes to take (alternatives should be indicated where possible).

When a decision has been reached, the student will be notified directly by the Registrar. If the decision is favourable, the receiving university will be so advised by the Registrar's Office.

Correspondence Classes
The regulation similar to the above relates to correspondence classes and, at the present time, only the correspondence classes offered by Queen's University, Kingston, Ontario will be considered.

Students should make application for Summer School as early as possible in order that they may make necessary arrangements and obtain a list of the text-books required.

Transfer Credits

Upon receipt of an application for admission to this University, and an official transcript, students will be advised of the number of credits which may be transferred from another university. However, provisional assessment can be made on interim transcripts.

Credits from Other Faculties

A student taking classes in another Faculty as part of an affiliated course must conform to the regulations of that Faculty with respect to these classes.

Credits from Other Universities under Concurrent Registration

A student, while registered at King's wishing to take classes at another institution, must make an application to the Registrar at Dalhousie and provide a description of the classes offered at the other institution. A letter of permission will be provided if approval for the classes is given by the appropriate department.

The class fee will be paid by Dalhousie if:
(a) the student is registered as a full-time student at Dalhousie-King's;
(b) the classes are approved.
The class fee will be paid by the student if registered as a part-time student at Dalhousie-King'.

9. Change of Registration

Changing a Class
Class changes will not be permitted during the first week after commencement of classes in September. Students should decide during the first week of classes what changes they wish to make and make these changes during the second week of classes (see below).

Adding Classes
The last date for adding classes is two weeks from the commencement of the term in which that class begins. Students must complete the appropriate registration change form which must be approved by the instructor concerned and by the Registrar.

Withdrawing from Classes
(a) The last day for withdrawing from a class without penalty is: for A classes: 16th November, for B classes: 1 week after study break, for C classes: 31st January, for full year classes: 31st January. Classes dropped after these dates are recorded as W (withdrawal). Students must complete the appropriate registration change form which must be approved by the instructor concerned and by the Registrar.
(b) No class may be dropped after the last day of classes in the term in which that class ends.
(c) Classes may not be added to replace withdrawn classes after the second week of the term in which that class begins (see Regulations).
(d) A student may not transfer from full to part-time status by withdrawing from classes after the deadlines listed (see Regulations).

Withdrawing from the University or Changing to Part-time Status
A registered student who wishes to withdraw from the University, or one who wishes to change from full-time to part-time status, must write to the Registrar explaining his circumstances. In either case, the student should not discontinue attendance at any class until his application has been approved. A student proposing withdrawal will normally be invited to discuss his situation with the Dean or the Assistant Dean of Student Services.

10. Experimental Classes

Experimental classes, on any subject or combination of subjects to which the arts and sciences are relevant and differing in conception from any of the classes regularly listed in departmental offerings, may be formed on the initiative of students or of faculty members.

If formed on the initiative of students, the students concerned shall seek out faculty members to take part in the classes.

Whether formed on the initiative of students or on the initiative of faculty members, the faculty members who wish to take part must obtain the consent of their department.

The classes may be of one-year length or half-year length.

A class shall be held to be formed when at least one faculty member and at least eight students have committed themselves to taking part in it for its full length, and in the case of one-half year classes when a class in the other one-half year is available.

Classes may be formed any time before the end of the second week of classes in the Fall term to run the year or first half year, or any time before the end of the second week of classes in the Spring term. If they are formed long enough in advance to be announced in the Calendar, they shall be so announced, in a section describing the Experimental Programme; if they are formed later, they shall be announced (a) in the Dalhousie Gazette, (b) in the University News, (c) on a central bulletin board set aside for this purpose.

One faculty member taking part in each experimental class shall be designated the *rapporteur* of the class. It shall be his responsibility (a) to advise the Curriculum Committee of the formation and content of the class; (b) to obtain from the Curriculum Committee a ruling as to what requirement or requirements of distribution and concentration and credit the class may be accepted as satisfying; (c) to report to the Registrar on the performance of students in the class; and (d) to report to the Curriculum Committee, after the class has finished its work, on the subjects treated, the techniques of instruction, and the success of the class as an experiment in pedagogy (judged so far as possible on the basis of objective comparisons with more familiar types of classes).

A student may have five one-year length experimental classes (or some equivalent combination of these with half-year length classes) counted as satisfying class for class any of the requirements for the degree, subject to the rulings of the Curriculum Committee (above) and (where relevant) to the approval of the departments.

Programmes of Study

FACULTY OF ARTS AND SCIENCE

King's offers 4 Programmes of Study leading to degrees in Arts and Science.

B.A. (General) three years
B.A. (Honours) four years
B.Sc. (General) three years
B.Sc. (Honours) four years

King's provides an alternative to the ordinary B.A. and B.Sc. first year programmes.

The ordinary first year programme consists of five classes.
The King's alternative first year programme, the Foundation Year Programme, is a first year programme for both general and honours students. Bachelor of Arts students enrolled in the Foundation Year Programme do one class in addition to the Foundation Course. Bachelor of Science students in the Programme do two additional classes.

Thus for B.A. students the Foundation Year Programme is equivalent to 4 classes, for B.Sc. students it is equivalent to 3 classes.

Diploma for Studies in the Humanities and Social Sciences.
Students who do not intend to proceed to graduation may be admitted as Special Students into the Foundation Year Programme (equivalent to four credits), successful completion of which will result in the obtaining of the Diploma for Studies in the Humanities and Social Sciences. Permission to enrol as a Diploma student must be sought through the Director of the Foundation Year Programme. Evidence of genuine interest in pursuing such studies will be considered in the admittance decision, together with high school record.

King's Interdisciplinary Studies

In addition to the Foundation Year Programme for first year students, King's College offers classes at the second year level for degree credit as non-departmental electives in the B.A. and B.Sc. programmes. These classes are available primarily for students who have successfully completed the Foundation Year Programme.

Classes for 1974/75

K220 Selected Topics in Interdisciplinary Studies. 1 Full credit
Instructor: Members of Staff

This class provides the student with the opportunity to undertake specialized interdisciplinary study on a topic to be agreed upon by the chosen instructor.

K221 The Aristotelian System as an Integration of Disciplines. 1 Full credit
Instructor: W. J. Hankey

K222 From Nietzsche to Hitler: A Study of Modern Evil. 1 Full credit
Instructor: C. J. Starnes, et al

K223 The Social and Political Context of Revolutionary Ideas in the Nineteenth and Twentieth Centuries.
1 Full credit Instructor: H. G. Yesus

K224 The Decline of Liberalism as an Ideology. 1 Full credit
Instructor: J. A. Lennon

Foundation Year Programme

Introduction

The University of King's College, in association with Dalhousie University, offers a special Foundation Year Programme in the first year of the Bachelor of Arts and Bachelor of Science. First offered in 1972-73, the Programme has proved a successful way of providing an integrated and interdisciplinary course for first year students. A part of the offerings of the Dalhousie-King's Faculty of Arts and Science, the Programme is open only to students registered at King's.

The Foundation Year Programme is a new approach to the first year of University. Literature, philosophy, political and social institutions, the history of science, economic forms, religion, art and music are studied together in one course in an integrated manner which sees them as interdependent elements in the development of Western culture. This movement is understood through the examination of some of the most basic works in our history. To learn to deal with these works is to acquire a foundation for studies in the humanities and social sciences, just as to have a conception of the nature of our society and culture is to have a basis for thoughtful living. To provide these is the aim of this new programme.

Many scientists are acutely aware of the need to understand the relation of science to other aspects of culture and to social life; a stream of the Programme will provide a general view of our culture for science students interested in these questions.

The form of the teaching is designed to meet the special problems of first year students. Students spend about equal time in lectures and tutorial groups. Enrolment in the Programme is limited to 100 Arts students and 25 Science students. The very favourable ratio of staff to students and the concentration of the student's work within one course both permits the course to offer a wide variety of experiences and allows it to help students analyze, focus, and evaluate their experiences. The amount of time spent in small group tutorials permits close attention to be paid to each student's development. A large number of departments recognize the Programme as a substitute for their introductory class; this gives Foundation Year students wider options for second year study.

The instructors in the programme are specialists in a wide variety of university subjects. All take the view, however, that first year study at university can profitably be devoted to attempts to integrate knowledge and understanding rather than to premature specialization in particular subjects. On the basis of the integrated view which a student can develop in the Foundation Programme, choice of greater specialization for subsequent years at university may be more reasonably made.

Teaching Staff

J. P. Atherton, M.A. (Oxon), Ph.D. (Liverpool,
Associate Professor of Classics.
R. D. Crouse, B.A. (Vind.), S.T.B. (Harvard), M.Th. (Trinity), Ph.D. (Harvard),
Associate Professor of Classics.
H. V. Gamberg, B.A. (Brandeis), Ph.D. Princeton),
Associate Professor of Sociology.
W. J. Hankey, B.A. (Vind.), M.A. (Toronto),
Ass't. Professor and Director, Foundation Year Programme.
J. G. Morgan, B.A. (Nottingham), M.A. (McMaster), D.Phil. (Oxford),
President, University of King's College.
M. Reckord, B.A., M.A. (Manchester), Ph.D. (London),
Associate Professor of History.
D. H. Steffen, Ph.D. (Goettingen),
Associate Professor of German.
J. Stolzman, B.A. (Oregon), M.S. (Florida), Ph.D. (Oregon),
Assistant Professor of Sociology.
J. A. Lennon, B.A., M.A. (Tor.),
Lecturer in Humanities and Social Sciences
C. J. Starnes, B.A. (Bishops), S.T.B. (Harvard), M.A. (McGill),
Lecturer in Humanities and Social Sciences
H. G. Yesus, B.A. (Haile Selassie), M.A. (Illinois et Brandeis),
Lecturer in Humanities and Social Sciences

...sional Lecturers (1973-74)

...Armstrong, M.A. (Cantab),
...ssor of Classics.

...Farmer, Mus. Bac. (Tor.), F.R.C.O., ...A.M., D.C.L. (Vind.)

...Farley, B.Sc. (Sheffield), M.Sc. (West. ...), Ph.D. (Man.),
...ciate Professor of Biology

...M. Farrell, B.A. (St. Norbert), M.Mus., ...D. (Wis.),
...stant Professor of Music.

...F. Graham, B.A. (U.B.C.), A.M., Ph.D. ...),
...d D. Manning Professor of Economics.

...E. Gesner, B.A., B.Ed., M.A. (Dal),
...stant Professor of French

...Haberl, B.A. (Long Island), M.A. (N.Y.),
...turer in French

...M. Harvey, B.A. (Hull),
...stant Professor of English

...E. vonMaltzahn, M.S., Ph.D. (Yale),
...rge S. Campbell Professor of Biology

...Sewell, Nova Scotia College of Art and ...sign

...dmission Requirements

...e admission requirements are those per...ning to the Faculty of Arts and Science in ...eral. The course is designed to be use... to students of every level of attainment. ...wever, applications are invited from ...dents completing junior matriculation ...S. Grade XI); these students will be ...dividually considered for admission with... senior matriculation (N.S. Grade XII). ...l students are admitted to the three year ...eneral or four year honours degrees.

...cholarships

...dents of the Programme are eligible for ...e scholarships open to entering students. ...n addition, the Henry S. Cousins Scholar...ips of $1,000 and $750 per year, the Dr. ...rman H. Gosse Entrance Scholarship of ...00 and the Foundation Year Entrance ...cholarships of $500 are open only to stu...ents entering this Programme.

...rading and Credit

...e Programme is to be regarded as a ...mplete unit. It is not possible for stu...ents to enrol in only part of the course. ...valuation of the students' performances ...ill be continuous and made on the basis of ...utorial participation and essays. There ...re no examinations. The final grade is to be a composite of all evaluations. Final grading will be the result of discussion among all those teachers who have had grading responsibilities. Grades are given in terms of the letter grade system of the Faculty of Arts and Science.

Successful completion of the Programme will give students in the Bachelor of Arts course twenty-four credit hours or four class credits toward the Bachelor of Arts degree. These students do one other class besides the Foundation Year course to achieve a complete first year. Bachelor of Science students will do two science classes in addition to their work in the Foundation Year Programme. The course for science students carries eighteen credit hours, i.e. three class credits.

Upon successful completion of the Programme the normal departmental requirement of passing an introductory course in the discipline concerned is waived by the following departments;

Classics (except in the case of courses in the classical languages).
English Language and Literature.
German (except in the case of courses in language).
History.
Political Science.
Sociology (except for courses in Anthropology).

In addition the following departmental provisions have been established:

Economics:
(a) successful completion of the Foundation Programme is regarded as adequate prerequisite for upper year courses in Economics for which Economics 100 is not a prerequisite.

(b) students intending to enrol in Economics courses for which Economics 100 is a prerequisite must have passed Economics 100A, (the requirement of Economics 100B being waived).

German:
Successful completion of the Foundation Programme may be regarded as a substitute for German 221.

Philosophy:
Successful completion of the Foundation Programme may be regarded as a substitute for Philosophy 230.

The Department of Education of Dalhousie University waives its requirement of English 100 for students enrolled in the B.Ed. Integrated Courses who have successfully completed the Foundation Year Programme.

Pre-Professional Training

The Faculties of Medicine and Dentistry of Dalhousie University have approved the Foundation Year Programme as part of the pre-professional work they require for admission to their respective faculties. Students may substitute the Programme for the appropriate requirements laid down by these faculties.

Course Designation, Lecture and Tutorial Hours

The formal designation of the Programme courses is as follows:

King's Interdisciplinary Studies

K100 (Arts): Foundation in Social Science and Humanities; Lectures M. W. Th. F. 9:30 a.m. - 11:30 a.m.; Four hours of tutorials to be arranged.

K110 (Science): Foundation in Social Science and Humanities; Lectures M. W. F. 9:30 a.m. - 11:30 a.m.; Two to four hours of tutorials to be arranged.

Outline of the Foundation Year Programme

The course has its own logic; it is not just a collection of diverse materials but integrates them in accord with the interpretation of our culture which it develops. As we work out this interpretation, we consider works of various kinds, some of the most crucial works in this culture. These we consider no matter what discipline ordinarily studies them. Thus we look, for example, at Mozart's Don Giovanni, early Greek urns, Michelangelo's "Prisoners", and Brooklyn bridge; these are usually understood to belong to the disciplines of music, archaeology, art history and architecture. We read Homer's *Iliad*, Shakespeare's *King Lear*, Robert Penn Warren's *All the King's Men;* works usually studied by the departments of classics, theatre, and English literature. We analyse St. Anselm's *Proslogion*, Descartes' *Meditations*, and Luther's *The Freedom of a Christian*, which are usually studied by departments of philosophy, theology and religion. We study Huizinga's *The Waning of the Middle Ages*, Rousseau's *Social Contract*, Marx's *Capital*, Mill's *White Collar;* works thought to belong to history, political theory, economics and sociology. We read selections from Copernicus' *On the Celestial Spheres*, Newton's *Optics*, Darwin's *On the Origin of the Species;* texts taken from the history of astronomy, physics and biology.

The logic we develop to integrate the different stances of these various works is of two kinds. On the one hand, we see how each of these works shows the nature of the

different epochs or stages of our culture and how each of these civilizations break up to form the one succeeding. On the other hand, we trace some institutions, ideas and movements through each of the historical periods.

The following are the teaching units of the course. One or more of the aspects of culture mentioned above tends to be stressed in each unit in accord with the difference between the general character of each.

1. The Ancient World: The origin of the primary institutions and beliefs of the western world in Greece, Rome, and Israel. Religion manifesting itself in art, myth and institutions provides a focus for our approach to this epoch. Co-ordinator: Mr. Atherton.

2. The Medieval World: The formation of Christendom. The forms of the *City of God* developed in the assimilation of ancient culture to Christianity provide the elements for the consideration of this period. We attempt to grasp their unity, as the medievals saw it, through the *Divine Comedy* of Dante. Co-ordinator: Mr. Crouse.

3. The Reformation and Renaissance: The break up of the medieval world in the opposition of faith and nature. We begin to consider philosophy, science, politics: the secular arts in general, as self-consciously independent of the Church and attempting to achieve secularly what it proclaimed religiously. Co-ordinator: Mr. Hankey.

4. The Age of Reason: The enlightenment, romanticism, and revolution. The development of secularization to the religion of nature. Special attention is paid to political theory in this section. Co-ordinator: Mr. Steffen.

5. The Triumph of the Bourgeoisie: Bourgeois culture from its triumph in the French Revolution to its collapse in World War I. The nineteenth century is mainly treated in terms of the revolutions: political and industrial. Marx provides a crucial analytical focus; novels provide a new form of literary experience. Co-ordinator: Mr. Morgan.

6. The Contemporary World: From the decline of the European empires to contemporary industrial society. The focus is the point of view of the new social sciences which came into view in our investigation of the nineteenth century. The revolutions of the twentieth century are considered central. Co-ordinator: Mr. Gamberg.

One major paper will be required of both Arts and Science students during each unit. In addition, Arts students will write a number of smaller papers relating to the work of their Thursday lecture. This additional lecture will consider one text or topic in detail during the whole unit. A different kind of work will be considered in each period so that instruction is given in the different techniques appropriate to literature, philosophy, history, etc. As the mark for the course is based on papers and class performance, no student will be able to pass the course without completing the written requirements.

The following are the recurring general topics which are discussed in each of the units outlined above.
(a) Political institutions, the modes of authority, conceptions of law and the person, the political ideal.
(b) Theological and philosophical positions and forms.
(c) The conception of nature and forms of natural science.
(d) Economic institutions.
(e) The structure of society.
(f) Literary, musical and artistic expression.

A classroom with facilities for slides, films and musical reproduction is used so that the presentation of these aspects of culture can be an integral part of the teaching.

There follows a synopsis of the course showing the relation of the above general topics and the various units.

	Unit 1	2	3	4	5	6
Historical Outline	From the Iliad to the beginnings of Christianity	From the "Dark" Ages" to "the Waning of the Middle Ages:" circa 1500 A.D.	From the end of the Middle Ages to circa 1650	The "Age of Reason" from c. 1650 to 1815	From French Revolution to the First World War	From the First World War to the present
Political Institutions	The City State, The Roman Empire; The Golden Age, The legal person.	Christendom, Marauding imperialism, The Holy Roman Empire; feudal kingdoms, Decline of the Papacy.	Rise of centralized territorial states, Absolute Monarchies	Absolute Monarchy, enlightened despotism, The English parliament, French Revolution	Revolutions, liberalism, conservatism, democracy. Nationalism.	Liberal Democracy, Fascism, Socialism. Welfare States. Left and Right.
Philosophy and Theology	The rise of "reason"; The Gods in human form, God beyond Nature, The Trinity.	Theology "queen of the sciences." Reason and Faith. Realism and Nominalism. The absolute System.	Secularism; mysticism; Christian humanism; The Reformation and Protestantism. The Counter Reformation.	Revealed religion criticized; Deism. Empiricism and rationalism; idealism.	Revival of religion; Sectarianism. Reactions to rationalism. Positivism. Materialism. Evolutionary thought, Social Darwinism.	Existentialism; individualism. Atheism, Nontheism. Neo Orthodoxy. The Philosophy of History.
Scientific Thinking	Man against nature, Reason in nature.	Abstract Speculation and deductive logic; Nature and the Divine Ideas.	Modern conception of science begins: Cartesianism; astronomy. Mathematics and Science.	The public acceptance of Science. The growth of the natural sciences.	Scientific advance and technology. The social "sciences", evolution. Advances on all fronts.	New directions in Physics: the atomic age. Technocracy, The Computer.
Economic Institutions	Slavery, Imperial Economy	The rise of cities, merchants, guilds. The feudal system: manorial system, fiefdoms.	The growth of capitalism: trade and industry. Decay of feudalism.	Contests for commerce and colonies; the bourgeois revolution. Beginnings of Industrialism.	Industrialism, Capitalism, imperialism.	Monopoly and Corporate Capitalism Neo-Colonialism; Modernization and The Third World
Structure of Society	Family, Tribe and State.	Monasticism. Feudalism: peasants and nobles. The beginnings of the "middle classes". The Church and Society.	Monarchism; the mercantile society and its structure. Decline of monarchical system.	Criticism of divine right; republicanism; Class societies; State and Society.	Parliamentary democracy; the entrenchment of the bourgeoisie. Social classes.	Class Societies, and Socialist Societies. Problems of race. Bureaucracy.
Literature and Music and Art	Epic and Tragic drama, Myth; the Ideal and the realistic.	Romanesque: Gothic, Plainsong, Polyphony. The beginning of "modern" literature.	The Renaissance and its products; Baroque art and music.	The "neo-classical" era. Rococo and Baroque. Early phases of Romanticism.	Romanticism, nationalism in art. Naturalism. Impressionism.	"Alienation" and the Arts; The Waste Land Experimentation and fragmentation, The problem of form.

Divinity

Director of Parish Field Work and Divinity Secretary
Rev. Canon J. H. Graven, M.A. (Dal.), L.Th. (Vind.).

With the establishment of the Atlantic School of Theology during 1974, the work of the Faculty of Divinity of the University of King's College is to be transferred to that School and the Faculty dissolved as a teaching component of King's College.

King's College remains a recognized institution for the conferring of divinity degrees and diplomas on recommendation of the General Synod of the Anglican Church.

Divinity scholarships awarded by King's College are tenable at the Atlantic School of Theology.

Details of the basic course requirements and offerings of the Atlantic School of Theology are given in a bulletin published separately, and available from the School or from King's Registrar on request.

Master of Sacred Theology (M.S.T.)
In conjunction with the Institute of Pastoral Training, the University of King's College now offers the degree of Master of Sacred Theology in the field of pastoral care. Particulars concerning regulations for this degree may be obtained from the Executive Director of the Institute of Pastoral Training at the University of King's College. A degree in Divinity is a prerequisite.

Diploma of Associate of King's College (Nova Scotia) (A.K.C. (N.S.))
The University of King's College has established the diploma of Associate of King's College (Nova Scotia), A.K.C., (N.S.), to encourage further study for those persons who are not eligible for the B.D. It combines extramural and intramural work, and now includes Pastoralia. Particulars concerning regulations for this diploma may be had upon application to the Registrar. (No new registrations after July 1, 1974).

Bachelor of Divinity (B.D.)
Students who have received the M.Div., B.S.Litt., or B.S.T. and graduate students who have qualified for the L.Th. may proceed to the final examination for the extramural degree of B.D. under the General Synod Board of Examiners. By agreement among all Anglican Theological Colleges in Canada, the Degree of Bachelor of Divinity is now awarded only by examination by the Board of Examiners of General Synod. (No new registrations after November 30, 1973).

Associate in Theology (A.Th.)
By arrangement among all Anglican Theological Colleges in Canada, the Title of Associate in Theology is now awarded only by examination by the Board of Examiners of General Synod. Particulars concerning regulations for this Title may be had upon application to the Registrar. (No new registration after November 30, 1973).

Institute of Pastoral Training

University of King's College
Atlantic School of Theology
Acadia Divinity College
Medical Faculty of Dalhousie University

The organization of the Institute in collaboration with Pine Hill Divinity Hall, the Divinity School of Acadia University, Presbyterian College, (Montreal), Medical Faculty of Dalhousie University, pioneered this modern development in Theological education on the Canadian scene. It is the objective of the Institute to bring pastors and theological students face to face with human misery as it exists both in and out of institutions, through courses in Clinical Pastoral Education in both general and mental hospitals, reformatories and juvenile courts, homes for the aged, alcoholism treatment centres, and other social agencies. In this connection, the Institute now sponsors six-week courses in Clinical Pastoral Education, usually commencing mid May, at the Nova Scotia Hospital, Dartmouth (mental), the Nova Scotia Sanatorium, Kentville, the Victoria General Hospital, Halifax, the New Brunswick Provincial Hospital in Lancaster, King's County Hospital, Waterville, and Springhill Medium Correctional Center, Springhill.

While the above mentioned courses aim primarily at increasing the pastoral competence of the parish minister or church worker, students of particular aptitude and interest can be guided in further theological training to become qualified teachers of these subjects in theological courses, directors of Clinical Training Courses, and institutional chaplains; also, in certain cases, to become experts in particular specified fields, such as ministering to the mentally ill or alcoholics, where the church may have a significant role to play in partnership with other helping professions.

A recent development in this field was the formal constitution in December 1965 of "The Canadian Council for Supervised Pastoral Education". In 1974 the Canadian Council for Supervised Pastoral Education officially adopted the shorter and now more appropriate title of Canadian Association for Pastoral Education which seeks to co-ordinate training across Canada, establishing and maintaining high standards, accrediting training courses, and certifying supervisors. The Institute of Pastoral Training has links with the Council, a former Executive Director served as President of the Council and as a member of the Board of Directors, and two members of its Executive have been serving on the Council's Committee on Accreditation and Certification. Professor R. J. R. Stokoe of King's College and Atlantic School of Theology who has directed the six-weeks course at the Nova Scotia Hospital, Dartmouth, and now directs courses at the V.G. Hospital, has been certified as a Chaplain Supervisor, by the Canadian Council and also by the Association for Clinical Pastoral Education in the United States.

Other goals of the Institute include the production of teaching materials, the promotion of workshops, and the establishment of a first class library and reference center at the Institute office.

A number of one-day and four-day workshops have already been held in various localities in the Maritimes, and information as to what is involved in setting one of these up may be obtained from the Secretary of the Institute.

All enquiries concerning courses offered should be addressed to the Executive Secretary of the Institute of Pastoral Training, University of King's College, Halifax, N.S. Board and lodging can usually be arranged, and some bursary assistance is forthcoming. Academic credit is given by certain Canadian and American colleges, including the Atlantic School of Theology, for satisfactory completion of any of the courses offered. Applications to attend the courses from bona fide enquirers belonging to other professions are welcomed and receive equal consideration.

Extension Courses

Extension courses are given in the evenings at the University of King's College. These courses are available in a number of topics. All extension courses are designed for their general interest and are not taken as credits in degree programmes. Academic requirements for admission are not necessary, the expectation being simply that persons who enroll in the courses will do so on the basis of their interest in pursuing the topic.

Registration for all courses will occur on the evenings of September 25 and 26 from 7:00 to 10:00 p.m., fees being payable at those times.

1974-75 Courses

A. **Public Relations (A Survey of the Entire Field)** Instructor: G. Hancock, B.A., Dip. Journ. 20 sessions of 2 hours each. October to April. Fee $75.

These lectures attempt a practical application of the theory of communications. Subjects discussed include: History and Philosophy of Public Relations, communications research (persuasion and public opinion), interpretation of problems, planning and action evaluation, improving PR standards, image, language of public relations, the publics (shareholders, employees, customers, the community), PR for business and industry, utilities, welfare agencies, churches, schools, government; technique of communications (mass media, printed and spoken word, films, speeches, displays, advertising), case histories, Seminar discussions include letter writing, human conflicts and publicity.

B. **Journalism (A Survey of the Entire Field)** Instructor: G. Hancock, B.A., Dip. Journ. 20 sessions of 2 hours each, October to April. $75.

These lectures attempt a practical application of journalistic theory and mechanics. Subjects discussed include: Canons of journalistic practice, newspaper organization, ethical standards, physical aspects of a newspaper, beginnings of journalism, editorial policies, new mechanical devices, nature of news (what people read), gathering news, reporting techniques, art of news writing in various categories (civic, social, labor, accidents, science, education, crime, business and industry, sports, etc.), editing the news.

C. **Is a Dialogue Between Christians and Marxists Possible?** Instructor: H. G. Yesus, B.A., M.A. 8 sessions of 2 hours each. October - November Fee $40.

D. **A Canadian Identity: Our National Dream** Instructor: J. A. Lennon, B.A., M.A. 8 sessions of 2 hours each. October - November Fee $40.

E. **Detente and Dispute: The Chinese - Russian - American Triangle.** Instructor: H. G. Yesus, B.A., M.A. 8 sessions of 2 hours each. Mid January - Mid March Fee $40.

F. **The Uses and Abuses of Propaganda** Instructor: J. A. Lennon, B.A., M.A. 8 sessions of 2 hours each. Mid January - Mid March. Fee $40.

G. **The Confluence of East and West in the Modern World.** Instructor: C. J. Starnes, B.A., S.T.B., M.A. 8 sessions of 2 hours each. Mid January - mid March Fee $40.

Fees

Payment must be made in Canadian funds by cash or negotiable cheque. Please make cheques payable to the University of King's College for the required amount.

Residences

A complete session is defined for students registered in the faculty of Arts and Science as being from the first day of regular registration (including Sunday, September 8) until the day following the last regularly scheduled examination in the Faculty of Arts and Science (for students in this Faculty). The annual charges for these periods for board, light, meals, etc. are as follows:

	Double	Single
Men's Residence	$1150.00	$1225.00
Women's Residence	$1150.00	$1225.00
Women's Residence (Suite)		$1300.00

(fees subject to change).

A graduating resident student may stay in residence without charge after these periods up to and including the last day of Encaenia activities, but will be expected to pay for meals during this time.

In exceptional circumstances a student may seek permission of the Dean of Residence to occupy a room at times other than those specified above. For charges and conditions students should consult with the Dean of Residence.

Students in residence must make a deposit of $650.00 at commencement of the first term, the balance of the bill to be paid in January. New students are expected to deposit $50.00 when pre-registering and returning students $20.00 before April 15, increasing this deposit to $50.00 by July 15. The room deposit will be refunded only when notice of cancellation of accommodation has been received by the Registrar or the Deans before August 15.

Resident students *as well as non-resident*, must pay the following at commencement of the first term: Student Body Fees $40.00, Gown $15.00, and any tuition fees payable to the University of King's College. (Gowns for non-resident students are optional).

Surcharges
If deposit is not paid within 21 days of registration day a surcharge of 8% will be charged. The same applies to charges payable by non-resident students.

Second Term residence fees are due in January and surcharge as above will be levied after January 25.

Caution Deposit
On enrolment each resident student is required to make a deposit of $25.00 as caution money to cover damage done to furniture, etc. This amount, less deductions, will remain a credit on the books until the student *graduates or leaves*, when the balance will be returned by cheque, usually during June. No refund in whole or in part will be made before that month. All students in residence are held responsible for the care of furnishings within their respective rooms. Losses or damages incurred during the session will be charged to the caution deposit.

Each year a student, on returning, is expected to settle for the previous year's deductions so that his credit may be maintained at $25.00.

The items above, together with a key deposit of $5.00 are payable at King's Business Office.

Tuition

Faculty of Arts and Science

King's Students $681.00
1st instalment $446.00
2nd instalment $240.00

The above charge includes class fees, laboratory fees, library fees, examination, diploma and registration fees, instrument rental and hospital clinics where applicable.

Incidental Fees are collected for the Students' Union.

(These charges include incidental fees of registration and library only):

Part-time students are students registered for three credits, or less. Total fees must be paid at registration.
one full credit class $150.00
Students registering for 1/2 credit class $75.00
1/3 credit class $50.00

Audit students (This charge does not entitle students to any privileges other than attendance at class);

Students not candidates for University credit who wish to take one university lecture class because of their interest in it. No credit or official transcript will be issued to such students. Total fee must be paid at registration.
1 full credit class $75.00
1/2 or 1/3 credit class $37.50

(A student enrolled at King's is required to pay the King's Council of Students' fee of $40.00, but not the Dalhousie Council of Students' fee, or the Rink and Athletic Field fee. However, any King's student who wishes to participate in the Dalhousie Council of Students' activities must pay both of the above Dalhousie fees. Dalhousie students resident at King's College must pay King's College Council of Students' fee of $30.00).

Divinity

Full-time students, M.S.T. $575.00
Part-time students for each semester course at Master's level $60.00
Arts and Science courses, when necessary $150.00
A.K.C. Registration .. on application $10.00
A.K.C. Examinations: per paper to be paid by the preceeding December 1, and non-refundable ..... $ 5.00

Regulations for Payment of Tuition Fees

Payment of tuition fees for Arts and Science students is to be made to Dalhousie University Business Office. Please note that cheques are to be made payable to Dalhousie University. A charge of $5.00 is made for any cheque returned by the bank and penalties as shown below for unpaid accounts may be added. Post-dated cheques cannot be accepted.

Full-Time Students
Students registered for more than three credits.

Payment

Fees are payable in full at registration or if preferred, in two instalments, the first payable at registration, the second instalment on or before January 24.

A carrying charge of $5.00 is added if fees are not completely paid at registration. Registration is not complete until the first instalment is paid.

The Dalhousie Business Office does not issue bills for tuition fees; the receipt issued at registration will show the balance, if any, which is outstanding.

Students planning to pay the first instalment of fees from a Canada Student Loan should apply to their Province as early as possible so that funds will be available at registration.

Penalties for Late Payment

Students unable to pay the first instalment due for fees may register conditionally. A penalty of $5.00 per day, to a maximum of $20.00, commencing on the first business day following the regular registration day, will be charged. To accounts outstanding after October 1, an additional charge of 8% interest from October 2 will be added.

Penalty and interest charges will be waived for students paying accounts from provincial loans who pay by October 31 and give evidence of having received the loan from the province. Students who produce evidence that their application for a provincial loan has been rejected and pay accounts by October 31 will also have penalty and interest charges waived.

Students who receive payment or notification of rejection of application from the Province after October 31 and pay accounts within seven days may have the penalty charges waived, but interest will be charged from October 1. Proof must be provided to the Awards Officer that an application for a provincial loan was made prior to August 15 and that payment or notification of rejection of application had not been received by October 31.

Interest at 8% will be charged on second instalments outstanding after January 24. No examination results will be released, nor will the student be permitted to register for another session until all accounts are paid in full. The names of graduating students whose accounts are not completely paid by April 26 will not be included in graduation lists.

Part-time Students - Students registered for three credit classes or less. Fee must be paid at registration.

Audit Students - Students auditing a lecture class for interest only with no credit to be issued. Fee must be paid at registration.

Scholarships awarded by King's College will normally be applied to charges at King's. If a student has a larger scholarship than his obligation to King's, the balance may be paid by King's to Dalhousie University for tuition fees. The student should enquire at the Bursar's Office to ascertain if the Dalhousie Business Office has been informed of the arrangement.

Late Registration
Students are required to register on the regular registration dates as shown in the Academic Schedule. Late registration requires the approval of the Registrar, and payment of an extra fee of $5.00 per day, to a maximum of $20.00.

Diplomas (Divinity)
Diploma fees are payable at registration in the final year of the course,
A.K.C. $12.00
M.S.T. 20.00
B.D., A.Th. 40.00

Examinations
An application for a supplemental examination must be accompanied by the proper fee:
Supplemental and Special (per examination) $15.00
Each examination written at an outside centre (extra fee) $10.00
Fee for re-marking of a paper ..... $ 3.00
Application for re-marking must be made in writing to the Registrar within three months of the date of the examination.
If application for refund of supplemental examination fee is not made on or before July 31, the fee will be forfeited.

Degree in Absentia
A graduating student must notify the Registrar prior to May 10 if not planning to be present to receive a degree. If this notification is not given and the student does not attend the graduation ceremony, a charge of $10.00 is required to be paid to the University (to Dalhousie for Arts and Science students) to cover additional costs before the degree is released.

Transcripts
A student may receive *only* an unofficial transcript. Official transcripts will be sent at a student's request to other universities or to business organizations. An application for a transcript must be accompanied by the proper fee. First transcript, no charge; additional copies, each original, $1; extra copies, $.50 each. *No transcript will be issued until all charges owing to the university have been paid in full.*

Student Photograph
At time of first registration at King's each student will be required to supply two pictures.

Laboratory Charge
No laboratory deposit is charged. Individual students will be charged for careless or wilful damage.

Parking on the Campus
Each student who has a car on campus may obtain a parking permit from the General Office upon the presentation of insurance and license number for a charge of $15.00.

Students with motorbicycles may obtain parking permits under the same conditions for a charge of $2.50, and will be required to park them in a designated area.

Refund of Fees
A student who has completed registration and wishes to withdraw must obtain written approval from the Registrars of Dalhousie and King's.

A student withdrawing after two weeks from the date of commencement of classes will be charged in full for the incidental fees and may receive a refund of the balance on a proportional basis, calculated in monthly units; a full charge will be made for the month in which the withdrawal is approved, including the month of December. A student withdrawing in January will be charged the full first instalment of fees. A student changing before February 1 from full-time to part-time status, with the approval of the Registrar, will be eligible for an adjustment in fees for the remainder of the session.

A student who is dismissed from the University for any reason will not be entitled to a refund of fees, either academic or residence.

Applications for a refund or adjustment should be made to the Business Office at Dalhousie after the approval of the proper authority has been obtained. N.B. — King's College students must report AS WELL to the Bursar, King's College.

Fee For Student Organizations
At the request of the King's student body, a fee of $40.00 is collected on enrolment from each student who takes more than one class. This fee entitles the student to the privileges of the various students' organizations and clubs, and a copy of the King's College RECORD.

King's College Residences 1974-75

Dean of Residence

Mr. Kenneth Clare

Dean of Women

To be appointed

Dons

Mr. Gene Barrett
Prof. John Godfrey
Prof. W. J. Hankey
Miss JoAnn Radbourne
Miss Jean Sherrard
Mr. Hagos Yesus

Residence life at the University is *encouraged for all students* because the community life there enjoyed forms an essential part of the student's education. Exceptions will be made in the case of a student wishing to reside in a home or lodging outside the university.

All students registered at King's College are guaranteed residence accommodation should they wish it, on completion of the form for application for accommodation, and subject to the approval of the application by the Dean of Residence (for men) and the Dean of Women (for women).'

Male students live in the men's bays (Chapel, Middle, Radical, North Pole, Cochran and The Roost), each housing 22-26 men, under the supervision of the Dean of Residence. Female students live in Alexandra Hall, a residence accommodating 100 women, under the supervision of the Dean of Women.

All rooms are furnished with bed, dresser, desk, and chairs. *Students are required to provide their own bedding and towels,* and to attend to their own laundry arrangements. Coin-operated washing and drying equipment is provided in both men's and women's residences.

Single and double rooms are available to both men and women, priority for single rooms being given to students in their senior year.

The residences have been designed to provide for the comfort and convenience of the students, *and to facilitate study.* In the men's residence, two students occupy a suite of two rooms (bedroom and study). The common room and lounge is open to all residents, as is the Haliburton Room, a gathering place for all students and the site of many student activities.

The Women's residence was built in 1962 and is modern in every respect. It contains, besides the rooms in which female students live, a library, reading rooms, lounges, a service elevator and ample storage space.

Both residences are designed so that it is not necessary to go outside for meals and extra-curricular activities.

Meals are prepared and served to all resident students in Prince Memorial Hall, erected in 1962.

Students accepted in residence by the Deans are expected to remain for the whole session, or, in the case of withdrawal during the session, must obtain substitutes satisfactory to the Dean. All residents will be charged with room for the compiete session and will be liable for this charge unless or until a substitute has assumed obligation to the University for the balance. No student may withdraw from the residence without notice to the Dean.

It should be noted that the University assumes no liability for personal property in the case of theft or damage.

The residence will be open for new students from the evening of September 8, 1974, and for **returning** students September 10, 1974, until December 21, 1974, and from the evening of January 5, 1975, to the morning of May 17, 1975. *(Students not in their graduating year will be expected to vacate the residence 24 hours following their last examination).* Resident students in faculties whose terms exceed these periods may reside in the College by permission of the Dean on payment of rent; and, when Prince Hall is open, meals may be eaten by arrangement with the Steward.

Confirmation of accommodation will not be made until the student has been accepted by the University for the coming session and a $50.00 residence deposit has been received by the Business Office. Deposits for all applications made prior to July 15th must be received by that date. Applications for residence accommodation made after July 15 must be accompanied by the $50.00 deposit. Cancellation of application received by the Registrar or the Deans prior to August 15th will entitle the student to a refund of the $50.00 deposit.

Student Organizations

The University of King's College Students' Union

The University of King's College Students' Union is the organization in which the students enjoy their right of self government. The Constitution revised in 1964, provides for a democratic government in which the participation of every student is expected. The students endeavour to play a determining role in every aspect of university life. The Union's main organs are the Student Assembly, the Executive of the Students' Union, the Students' Council. The power of self discipline is exercised through the Union's Male and Female Residence Councils and the Campus Police.

The Union operates through a number of permanent committees, e.g.: the Academic Committee, the Social Committee, committees on the constitution, elections, finances, Dalhousie relations, awards, etc.

King's College Women's Amateur Athletic Association

The object of this association is the promotion of women's amateur sports at the College. The K.C.G.A.A.A. is a member of the Atlantic Women's Intercollegiate Athletic Association and competes in the Intermediate section of this Association, field hockey, volleyball, and basketball are played at the Intercollegiate level, and floor hockey, badminton, table tennis, and swimming are available on a regularly scheduled basis in the University Gymnasium.

King's College Amateur Athletic Association

The object of this association is the promotion of amateur sports at the College. The K.C.A.A.A. is an honourary member of the Atlantic Intercollegiate Athletic Association and a full member of the Nova Scotia College Conference. The University competes in interscholastic competition in the following sports: soccer, golf, hockey, volleyball, and basketball. There is also strong inter-bay or inter-residence competition in volleyball, road racing, softball, hockey, volleyball, basketball, and floor hockey. The gymnasium also has available for personal use a swimming pool, weight lifting room, and regulation size gymnasium.

King's College Dramatic and Choral Society

This society was founded in 1931 to further interest in dramatic and choral work. The society presents an evening of one-act plays during the first term, and a three-act play. In addition, the society sponsors an interbay play evening and enters a play in the Connolly Shield Competition.

The Dalhousie Drama Workshop, a branch of the Department of English, offers training in voice production, acting, dance, movement, make-up, costume, set design and construction, and lighting under the direction of experienced instructors. King's students are invited to participate in the activities and productions of the Workshop on the same basis as Dalhousie students.

The King's College Record

The Record (founded 1878) is published by the undergraduates of the College during the academic year. It contains a summation of the year's activities and awards.

The Quintilian Debating Society

This Society was founded in 1845. Quintilian sponsors interbay debates in competition for the Alumni Association (Halifax Branch) Interbay Debating Award. In addition further campus debates are seen in competition for the Rev. Canon A. E. Andrew Memorial Award for Block Debating. During the Easter weekend of each year a High School competition is co-ordinated by the Society, the Quintilian Exhibition Shield being awarded to the successful school in the Metro area (the Shield having been given by the Alumni Association, Saint John Branch). Annual tours of Upper Canadian Colleges and Universities complete the Society's wide range of academic activities.

The Haliburton

The Haliburton was founded and incorporated by Act of Legislature in 1884, and is the oldest literary society on a college campus in North America. Its object is the cultivation of a Canadian Literature and the collecting of Canadian books, manuscripts, as well as books bearing on Canadian History and Literature. College students and interested residents of the metro area meet to listen to papers which are given by literary figures and by the students.

The Ancient Commoner

The "Ancient Commoner" is the students newspaper.

The Students' Missionary Society

This society was founded in 1890. Its object is to promote interest in missionary work and to further the missionary work of the Church, especially in the Maritime Provinces. The annual meeting is held on Saint Andrew's Day, or as near to it as possible. Through the efforts of this organization, divinity students are provided with summer charges and foreign students have been afforded the opportunity of studying Theology at King's. The status of this Society is at present under review in the light of King's participation in the Atlantic School of Theology.

Awards

The Student Body of the University of King's College awards an overall "K" to participants in King's activities. Under this system, begun during the 1956-1957 term, a student may receive a silver "K" upon amassing 160 points and a gold "K" upon amassing 250 points.

In addition several awards are presented to students for outstanding achievements in extra-curricular activities.

Bob Walter Award. Awarded to the graduating male student who best exemplifies the qualities of manhood, gentlemanliness, and learning, and has contributed to the life at King's.

Warrena Power Award. Awarded annually to the graduating female student who best exemplifies the qualities of womanhood, gentleness, and learning, and has contributed to the life at King's.

The R. L. Nixon Award. This award is given annually to the resident male student who, in the opinion of his fellows, contributes most to residence life in King's.

The Prince Prize. This prize is designed for the encouragement of effective public speaking. The recipient is chosen by adjudicators in an annual competition.

The H. L. Puxley Award. Awarded annually to the best all-round woman athlete.

The Bissett Award. This award is given annually to the best all-round male athlete.

The Arthur L. Chase Memorial Trophy. This is presented annually to the student who has contributed most to debating in the College.

Scholarships, Prizes and Bursaries

Any scholarship winner who can afford to do so is invited to give up all or part of the money awarded. He will still be styled the winner of the Scholarship during its tenure. This arrangement increases the values of the Scholarships Funds, as it enables other students of scholarly attainments to attend the University.

All Scholarships, Prizes and Bursaries, except awards to Graduating Students, will be credited to the student's account and not paid in cash.

No special application forms are required as all students who have been admitted are automatically considered for a scholarship. Students should, however, bear in mind that most of the awards will have been allotted by the middle of April, so it is important that applications for admission be sent to the Registrar's Office as early as possible.

In order to retain scholarships tenable for more than one year, a B average must be made each year, with no failing mark in any subject.

ARTS AND SCIENCE

A. Entrance Scholarships

Dr. W. Bruce Almon Scholarship — $1500 a year. Established by the will of Susanna Weston Arrow Almon, this scholarship is open to a student entering the University of King's College and proceeding to the degree of Doctor of Medicine at Dalhousie University. It is renewable yearly provided that the student maintains a first class average, and lives in residence each year until the regulations of Dalhousie Medical School require otherwise.

By the terms of the will preference is given to a descendant of Dr. William Johnstone Almon.

Henry S. Cousins Scholarships — (a) $1000 a year, maximum $4000 for four years, (b) $750 a year; maximum $3000 for four years. Established by the University from the legacy of Anna H. Cousins in memory of her husband Henry S. Cousins, these scholarships are open to students entering the Foundation Year Programme only.

Susanna Almon Scholarships — $750 a year. Established by the University from the legacy of Susanna Weston Arrow Almon, these scholarships are tenable for four years.

Chancellors' Scholarships — $500 a year. Established originally through the generosity of the Hon. Ray Lawson, former Chancellor of the University, and continued by succeeding Chancellors, these scholarships are open to students of the Atlantic Provinces, and are tenable for four years. The holders of Chancellors Scholarships will normally be required to live in residence.

Foundation Year Scholarships — A number of entrance scholarships varying in amounts from $300 to a maximum of $1000 for students entering the Foundation Year Programme only.

Board of Governors Scholarships — $350 a year. Established by the Board of Governors, these scholarships are tenable for four years.

Dr. Norman H. Gosse Scholarship — $400. Established from a bequest of Dr. Norman H. Gosse, former Chancellor of the University, this scholarship is open to a Science student entering the Foundation Year Programme.

Halifax-Dartmouth Scholarships — $300. An entrance scholarship for students entering the University from the Halifax-Dartmouth area.

King's College Bursaries — The University offers a limited number of small bursaries to entering students of satisfactory academic standing and in need of financial assistance.

Alumni "Annual Giving" Scholarships — $600. Established by the Alumni Association, these scholarships are intended for entering students, but consideration will be given to applications from students who are already members of the College and who are in good academic standing. The holders of Alumni "Annual Giving" Scholarships will normally be required to live in residence.

Margaret and Wallace Towers Bursary — $600 a Year. Established by Dr. Donald R. Towers, an alumnus of King's, in memory of his mother and father. This bursary, tenable for four years, is open to a student of high academic standing entering the University to study Arts and Science and who is a resident, or a descendant of residents, of Charlotte County, New Brunswick. Failing any qualified applicants from this county in any one year, the bursary for that year only will become available to a student resident anywhere outside the Maritime Provinces of Canada. Holder must live in residence.

Winfield Memorial Entrance Scholarship — $200. Established by Mrs. W. A. Winfield in memory of her husband.

The Alumni Scholarships — $300. The Alumni Association has established two scholarships of $300 each: one restricted to students of King's College School, Rothesay Collegiate, Edgehill, Netherwood or Halifax Ladies College; and one unrestricted.

Keating Trust Scholarships — $125. Awarded from a bequest to the College from the Rev. J. Lloyd Keating to students entering College with outstanding marks in Science. these scholarships, according to the will of the donor, are intended to encourage students, and preferably Divinity students, in the study of chemistry and physics, and scholars will be required to take at least one class in physics or chemistry during the year in which they hold the scholarship.

Nova Scotia Power Corporation Scholarship — $300 a year. The Nova Scotia Power Corporation offers an entrance scholarship of $300 a year, tenable for three or four years, providing the student maintains an average of 65% and has no failure in any subject.

Nova Scotia Teachers College Bursary — $500. Awarded on the recommendation of the Principal to a graduate of Nova Scotia Teachers College who registers as a full time student in the Faculty of Arts and Science.

The Halifax Rifles Centenary Scholarship — $200. Established by the Halifax Rifles as an entrance scholarship. For particulars apply to the Registrar.

King's College Naval Bursary — $300 a year. In order to commemorate the unique and valuable relationship between the University of King's College and the Royal Canadian Navy during the Second World War, ships and establishments of the Atlantic Command have set up a Bursary to enable a student to attend King's.

Applicants must be children of officers and men either serving in the Royal Canadian Navy or retired from the R.C.N. on pension. Academic achievement and promise will be the first consideration in selecting a candidate. Purpose, industry, and character are to be carefully weighed, together with the likelihood that the candidate will make good use of higher education to benefit not only himself but also his country.

The Bursary is awarded annually but it is intended to be tenable by the same student to the completion of his course at King's College provided that he makes acceptable progress. The Bursary will be withdrawn in the event of academic failure or withdrawal from King's College for any reason.

Deihl Bridgewater Bursary — $250. To assist needy students of suitable standing resident in the town of Bridgewater, or within six miles of the town. Bequeathed by the Late Lena Ruth Deihl.

Walter Lawson Muir Bursary — $175. To be awarded at the discretion of the Scholarship Committee either to a student entering college for the first time or to a student returning to college who won high scholastic standing in the previous year. Endowed by Mrs. W. L. Muir.

The United States Scholarship — $500. Awarded annually by Friends of New York State Corporation, to a student resident in the United States, who in the judgment of the Directors of the Corporation best exemplifies an appreciation of the importance of good relationships between the people of the United States and Canada.

In any year the scholarship may be divided among two or more students.

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 awards are tenable for a maximum of four years, or the equivalent, at the undergraduate or bachelor degree level. For particulars apply to the Registrar.

I.O.D.E. Bursaries, value $100 to $200. Awarded to entering students who show academic ability and financial need. Address applications to Provincial Education Secretary, Provincial Chapter, I.O.D.E., 2037 Parker St., Halifax, N.S.

Applications open April 1, close June 1.

B. Scholarships, Bursaries and Prizes Awarded in Course

The President's Scholarship - $250. Three scholarships of $250 will be awarded to the student who makes the highest average at the end of the first, second and third year examinations. Preference will be given to students who hold no other scholarship.

The Stevenson Scholarship - $120. Founded by the Rev. J. Stevenson, M.A., (sometime Professor of Mathematics), of the value of $120 a year tenable for two years, this scholarship will be awarded to a student with the highest average on the five best subjects in the first year examinations.

Alexandra Society Scholarship - $300. An annual award offered by the Alexandra Society of King's College to a woman student who stands highest in the second or third year examinations, provided that she live in residence. If the student who stands highest is otherwise ineligible, the award shall be left to the discretion of the Scholarship Committee.

The Claire Strickland Vair Scholarship - $300. An annual award to be offered a student beyond the first year who displays excellence in English, an English Major or English Honours student preferred.

Saint John University Women's Club Scholarship - $100 (Undergraduate). The Saint John University Women's Club awards a scholarship of $100 each year to a woman student entering her senior year in a Maritime University. The award is made to a student from the City or County of Saint John, with consideration being given to both academic attainment and financial need. For particulars apply to the Registrar, before March 1.

The Lawson Prize - $100. Established by The Hon. Ray Lawson, former Chancellor of the University, for the student who shows the greatest progress between the first and second year.

Dr. M. A. B. Smith Prize - $25. Established by a bequest of $500 from the late Dr. M. A. B. Smith. Awarded to the student with the highest marks at the end of his second year with ten classes. In case of a tie preference will be given to a Divinity student.

Bishop Binney Prize - $20. This prize, which was founded by Mrs. Binney, is given to the undergraduate with the best examination results at the end of the second year with ten classes.

The Akins Historical Prize - $100. Founded by T. B. Akins, Esq., D.C.L., Barrister-at-Law and Commissioner of Public Records.

The award is made for the best original study in Canadian History submitted in competition.

Essays must be handed in, under a nom de plume, with the writer's name in an attached envelope, on or before the 1st day of April of the year concerned. Essays become the property of King's College.

The Beatrice E. Fry Memorial - $50. Established by the Diocesan Board of the W.A. of the Diocese of Nova Scotia, in memory of Miss Beatrice E. Fry. To be awarded to the woman student (Anglican) of the College obtaining the highest mark of the year in English 100, provided that mark exceeds 65%.

The Henry deBlois English Prize - $15. The late Rev. D. deBlois, D.C.L., a graduate of King's College, left the sum of $200 to the Governors of the College to establish a prize in English. Awarded to the student of the 2nd, 3rd or 4th year in Arts or Science who submits the best essay on some subject relating to English Literature.

For conditions, apply to the Registrar. All essays must be in the hands of the Registrar of King's College by April 10.

The Almon-Welsford Testimonial - $30. The Honourable William J. Almon, Esq., M.D. (1816-1901) and his family endowed a prize to commemorate the gallant and loyal deeds of Major Augustus Frederick Welsford who died in the Crimean War (1855) and to encourage the study of Latin. The prize is awarded annually to the student in his first year who makes the highest mark in either Latin 100 or Latin 200, provided the mark is not less than 65%.

The McCawley Classical Prize - $35. Established as a testimonial to the Rev. G. McCawley, D.D., on his retirement from the office of President.

Open to students who have completed their first year.

The Zaidee Horsfall Prize in Mathematics - $10. Established as a memorial to the late Zaidee Horsfall, M.A., D.C.L. Awarded to the student who makes the highest mark in first year Mathematics.

Khaki Bursary - $60. Awarded to the sons and daughters of the soldiers of the Great Wars. Written application must be made to the Registrar showing claim for consideration.

The Binney Bursary - $50. Founded in the year, 1858, by Miss Binney, sister of the late Bishop Binney, and daughter of the late Rev. Hibbert Binney, in memory of her father.

This scholarship is intended to aid students who may require assistance, and who shall have commended themselves by their exemplary conduct, although their abilities and achievements may not qualify them to be successful competitors for an open scholarship.

Charles Cogswell Bursary - $20. Charles Cogswell, Esq., M.D., made a donation of $400 to the Governors of King's College, the object of the donation being "to promote the health of the students and encourage them in the prosecution of their studies".

The Harry Crawford Memorial Prize - $40. Offered annually by a friend in memory of Harry Crawford, son of Thomas H. and Elizabeth A. Crawford, Gagetown, N.B.; a student of this College, who died true to his King and his Country, April 14, 1915, while serving in the Canadian Motor Cycle Corps.

The prize is awarded to the student completing the second year Arts course, of good character and academic standing, who in the opinion of the Faculty deserves it most.

The Jackson Bursary - $25. Founded by the Rev. G. O. Cheese, M.A. (Oxon.), in memory of his former tutor, the late T. W. Jackson, M.A., of Worcester College, Oxford.

C. Graduate Scholarships, Medals and Prizes

The Governor General's Medal. Awarded to the candidate who obtains the highest standing in the examination for B.A. or B.Sc. Degree. Preference will be given to an Honours Student.

The Rev. S. H. Prince Prize in Sociology. This prize was made available by a $1,000 bequest under the will of the late Dr. S. H. Prince for annual award to both Dalhousie and King's Students.

The Rhodes Scholarship. This scholarship is of the annual value of 750 pounds sterling. Before applying to the Secretary of the Committee of selection for the Province (which application must be made by November 1), consult the Registrar, King's College.

Rhodes Scholars who have attended the University of King's College

1909 Medley Kingdom Parlee, B.A., '08
1910 Robert Holland Tait, B.C.L., '14
1913 Arthur Leigh Collett, B.A., '13
1916 The Rev. Douglas Morgan Wiswell, B.A., '14 M.A., '16
1916 The Rev. Cuthbert Aikman Simpson, B.A., '15, M.A., '16
1919 William Gordon Ernst, B.A., '17
1924 The Rev. Gerald White, B.A., '23, M.A., '24
1925 M. Teed, B.A. '25
1936 Allan Charles Findlay, B.A., '34
1938 John Roderick Ennes Smith, B.Sc., '38
1946 Nordau Roslyn Goodman, B.Sc., '40, M.Sc., '46
1949 Peter Hanington, B.A., '48
1950 Ian Henderson, B.Sc., '49
1950 Eric David Morgan, B.Sc., '50
1955 Leslie William Caines, B.A., '55
1962 Roland Arnold Grenville Lines, B.Sc., '61
1963 Peter Hardress Lavallin Puxley, B.A., '63
1969 John Hilton Page, B.Sc., '69

University Women's Club Scholarship - $500. The University Women's Club of Halifax offers a scholarship of the value of $500 every second year, 1964, 1966, etc., to a woman graduate of Dalhousie University or King's College, to assist her in obtaining her M.A. or M.Sc. degree at any recognized graduate school. For particulars apply to the Registrar.

The Canadian Federation of University Women Fellowships - $1500 to $2500. For information apply to the Registrar.

The Imperial Order Daughters of the Empire Post-Graduate Scholarships - $5000. (For study overseas) **and $3000.** (For study in Canada). For information apply to the Registrar.

Imperial Oil Graduate Research Fellowship $3000 for three years. For information apply to the Registrar.

Commonwealth Scholarships. Under a Plan drawn up at a conference held in Oxford in 1959, each participating country of the Commonwealth offers 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 living allowance. For details of the awards offered by the various countries consult the Registrar's office or write to the Canadian Universities Foundation, 75 Albert Street, Ottawa.

Rotary Foundation Fellowship. Open to graduate students for advanced study abroad. Available every second academic year, 1963, 1965, etc. Applications must be considered before August 1st of previous year. Information may be obtained from Rotary Clubs or the Registrar.

DIVINITY

Scholarships in Divinity are tenable at the Atlantic School of Theology (or elsewhere in the case of particular scholarships). The Anglican faculty members of the Atlantic School of Theology advise on their disposition. Information on and application for these scholarships should be sought from the Divinity Secretary of King's College, Rev. Canon J. H. Graven.

Owen Family Memorial Scholarships - Two of $250. Established by Mr. and Mrs. D. M. Owen, in memory of the Owen family, tenable for one year, but renewable, and open to applicants who are Nova Scotia born, and resident therein, and are or are about to become theological students at King's College, preference being given (1) to native residents of the town of Lunenburg, and (2) to native residents of the county of Lunenburg.

Canon W. S. H. Morris Scholarship - $1,500. This Scholarship was founded by the late Robert H. Morris, M.D., of Boston in memory of his father, the Reverend Canon W. S. H. Morris, M.A., D.D., Kingsman, Scholar and Parish Priest in the Diocese of Nova Scotia for forty years.

The Scholarship may be awarded annually by the President and Divinity Faculty to the most deserving member of the present or recent graduating class of the Divinity School, who has been at King's at least two years, and who, in the opinion of the Faculty, would benefit from travel and/or study in Britain, the U.S.A. or some other area outside the Atlantic Provinces of Canada, provided he reaches a satisfactory standard. Applications, stating the use which the applicant expects to make of the Scholarship, must be submitted to the Divinity Secretary on or before January 8, of the year in which the applicant, if successful, intends to use the scholarship. The recipient will be required to serve in the Atlantic Provinces for a minimum of three years after his return from abroad.

William Cogswell Scholarship. Open to students intending to work in the Diocese of Nova Scotia. Scholarship (A): Under the direction of the Trustees of the William Cogswell Scholarship to be awarded to the student who passes a satisfactory examination and who takes his Divinity course at any recognized Divinity College of the Anglican Church in Canada best fitted, in the opinion of the Trustees, to serve the terms of the Trust, giving when possible preference to King's College.

Scholarship (B): Under the direction of the Faculty of Divinity of the University of King's College, Halifax, Nova Scotia, an entrance scholarship of $200 or $300 depending on quality of work submitted, will be awarded to the properly accredited student entering the Divinity course for the first time and who stands highest in a special examination to be held in the month of admission provided he reaches a satisfactory standard. The recipient will be required to sign a statement promising to serve in the Diocese of Nova Scotia for a period at least as long as the period during which he holds the scholarship.

This examination will consist of two papers:
a. A paper on the content of the Old and New Testaments, and
b. A paper on A. H. McNeile's Introduction to the New Testament (revised edition by C. S. C. Williams) Oxford, 1953.
Awards will not be made every year.

The Daniel Hodgson Scholarship - $240. Founded in 1883 by Edward J. Hodgson and the Reverend G. W. Hodgson in memory of their father Daniel Hodgson, who died about that time. This Scholarship of an annual value of $60, tenable for four years, is for the purpose of encouraging students to take an Arts Degree before entering upon the study prescribed for Holy Orders. Candidates, who must be residents of Prince Edward Island, shall file their applications and certificates of having passed the full Arts matriculation requirements before August 15th, and must not be over 24 years of age at that time. They must also satisfy the Diocesan Committee for Holy Orders as to their aptitude for the Ministry of the Church. At the end of each academic year the Scholar shall file with the Trustees a certificate from the President or Secretary of the University "that during the past year he has resided in College (or has been excused from such residence) and has attended the full Arts course in the College", together with a certificate that his moral conduct, his attention to his studies and his general conduct have been satisfactory to the Board of Governors.

Scholars who fail to comply with the foregoing conditions automatically forfeit the Scholarship, but in special cases the Bishop, on the representations of the Trustees, may restore a terminated Scholarship in whole or in part.

The Bishop Waterman Bursary (Parish of Clements) - $150. The Parish of Clements, Nova Scotia, wishing to give tangible expression to its appreciation to the Rt. Rev. R. H. Waterman, D.D., for his services to the Parish immediately following upon the death of their Rector (Rev. W. H. Logan, December 19, 1964), has set up a Bursary Fund, to be known as the Bishop Waterman Bursary Fund, to help young men entering King's College to undergo training for the Ministry. An amount not less than $150 is to be forwarded by the Treasurer of the Parish to the Bursar at King's on September 1st of each year. This money is to be used at the discretion of the Faculty of Divinity in consultation with the Bishop of the Diocese for the assistance of any candidate for Holy Orders needing it from any Parish of the Diocese of Nova Scotia enrolled at King's for training for work in the Diocese of Nova Scotia or any Missionary Diocese. If any young man from the Parish of Clements offers himself for such training, he shall be given first consideration in the awarding of the Bursary.

The Mabel Rudolf Messias Divinity Bursary - $120. The interest on an endowment of $2,000, the gift of Mrs. M. R. Messias of Wolfville, Nova Scotia, is to be used to provide an annual bursary for a needy and deserving Divinity student studying at the University of King's College, on the nomination of the Faculty of Divinity.

Order of The Eastern Star - $300. Four scholarships are to be awarded, primarily on the basis of financial need, to 2nd or 3rd year Arts students, or to older men with their Arts degree, in their 2nd or 3rd year of Theology.

The H. Terry Creighton Scholarship - $150 approximately. The annual income from an endowment of $2,000, established by family and friends to honour the memory of H. Terry Creighton of Halifax, Nova Scotia, who was an active Lay Reader and prominent Layman of the Diocese of Nova Scotia for many years.

The award is to be made to a deserving Anglican Divinity Student in his final year of training who is intending to enter the ministry in the Diocese of Nova Scotia. Should there be no suitable candidate for the scholarship training in Nova Scotia, the award may be made, in consultation with the Bishop of Nova Scotia, to one studying elsewhere, provided that the student intends to return to Nova Scotia for ministry in that Diocese.

Mary How Donaldson and Cornwallis W. A. Bursary — $400. This Bursary was established by St. John's (Cornwallis, N.S.), Anglican Church Women to provide a living memorial to the life and work of Mary How Donaldson, who had family connections with King's, and of Cornwallis W. A., of which she was a charter member. It is to be awarded on the recommendation of the Divinity Faculty to a deserving member of the Divinity School at King's, male or female, preferably a Nova Scotian, who is prepared for full-time service in the Church and is in need of financial assistance.

The George M. Ambrose Proficiency Prize — ($300. Approx.) The income from a trust fund set up in memory of Canon G. M. Ambrose, M.A., an alumnus of King's, provides an annual award to the Divinity student who receives the highest aggregate of marks at the end of his first year, provided that during that year such student takes the regular full course in theology.

The Margaret Draper Gabriel Bursary — $450. A fund has been established in memory of Margaret Draper Gabriel by her son, Rev. A. E. Gabriel, M.A., an alumnus of King's, the yield from which is to be used to give financial aid to a Nova Scotian Divinity Student entering King's College in preparation for the Ministry of the Church. The recipient must be nominated or recommended by the Bishop of Nova Scotia. If in any year there is no candidate for this assistance the yearly yield is to be used to augment the fund. Should King's College Divinity School cease to exist as such, the fund is to be transferred to the Diocese of Nova Scotia and the income used as aforesaid.

H. H. Pickett Memorial Scholarship — $175. This scholarship is payable to the student entering the final year of study for the Sacred Ministry who has shown the greatest all round improvement during his time in Divinity studies. Preference is to be given, first, to a student from Trinity Church, Saint John, and, second, to a student from the Diocese of Fredericton.

John Clark Wilson Memorial Bursaries — $100 each. Established in 1947 by Miss Catherine R. Kaiser, in memory of John Clark Wilson. Two bursaries of $100 each, tenable for one year. Awarded to Divinity students deemed worthy of financial help.

Glebe Scholarship. A scholarship of approximately $250 is offered annually to Anglican students of Prince Edward Island, preference being given to Divinity students.

Application, accompanied by a certificate of character from the applicant's Rector, must be sent to Canada Permanent Trust Company, Charlottetown, P.E.I. on or before May 31st.

Moody Exhibition — $100. The "Catherine L. Moody" Exhibition of $50 a year for two years is awarded every two years to the student entering the second year preparing for Holy Orders, whose scholarship and exemplary conduct shall, in the opinion of the Faculty, merit it. (Next award 1975).

The George Sherman Richards Proficiency Prize — $120. In Memory of the Reverend Robert Norwood, D.D. The income from a fund of $2,000 to be awarded annually to the Divinity student who gains the highest aggregate of marks at the end of his penultimate year, provided that in that year he takes the regular full course in Theology.

The Countess de Catanzaro Exhibition — $100. The income from a fund of $2,000 to be awarded by the Faculty to a Divinity student during his second year in college. The award will be made on the basis of character and need.

The McCawley Hebrew Prize — $25. Open to all members of the University who are below the standing of M.A.

This prize is given out of the interest of a Trust Fund, the gift of the Reverend George McCawley, D.D., in the hands of the Society for the Propagation of the Gospel in Foreign Parts.

This prize will be awarded to the student who leads the class in Hebrew 2 and receives a recommendation from the professor of Hebrew.

Junior McCawley Hebrew Prize — $25. With the accumulated unexpended income from the McCawley Hebrew Prize a fund has been set up establishing a second prize, to be awarded to the student standing highest in first year Hebrew.

Archdeacon Forsyth Prize — $50. The Ven. Archdeacon D. Forsyth, D.C.L., of Chatham, N.B. who died in 1933, left to King's College $1,000 to provide an annual prize or scholarship, to be awarded to a Divinity student for proficiency in the study and knowledge of the original Greek Scripture. To be awarded on the combined results of Greek Testament 1 and 2.

Shatford Pastoral Theology Prize — $40. Established by an anonymous donor, in memory of the late Rev. Canon Allan P. Shatford, C.B.E., D.C.L. Awarded annually for Pastoral Theology. The winner must receive a recommendation from the Professor of Pastoralia.

Laurie Memorial Scholarship. One or more scholarships of about $250 each, founded in memory of Lieut.-Gen. Laurie, C.B., D.C.L., open to candidates for the Ministry, under the direction of the Trustees. Particulars may be had from the Registrar.

The Wiswell Trust Divinity Studentship — $120. A. B. Wiswell, D.C.L., Hon. Fell. (Vind.) of Halifax, N.S., in order to perpetuate the memory of the Wiswell family, augmented a bequest from members of the family, thus providing a capital sum of $2,500, the income of which is to assist Divinity students at King's College, who were born in Nova Scotia and who propose entering the ministry of the Anglican Church in Canada.

Prince Prize in Apologetics — $60. Established by a bequest of the late Dr. S. H. Prince. Awarded every alternate year, at the discretion of the Faculty. (Next award 1975-76).

Wiswell Missionary Bursary — $200. Founded by Dr. A. B. Wiswell for help to a Divinity student who believes he has a call to the Mission Field either Overseas or in the Canadian West.

Preference will be given to a student who has given promise of the needed qualities and has taken his degree or is within a year of completing his Arts course. If there is no student meeting the above requirements the award will be left to the discretion of the Divinity Faculty.

Clara E. Hyson Prize — $5.00. Founded by Miss Clara E. Hyson and awarded each year on vote of the Faculty.

A. Stanley Walker Bursary — $200. Awarded by the Alexandra Society of King's College. To be given to an Anglican student at the Atlantic School of Theology for the year 1974-75.

Johnson Family Memorial Bursary — $60. Founded by the Misses Helen and Marguerite Johnson in memory of their parents. This bursary is to be awarded annually at the discretion of the President and Divinity Faculty to the Divinity student considered most worthy on grounds not only of scholarship, but also, of financial need and of devotion to his vocation. Preference will be given to a student from the parish of St. Mark's, Halifax.

Divinity Grants. Grants to aid students in Divinity who require assistance are made by the Archbishop of Nova Scotia, and by the Bishop of Fredericton. The holders of these must fulfill such conditions as the Bishops lay down and in every case attend a personal interview. For further particulars apply to the Divinity Faculty.

The King's Divinity Scholarship — $150. The Anglican Church Women in the Diocese of Nova Scotia makes an annual grant of $150 towards the expenses of Divinity students who agree to work in the Diocese of Nova Scotia after ordination.

Archbishop Kingston Memorial — $100. Awarded annually by the Nova Scotia Diocesan A.C.W. on recommendation of the Divinity Faculty, to a needy divinity student.

The Wallace Greek Testament Prize — $50. A Book Prize established by the late Canon C. H. Wallace of Bristol, England, in memory of his father Charles Hill Wallace, barrister, of Lincoln's Inn, who graduated at King's College in 1823, and died in England in 1845. Subject: Epistle to the Hebrews. Application to be made to the Registrar by March 1st.

Agnes W. Randall Bursary. Two bursaries of $8.00 each will be given each year to the students in Theology who show the greatest diligence in their studies. An award will not be made twice to the same student.

Bennett-Cliff Memorial Prize. A prize of $10.00 each year. Award to be at the discretion of the President.

Kenelm Eaton Memorial Scholarship — $60. This scholarship is provided by the Synod of Nova Scotia as a memorial to The Hon. Captain Kenelm Edwin Eaton, B.Sc., L.Th., who made the supreme sacrifice while serving as a Chaplain in Italy, August 31, 1944. For particulars apply to the Registrar.

Dr. C. Pennyman Worsley Prize — $100. A memorial to the late Dr. Worsley. To be used in alternate years for a prize in Church History. Next award 1975-76.

Fenwick Vroom Exhibition — $40. To be awarded to a Divinity Student at the discretion of the Faculty.

The Church Boy's League Bursary Fund. Students eligible for assistance from this Fund are those who have, at one time, been full-pledged members of any Parochial C.B.L. branch in Canada. Particulars are available from the Registrar.

Archbishop Owen Memorial Scholarships. A number of scholarships of $300 each are awarded each year by the General Synod Committee concerned to students in their final year in Theology, who are ready to take up missionary work, either in Canada or overseas. Academic standing and financial need are taken into account in making the award.

Application should be made to the Divinity Faculty by November 1st of each year.

The Florence Hickson Forrester Memorial Prize — $100. The prize, presented in memory of the late Mrs. Forrester, by her husband, is to be awarded on Encaenia Day to the Divinity Student in his penultimate or final year who passes the best examination on the exegesis of the Greek text of St. Matthew, Chapter V-VII provided always that the standard is sufficiently high.

Bibliography:
T. W. Manson: The Sayings of Jesus (SCM)
J. Jeremias, The Sermon on the Mount, (Athlone Press)
F. W. Beare: The Earliest Records of Jesus, (Blackwell) pp. 52-69 and 95-98.
H. K. MacArthur: Understanding the Sermon on the Mount (Epworth).

The Bullock Bursary — $225. Established by C. A. B. Bullock of Halifax for the purpose of defraying the cost of maintenance and education of divinity students enrolled at King's College who were, before being enrolled, residents of Halifax, and who members of a Parish Church there, and who are unable to pay the cost of such maintenance and education.

The Harris Brothers Memorial — $100. To be awarded at the beginning of each college year as a bursary to a student of Divinity at the University of King's College. The student shall be selected annually by the Divinity Faculty, preference being given to a needy student from Prince Edward Island, failing that, a needy student from the Parish of Parrsboro, and failing that, to any deserving student of Divinity at the said University.

The Carter Bursaries — $160. Two bursaries of a value of $160 each, established under the will of Beatrice B. Carter of Amherst, Nova Scotia, to be used to assist young men studying for the ministry.

Royal Canadian Air Force Protestant Chapel Bursary — $120. This Bursary, established in 1959 by endowment from collections taken in R.C.A.F. chapels, is awarded annually at the direction of the Divinity Faculty to a bona fide ordinand, preference where possible being given to (a) ex-R.C.A.F. personnel, (b) children of R.C.A.F.

The Ott Reading Prize — $25. Established by Dr. T. Gordon Ott. Awarded annually to a student of Divinity for the best reading of the Bible and the Services of the Church.

The Ott Preaching Prize — $25. Established by Dr. T. Gordon Ott. Awarded annually to a student of Divinity for the best extempore sermon of an expository nature.

William A. and Kathleen Hubley Memorial Bursary — $175. This bursary is designed to assist students from St. Mark's Parish, Halifax, and failing a suitable candidate then from any parish in the Diocese of Nova Scotia, who are studying for the Sacred Ministry at any recognized College in the Anglican Communion, preference being given to students studying at the University of King's College. The award is made on the basis of need and may be renewed provided a certain acceptable standard is attained. The recommendations of the Rector of St. Mark's and the Divinity Faculty are necessary conditions. The bursary must be applied for annually.

The Reverend Dr. W. E. Jefferson Memorial Bursary — $100. This bursary, the gift of the Parish of Granville, N.S., is established in memory of Reverend W. E. Jefferson, D.Eng., an alumnus of King's and a graduate engineer, who was ordained late in life and yet was able to give nearly twenty years of devoted service to the ordained ministry. Preference will be given to older men pursuing post-graduate studies or to older men preparing for ordination. The award is to be made by the Divinity Faculty.

The Archdeacon Harrison Memorial Bursary — $20. Established by Miss Elaine Harrison in memory of her father. To be awarded to a deserving and needy Divinity student, at the discretion of the Faculty.

St. Paul's Garrison Chapel Memorial Prize — $20. To be awarded to the Divinity student chosen by the Faculty to attend a Christmas Conference.

The Clarke Exhibition. An endowment was established by the late Reverend Canon W. J. Clarke of Kingston, New Brunswick, the first charge upon which shall be the provision of copies of "The Imitation of Christ" to members of each year's graduating Class in Divinity. The balance of the income each year is to be awarded by decision of the Divinity Faculty to a deserving Divinity Student for the coming year.

Halifax Deanery Laymen's Association Bursary.

A bursary in the amount of $100 or more awarded to a deserving Divinity student nominated by the Divinity Faculty.

LOAN FUNDS

Edith Mabel Mason Memorial Students Loan Fund.
Established by Alumni and friends as a memorial to the late Miss Edith Mabel Mason, M.A. a former Dean of Women and Professor of Modern Languages. Available to women students entering upon their third or fourth year. Application to be made in writing to the Registrar.

Canada Student Loans
1. All Canadian students are eligible to be considered for Canada Student Loans which, in most provinces, are administered in conjunction with provincial bursary plans.

2. Students should apply as early as possible by requesting application forms from the provincial authority in order to have the money available for registration.

Societies Connected With The College

Alumni Association of King's College

This Association, incorporated in 1847 by Act of the Legislature, consists of graduates and others whose object is the furtherance of the welfare of the University.

The Association maintains annual scholarships.

The annual meeting of the Association is held the day before Encaenia.

The Officers of the Association in 1973-74.
President,
The Rev. D. F. L. Trivett, 1665 Oxford St., Halifax, N.S.

Vice-President,
Ms. Mary L. Barker, 5685 Inglis St., Halifax, N.S.

Treasurer,
Dr. Henry Muggah, Q.C., 6033 Belmont Road, Halifax, N.S.

Executive Secretary,
Mrs. J. Murphy, University of King's College, Halifax, N.S.

The Alexandra Society of King's College

This Society, which has branches all over the Maritime Provinces, was formed in Halifax in 1902 as the Women's Auxiliary to the College. It maintains an annual scholarship and bursary and supports the Alexandra Special Lecturer in Pastoralia (Director of Parish Field Work).

Officers 1974-75

Patroness,
Mrs. W. W. Davis.

Hon. President,
Mrs. H. L. Nutter.

Hon. Vice-President,
Mrs. G. F. Arnold.

Immediate Past President,
Miss Miriam Morris, 2438 Gottingen St., Halifax, N.S.

President,
Mrs. A. G. MacIntosh, 48 Beechwood Drive, Truro, N.S.

Vice-Presidents,
Mrs. A. MacKeigan, 68 Reserve St., Glace Bay, N.S.
Mrs. P. N. McIvor, 8 Lakeview Point, Dartmouth, N.S.
Mrs. J. E. Lane, 211 Willett St., Apt. 206, Halifax, N.S.
Mrs. C. A. Orford, 86 Kent St., Charlottetown, P.E.I.
Mrs. E. R. McCordick, 237 Brookside Dr., Apt. 9B, Nashwaaksis, N.B.

Recording Secretary,
Mrs. H. B. Wainwright, 9-1-7, SS No. 2, Armdale, N.S.

Corresponding Secretary
Mrs. V. Fairn, 55 Lynn Drive, Dartmouth, N.S.

Treasurer,
Mrs. W. F. Palmer, 1652 Chestnut St., Halifax, N.S.

Convocation 1973

Graduating Class

Honorary Life President,
Roderick Morgan Shoveller

Life President,
Bernard Wayne MacQueen

Life Vice-President,
Bruce Fairbairn Campbell

Life Secretary,
Deborah Suzanne Martin

Life Treasurer,
Janice Elizabeth Ingram

Co-Valedictorians
Tricia J. Murwin
James M. Queen

Doctor of Civil Law *(honoris causa)*
The Honourable Mr. Justice Arthur Gordon Cooper
Mr. Robert Jardine McCleave, MP

Doctor of Divinity *(honoris causa)*
The Reverend Professor Eugene Rathbone Fairweather
The Right Reverend William Gordon Legge

Bachelor of Divinity
Peters, The Reverend Arthur Gordon, B.A., B.S.Litt., Annapolis Royal, N.S.

Bachelor of Theology
Pickett, The Reverend Charles Edward, Petitcodiac, N.B.

Master of Divinity
Ripley, The Reverend Lloyd Harold, B.A., Upper Rawdon, N.S.

Bachelor of Arts
Abbass, Paul Joseph Micheal, Sydney N.S.
Blennerhassett, Robert Lorne, Antigonish, N.S.
Borlase, Timothy James, Lewisville, N.B.
Browne, Janice Rachel, Dartmouth, N.S.
Campbell, Bruce Fairbairn, (Honours in Political Science), Peterborough, Ont.
°Chapman, Laura Allison, Dartmouth, N.S.
Cook, Gloria Jean (MacKay), Sydney, N.S.
Corsano, Elissa Anne Marie, Sydney, N.S.
°°Davidson, Glenn Victor, Truro, N.S.
D'Orsay, John Vincent, Dartmouth, N.S.
°Gilbert, Andrew Martin (Honours in Theatre), Dartmouth, N.S.
°Grady, Janine Rosalind, Sydney, N.S.
°Handspiker, Gordon Rosco, Digby, N.S.
Harris, Anne Margaret, Lawrencetown, N.S.
°°Hart, Jane Shelley, Halifax, N.S.
°°Hartling, Philip Loran, Dartmouth, N.S.
Ingram, Janice Elizabeth, Dartmouth, N.S.
°°Lacey, Laurie Kenneth, Hebbs Cross, N.S.
°°MacDonald, Daniel Sherman, Sydney, N.S.
°MacDonald, Mary Grace, Halifax, N.S.
MacDonald, Ronald Clark, North Sydney, N.S.
MacKenzie, Paula Heather, Sydney River, N.S.
MacQueen, Bernard Wayne, Sydney, N.S.
McGregor, Bryan Walter, Dartmouth, N.S.
Meisner, Cathy Bernice, New Germany, N.S.
Mitchell, Roderick Noel, New Waterford, N.S.
Morse, Ronald Irvin, Middleton, N.S.
°Munro, Sharon Ann, Chester, N.S.
Murwin, Tricia Joan (First Class Honours in French and Spanish), Halifax, N.S.
Pike, Valerie Elizabeth Ann, Hubbards, N.S.
Pitcairn, Brian Andrew Hunter, Dartmouth, N.S.
Power, Margaret Mary (Latimer), Sydney, N.S.
Queen, James Matthew, (Honours in Philosophy), Saint John West, N.B.
Ramey, Cathy Lee, Crousetown, N.S.
°°Robertson, Donald John, Port Williams, N.S.
Roby, John Harold, Windsor, N.S.
Seegmiller, David Harold, (Honours in Classics), Halifax, N.S.
Smith, Paul Kenneth Mowbray, Ottawa, Ont.
Stephenson, Sharon Victoria, Halifax, N.S.
Taylor, Robert Brian, Sydney Mines, N.S.
Theman, Dennis William, Bedford, N.S.
Tomlin, Judith Ann, Halifax, N.S.
Vondette, Christopher Stephen, Bedford, N.S.
°°Wainwright, Charles Albert, Halifax, N.S.

Bachelor of Science
Campbell, Carolyn Jean, Middleton, N.S.
°Coll, Heather Elizabeth, Dartmouth, N.S.
Dacey, John William Harry (First Class Honours in Biology and Chemistry), Kingston, Ont.
Edwards, Susan Jane, Halifax, N.S.
Fleury, Philip Victor, Westville, N.S.
°Fraser, Wenda Ann, Dartmouth, N.S.
°°Irving, Donald Gordon, Kingston, N.S.
°°MacDonald, Geoffrey James Campbell, Rothesay, N.B.
Martin, Deborah Suzanne, Coxheath, N.S.
McMaster, Adrian Ronald Anthony, New Waterford, N.S.
°Nickerson, Gladys May, Halifax, N.S.
°°Veling, Mary Wilhelmina, Fraser's Mountain, N.S.
Wood, Harold Tega (Honours in Geology), Amherst, N.S.

Diploma in Divinity

Associate of King's College (Nova Scotia)
Akerley, The Reverend George Charles, L.Th. Saint John, N.B.

°Conferred during the session
°°In absentia

Encaenia Awards

Arts and Science
The Governor General's Medal, Tricia Murwin
President's Scholarship (Third year), Gene Barrett
President's Scholarship (Second year), David Secord
President's Scholarship (First year), Hendrick Visser
Alexandra Society Scholarship, Irené Hall
Stevenson Scholarship, Hendrick Visser
Lawson Prize, Elizabeth Chisholm
Dr. M.A.B. Smith Prize, Irené Hall
Bishop Binney Prize, Irené Hall
Beatrice E. Fry Memorial Prize, Wendy Roos
Zaidee Horsfall Prize in Mathematics, John Wright
Almon-Welsford Testimonial Prize, Patricia Harrigan
McCawley Classical Prize, Avard Bishop
Binney Bursary, Brenda Silver
Charles Cogswell Bursary, Blair Mitchell
Harry Crawford Memorial Prize, Blair Mitchell
Jackson Bursary, Brenda Silver
Claire Strickland Vair Scholarship, Susan Harris

Divinity
The Canon W. S. H. Morris Scholarship
The Reverend Vernon Glen Kent
The George Sherman Richards Proficiency Prize, John Victor Cavill Pitt, Barkat Masih Khokhar
The McCawley Junior Hebrew Prize, John Victor Cavill Pitt (1972), Barkat Masih Khokhar (1973)
The Archdeacon Forsyth Prize, The Reverend Lloyd Harold Ripley
The Shatford Pastoral Thelogy Prize, The Reverend Lloyd Harold Ripley
The Kenelm Eaton Memorial Scholarship, John Victor Cavill Pitt
The Ott Reading Prize, John Victor Cavill Pitt
The Ott Preaching Prize, Barkat Masih Khokhar
The Canadian Bible Society Book for the Reading of the Holy Scripture, Gordon Blandford Rigby
The George M. Ambrose Proficiency Prize, Peter Mitchell, Robert Lloyd Power
The Moody Exhibition, Donald Eugene Routledge

Entrance Scholarships and Bursaries Awarded May, 1973 (Arts and Science)

Henry S. Cousins Scholarships
Richard Fiander
Richard March
Margaret vonMaltzahn

Susanna Almon Scholarship
Peter Bryson
Carole Cushing
Deborah Northover

Chancellors' Scholarship
Crystal Bain
Peter Hull
Carla Rafuse

Board of Governors Scholarship
Tony Kelly
Catherine Sanderson

Halifax-Dartmouth Entrance Scholarship
Gordon Brown
Carolyn Coulter
David Curry
Florence Fitt
Robert Giles
Kim Horne
Debra Hornsby
Peter Lee
Ann MacKenzie
Diane Zwicker

Special Alumni Entrance Scholarship
John Farrell

Alumni Scholarship
Catharina Lake
John Matheson

Alumni "Annual Giving" Scholarship
Mary Lewis
Sandra MacLeod
Michael Walsh

Nova Scotia Teachers College Bursary
Carolyn Demmons

Walter Lawson Muir Bursary
Torrance Kirby

Winfield Memorial Scholarship
Deborah Boltz
Timothy Menzies

Keating Trust Scholarship
Torrance Kirby

Nova Scotia Light and Power Co. Ltd. Scholarship
Paul Wavrock

University Bursaries
Deborah Boltz
Gordon Brown
Ann MacKenzie
Timothy Menzies
Diane Zwicker

NOTE

The following pages contain information about the Degree Programmes, and Programmes of Study leading to the Degrees of Bachelor of Arts and Bachelor of Science and are reprinted, with permission, from the Calendar of Dalhousie University. Students enrolled at King's College in Arts and Science are admitted to the same programmes and classes as students enrolled at Dalhousie University (see p. 9), with the exception of King's College students enrolled in the Foundation Year Programme (see p. 18). The sections dealing with programmes leading to other degrees (such as Bachelor of Commerce, Bachelor of Education, Engineering, etc.) are also included for information, but only students enrolled at Dalhousie University may enter these other degree programmes.

Degree Programmes

1. Courses of Study

Bachelor of Arts / Bachelor of Science
General
Honours

Uniform Bachelor of Science for Engineering

Bachelor of Science with Honours in Engineering Physics

Bachelor of Commerce
General
Honours

Bachelor of Education
Sequential
Integrated

Bachelor of Music Education

Certificate in Public Administration

2. Subject Grouping

A. Languages	B. Humanities
French	Classics
German	Comparative Literature
Greek	English
Latin	History
Russian	Mediaeval Studies
Spanish	Music
	Philosophy
	Religion
	Theatre
C. Social Sciences	**D. Sciences**
Anthropology	Biochemistry
Economics	Biology
Political Science	Chemistry
Psychology	Geology
Sociology	Mathematics
	Physics

Classes are offered also in other subjects: Architecture, Art History, Commerce, Computer Science, Education, Engineering, Oceanography, Humanistic Studies in Science, Hebrew, Arabic, Coptic, and Syriac.

3. Numbering of Classes

The Faculty is in the process of reviewing its system of numbering classes. Most classes are numbered with a three digit number; others, however, are numbered with a four digit number. The following general criteria apply to both kinds of numbering. Students are urged to consult the relevant departments if they are confused by any specific numbering system.

Classes are numbered to indicate their general level and the year of study in which they may first be taken. The first digit in either a three or four digit number normally indicates the year of study. Thus, classes in the 100 + series are introductory and can normally be taken by fully matriculated students without any special prerequisites. Completion of a 100-level class is normally a prerequisite for admission to further classes in the subject. Classes in the 200 + series, 300 + series and 400 + series are normally taken in the second, third and fourth years respectively.

Certain classes in the 200, 300, or 400 series are restricted to Honours students and may not be taken by students in the General Degree programmes, except with special permission of the instructor.

Classes in the 500 + and 600 + series are normally regarded as graduate classes; however, some may be open to senior undergraduates with the permission of the department or instructor concerned.

The letters A, B and C suffixed to a three-digit class number indicate a half-credit class, i.e., a class having one-half the value of a full class in determining the standing of students. The letters indicate the terms during which the classes are offered as follows:
A: First term, classes end in December.
B: Second term, classes end in April.
A/B: Given in the first term and repeated in the second term. Classes end in December or April according to the term in which the class is taken.
C: Spread over both terms, final examination in the Spring.

Classes with numbers below 100 do not carry credits but may be prerequisites for entry to credit classes for students whose matriculation backgrounds are deficient.

4. Programme Advice

4.1 Entering Students
Any student who wishes to declare his major at initial registration must consult with the department concerned regarding his first-year programme.

Students entering the King's Foundation Year Programme should consult the Director of the Programme before registration.

4.2 Students who have Completed the First Year
Every student entering the second year is assigned a Faculty advisor with whom he must consult regarding his programme. Normally the department concerned assigns an advisor to a student once he has declared his major subject. Students seeking to enter an Individual Programme (section 5.2.3 below) or an Unconcentrated Honours Programme (section 5.3.5.2 below) must approach the Chairman of the Programme Advisory Committee which will assign an advisor or advisors and which must give approval to programmes of these types.

4.3 Prospective Teachers
Students considering teaching as a profession should before registering consult the Chairman of the Department of Education regarding their programme of study. Those considering music teaching should consult the Chairman of the Department of Music.

5. Bachelor of Arts/Bachelor of Science

General: three years — 15 classes required [1]
Honours: four years — 20 classes required

5.1 The First Year

5.1.1 Requirements
(a) Each full-time student planning to take a B.A. or a B.Sc. will in the first year normally take five classes or the equivalent, chosen from groups, A, B, C, and D. (The King's Foundation Year Programme is equivalent to four classes for B.A. candidates or three classes for B.Sc. candidates).

(b) No student may in his first year take for credit more than the equivalent of two full-credit classes in a single department.

(c) One of the five classes chosen must be selected from a list of classes in which written work is considered frequently and in detail. These classes are approved by the Curriculum Committee and listed in the Programme Planning Guide.

5.1.2 Recommendations
These recommendations do not apply to students entering the King's Foundation Year Programme.

(a) Students should seriously consider choosing a class from a list of classes which deal with a formal subject. This list is in the Programme Planning Guide and has been approved by the Curriculum Committee.

(b) Students should consider becoming fluent in French.

(c) It is recommended that one class be chosen from each of the groups A, B, C, and D.

5.1.3 Special Options
(a) A first-year student may (but need not) declare his intended major department and

[1]Application of Regulations to students who entered in 1972 or earlier.
All students who entered a General B.A. or General B.Sc. degree programme prior to 1973 must meet the requirements as outlined in Sections 5.2 and 5.1.1(a) above; if beyond the first year they will be considered to have been in an Ordinary Programme.

may be accepted by the chosen department at initial registration. Such a student must consult with the department concerned regarding his first-year programme.

(b) The King's Foundation Year Programme offers the first-year student in Arts and Science an integrated introduction to the humanities and social sciences through study of some of the principal works of western culture. To take advantage of this Programme the student must be enrolled at King's. Details are to be found in the Calendar of the University of King's College, and advice may be obtained from the Director of the Programme.

5.2 General B.A. and B.Sc. — Requirements for the Second and Third Years

A student who has successfully completed the first year may pursue a programme toward a general degree or - if qualified - enter an honours programme. (Honours programmes are outlined in section 5.3 below.) In the second and third years, three types of options are open to the candidate for a General B.A. or General B.Sc.:

(a) *Ordinary Programmes,* which may be pursued in any department in which it is possible to obtain a General B.A. or B.Sc. In such a programme, the student must select a major subject, but the structure of study in the major and elective classes may be relatively loose;

(b) *Co-ordinated Programmes,* offered by some departments or groups of related departments, each programme requiring either one or two years of relatively concentrated study in the departmental or interdepartmental area of specialization; and

(c) *Individual Programmes,* for students whose academic needs are not met by the foregoing options.

The rules governing each of these options are outlined below.

5.2.1 Ordinary Programmes (B.A./B.Sc. General)

5.2.1.1 The ten classes making up the course for the second and third years must meet the following requirements:

(a) at least seven classes shall be beyond the 100 level;

(b) at least one class shall be in each of at least three subjects:

(c) (i) at least four and no more than eight classes *beyond the 100 level* shall be in a single area of concentration (the major). (ii) up to two of the classes in the major subject must be selected in accordance with departmental or interdepartmental requirements outlined in the Calendar under Programmes of Study. These requirements may also designate particular offerings of the department (e.g. service classes) as unacceptable in constituting a part of the major specialization.

5.2.1.2 On registration in his second year the student must declare his major and have it approved by the department concerned.

5.2.1.3 For the B.A., the major may be chosen from French, German, Greek, Latin, Russian, Spanish, classics, English, history, philosophy, music, anthropology, economics, political science, sociology, or from any of the B.Sc. subjects except engineering.

5.2.1.4 For the B.Sc. the major subject must be chosen from biology, chemistry, engineering, geology, mathematics, physics, or psychology.

5.2.1.5 Electives may be chosen from any of the subjects listed in the preceding two paragraphs. Architecture 100, Art History, Biochemistry, not more than three classes in Commerce, Comparative Literature, Computer Science, Education 401 or 402, Hebrew, Humanistic Studies in Science, Mediaeval Studies, Religion, and Theatre 100.

5.2.2 Co-ordinated Programmes (B.A./B.Sc. General)

A student may in his second and third years follow a two-year - or two one-year - integrated programme(s) of study. If two one-year programmes are chosen, they may be in different departments. All such co-ordinated programmes have been explicitly approved by the Curriculum Committee. A department or group of departments offering co-ordinated programmes may structure them as it wishes, consistent with sound academic practice and subject to the following guidelines:

(a) that the equivalent of five class units constitute a normal year;

(b) that the function of each programme form part of the Calendar description of each programme;

(c) that each two-year programme permit the student at least one class of his own choice in each of the second and third years;

(d) that two-year programmes normally not be exclusively in a single discipline.

(e) that the normal prerequisite for entry into a departmental one-year or two-year programme be the introductory class of the department in question, or an equivalent that the department considers acceptable, and not more than one introductory class in a related subject.

A student considering a Co-ordinated Programme should consult as early as possible with the departments concerned.

5.2.3 Individual Programmes (B.A./B.Sc. General)

A student whose academic needs are not met by the programmes offered under paragraphs 5.2.1 and 5.2.2 may present two one-year or a two-year programme of his own choice to the Programme Advisory Committee for scrutiny and approval; it being understood that the Committee and/or Faculty advisor provide assistance in constructing and revising such programmes.

5.2.4 Transfer Between Programmes

A student who transfers at the beginning of his third year from or into an Ordinary Programme must either meet the requirements under paragraphs 5.2.1 or 5.2.3, and may declare a new major subject.

5.3 Honours Programmes

Abie and ambitious students are urged to enter an Honours Programme. These programmes entail a higher quality of work than that required for the general bachelor's degree. There are two types of honours courses: concentrated, involving a major concentration in a single discipline or a combined concentration in two related disciplines; and unconcentrated, involving breadth of study in several related disciplines. A student may transfer from the honours to the general programme without serious inconvenience. *Students considering an honours course are advised to consult as soon as possible — preferably before their first registration — with the departments in which they may wish to do their advanced work.*

5.3.1 Acceptance

Honours students in a concentrated programme must be accepted by the major department concerned, which will supervise their whole programme of study. Honours students in an unconcentrated programme must be accepted by the Programme Advisory Committee, which will appoint an interdisciplinary advisory committe of two or more Faculty members to supervise the programme of study.

5.3.2 Application for Admission

Application for admission to an honours course must be made in triplicate on forms that are available from the Registrar's Office. Students desiring to puruse a concentrated programme must submit these forms to the head of the department concerned.

5.3.3 Conversion to Honours of a General B.A., B.Sc., or B. Comm. Degree

A student who has received a General B.A., B.Sc., or B.Comm. degree from Dalhousie and who is not enrolled in a programme of study in another Faculty, may apply for admission into an Honours B.A., B.Sc., B.Sc. (Eng. Phys.), or B. Comm. programme. Regulations in paragraphs 5.3.1 and 5.3.5 (or the regulations regarding the B.Sc. with Honours in Engineering Physics) must be met. On satisfying the requirements of the Honours degree programme, the student will receive a certificate which converts his General degree to an Honours degree.

5.3.4 Joint Honours: Dalhousie-Mount Saint Vincent

Special arrangements exist under which students may be permitted to pursue an honours programme jointly at Dalhousie and Mount Saint Vincent. Interested applicants should consult the appropriate department of their own university and must be accepted by the major departments concerned at both institutions. These departments will supervise the entire programme of study of accepted applicants. Paragraph 5.3.5.1 applies fully to such joint programmes.

5.3.5 Requirements for the Second, Third, and Fourth Years

5.3.5.1 Concentrated Honours Programmes

(a) Honours in a *major programme* are based on the general requirement that the 15 classes beyond the first year of study comprise:
(i) nine classes beyond the 100 level in one subject (the major subject);
(ii) two classes in a minor subject satisfactory to the major department; and
(iii) four classes not in the major field.

(b) Honours in a *combined programme* are based on the general requirements that the 15 classes beyond the first year of study comprise:
(i) eleven classes beyond the 100 level in two allied subjects, not more than seven classes being in either of them;
(ii) four classes in subjects other than the two offered to satisfy the requirement in the preceding clause.

(c) At the end of a concentrated honours course, a student must pass a comprehensive examination covering his honours work and he must attain an average of not less than B— in the classes in the two disciplines in which he has concentrated; attainment of an average of at least A— in this examination and these classes is required to obtain First-Class Honours.

Details of specific departmental honours programmes will be found under departmental listings of *Programmes of Study.*

5.3.5.2 Unconcentrated Honours Programmes

(a) Honours in the unconcentrated programmes are based on the general requirement that the fifteen classes beyond the first year of study comprise:
(i) twelve classes beyond the 100 level in three or more subjects. No more than five of these may be in a single subject; no less than six and no more than nine may be in two subjects.
(ii) three other classes.

(b) Requirements for an Unconcentrated B.A. (Honours)

At least ten classes of the twenty required must be selected from groups A, B, and C.

(c) Requirements for an Unconcentrated B.Sc. (Honours)

At least eight classes of the twenty required must be selected from biology, chemistry, geology, mathematics, physics, and psychology, and at least six additional classes must be selected from groups C and D.

(d) At the end of an unconcentrated honours course, a student must obtain a grade of B— or higher on an honours essay or a comprehensive examination regarding his honours work. In addition, he must attain an average of B— in the required advanced classes which comprise his honours programme. Achievement of an average of at least A— on the honours essay or examination and in the required advanced classes is required to obtain First-Class Honours.

6. Uniform Bachelor of Science for Engineering

Three Years — 16 classes required.

On successful completion of this course, the student receives a General Bachelor of Science Degree from Dalhousie and qualifies for admission to the junior year of the Nova Scotia Technical College. Students who plan to study further at a college other than the Nova Scotia Technical College should consult the Department of Engineering and Engineering-Physics on initial registration. See also *Architecture* below.

Details of the curriculum are given under *Engineering and Engineering-Physics* in *Programmes of Study.*

7. Bachelor of Science with Honours in Engineering-Physics

Four years — 21 classes required.

This special course is based on a study of physics oriented towards its application to engineering problems. It is designed to give students more exposure to practical applications than does the Honours physics course. Students are also given an opportunity to specialize in such fields as electronic systems engineering, semiconductor engineering, underwater acoustics and materials science. Completion of the course is excellent preparation for a career in industrial research or for graduate study in applied sciences.

Details of the curriculum for the course are given under *Engineering and Engineering-Physics* in *Programmes of Study.*

8. Bachelor of Commerce

General: Three years — 15 classes required.
Honours: Four years — 20 classes required.

For 1970 and subsequent years new students will enter a revised programme which may permit some concentration in one of several fields of business studies. Students planning to follow a concentration programme should consult the Department of Commerce prior to registration.

(a) The Institute of Chartered Accountants in most provinces in Canada offers exemptions to graduates in commerce of Dalhousie who are candidates for the Diploma in Chartered Accountancy.

(b) The Society of Industrial and Cost Accountants offers exemptions to graduates in commerce of Dalhousie who are candidates for the Diploma in Registered Industrial Accountancy.

Details of the curriculum for the General and for the Honours degree courses are given under *Commerce in Programmes of Study.*

9. Bachelor of Education

Integrated (with General B.A. or B.Sc.): four years - 22 classes, including field experience.

Integrated (with Honours B.A. or B.Sc.): five years - 27 classes, including field experience.

Sequential: one year —
(Elementary) 8 classes, including field experience.
(Secondary) 7 classes, including field experience.

In the integrated course, classes in education are taken concurrently with classes in arts and science; two degrees are awarded on completion, the B.Ed. and the B.A. or B.Sc.

In the sequential course, classes in education are taken only after completion of all classes in arts and science. Candidates for admission to this course must have received the degree of B.A., B.Sc., or B.Comm. from a college or university recognized by the Senate for the purpose.

By arrangement with the Nova Scotia Department of Education, students completing either of these courses in education may receive a Teacher's Certificate (Class 5). Both B.Ed. courses are divided into two types, Elementary and Secondary.

10. Bachelor of Music Education

Four years - 20 classes plus practice teaching required.

By arrangement with the Nova Scotia Department of Education, students completing the course are awarded a Teacher's Certificate (Class 5). Details of the curriculum and requirements for admission to the course are given under *Music* in *Programmes of Study.*

11. Certificate in Public Administration

One year - five classes plus standing in Political Science 100 or its equivalent.

A programme leading to the Certificate of Public Administration is available to persons who meet the admission requirements of Dalhousie University and who neither hold a first degree nor are enrolled in a programme leading to a first degree. Those not meeting the usual admission requirements may apply for admission as a *Special Case (see Admissions,* section 1.3). The Department of Political Science will review applications for admission under this provision and make recommendations thereon.

11.1 Prerequisite Requirement
Standing in Political Science 100 or its equivalent.

11.2 Programme Requirements
(a) Government of Canada (Political Science 202);

(b) a class in economics;

(c) Public Administration (Political Science 311);

(d) and (e) two other classes in the social sciences chosen in consultation with the Department.

Normally four of the five classes in the programme must be taken at Dalhousie University. Except for the prerequisite class, credit will normally be give only for classes taken after the student has registered in the programme.

Classes taken for the Certificate may be credited toward a bachelor's degree, but a student must complete at least five of the subjects required for the degree *after* the award of the Certificate.

A degree programme and the Certificate programme cannot be taken concurrently. A person registered in a degree programme cannot also be registered in a Certificate programme, nor can a Certificate in Public Administration be awarded for work taken as part of a degree programme.

12. Dentistry

Detailed requirements for admission are set forth in the Calendar of the Dalhousie University Faculty of Dentistry. Candidates are encouraged to proceed to a Bachelor's degree before seeking admission.

12.1 Entrance Requirements
At a minimum, applicants pursuing a predental course in the Faculty of Arts and Science are required to have completed ten classes during regular attendance at a university acceptable to the Faculty of Dentistry.
(a) Five of these ten classes are imperative, namely: English 100; Physics 100; Biology 1000 or 200; Chemistry 110 and 241.

(b) Credit for the remaining five classes may be obtained in either of the following ways:
(i) by the successful completion of three classes chosen from the humanities and the social sciences plus two other elective classes.
(ii) by Bachelor's degree.

12.2 Dental Aptitude Tests
All Canadian applicants must submit test results from the Canadian Dental Association Dental Aptitude Testing Programme. Applicants from other countries may submit the American Dental Association Dental Aptitude Testing Programme results.

13. Medicine

Detailed requirements for admission are set forth in the Calendar of the Dalhousie University Faculty of Medicine. The majority of students accepted for admission to that Faculty have a bachelor's degree, but this is not a requirement.

13.1 Entrance Requirements
At a minimum, applicants pursuing a premedical course in the Faculty of Arts and Science to which they have been admitted on the basis of Nova Scotia Senior Matriculation (or the equivalent) including credits in English and mathematics, are required to have completed ten classes in a regular degree programme prior to June 10 of the year of expected entrance.

(a) Five of these classes are imperative, namely: English 100, Biology 1000 or 2000, Chemistry 110 and 241, and Physics 100 or 110.

(b) The remaining five classes must include at least two in a single subject. Ordinarily these five electives should be chosen from the following: anthropology, biology, chemistry, classics or classical languages, economics, English, history, mathematics, modern languages, philosophy, physics, political science, psychology or sociology.

In choosing electives pre-medical students are generally well-advised not to anticipate medical school subjects such as bacteriolcgy, biochemistry, histology, and physiology at the expense of fundamental training, but for students intending to specialize within the medical sciences, an honours degree in one of these fields or in biology, chemistry or physics may prove advantageous.

13.2 Medical College Admission Test
Results of this test must be submitted by all applicants.

14. Architecture

Qualification for entrance to the School of Architecture at the Nova Scotia Technical College is the satisfactory completion of at least two years at any university or equivalent institution of recognized standing. A university course in mathematics is prerequisite, except that the applicant may instead be required to take a written examination in this subject.

Providing it has been undertaken at a recognized university, virtually any course of studies, including arts, fine arts, engineering and other technologies, science, agriculture, social sciences, education, medicine, is acceptable.

A candidate for admission to the first year in architecture should submit to the Registrar of the Nova Scotia Technical College by July 4 the following documents; (a) an application form obtained from the Registrar, NSTC; (b) an official transcript of his university record; (c) a letter of recommendation from some person of academic rank with close personal knowledge of his academic background.

15. Design

Students successfully completing one year of a B.A. programme in the Humanities at Dalhousie may be admitted into the second year of the four-year programme leading to the Bachelor of Design degree in Communication Design or Environmental Design at the Nova Scotia College of Art and Design.

Programmes of Study and Classes Offered

African Studies

Professors
J. E. Flint (History)
K. A. Heard (Political Science)
Z. A. Konczacki (Economics)
J. B. Webster (History)

Associate Professors
P. D. Pillay (History)
R. J. Smith (English)

Assistant Professors
J. Barkow (Anthropology)
T. M. Shaw (Political Science)
J. E. Sorenson (Music)

The programme in African Studies offers students an opportunity to integrate classes from a number of disciplines around the focus of one major world region. Students wishing to read towards a B.A. with a concentration on African Studies should note the following recommendations and regulations.

I It is strongly recommended that in the first year students should read three of Anthropology 100, Economics 100, English 100, History 199, Political Science 100 or Sociology 100.

II In the second and third years at least seven of the ten classes required for a degree must be chosen according to the following regulations:
(a) African Studies 200 (compulsory)
(b) Four classes to be chosen from List I below (direct focus on Africa)
(C(A further two classes must be chosen from List I or List II the latter list being classes concerned with the problems of development and underdevelopment.
(d) Two of the ten classes must be at the 300 level.

200 African Studies

The class is intended to provide a detailed study of one African region. (During the 1973/74 academic year East Africa was studied.) The study involves several disciplines. The class consists of two lectures per week plus one evening session per month. Students are graded on the basis of three essays written during the course of the year and chosen from at least two of the disciplinary sections plus satisfactory attendance. The class consists of approximately six lectures in each of the following:

1. **Ethnography of East Africa;** J. Barkow (Anthropology)

2. **Pre-Colonial History with Special Emphasis on Uganda,** J. B. Webster (History)

3. **Imperial Intrusion & Impact on East Africa;** J. E. Flint (History)

4. **Economic change from 1890 to the Present,** Z. A. Konczacki (Economics)

5. **Contemporary Politics of East Africa;** K. A. Heard (Political Science)

6. **East Africa and the International System;** T. M. Shaw (Political Science)

7. **The East African Novel;** R. J. Smith (English)

8. **Varieties of East African Music;** J. Sorenson (Music)

LIST I
(See respective disciplinary sections of the calendar for class descriptions).

Anthropology 316, Africa: Ethnography & Modernization, J. H. Barkow.

Economics 234A, Pre-Colonial History of Sub-Saharan Africa, Z. A. Konczacki.

Economics 235A, Economic History of Tropical Africa: Colonial Period, Z. A. Konczacki.

Economics 236B, Recent Economic Development in Sub-Saharan Africa, Z. A. Konczacki.

English 217, African Literature in English, R. J. Smith.

History 240, Tropical Africa in the Nineteenth & Twentieth Centuries, J. B. Webster & J. E. Flint.

History 344, Origins of Tribalism and Nationalism in Africa, J. B. Webster.

History 345, History of South Africa, P. D. Pillay.

Political Science 317A, Foreign Policies of African States, T. M. Shaw.

Political Science 317B, Politics in Africa South of the Sahara, K. A. Heard.

Political Science 318, The Politics of South Africa, K. A. Heard,

Political Science 324, Problems of Development, K. A. Heard and T. M. Shaw.

LIST II
Anthropology 301, Peasant Society and Culture, L. Kasdan.

Anthropology 306, Social Organizations of Pre-Literate Societies, L. Kasdan.

Economics 333A, Theories of Economic Development, Z. A. Konczacki.

Economics 423A, International Economics of Development, C. M. Ouellette.

Economics 424B, Economic Development and Ecology, Z. A. Konczacki.

History 213, British Commonwealth and Empire, P. Burroughs, M. Reckord, P. D. Pillay.

History 337, Cuba and the Caribbean, M. Reckord.

Political Science 321, International, Regional and Trans-National Organization, T. M. Shaw.

Political Science 372A, Comparative Public Administration, J. D. McNiven.

Sociology 206A, Social Change and Modernization, H. V. Gamberg.

Sociology 306B, Socio-Cultural Change: Modernization and Development, J. J. Mangalam.

Anthropology
See
Sociology and Anthropology

Architecture

Introduction to Architecture, lect./sem.: 1 hr. Prac.: 2 hrs., P. Manning.

An introductory class showing architecture as a bridge between the Arts and Sciences that will provide an insight into professional architectural studies. In the first term discussion will centre around some components of architectural design; in the second term, architecture in present day life. Available as an elective in the general degree programmes in Arts and Science.

Art History

Assistant Professor and Director of the Art Gallery
E. Smith

Classes Offered

101A Survey of the History of Art, lect.: 2 hrs.; E. Smith

Palaeolithic to the end of the 18th Century.

101B Survey of the History of Art, lect.: 2 hrs.; E. Smith.

The 19th and 20th centuries: A survey of painting sculpture, architecture and allied arts.

Biochemistry

Professors
C. W. Helleiner (Chairman)
L. B. Macpherson
S. J. Patrick
D. W. Russell
S. D. Wainwright

Associate Professors
A. H. Blair
F. I. Maclean
C. Mezei
F. B. Palmer
J. A. Verpoorte

Assistant Professors
W. F. Doolittle
C. B. Lazier
L. C. Stewart
M. W. Gray
F. M. Smith
M. W. Spence

Lecturers
M. S. DeWolfe
G. H. Huntley
E. S. MacFarlane

Biochemistry, the study of the structure and behaviour of the molecules of living things, is a new science: most of what we know has been discovered since 1945, so that even elementary textbooks are changed and added to constantly.

Structure can be investigated in various degrees of detail. Scientists have progressed from study with the naked eye (gross anatomy) to examination of the whole specimen or parts of it with light and, in recent years, electron microscopes (microscopic anatomy). These optical methods led to the discovery of such minute particles that it became necessary to apply methods of chemistry and physics. Thus, the biochemist of today studies the structure of small molecules by the well-known methods of organic chemistry. Study of the larger molecules which are characteristic of living organisms and the measurement of living organisms and the measurement of their physical properties requires special methods. Old methods must be expanded and adapted, and new ones evolved, to study even larger molecules — in some cases with the return to the use of the electron microscope.

Biochemists also try to explain, in chemical terms, the behaviour of the living organism — how it becomes what it is and maintains itself. An organism takes its food from the environment and converts it, by the process of metabolism, into its own molecules and larger structures. Biochemists have provided most of our knowledge of this complex and important series of reactions, largely by tracing the sequence of changes in chemicals labelled with radioactive isotopes.

Biochemical genetics (the biochemistry of heredity) is concerned with the mechanism by which a cell specifies the structures not only of its own molecules but also those of its daughter cells. A recent major breakthrough was the elucidation of the structures of DNA and RNA; this, together with even more recent knowledge of the action of viruses, has resulted in our present understanding of the chemistry underlying heredity.

Biochemists are also concerned with the study of enzymes: most of the chemical reactions in living things would proceed very slowly, or not at all, if these specific catalysts were lacking. Studies now in progress are investigating the properties of enzymes and the ways in which they function in the many, varied types of living things.

The results of biochemical research are applicable in almost every aspect of life. The biochemist relates the structure of soil and the functioning of its micro-organisms to the needs of agriculture and of animals, and helps to design pesticides and fertilizers, additives and substitutes. The drug, fermentation and food processing industries, to name but a few, rely heavily on biochemical techniques and knowledge. Much of fundamental biology is best understood in biochemical terms, and problems relating to such apparently remote areas as ecology and psychology are being referred, more and more often, to the biochemist. Medicine turns to biochemistry for explanations of hereditary and metabolic disorders and for an understanding of the actions of drugs and is on the threshold of explaining some psychiatric conditions in biochemical terms.

Where are biochemically trained people employed? In Canada, most of them work in universities, in agricultural research, or in government or hospital laboratories; some are employed in industry. Training to the B.Sc. level enables one to work as a technician or research assistant; more responsible positions usually require a higher degree. Graduates in biochemistry can go on to further training in medicine, pharmacology, physiology, and various other branches of the biological sciences.

The Biochemistry Department is located in the Sir Charles Tupper Medical Building. Although administratively the department is in the Faculty of Medicine, it is also an integral part of the Faculty of Arts and Science; its members take an active part in teaching in both faculties, and most of the research work is as relevant to biology in general as to medicine. The department has exceptionally up-to-date equipment, and almost all current biochemical interests can be handled.

Degree Programmes

The study of biochemistry requires a prior knowledge of elementary biology, mathematics and physics, and a good grounding in organic and physical chemistry. Accordingly, the honours programme in biochemistry is planned in such a way that these subjects are covered in an orderly fashion before students begin the study of biochemistry proper. Students who are not concentrating in biochemistry, but who wish to include a class in biochemistry in their programmes, should plan to do so in their third or fourth year. They should ensure that the necessary background is provided in their earlier years. The outline of the honours programmes will serve as a guide in this respect. It should be noted particularly that a class in organic chemistry is a prerequisite for the elementary class in biochemistry, and that one in physical chemistry is strongly recommended.

B.Sc. with Honours in Biochemistry
The honours programme in biochemistry aims to provide the student with the background necessary for graduate work in biochemistry and allied fields. It is also a suitable preparation for the study of medicine or dentistry. Because the chemical content of all branches of biology is rapidly increasing, biochemistry can be recommended as a starting point for a career in many fields of biology.

Three major programmes in biochemistry are outlined below, with minors in biology, physics and mathematics. Honours students must pass a comprehensive examination in biochemistry at the conclusion of their period of study.

Year I
1-2 Two electives (See section 5 page 12).
3. Mathematics 100
4. Chemistry 110.

Minor in Biology
5. Biology 2000.

Minor in Physics
5. Physics 110.

Minor in Mathematics
5. Biology 2000.

Year II
6. Chemistry 230.
7. Chemistry 240.

Minor in Biology
8. Elective
9. Physics 110.
10. Two Biology half classes (2020, 2030, 2040, or 2050) or one Microbiology class.

Minor in Physics
8. Biology 2000.
9. Physics 230.
10. Physics 221 or 222.

Minor in Mathematics
8. Elective.
9. Physics 110.
10. Mathematics 200.

Year III
11. Biochemistry 302.
12. Chemistry 210.
13. Additional Chemistry class.

Minor in Biology
14. Elective
15. Additional Microbiology or Biology class.

Minor in Physics
14. Elective.
15. Additional physics class.

Minor in Mathematics
14. Elective.
15. Additional mathematics class.

Year IV
16. Biochemistry 403A and 403B.
17. Biochemistry 406A and 406B.
18. Biochemistry 407A and 407B.
19. Additional Biochemistry or Chemistry class.

Minor in Biology
20. Additional mathematics or physics class.

Minor in Physics
20. Additional biology or microbiology class.

Minor in Mathematics
20. Additional biology or microbiology class.

Classes Offered

302 Introductory Biochemistry, lect.: 2 hrs.; lab.: 3 hrs.; A. H. Blair / M. W. Gray / C. Mezei / F. B. Palmer / S. J. Patrick.

This class is designed to introduce the student to the various aspects of the general field of biochemistry.

Approximately half the class is devoted to a study of the structures and chemical and biological properties of the molecules of which living things are composed. These include the biological macromolecules: polysaccharides, proteins and nucleic acids. The properties of enzymes as catalysts and the basis of their activity are discussed.

The remainder of the class deals with intermediary metabolism: the pathways of transformations which molecules undergo in the living organism. These pathways provide for the generation of usable energy, and for the utilization of this energy for the synthesis of new molecules characteristic of the organism. Finally, the class includes an introduction to biochemical genetics: the means by which the living cell specifies the structures of the molecules to be synthesized by itself and by its descendants.

This class, or an equivalent one, is a prerequisite to more advanced classes in biochemistry. Enrolment is limited to about 40.
Prerequisite: a class in organic chemistry; it will be assumed that students are familiar with the structures and reactions of the major classes of organic compounds. A basic class in physical chemistry is very desirable. The prospective student will be much better prepared for this class if he has some prior knowledge of chemical equilibrium, pH and elementary chemical kinetics.

403A Intermediary Metabolism I, lect.: 2 hrs.; M. S. DeWolfe/C. Mezei/F. B. Palmer.

This class is intended to expand and complement the study of metabolism begun in the introductory class. Topics previously introduced are studied in greater detail and complexity. These are supplemented by a selection of more specialized topics of particular interest. Emphasis is placed on the interrelationships between the different metabolic systems and, wherever possible both cyclic and non-cyclic systems are examined for mechanisms by which the control and direction of metabolism are achieved. The material is taken from the recent scientific literature. Two broad subject areas are covered. A consideration of the diversity of different energy yielding systems which occur throughout nature is presented which includes the details of the oxidative and photosynthetic phosphorylation systems as well as some fermentative pathways.

The second portion of the course is devoted to the metabolism of amino acids followed by a consideration of protein synthesis. Controlling factors at all stages are emphasized.

Prerequisite: Biochemistry 302 or an equivalent class in basic biochemistry.

403B Intermediary Metabolism II, lect.: 2 hrs.; M. S. DeWolfe/F. I. Maclean/C. Mezei.

The intent of this class is the same as that for 403A; however it may be taken independently.

The class is principally concerned with aspects of carbohydrate and lipid metabolism in animals, plants, and microorganisms. Also discussed are the biochemical aspects of synaptic transmission in nerves and modern concepts of membrane structure.

Prerequisite: Biochemistry 302 or an equivalent class in basic biochemistry.

406A Advanced Instrumentation Techniques, lab.: 6 hrs.; J. A. Verpoorte.

Instruction is provided for advanced students in the use of instrumentation. The principles and operation of the equipment will be discussed. The class includes discussion of spectrophotometers, a spectrofluorimeter, atomic absorption spectrophotometer, spectropolarimeter, automatic titration equipment as well as ultracentrifuges.
Prerequisite: Biochemistry 302 or an equivalent class in basic biochemistry.

406B Experiments in Metabolism, Lab.: 6 hrs.; M. S. DeWolfe/F. I. Maclean/C. Mezei /F. B. Palmer.

This laboratory class is designed principally to provide some practical experience with subjects developed theoretically in Biochemistry 403. However, it may be taken by anyone with a good basic knowledge of biochemistry. Experiments are chosen to illustrate the mechanisms of metabolic control at the molecular level in systems of varying complexity from the whole animal to isolated enzymes. In the course of these experiments the student will be expected to become familiar with the principles underlying the methodology employed and to participate in the design of the experiments.
Prerequisite: Biochemistry 302 or an equivalent class in basic biochemistry.

407A Physical Biochemistry, lect.: 2 hrs.; J. A. Verpoorte.

Selected aspects of the chemistry of biological macromolecules, mainly proteins. Topics include: discussions of the relationship between structure and biological activity, the stabilizing forces in maintaining structure as well as chemical and physical methods for isolating polymers, and studying their molecular properties.
Prerequisites: A basic class in biochemistry and in physical chemistry.

407B Enzymes, lect.: 2 hrs.; A. H. Blair/ J. A. Verpoorte.

The first part of this class deals in a general way with the binding of small molecules, including hydrogen ions, to proteins. The second part is devoted to a study of the kinetic properties of enzymes and how the binding of various regulatory substances influences kinetic behaviour. Such interactions are important for the control of cellular metabolism. The relationship between the structure of catalytic and regulatory sites and their function will be considered for selected enzymes.
Prerequisite: A basic class in biochemistry.

Biology

Professors
C. M. Boyd (Oceanography)
M. L. Cameron
F. R. Hayes (Killam Senior Fellow)

O. P. Kamra
K. E. von Maltzahn
K. H. Mann (Chairman)
I. A. McLaren
E. L. Mills (Oceanography)
J. G. Ogden
E. C. Pielou (Killam Research Professor)
G. A. Riley (Oceanography)
L. C. Vining

Associate Professors
E. W. Angelopoulos
R. G. Brown
R. W. Doyle
J. Farley
E. T. Garside
L. E. Haley
B. K. Hall
M. J. Harvey
W. C. Kimmins

Associate Professor (Part-time)
L. M. Dickie

Assistant Professors
A. R. O. Chapman
J. V. Collins
G. S. Hicks
P. A. Lane
R. W. Lee
R. P. McBride
R. K. O'Dor
E. Zouros

Research Associates
D. Brewer
J. S. Craigie
T. Platt
D. P. Pielou
S. Russell
A. Taylor
J. Mortenson
M. Yoon

Research Fellows
R. Rajaraman
J. Wright

Postdoctoral Fellows
R. Cella
G. S. Jamieson
G. McLelland
G. F. Newkirk
O. Prasad
D. L. Waugh

The programme in biology is designed to provide the student with an understanding of living things. Understanding of the biological world is so important for us because we are part of it. We carry to a large degree the responsibility for the state of the biosphere and we can act responsibly only if we understand it and relate ourselves to it.

The programme offered by the Department gives also a basic training in the biological sciences which may serve as preparation for

Biology

graduate and professional work in biology, medicine, dentistry, pharmacy, the health professions, bioengineering and education; in agriculture, aquaculture, forestry and environmental architecture and engineering.

Degree Programmes

The Department offers classes leading to the General B.A. and B.Sc. degree in biology and to a concentrated or combined Honours B.Sc. programme. A student intending to study biology as his main subject is asked to consult the Department early in his course so that a proper programme can be worked out.

Honours in Biology and Preparation for Graduate Study.
For entrance to graduate school an Honours degree or equivalent four-year background is required. Some graduate schools require a reading knowledge of French, German or Russian. A thorough grounding in mathematics and physical sciences is as important as advanced undergraduate training in biology.

Students reading for a Bachelor of Science degree with honours in biology must satisfy the general requirements for honours degrees and arrange their course programme as early as possible in consultation with the Department. During the first three years of a programme of concentrated honours, students are advised to follow one of the programmes shown in the table following. In the fourth year a programme will be selected to meet the honours requirements and will normally include Biology 4900.

For some graduate programmes, a combined or unconcentrated honours programme may be the best preparation. Advice on this matter may be obtained in the Department.

Students having a special interest in Marine Ecology are advised to obtain a good undergraduate training in general biology, mathematics and physical sciences, and specialize in marine work in graduate school.

Honours students must attend a weekly Honours Seminar in their fourth year.

Honours in Microbiology

The departments of Biology and Microbiology offer a combined honours program. Please consult Dr. D. E. Mahoney in Microbiology or Dr. R. P. McBride in Biology for details.

General B.S. or B.Sc. Programme
The Biology department offers 1, 2 and 3 year programmes of directed study. The prerequisite for entry to these programmes is 75% in Grade 12 Biology (or equivalent). Those who have not met this requirement must first take Biology 1000. There are 3 possibilities:

(i) A qualified student who elects to concentrate in Biology from time of entry to the University will take 3 years of the programme. In the second and third years this involves either choosing an area of specialization from the programme or designing a general biology programme with the help of a counsellor.

(ii) A student may take a general course distribution in the first year of university, and then take Years I and II of the Biology Programme.

(iii) A student may take Year I of the Biology Programme in second or third year in the University.

There are additional possibilities outside the formal Biology programme. For example, a student may elect to follow a general degree with concentration in biology, under the general faculty regulations, or may design a special programme and submit it for approval to the Committee on Studies.

Classes Offered

A class number that is suffixed by one of the letters A, B or C is a half-credit class. See comments on these classes under the heading Numbering of Classes under Degrees and Courses).

Biology class offerings may be grouped into four general types:

1. Introductory biological principles — Biology 1000. This class is designed for students with no previous biology or for students in the health sciences or other sciences who require an overview of biology.

2. Core classes — These consist of a full-year class Biology 2000 and six half-year classes 2010A/B-2060A/B. Collectively these classes form the basis of Biology class offerings. It is recommended that a student who takes biology as his area of concentration complete as many of these classes as possible.

3. 3000-level classes — Intermediate classes are mainly for second and third year students. The classes Biology 3110A-3324 represent studies of the biology of the groups of organisms specified. The other 3000-level classes are concerned particularly with principles in molecular, developmental and environmental biology.

4. 4000-level classes — These classes are primarily for honours and graduate students. They are open to others with permission of the instructor.

Biology - 1, 2 or 3 year programme of guided study

Year I	Prerequisite: 75% in Grade 12 Biology or Bio. 1000 1, 2 or 3 credits * chosen from: Bio. 2000 (full class) and Bio. 2010 to 2060 (half classes) 1 or 2 credits chosen from : Math 100, Chemistry 110, Physics 100 or 110, or other science class by agreement 1 elective				
	Counsellors				
	General Biology A. R. O. Chapman L. E. Haley	**Molecular Biology** W. C. Kimmins L.C. Vining	**Development and Genetics** B. K. Hall G. S. Hicks	**Environmental Biology** J. G. Ogden R. W. Doyle	**Microbiology** R. G. Brown R. P. McBride D. E. Mahoney
		(Prerequisite Bio. 2010A or B; Chem. 110)	(Prerequisite Bio. 2030A or B; 2050A or B; Chem. 110)	(Prerequisite Bio. 2010A or B; 2060A or B; Math. 100)	(Prerequisite Bio. 2010A or B; 2030A or B; Chem. 110)
Year II (Prerequisites should be taken in Year I)	Bio. 2000 if not already taken 1, 2 credits from: Bio. 2010-2060 1-2 credits from 3000 level classes 1-2 other sciences 1 elective	Bio. 3010A, 3011B 1 credit from Bio. 2020-2060 Chem. 240 1 Science elective 1 elective	Bio. 3050A, 3213B 1 credit from Bio. 2020-2060 Chem. 240 2 electives	1 credit from Bio. 3061B, 3062A, 3063 1 credit from Bio. 2010-2060 Bio. 2000 if not already taken 1, 2 credits from Ocean. 200, Geol. Math. 106, 107 1 elective	Bio. 3110A + 3111B (= Micro. 302) Bio. 3010 ½ credit from Bio. 2010-2060 Chem. 240 Physics 110 1 elective
Year III (Prerequisites should be taken in Years I and II)	2 credits from Bio. 3000 or 4000 level 2 credits from Bio. or other sciences 1 elective	Bio. 4010 ½ - 1½ credits from Bio. 3012A, 3013B, 3110A ½ - 1½ credits from Bio. 3030B, 3050A, 3213B 1-2 science electives 1 elective	½ credit from Bio. 3030B, 3031B ½ - 1½ credits from Bio. 3070A, 3071B, 3073B 1 Bio. class, 2-3 electives	2 or 3 credits from Bio. 3061B, 3062A, 3063, 3064B, 4035A 1 science or Math. elective 1 or 2 electives	Bio. 3011B Bio. 4033A Bio. 4113 or 4114 Bio. 4115 or 4010 1 credit from Bio. 3112B, 3322B, 4116A, or Math. 106 (½ credit) 1 elective

*A maximum of 2 for first year students

Introductory Classes Offered

All students registering for a biology class for the first time should read the following regulations carefully before completing registration.

(a) Course 1000 is designed for, and must be be taken by, those who did not take, or scored less than 75% in, Grade 12 Biology. It thus serves as an introduction to biology and enables students to progress to other offerings in the Biology Department.

(b) Students who have achieved 75% or over in Grade 12 Biology will normally take Biology 2000 or two of: 2010A or B; 2020A or B; 2030A or B; 2040A or B; 2050A or B; 2060A or B.

(c) Students who receive credits for 2010A or B, 2020A or B, 2030A or B, 2040A or B, 2050A or B, or 2060A or B in their first year cannot take Biology 1000 for credit in a later year.

1000 Principles of General Biology, Study Centre 3 hrs.; Tutorial Quiz ½ hr.; Lecture Assembly 1 hr.; M. L. Cmameron, M. J. Harvey, J. G. Ogden.

Biology 1000 is now given in an audio-tutorial format with a study centre open on a come-any-time basis from 8:30 a.m. to 5:30 p.m. and evenings depending on demand. In addition regular tutorial quiz sessions are held but the traditional lecture no longer has any great importance in the system; this latter time slot is used for question-and-answer session, class tests and the occasional lecture.

The subject matter puts emphasis on those features common to all or large groups of organisms. It thus contrasts with Biology 2000 in searching for unity among organisms rather than the major differences between groups. The course starts by considering the basic functions of whole organisms, studying a typical plant and a typical animal. Then the organism is examined in finer and finer detail considering the structure of cells, cell chemistry, energy needs, the coding system and protein synthesis. This leads to the topics of genetics, evolution, ecology and systematics.

The following classes are core classes in the general biology programme. Students concentrating their studies in biology may want to include all of these classes in their programme of studies.

2000 Diversity of Organisms, Study Centre 3 hrs.; Tutorial 1 hr. and/or Tutorial Quiz 1 hr. per week; A.R.O. Chapman, J. Farley, G. S. Hicks, P. Lane, K. E. vonMaltzahn, K. H. Mann, R. P. McBride, I. A. McLaren.

This class explores the great diversity of organisms from bacteria to fungi, to higher animals and plants. Although the present diversity is the outcome of long range historical changes, this class does not attempt to trace the historical events or to understand the mechanisms underlying historical change. The class is concerned principally with the present diversity of structural design of different types of organisms as related to the performance of integrated functions.

The class is taught through the audio-visual-tutorial approach. Self study in the Biology 2000 Study Centre is achieved in the framework of weekly lessons. Listening to information about a topic, guidance through demonstrations and visual instructions leading to observation and analytical experiment are the main activities in the week and understanding of it within the study centre. Comprehension of a specific topic of the week and understanding of it within the broader framework of the class as a whole are assisted through tutorials held in small groups. Lessons are supplemented by lectures which explore the relevance of the lesson to contemporary human affairs.

Students are advised to take this class early in their programme of biology classes, since some knowledge of diversity of organisms is required in other classes.

2010A/B Molecular Biology, Lect. 3 hrs.; Lab. 3 hrs.; W. C. Kimmins, L. C. Vinning, S. L. Russell.

This class forms a bridge between biology and chemistry. Beginning with the structure and properties of the elements it explores the molecular organization of the living world in terms of physical and chemical laws. Students will acquire an introductory knowledge of the chemistry of cell constituents, and of the biochemical basis of life, growth and heredity. The structure and function of proteins and their role as enzymes catalysing essential cellular processes is developed in greater depth.

Molecular biology seeks to explain the complexity of living systems as a logical consequence of the fundamental properties of atoms. The laboratory section will introduce students to some of the equipment, techniques, and deductive reasoning used to explain biological phenomena at the molecular level.

Background in chemistry is essential.
Texts: Loewy and Siekevitz, *Cell Structure and Function* 2nd edition, 1969, Kimmins, Vining and Russell, *Practical Biological Chemistry*, 1972.

2020A/B Cell Biology: Form and Function, Lect. 2 hrs.; Discussion 1 hr.; Lab. 3 hrs.; M. L. Cameron, J. V. Collins.

The class introduces the basic concepts of cell structure and function, through lectures, laboratory sessions, demonstrations and films. Lectures correlate the findings of light and electron microscopy with biochemistry.

Laboratory work is integrated with the lecture material and includes the theory and practice of light microscopy, staining and histochemistry, and observations on cell division and chromosome structure.

Students are expected to develop and show competence in expressing ideas in writing, in performing and recording observations in the laboratory, and in expressing themselves orally in group discussions. Background in chemistry is essential.

2030A/B Genetics, lect. 3 hrs.; Lab. 3 hrs.; L. E. Haley, O. P. Kamra, R. W. Lee.

The following three questions will be discussed in this class: (1) What is the nature of the genetic material, i.e. the structure and function of DNA; (2) How is the genetic information transmitted from one generation to the next; and (3) How does the genetic material act? Taught by audio-tutorial method.
Text: Levine, *Biology of the Gene.*

2040A/B Evolutionary Biology, Lect. 2 hrs.; Tutorial 2 hrs.; optional laboratory, time to be arranged; R. W. Doyle, E. Zouros.

A study of evolution as the interaction of genetic and ecological processes. The first half of the class introduces certain areas of population and biometrical genetics, an explicit statement of natural selection and an ecological model of population growth and competition. In the second half of the class these ideas will be applied to the problem of the origin of new species in space and time, to aspects of human cultural and biological evolution, to the evolution of complex life cycles and to the evolution of the genetic system itself.

There are two lectures and a tutorial every week with a problem set or paper due at each tutorial. A thorough grasp of Mendelian genetics at the senior matriculation or Biology 1000 level will be assumed from the beginning; experience indicates that the background provided by Biology 2030 may be helpful.

2050A/B Developmental Biology, Lect. 2 hrs.; study session 3 hrs.; J. V. Collins, B. K. Hall, G. S. Hicks.

This class discusses the principles of both plant and animal development, emphasizing the experimental approach. Topics covered include: factors initiating development; embryogenesis; typical developmental patterns; analysis and regulation of growth and ageing; cell specialization and its possible reversal.
Text: N. T. Spratt, Jr., *Developmental Biology*, 1972.

2060A/B Ecology, lect. 2 hrs.; Lab. 3 hrs.; I. A. McLaren.

The lectures offer an overview of ecology, considering in order the ecology of individuals, the regulation of numbers in single-species populations, various interactions among such populations, and finally the complex interactions involved in the structure, function, and development of ecosystems. The laboratories give some insight into techniques and modes of thought used by ecologists, and include independent projects by students.
Text: Kormondy, *Concepts of Ecology*, Odum *Ecology.*

Intermediate Classes Offered

Intermediate classes are mainly for second and third year students. They may be taken before completion of the core of classes described above. Please notice, however, prerequisites for the classes listed below.

3010A Metabolism I, Lect. 2 hrs.; Lab. or Tutorials: 1-3 hrs.; W. C. Kimmins, R. G. Brown.

The pathways of degradation and synthesis of molecules within the cell and the transformation of energy.
Prerequisite: Biology, 2010A or B.
Text: Lehniger, *Biochemistry*, 1970.

3011B Metabolism II, Lect. 2 hrs.; Lab. or Tutorials: 1-3 hrs.; L. C. Vining, R. G. Brown.

Metabolic pathways information transfer and control of metabolism within the cell.
Prerequisite: Biology 2010A or B.
Text: Lehniger, *Biochemistry*, 1970.

3030B Molecular Genetics, Lect. 2 hrs.; Lab. 3 hrs.; L. E. Haley.

The replication, transmission and control of genetic information in various organisms from viruses to higher cells.
Prerequisite: Biology 2030A or B.

3031B Developmental Genetics, Lect. 2 hrs.; Lab. 3 hrs.; R. W. Lee.

Will deal with those aspects of gene action which are involved in developmental processes, especially differential gene activity.
Prerequisite: Biology 2030A or B, 2050A or B.

3050A Development and Morphogenesis in Animals, Lect. 2 hrs.; Lab. 3 hrs.; B. K. Hall.

This class assumes the material of Biology 2050A/B as background and studies the mechanisms underlying the control of development, morphogenesis and growth in animals. Topics of studies include: descriptive embryology of invertebrates and vertebrates; mammalian development and its hormonal control; histogenesis and morphogenesis of tissues and organs; regeneration of lost body parts; growth; cellular differentiation; aspects of metamorphosis.

The laboratory classes emphasize the experimental approach to the lecture topics.
Prerequisite: Biology 2050A or B.

3061B Structure and Function of Ecosystems I, lect. 2 hrs.; seminar 1 hr.; M. J. Harvey, R. P. McBride, K. H. Mann, J. G. Ogden III.

Utilizing a systems approach to production, decomposition, respiration, and nutrient cycling in terrestrial and aquatic ecosystems, this course surveys both methods and results of studies in a variety of ecosystems. Seminars will be devoted to a review of specific investigations reported in the literature, emphasizing techniques and data manipulation.
Prerequisites: Biology 2040A or B and 2060A or B, Math 100 or 150.

3062A Structure and Function of Ecosystems II, 2-week field course prior to beginning of classes; lab. 3 hrs. during Fall Term. M. J. Harvey, R. P. McBride, K. H. Mann, J. G. Ogden III.

Intensive two-week field study (Labour Day to beginning of term) emphasizing sampling techniques and data collection in a selected habitat. Field work includes surveying and mapping of topography, soils, vegetation, and bathymetry of lakes or ponds; stream flow measurement, characterization and analysis of plant and animal communities, microclimatology, chemical and calorific measurement of biotic and abiotic components. Laboratory work during the fall term is continued on samples collected during the field work and leads to a paper on some aspects of community analysis.
Prerequisite: Biology 3061B.

3064B Topics in Population Biology, seminar 2 hrs.; R. W. Doyle.

Controversial topics in the general areas of population ecology, population genetics and evolutionary theory. Topics will vary from year to year but cover a broad range extending, for example, from competition among phytoplankton species in tropical oceans to the "biological species" problem to the genetics of human racial differences. Suitable for 3rd and 4th year undergraduates and graduate students who have obtained a grade of B or better in Biology 2040A or B, Biology 2060A or B and Math 100 as essential prerequisites (others with equivalent or special qualifications should see the instructor). The research literature is the only text. Seminars every week plus five essays.
Prerequisites: Biology 2040A or B, 2060A or B, Math 100 or 150.

3063 Theoretical Ecology, lect. 2 hrs.; lab. 3 hrs.; E. C. Pielou.

This class considers ecological problems whose solution entails mathematical reasoning. Discussion of recent research will illustrate, with a variety of examples from both plant and animal ecology, the whole sequence of steps that an investigation follows: this starts with formulating a problem and deciding what observations would lead to a solution; then follows the planning, performing and analysing of the observations and finally the drawing of conclusions. Emphasis is given to the overriding importance of judging how much (or how little) a particular set of field observations can contribute to general ecological theory.

Prerequisites: The class is intended for honours students who have done Mathematics 100 or 151. Other mathematical topics will be explained as they arise; the time to be devoted to them will be adjusted to the needs of the class. For students who have not done a course in elementary statistics, N. T. J. Bailey's *Statistical Methods in Biology* is required reading. Biology 2060A or B.

3070A Animal Physiology I, Lect. 2 hrs.; Discussion 1 hr.; Lab. 3 hrs.; R. K. O'Dor.

This class discusses the mechanisms which coordinate the activities of cells within multicellular organisms and permit such organisms to maintain a stable internal environment in a changing external environment. The emphasis will be on the most successful mechanisms - those most widely distributed through the animal kingdom. The laboratories will be designed to illustrate these "principles of physiology" in a variety of organisms and to demonstrate the experimental approaches used to study physiology.
Prerequisites: Biology 2000, 2020A/B.

3071B Animal Physiology II, Lect. 2 hrs.; Lab. 3 hrs.; R. K. O'Dor.

This class continues 3070A and admission requires completion of that class. Many of the topics discussed in 3070A will be considered in greater depth, but the emphasis will be on the diversity of mechanisms used in different animals to solve similar problems. In the laboratory students will be encouraged to follow their interests and develop their own experimental approaches.
Prerequisite: Biology 3070A.

3073B Plant Physiology (Offered in 1975-76)

3110A Bacteria, Viruses and Fungi I, lect. 2 hrs.; lab. 3 hrs.; R. P. McBride.

A comparative study.
Prerequisites: Normally 2010A or B, 2020A or B, 203A or B.

3111B Bacteria, Viruses and Fungi II, lect. 2 hrs.; lab. 3 hrs.; R. Brown, R. P. McBride.

Study of their physiological and ecological characteristics. Admission to 3111B requires the completion of 3110A. The object of Biology 3111B is to acquaint students with the "microbial world". In so doing, the following three questions are considered:

What are micro-organisms? In deciding what microbes are one must compare them with other living organisms and with each other. Consequently, a comparative study of micro-organisms based on morphological, physiological, developmental and chemical considerations is made in the first term. The object is to delimit the microbial world.

Where are micro-organisms found? For an answer to this question one turns to microbial ecology. Microbial interaction with other organisms is important because of their saprophytic and/or parastic nature. To demonstrate this interaction, topics such as symbiotic nitrogen fixation, ruminant digestion, and disease are discussed.

Finally, what do microbes do? Birds sing, eat insects and seeds, etc. Without seeing them, how do we know that micro-organisms are present? To illustrate the diversity of microbial action, selected metabolic activities of micro-organisms are considered at the molecular level.

Students entering this class should have taken classes in organic chemistry and cell physiology, although students taking these subjects concurrently will be admitted.
Prerequisite: Biology 3110A.

3112B Microbial Ultrastructure, K. Easterbrook.

A half-class in ultrastructure. The laboratory programme will center around the electron microscopic unit of the Microbiology Department and lectures will deal with suitable topics in microbial structure.

3212A Algology, lect. 2 hrs.; lab. 3 hrs.; A. R. O. Chapman.

This class is designed to introduce a broad spectrum of topics which may be included in the field of algal biology. These will include morphological diversity presented from a developmental viewpoint, some aspects of ultra structure, marine benthic ecology, phytoplankton ecology and economic importance.
Prerequisite: Grade B minimum in Biology 2000.

3213B Plant Development, lecture/discussion 3 hrs.; lab. 3 hrs.; G. S. Hicks, K. E. von Maltzahn.

The class attempts to provide greater understanding of the regulation of differentiation and morphogenesis in plants. Emphasis is placed on critically evaluating concepts derived from experiments with a wide variety of experimental systems, sample topic areas: differential gene activation, induction, polarity, determination, totipotency, photomorphogenesis.

The laboratory sessions emphasize application of sterile culture technique to developmental problems.
Prerequisites: Biology 2000 and 2050A or B.

3215A Systematics of Higher Plants, lect. 2 hrs.; lab. 3 hrs.; M. J. Harvey.

This class has two main aims; first, to give consideration to current speculation on the evolution of the flowering plants, connecting this with the attempts over the years to produce a phylogenetic classification of the existing species; second, to go into some of the newer concepts of classification arising out of the 'computer revolution'. The latter is still in an experimental stage here and will involve some study of numerical taxonomy, automated identification and key construction.
Prerequisite: Biology 2000.

Text: A Takhtajan, *Flowering Plants: their Origin and Dispersal. Reference text:* P. H. Davis and V: H. Heywood, *Principles of Angiosperm Taxonomy.*

3216B Adaptation and Speciation in Higher Plants, lect. 2 hrs.; lab/seminar 2 hrs.; M. J. Harvey.

This course deals with the discipline known as biosystematics or, alternatively, experimental taxonomy. The approach taken is the analytic one of considering particular examples and trying to deduce which peculiarities of their biology have contributed to their relative success. In this way the mechanisms which have caused particular species pairs to diverge are studied. Examples considered are many and range from evening primroses and irises, through bananas and maize, down to the humble, but complex, dandelion.
Prerequisite: Biology 2000.

Texts: D. Briggs and S. M. Walters, *Plant Variation and Evolution;* G. L. Stebbins, *Chromosomal Evolution in Higher Plants; Reference text:* O. T. Solbrig, *Principles and Methods of Plant Biosystematics.*

3321 Invertebrates, lect. 2 hrs.; lab. 3 hrs.; C. M. Boyd, J. Farley, K. H. Mann, E. L. Mills.

An attempt will be made to understand how different groups of invertebrate animals live — what modifications have they incorporated that allow them to survive in environments or to assume a manner of life alien to their evolutionary predecessors. Because there are so many kinds of invertebrate animals, certain morphological and functional changes will be considered in those animals where they are most pronounced or where they first occur. The course will progress chronologically through the phylogenetic series; the characteristics of the animals in a group will be considered and new physiological systems and morphological peculiarities will be emphasized.

A laboratory session each week will give students an opportunity to examine the morphology and life traits of live invertebrate animals based on observation of feeding, respiration, locomotion, etc.

3322B Animal Parasitology, lect. 2 hrs.; lab. 3 hrs.; E. W. Angelopoulos.

The class is intended to give students an understanding of parasitism, diversity and ubiquity.

Although the class gives a survey of parasites from parastic protozoa to vertebrates, the emphasis in not on taxonomy and morphology. Instead, one or more representative species from each group are discussed in detail and used to demonstrate the life cycle as well as the host-parasite relationships. Morophology and physiology are brought into the study of specific adaptations to the environment during free-living and parastic stages. Problems of the reproduction and transmission of parasites are stressed. Different hypotheses of the origin of parasitism and recent trends in evolution are considered.
Prerequisite: Biology 2000.

3323 Vertebrates, lect. 2 hrs.; tutorial 1 hr.; lab. 3 hrs.; E. T. Garside.

The main purpose of this class is to acquaint the student with the current state of knowledge and speculation concerning the evolution of vertebrate animals from an invertebrate ancestral line at least 500 million years ago.

The structure of vertebrates and their sequential deposition of fossils in progressively more recent formation of the superficial crust of the earth form an unparalleled and unequivocal exposition of organic evolution, the gradual, natural development, through the long expanse of time, of progressively more complex organisms. Those vertebrates which have survived the stresses imposed by the restless environment form a series of stages or steps, each characterized by several pronounced alterations in various organ-systems and in the general form of the body. Approximately three-quarters of the programme is given to an analysis, by procedures of comparison and contrast, of these changes and their relevance in the synthesis of the evolutionary pathway of vertebrates.

An appreciation of the classification, structure and evolution of vertebrates is essential to considerations of the development and functional capacities of vertebrates and of their relations with their surroundings and with each other.
Prerequisite: Biology 2000.

The laboratory study of a broad array of vertebrates provides the core of this class and serves to familiarize the student with the gross anatomic features of these animals while giving instruction in the traditional approach to comparison and contrast. The background which is required for this study is not particularly extensive but should incorporate the rudiments of animal form and function and an introduction to the principles of evolutionary biology. Although this class is often considered to belong at the intermediate level, it can be mastered by any diligent student who has completed a basic class in biology.

3324 Entomology, lect. 2 hrs.; lab. 3 hrs.; D. P. Pielou.

Entomology, the study of insects, is not only an important branch of academic biology; it is also one of the largest divisions of applied biology. There are considerable career prospects for entomologists.

This class is an introduction to the study of insects and it deals with:
(1) The classification and evolutionary diversity of insects.
(2) The biology, ecology and behaviour of insects.
(3) Applied aspects — medical, agricultural and forest entomology; harmful and beneficial insects; the pros and cons of chemical control; other methods of pest control.
Prerequisite: Biology 2000.

3400 History of Science (same as History 310 and Physics 340), lect. 2 hrs.; tutorial 1 hr.; J. Farley (Biology), R. Ravindra (Physics).

This class is designed to accommodate students of the sciences and the arts. There are no formal prerequisites although *all students must have a strong background in either a science, history or philosophy.* The class will stress the period from the 16th to the 20th centuries, and will attempt to show how ideas of what constitutes an acceptable scientific explanation have changed. There will be constant emphasis on the social context of science and the interactions between the different sciences.

The following classes are primarily for honours and graduate students. They are open to others with permission of the instructor.

4010 Advanced Molecular Biology, lect. and tutorials 2 hrs.; R. G. Brown, W. C. Kimmins, L. C. Vining.

The main objective of the class will be to explain the biochemical basis of structure and function in biological systems. Lectures and discussion groups will deal in depth with a limited number of topics, chosen for their regional interest or because they represent rapidly advancing areas of general importance in biology. A proportion of the course material will be presented by guest lecturers from other departments or from outside the university. Examples of the topics selected are; cell walls, cell membranes and transport; enzyme catalysis, antibiotics, photosynthesis, seaweed products.
Prerequisite: Biology 3010A and 3011B or Biochemistry 302.

4022A Concepts and Topics in Tissue Culture, lect. and seminars, 2 hrs.; Lab. 3 hrs.; R. Rajaraman, B. K. Hall, J. V. Collins, G. S. Hicks and guest lecturers from other departments.

This is a half-class addressed to advanced students in cell and developmental biology. A format of directed reading, term papers, and seminars will be used to introduce current topics in cell and organ cultures and research applications. The basic concepts and techniques in tissue culture will be introduced in the form of laboratory exercises.
Prerequisite: Biology 2020A|B and 2030 A|B.

4032B Cytogenetics, (Offered in 1975-76)

4033A Microbial Genetics, C. Stutard.

A half-class for advanced students in microbial genetics.
Prerequisites: Biology 2030A or B, 3110A.

4034B Biological Effects of Radiation, (1974-75); lect. 2 hrs.; lab. 3 hrs.; O. P. Kamra.

The class consists of a survey of the current knowledge of the effects of ionizing radiation on biological materials on the three levels: physical, chemical and biological. In addition, methods of dosimetry, autoradiography, somatic and genetic effects, radiomimetic chemicals and biolasers are discussed.

4035A Population Genetics, E. Zouros.

Students are introduced to the theory of Population Genetics, which is then examined in the light of existing experimental evidence. Emphasis is placed on the origin and fate of genetic variation in natural populations as the raw material of evolution. Mendelism, mutation, recombination, migration, selection, random drift, systems of reproduction, and organization of the genetic material in multilocus units are discussed in detail in an attempt to understand the dynamics of change in gene frequency and to account for the observed patterns of genetic variation in natural populations.
Prerequisites: Biology 2030A or B, Math 100 and 106, or permission of the instructor.

4062 Advanced Ecology Seminar, seminar 2 hrs.; P. Lane and other staff.

Community structure, population dynamics, energy and materials budgets (topics vary from year to year). Fourth-year Honours and Graduate students only.
Prerequisite: Instructor's permission.

4064C Pleistocene Biogeography, lab. 3 hrs.; H. B. S. Cooke, J. G. Ogden, III.

Lecture, discussion, and laboratory experience in the reconstruction of environmental change during the Pleistocene epoch. Laboratory and field experience will pay particular attention to the environmental history of the Maritime region, including environmental changes caused by man. Techniques of pollen analysis, plant and animal macrofossil study, dendrochronology, geochemical and isotopic dating methods will be explored. Field and laboratory work include a class problem in an area in the Halifax region.
Prerequisites: At least two credits in Biology or Geology. This course is to be taken in conjunction with Geology 457 Pleistocene Geology. Permission of the instructors. May be counted as Biology or Geology half-credit.

4066B Microbial Ecology, lect. 2 hrs.; lab. 3 hrs.; R. P. McBride.

A format of directed reading, essays and discussions will be used to introduce the following topics: micro-organism populations; the functioning of micro-organism communities; interactions between microbes and macro-organisms; and the use of micro-organisms to examine ecological theory. A laboratory project will be chosen to suit the student's interest and background. Permission of the instructor is required.

4067B Introduction to Biological Oceanography, lect. 2 hrs.; E. L. Mills.

A survey of marine populations and their relationships with their physical environment and with each other. Permission of the instructor is required.

4068 Advanced Biological Oceanography, lect.; 2 hrs.; G. A. Riley, C. M. Boyd, E. L. Mills.

Physiology and ecology of marine organisms with particular reference to community structure and population dynamics; seasonal and regional variations in populations, interrelations with the physical and chemical environment.
Prerequisite: Biology 3061B. Permission of the instructor is required.

4113 Bacteriology, (1974-75); R. Brown, L. C. Vining, R. P. McBride, D. Mahoney, R. Martin.

A class for advanced students in bacteriology. Two of three topics will be chosen and covered in depth.
Prerequisites: Biology 3110A or 3111B or Microbiology 302 and permission of the instructor is required.

4114 Virology, (Offered in 1975-76).

4115 Immunology, L. Kind.

A class for advanced students in immunology. This class is limited to 12 students.
Prerequisite: Permission of the instructor is required.

4116A Mycology, R. Brown.

A half-class in mycology.
Prerequisites: Biology 3110A or 3111B or Micro-biology 302.

4117C Advanced Topics in Immunology, L. Kind.
Prerequisite: Permission of instructor.

4118B Techniques in Immunology, L. Kind.
Prerequisite: Biology 4117C and permission of instructor.

4214 Physiology of Marine Plants, lect. 2 hrs.; lab. 3 hrs.; J. S. Craigie.

A comparative study of the physiology and biochemistry of the various algal classes will be conducted. This will include studies of carbohydrates, proteins, fats, pigments and nutrition.
Prerequisites: Biology 201A or B, 301A.

4275B Topics in Algology, seminar 3 hrs.; lab. project; A. R. Chapman.
Discussion of current research topics.

4324 Advanced Entomology, seminar and discussion, 2 hrs.; plus necessary time on project work; D. P. Pielou.

A course of directed reading, discussion, and practical projects - not necessarily the same for each student in the class. Readings and projects will be chosen to suit the individual student's interests, background, and future plans.
Prerequisites: Permission of instructor. Each prospective student must approach the instructor at the end of the preceding academic year, and, if accepted, make a synoptic collection of insects during the summer months.

4379B Ichthyology, lect. 3 hrs.; E. T. Garside.

Evolution, systematics and structure, embryology, life history and distribution of fishes.
Prerequisite: Biology 3323.

4400 Ethology, lect. 2 hrs.; lab. or field work 3 hrs.; J. F. Mortenson.

The behaviour of animals is studied in the field and in the laboratory. These observations and other presented material will be

discussed in the context of modern ethological theory.

4401 Pharmacology: Influence of Chemical Agents on Living Organisms, lect.: Mon., Wed., Fri. 1:30; lab.: Wed. 2:30-5:00 p.m.; D. J. Echobichon.

This introductory class is designed to acquaint students with the actions of drugs on physiological and biochemical functions of man and lower animals. The basic mechanisms of action and structure-activity relationships of various groups of pharmacological agents will be stressed and, wherever possible, discussed at the molecular and macromolecular level of cell organization. Factors influencing the absorption, distribution, biotransformation, and excretion of drugs will be discussed, as will potential uses.

The lecture course will be augmented by a practical laboratory course designed for student participation in the demonstration of basic principles of pharmacology.

4405A Functions and Structures of the Nervous System, M. Yoon.

Introduction to basic neurophysiology and neuroanatomy.
Prerequisite: Permission of the instructor.

4406B Neurophysiology laboratory, M. Yoon.

Introduction to research problems in neurosciences with electrophysiological methods.
Prerequisite: 4402A and permission of the instructor.

4403 Human Physiology, lect. 3 hrs.; lab. 3 hrs.; B. Issekutz.

A class dealing with the physio-chemical basis of the physiological processes in man.
Prerequisite: Introductory classes in Chemistry and Physics. Permission of the instructor is required.

4404 History of Biology, (1974-75), seminar 2 hrs.; J. Farley, K. E. Von Maltzahn.

This class is for Honours and Graduate students only. In the first term students will take the first half of Biology 3400. In the second term students will branch off to study various aspects of the history of science since 1800.

4800 Special Topics.

4900 Honours Research and Thesis.

5900 M.Sc. Thesis.

6900 Ph.D. Thesis.

Canadian Studies Programme

Who are eligible

Dalhousie students who are planning to do, or are at present doing, major programmes in any of the following six departments, are eligible.

The six departments are: Economics, English, History, Political Science, French, and Sociology.

Aim

The purpose of the programme is to allow such students to concentrate part of their work on Canadian studies both within their major field, and outside of it. For example, a student who is planning to major in Political Science would take at least three of his Political Science classes in classes designated as Canadian in the list appended below. He would in addition take four classes outside his major field in Canadian Economics, Canadian History, Canadian Literature (either English or French), or Canadian Sociology.

In other words, the Canadian Studies Programme does not attempt to establish a new major field. It seeks to use any one of six present departments in the Faculty of Arts and Science as a base around which a student may effectively cluster a number of classes in Canadian subjects.

Classes

Year I

Students who are interested in such a programme should plan in their first year to take at least four classes from the following:

(1) Three classes from:
Economics 100
Sociology 100
History 120, or a **History 199** with Canadian content
English 100 (Sections 1, 5, 7, 10, 13, 15, 16, 20)
Political Science 100

(2) A student who does not have a competent reading knowledge of French should take **French 102** or **French 106** in the 1st or if necessary, 2nd year. Adequacy of reading knowledge can be checked by the French Department.

A fifth class in the first year has been left as open option, but students might consider doing **Geology 140** to provide a useful environmental base.

Year II

Students should plan to take at least one class within their major department from the list appended.

They should also plan to take two classes outside their major department from the same list, as follows:

nglish 207
conomics 232
rench 202

rench 230

rench 231

istory 220
olitical Science 202
ociology 211
ociology 212

ear III

tudents should take at least two classes ithin their major department in Canadian udies and two classes outside of it, from e following list:

conomics 324
conomics 326B
rench 312

rench 340
istory 325
istory 327
istory 328
istory 329
olitical Science 313
olitical Science 314A
olitical Science 315

olitical Science 316
olitical Science 322
olitical Science 330B
olitical Science 334A
olitical Science 373B
ociology 320

t should be possible for students to take a umber of 2nd year classes in their 3rd ear, and in a few cases, vice versa.

Canadian Literature
Canadian Economic History
Spoken and Written French
202A
202B Canadian sections
Introduction to French Literature

Introduction to French Literature

The Canadian Mosaic
Canadian Politics and Government
Canadian Society
Canadian Minorities

Public Finance
Money and Banking
Civilization of France and French Canada

Introduction to French-Canadian Literature
Canada Within the Empire
The Nova Scotia Experience
The Age of Macdonald and Laurier
Religion and Society in Canada
Intergovernmental Relations in Canada
The Policy Process in Canada
Politics, Government and Constitution of Canada
Politics in Nova Scotia since Confederation
Canadian External Relations
Canadian Political Parties
Local and Regional Government in Canada
Urban Problems
Social Change and Canadian Society

How to arrange it

Students wishing to discuss a Canadian Studies Programme, or wishing to take it, should get in touch with any of the following, within their respective departments:

Professor B. Lesser, Economics Department
Professor Allan Bevan, English Department
Professor Hans Runte, French Department
Professor S. D. Clark, Sociology Department
Professor J. M. Beck, Political Science Department
Professor P. B. Waite, History Department

Chemistry

Professors
W. E. Jones (Chairman of Department)
W. A. Aue
W. J. Chute
K. E. Hayes
O. Knop
K. T. Leffek
D. E. Ryan

Associate Professors
G. A. Dauphinee
T. P. Forrest
J. S. Grossert
D. L. Hooper
L. Ramaley

Assistant Professors
G. D. Abrams
J. B. Faught
P. M. Froehlich
J. E. Greedan
J. C. T. Kwak
A. M. Last
P. D. Pacey
J. A. Pincock
R. Stephens
C. H. Warren

Special Lecturer
E. Martin

Demonstrators
M. L. Heit
P. Renault
D. Silvert
R. Young

Postdoctoral Fellows
J. S. Carlow
J. Holzbecher
C. B. Kim
P. Kobrinsky
H. P. Longerich
A. Lumb
A. Mishra
D. Othen
H. Rollier
E. G. Skolnik
K. V. Subbarao
D. Tsui
J. G. K. Webb

Chemistry is one of the physical sciences and the language of physical science is mathematics. Any student who does not enjoy mathematics should not contemplate embarking on an honours programme in chemistry. We say honours programme advisedly, for the honours B.Sc. is the minimum professional requirement for a chemist — the general B.Sc. with a major in chemistry has no professional standing. Most students with an honours degree in chemistry will undertake further studies in the subject, working towards the degrees of M.Sc. and Ph.D. A postgraduate degree is essential for those who wish to engage in independent original research or in university teaching.

The first class in chemistry is an introduction to the discipline. Non-science students who elect to take chemistry to fulfill requirements for a degree will find that the subject provides a good insight into the scientific method, though once again it should be stressed that because chemistry is a physical science, the laboratory and class work stresses mathematics more than does that of a life science such as biology. Many students who do not intend to become professional chemists are required to take introductory chemistry and may be required to take second and third-year classes in the subject as well. This group of students can include those taking courses in engineering, pre-medicine, pre-dentistry, dental hygiene, nursing and pharmacy. Engineering students contemplating chemical engineering should consult the Department of Engineering for advice on desirable classes in chemistry. All students intending to take classes in chemistry beyond the first year level should include classes in mathematics and physics in their first year, and final grades in these classes should not be less than 65%. If they are, the student is bound to find advanced classes in chemistry difficult and frustrating.

At the second year level the student is exposed in the laboratory to the four areas of specialization into which chemistry has been traditionally subdivided. Inorganic chemistry deals with all the chemical elements except carbon, and the compounds which these elements form. Organic chemistry is devoted to the study of the almost limitless number of compounds containing carbon. Analytical chemistry is concerned with the determination of the composition of substances, and with the detection of elements in quantities however minute. Physical chemistry is primarily devoted to the study of the nature of chemical reactions and is undoubtedly the most purely mathematical area of chemistry. Beyond the second year level, a student's studies in chemistry become increasingly concentrated in one of these four areas. The student may also be introduced to biochemistry, or the chemistry of living organisms, as well as such specialties as structural chemistry, radiochemistry, electrochemistry and theoretical chemistry.

Because advances in chemistry have been and continue to be published in many languages, those who look forward to post-graduate study and research are urged to acquire a reading knowledge of at least two foreign languages. These are usually chosen from among French, German and Russian. The student is referred to the regulations of the Faculty of Graduate Studies regarding language requirements for advanced degrees.

Degree Programmes

General B.Sc. in Chemistry
A candidate for this degree must satisfy all of the general requirements. He will take Chemistry 110 in the first year. In the subsequent two years he may undertake as many as five full classes chosen from Chemistry 210, 230, 240, 300(A), 310, 320, 330(C), 331(B) and 340 (two of 300(A), 330(C) and 331(B) constitute a full class). It is essential that Mathematics 100 be secured as a prerequisite to Chemistry 230. Mathematics 200 is a prerequisite to Chemistry 300(A), 330(C) and 331(B). Physics 110 should be included in the course.

B.Sc. with Honours in Chemistry
This programme is intended to provide a good training in chemistry while at the same time it makes provision for the individual interests of students. All students are required to consult annually with the Chairman of the Department, and to obtain his approval of their course selection.

Year I will normally consist of:
1. Chemistry 110
2. Mathematics 100
3. A foreign language at 100 level
4. One of Biology 1000, Geology 100 or Physics 110
5. Elective

Years II, III and IV must include:
(a) Chemistry 210, 230 and 240
(b) Six full classes from Chemistry 300 and 400 levels. Chemistry 300(A), 310, 320, 330(C), 331(B) and 340 are required classes.
(c) Mathematics 200 (a prerequisite for Chemistry 300(A), 330(C) and 331(B).
(d) Five other classes. These must be chosen as follows:
(i) If Physics 110 or a foreign language were not taken in Year I, they must be taken in Years II-IV.
(ii) Two classes beyond the 100-level must be taken in a minor subject. Minor subjects allowed for this degree are biochemistry, biology, geology, mathematics or physics.

It is suggested that these five other classes be chosen according to the future plans of the student. For example: those planning future study in physical chemistry should take additional mathematics and physics classes; those planning future study in organic chemistry should take one or more biology classes; those planning future study in geochemistry should take one or more geology classes.

In all cases it is in the interests of the student to consult with the Chairman and other professors in the department. This may be done at any time during the first year. Experience indicates that March is the most suitable time for discussion of a future programme.

Classes Offered

105 Chemistry, (for dental hygiene students), lect.: 3 hrs.; lab.: 3 hrs.; G. A. Dauphinee.

This class is taken by dental hygiene students in their first year. It will not serve as a prerequisite to second-year chemistry classes. Organic chemistry is discussed in the second half of the year, since the regular programme of the students does not include further study of chemistry. The subjects discussed in the first term include atomic structure, solution equilibria and simple inorganic chemistry. Laboratory experiments are integrated with the material discussed in lectures. Quantitative aspects of chemistry are not emphasized in this class.

110 General Chemistry, lect.: 3 hrs.; lab.; tutorial: 3 hrs.; W. A. Aue, W. J. Chute, G. A. Dauphinee, J. B. Faught, P. M. Froehlich, J. E. Greedan, K. E. Hayes, J. C. T. Kwak, P. D. Pacey, D. E. Ryan.

This is an introductory class in college chemistry with lectures and tutorials on a number of topics in physical and structural chemistry. Included are stiochiometry, acid-base and oxidation-reduction reactions, gases, liquids and solids, solutions, thermochemistry, equilibrium, chemical kinetics, and atomic and molecular structure.

Emphasis is placed on the formulation of theories which will be useful in the correlation of experimental facts, rather than on the memorization of the facts themselves. Wherever possible, such a theory is derived using standard mathematical methods from basic physical principles. In tests and examinations the student is expected to demonstrate his knowledge of the basis of these theories and of their limitations and to show a logical approach to the solution of numerical problems.

It is assumed that students entering this class will have some knowledge of elementary chemistry, mathematics and physics. The minimum background in chemistry is the equivalent of Nova Scotia Grade XI with emphasis on its numerical aspects. It is important that students be able to use exponents and logarithms, proportionality and variation, and be able to solve quadratic and simultaneous equations.

210 Analytical and Inorganic Chemistry, lect.: 2 hrs.; lab.: 3 hrs.; R. Stephens and O. Knop.

The first term will be concerned with Chemical Equilibria. An intensive discussion of chemical equilibria (solubility, acid-base, redox, metal complex) with and without the use of approximation will be given.

Correlation to qualitative and quantitative analytical chemistry, such as competing equilibria, titration of weak and polyprotic acids, is attempted. The laboratory work will involve modern physical separation methods on exchange, thin-layer chromatography and quantitative analysis (precipitation, titration).

The second term will concentrate on

Inorganic Chemistry and will include a discussion of electronic structure of atoms and molecular orbital theory. These principles will then be applied to the chemistry and structure of the compounds of the first and second row representative elements and the first transition series. Organometallic chemistry will also be discussed. The preparation and analysis of inorganic compounds will be the laboratory assignments.
Prerequisites: Chemistry 110 or equivalent; Mathematics 100.

230 Introductory Physical Chemistry, lect.: 2 hrs.; lab.: 3 hrs.; W. E. Jones, C. H. Warren.

This class is designed to give a theoretical and practical background in the fundamentals of physical chemistry. The lecture periods include discussions of the following topics: properties of real gases, liquids and solutions; atomic structure; molecular structure; thermodynamics; thermochemistry; electrochemistry; chemical kinetics.

With the exception of topic (a), where background knowledge in the properties of the ideal gas is assumed, the discussions begin at an introductory level. A knowledge of simple calculus will be assumed.

The laboratory sessions will give students an opportunity to perform experiments which illustrate many aspects of the above topics with modern techniques and apparatus.
Prerequisites: Chemistry 110; Mathematics 100.

240 Introductory Organic Chemistry, Three sections. lect.: 2 hrs.; optional tutorial: 1 hr.; lab.: 3 hrs.; G. D. Abrams, T. P. Forrest, D. L. Hooper, A. M. Last, E. Martin.

In particular, the student is required to understand the relation between carbon and the other elements of the periodic table; valence; covalent and ionic bonding; electronic orbitals; orbital hybridization and the determination of molecular geometry by all types of s and p atomic orbital hybridization; electronegativity; the physical chemistry of solutions; chemical equilibria; velocities of reactions; oxidation-reduction; acids and bases. An examination may be set on these topics at the beginning of the academic year.

This class will provide a broad introduction to the chemistry of carbon compounds, including molecular shapes and bonding, characteristic reactions and the way in which they take place, and the application of spectroscopy to organic chemistry.
Prerequisites: A good comprehension of the principles studied in Chemistry 110.

243 Introductory Organic Chemistry with Biochemistry, lect.: 2 hrs.; lab.: 3 hrs.; W. J. Chute.

This class is taken by nursing students. It will not serve as a prerequisite to third-year classes in chemistry. During the first term a basic introduction to the chemistry of carbon compounds is given. In the second term students transfer to the Biochemistry Department.

300(A) Introductory Theoretical Chemistry, lect.: 2 hrs.; C. H. Warrren.

This class provides an introduction to quantum mechanics and its application to spectroscopy and the electronic structure of stoms and molecules. The postulates of quantum mechanics are first presented and applied to some simple physical systems. This is followed by a discussion of the rotations and vibrations of molecules, the electronic structure of atoms, molecules and the chemicalbond and the electronic structure of conjugated molecules.
Prerequisites: Chemistry 230 or consent of instructor.

310 Inorganic Chemistry, lect.: 2 hrs.; lab.: 3 hrs.; J. B. Faught and J. E. Greedan.

The aim of this class is to undertake a systematic study of the chemistry of the elements and their compounds. The first term will deal with the typical elements, the second term will be devoted to the study of the transition elements. Appropriate use will be made of modern bonding concepts such as molecular orbital theory and crystal and ligand field theories, with a view to unifying and illuminating the discussion of chemical and physical properties of inorganic substances.

The laboratory will introduce the student to a variety of problems in inorganic synthesis and characterization. Experiments will be selected to demonstrate the principles and uses of vacuum-line and high-temperature techniques, work in controlled atmospheres (glove-box handling) and non-aqueous solvents, crystal growth, etc. Characterization will utilize physical methods and measurements such as optical microscopy, magnetic susceptibility, magnetic resonance, differential thermal analysis and others.

Prerequisite: Chemistry 210.

320 Analytical Chemistry, lect.: 2 hrs.; lab.: 5 hrs.; L. Ramaley.

Chemistry 320 deals with the techniques and methods used to determine the chemical composition of a material. The chemical and physical principles underlying the analytical methods are examined in detail in order that methods of analysis may be rationally selected and used, or modified if needed. Statistical treatment of data, chemical equilibrium, theory of titrations, electrochemistry, separation theory, and the interaction of light and matter are topics covered in presenting volumetric, electroanalytical, spectroscopic, and chromatographic methods of analysis.

The laboratory work is primarily concerned with modern separation techniques and the final step in the analysis process, the quantitative determination. Examples of all methods discussed in the lecture are performed in the laboratory. Essential to the class is the ability, both chemical and mathematical, to handle stoichiometric problems. A basic knowledge of chemical structure and solution equilibria is assumed.

Prerequisites: Chemistry 210

330(C) Chemical Thermodynamics, lect.: 2 hrs.; lab.: 3 hrs.; K. E. Hayes.

This class, while primarily intended for Chemistry Honours and major students should prove of interest to students in the fields of Biology, Biochemistry and Geology.

The class will proceed via a review of the laws of thermodynamics as applied to ideal closed systems, to consider the problems of real gases and open systems. Extensive use is made of the chemical potential and the various Maxwell relationships. Specific topics to be covered include, free energy and equilibria, phase equilibria, activities and activity coefficients, solutions of electrolytes and the Debye-Hückel theory, partial molar quantities and E.M.F.'s and the thermodynamics of ions.

The laboratory, where students must complete six or seven experiments through the year, is open at all times. The laboratory work is designed to help the student gain confidence in results that he may obtain in any laboratory. Four of the experiments will be written up during the year as formal reports, following the format of the Canadian Journal of Chemistry.
Prerequisites: Chemistry 230, Mathematics 100, 200.

References: Glasstone, *Textbook of Physical Chemistry,* (van Nostrand, 1946); Moore, *Physical Chemistry,* 3rd ed., (Prentice-Hall, 1962); Castellan, *Physical Chemistry,* (Addison Wesley, 1964); References beyond this minimum list will also be consulted.

331(B) Chemical Kinetics, lect.: 2 hrs.; lab.: 3 hrs.; every other week; K. E. Hayes, W. E. Jones, P. D. Pacey.

This class deals with the rates and mechanisms of chemical changes. Topics include treatment of experimental kinetic data, free radical intermediates, inhibition and catalysis, photolysis and luminescence, and special techniques for studying fast reactions. Examples will be drawn from reactions in the gas phase, at the gas-solid interface and in liquid solutions.
Prerequisites: Chemistry 230 and Mathematics 200 or equivalent or consent of instructor.

340 Organic Chemistry, lect.: 2 hrs.; lab.: 3 hrs.; J. A. Pincock

This is an intermediate class in organic chemistry. The main purpose of the class is to develop an understanding of the principles of organic chemistry and their application to problems of synthesis and structure determination.

The laboratory section of the class involves the determination of structures of unknown substances by chemical testing and spectroscopic methods. Each student has individual problems in the laboratory and is given freedom to use his initiative in solving these.

The first section of the lectures is devoted to an outline of the principles of organic reactions. The application of these principles to synthetic organic chemistry is next considered with the purpose of developing in the student a facility in designing schemes for the synthesis of organic compounds. Examples are used from a variety of fields in order to familiarize the student with a large number of classes of compounds.

Students taking the class are expected to have a knowledge of the nomenclature of organic compounds. They should also be familiar with the functional group classification of organic compounds and the basic reactions of these functional groups, and with the basic concepts of kinetics and thermodynamics as applied to chemical reactions.
Prerequisites: Chemistry 110 and 240 or equivalents.

400(B) Theoretical Chemistry, lect.: 2 hrs.; C. H. Warren.

This class is a continuation of 300(A). Molecular orbital theory and its applications will be examined in greater detail. Group theory will be introduced and applied to spectroscopy and molecular orbital theory.
Prerequisite: Chemistry 300(A).

410 Advanced Inorganic Chemistry, lect.: 2 hrs.; lab.: 3 hrs.; O. Knop.

All chemical elements and compounds can exist as crystalline solids, and most of them normally do. The arrangements of atoms and molecules in such solids, known as crystal structures, closely reflect the bonding properties of the constituent elements. They can only be studied by methods that do not destroy or modify the crystal structure. The aim of this class is to acquaint the student with the methods most frequently employed for this purpose and with the principles of structural inorganic chemistry in general.
Prerequisites: Chemistry 320, 330(C) and 331(B) (or equivalents) or consent of instructor. May be registered for only with prior consent of the Department.

420 Instruments in Analytical Chemistry, lect.: 2 hrs.; lab.: 3 hrs.; R. Stephens.

420 is given as two half-classes; 420(A) and 420(B), covering respectively non-elemental and elemental techniques of instrumental analysis.

420(A). Instrumental methods applicable to molecular species, such as samples of organic material, are discussed. Techniques covered are the elemental analysis of organic samples, spectroscopic methods for functional group analysis (infrared, ultraviolet, nuclear magnetic resonance and mass spectroscopy) and the application of colligative properties in the analysis of high purity samples. The operating principles of each instrument are described, together with the methods of sample preparation and the applicability to both qualitative and quantitative analysis appropriate to each technique. Solution of practical analytical problems using the combined techniques is an integral part of the class.

420(B). Instrumental methods of elemental analysis are discussed. Techniques covered include atomic emission and absorption spectroscopy using both flame and non-flame cells, arc and spark spectroscopy, x-ray fluorescence, neutron activation and radiochemical methods. Both theoretical and practical experience in these techniques is given. In addition to normal laboratory operation, students are expected to solve at least one specific analytical problem by instrumental means.
Prerequisite: Chem. 320 or permission of instructor.

430(A) Statistical Thermodynamics and Absolute Reaction Rate Theory, lect.: 2 hrs.; K. E. Hayes.

In the first half of this class the methods of statistical thermodynamics will be developed so as to enable calculation of classical thermodynamic functions from a molecular basis. The topics to be considered include, derivation and significance of the Boltzmann distribution law, the relation of thermodynamic functions to the partition function, the evaluation of partition functions for ideal gases, the heat capacity of gasses and solids, the equilibrium constant in terms of partition functions and the statistical thermodynamics of adsorption.

The second half of the class considers the failure of collision theory to predict the absolute rate of chemical reactions, and proceeds to use statistical methods to evaluate the Absolute Reaction Rate Theory which will then be applied to systems of particular interest.
Prerequisites: Chem. 330(C).

431(A) Electrolyte Systems, lect.: 2 hrs.; lab.: 3 hrs.; J. C. T. Kwak, L. Ramaley.

This class can be taken in the 3rd or 4th year of study, and provides a theoretical and practical introduction necessary for the application of the physical chemistry of electrolyte solutions in life sciences and medicine. Topics include equilibrium and transport properties of solutions, especially electrolyte solutions, with applications, colloid chemistry and electrokinetic phenomena as applied to e.g. electrophoresis and centrifugation, and a description of membrane transport and coupled transport with examples of biological importance. Laboratory experiments emphasize the measurement of electrical potential differences in low and high impedance systems, micro-electrodes, redox-electrodes and selective-ion electrodes, as well as thermodynamic and transport properties of electrolyte solutions.
Prerequisite: Chem. 230 or permission of instructor.

432(B) Atomic and Molecular Spectroscopy, lect.: 2 hrs.; lab.: 3 hrs.; W. E. Jones, C. H. Warren.

The class is designed to introduce the student to the theoretical and practical aspects of atomic and molecular spectroscopy. The major topics will include discussions of techniques of spectroscopy atomic spectra, diatomic molecules, polyatomic molecules and electron and nuclear spin. The discussions of all topics will begin at an introductory level.

The laboratory has been designed to give the student a knowledge of various spectroscopic instruments and the analysis of the resulting spectra.
Prerequisites: Chemistry 110 and Chemistry 230 or permission of instructor.

440(A) Spectroscopy of Organic Molecules, lect.: 2 hrs.; lab.: 3 hrs.; G. A. Dauphinee, T. P. Forrest, D. L. Hooper.

This class includes an introduction to the theory of mass spectroscopy and nuclear magnetic resonance spectroscopy, however the focus of the class is the application of these techniques as well as infrared and ultraviolet spectroscopic methods in the structure determination of organic compounds.
Prerequisite: Chem. 340 or equivalent and permission of instructor.

440(B) Mechanism, Sterochemistry and Synthesis in Organic Chemistry, lect.: 2 hrs.; lab.: 3 hrs.; K. T. Leffek, J. S. Grossert and G. D. Abrams.

In this class, methods for determining the mechanisms of organic reactions are discussed from the viewpoint of the physical organic chemist, including such approaches as the use of free energy relationships, kinetic data, and isotope effects. Stereochemistry is considered in terms of the concepts of symmetry, and procedures for the determination of absolute configuration, including the use of asymmetric synthesis, are presented. Aspects of the strategy and tactics employed in the multistep preparation of complex organic molecules are exemplified by consideration of representative major syntheses.

The laboratory will illustrate some of the advanced techniques used in modern organic chemistry.
Prerequisites: Chemistry 340 and Chemistry 230 or equivalents, or permission of instructors.

All classes, and particularly the advanced classes, are required to consult material beyond the texts and references stated.

Texts used in 1973-74 will not necessarily be used in 1974-75.

Graduate Studies.
The department offers graduate classes leading to the degrees of M.Sc. and Ph.D. Details relating to admission, scholarships and fellowships, requirements for the degree, classes of instruction, etc., can be found in the Calendar of the Faculty of Graduate Studies.

Classics

Professors
A. H. Armstrong
J. A. Doull
T. E. W. Segelberg

Associate Professors
R. D. Crouse (Chairman)
M. A. Usmiani
J. P. Atherton

Assistant Professor
R. Friedrich

Classics is the study of our origins - how the Christian-European tradition to which we belong arose out of the ancient civilizations of the Mediterranean area. The fundamental ideas and beliefs of Europeans and North Americans, by which we are distinguished from Chinese, Indians, and those of other traditions, were formed in the meeting of Greek and Oriental cultures in ancient times. To understand fully our own contemporary culture, we must study its historical origins.

Classics is much more than the study of ancient languages. Languages are not learned for themselves, but because they are necessary for the scientific study of ancient history, literature, religion, mythology and philosophy. The Classics Department at Dalhousie provides instruction both in these subjects and in ancient languages. While previous preparation in one or more ancient languages is desirable, it is nevertheless quite feasible for a student who discovers an interest in classics to begin his language studies during his university course.

A student taking classics at Dalhousie can approach the study of ancient cultures through literature or through history and the study of social structures or through the study of Greek and Christian philosophy. Honours course are offered which concentrate on any one of these three approaches.

The department also offers combined honours courses in Greek and German and in Latin and French. These courses take account of the exceptionally close links between French culture and Latin literature on the one hand and between German and Greek poetry and philosophy on the other.

Students of classics usually learn Greek and Latin. Instruction may also be had in Hebrew, Coptic, Syriac and Arabic.

It is obvious that classics is worth studying for its own sake by students who wish to obtain a better understanding of the common assumptions and beliefs of our society. This knowledge has always been regarded as pertinent to a career in politics and the higher levels of the civil service. For those who are thinking of the clergy, classics is the most relevant preparation.

Classical studies also prepare students for a life of teaching and scholarship in several directions. Now that Canada is no longer a colony culturally; but responsible for its own culture, we have great need of scholars and teachers who know about our origins. Teachers of classics for schools and universities are hard to find in Canada. Classics is also the best preparation for the study of non-European cultures (Chinese, Indian, Islamic, etc.), and there is a growing need for specialists in these fields. For the older history of philosophy, and for the history of Christian belief until, and including, the Reformation, a knowledge of classics is indispensable. The same may be said for medieval studies in general. Classics leads also to ancient Near Eastern Studies (Jewish, Babylonian, Egyptian, etc.) and to archeology.

Degree Programmes

General B.A. and B.Sc.
Of classes offered by the department, Classics 100, 101 and 202, Classics 354, and those Ancient History and Ancient and Medieval Philosophy classes not having a language prerequisite should be especially useful to students taking a general degree. All classes beyond the 100 level are available for *major and minor programmes* in classics, and the Department will be glad to assist students in working out programmes according to their interests.

Honours Programmes
The candidate may choose between three programmes: B.A. with Honours in Classics, B.A. with Honours in Classics (Ancient History), or B.A. with Honours in Classics (Ancient Philosophy). *In each case, it is highly desirable, but not essential, that the student begin the study of at least one of the classical languages during the first year of study.* In conformity with University regulations, the fifteen classes of the Honours programme are normally distributed according to the following schedules (Note that for purposes of meeting grouping requirements, Ancient History and Ancient and Medieval Philosophy classes may be counted either as Classics credits, or as History and Philosophy credits, respectively).

B.A. with Honours in Classics
(i) Nine classes beyond the 100 level in the major subject must include advanced work in both Greek and Latin, at least two 300 level classes in each. The course must include work beyond the 100 level in both ancient history and Ancient Philosophy, one of which may be counted as the minor subject.
(ii) Two classes in a minor subject: *either* Ancient History *or* Ancient Philosophy.
(iii) Four classes not in the major field: Ancient History or Ancient Philosophy classes might be included here along with other electives.

B.A. with Honours in Classics (Ancient Philosophy)
(i) Nine classes beyond the 100 level in the major subject must include, besides the available classes in Ancient and Medieval Philosophy, advanced work in Greek (including two classes at the 300 level) and some work in Latin (at least to the level of Latin 201).
(ii) Two classes in a minor subject: History (Ancient and Medieval).
(iii) Four classes not in the major field may include additional classes in History or Philosophy, or other electives.

B.A. with Honours in Classics (Ancient History)
(i) Nine classes beyond the 100 level in the major subject must be mainly in Ancient History, but must include work to the 300 level in at least *one* of Greek and Latin, and at least elementary work in the other. If the field of study requires work in other ancient languages, such classes may be counted either as Classics credits or as electives.
(ii) Two classes in a minor subject: Philosophy (Ancient and Medieval).
(iii) Four classes not in the major field may include additional classes in History or Philosophy, or other electives.

Combined Honours
Classics may be taken as part of a combined honours programme with French or German. Students interested in either of these programmes should consult with the heads of the respective departments.

Classes Offered

Literature, History and Philosophy

Note: The history and philosophy classes listed below may be given credit as classics classes or as history or philosophy classes respectively. Except for advanced seminars in these subjects, knowledge of ancient languages is not pre-supposed.

Classics 100 Classical Literature in Translation, lect.: 2 hrs.; R. D. Crouse.

Classics 100 is intended to introduce the student to the poetry and literature of classical and Christian antiquity, by means of a study, in English translation, of some of the greatest works of ancient authors.

The first part of the class will be devoted to a study of Greek Epic and Drama (Homer's *Iliad,* tragedy and comedy) and Plato's *Republic.* The second part will be given to Roman poetry and literature (Vergil's *Aenid* and Juvenal's *Satires).* The lectures will conclude with a study of St. Augustine's *Confessions.*

The course will concentrate on the most important literary forms and themes and political and philosophical ideas expressed in these works. Thus, this class should serve as an introduction to both the study of ancient and Christian literature and the study of world literature; it should also be of value to students in other fields of the humanities and social sciences in that it shows the origins and significance of many of the ideas which have been of central importance in the formation of the traditions of Western thought.

As the class is intended as an introductory one, no special preparation is expected, and there is no foreign language requirement. *(See also under Comparative Literature.)*

Classics 101 Ancient History: An Introduction to the Cultural History of the Ancient World, lect.: 2 hrs.; J. P. Atherton.

The first term will be devoted to a study of the major pre-classical civilizations (Sumer, Egypt, etc.) in which attention will be paid to the art, religion and social forms of these cultures as well as their political development; in the second term the civilizations of Greece, Rome, and Israel will be studied, and their issue in the Early Christian world considered.

As the class is intended as an introductory one, no special preparation is expected, and there is no foreign language requirement.

Classics 202 Classical Art and Civilization, lect.: 3 hrs., M. A. Usmiani.

The classical Greco-Roman civilization as it was expressed in the visual arts will be the main theme of the class. Although frequent references will be made to ancient literature and some basic reading of Greek and Roman literature in translation will be required, the chief emphasis will be on how the basic classical ideas are reflected in the visual arts, especially sculpture, painting and architecture, and how these parts tended to shape the course of the daily life of the ancients. The lectures will be illustrated.

In addition to collateral reading, short papers on selected topics will be required. The course will be useful to students interested in ancient civilization, ancient history and in particular to those studying ancient art. There is no foreign language requirement. Open to first year students.

Classics 222 Greek History, lect.: 2 hrs.; J. P. Atherton

Classics 223 Roman History: The Cultural History of the Roman World, lecture/seminar, 2 hrs.; J. P. Atherton

Classics 224/524 Christian Beginnings and the Early History of the Church, seminar, 2 hrs; E. Segelberg. (Not offered in 1974-75)

Classics 226/526 Roman Religion, seminar: 2 hrs.; E. Segelberg (not offered in 1974-75).

Classics 227/527 Near Eastern Religion, seminars: 2 hrs.; E. Segelberg (not offered in 1974-75).

Classics 252/552 Seminar on Problems of the Hellenistic Period, seminar: 2 hrs.; E. Segelberg, (not offered in 1974-75).

Classics 253/553 Seminar on the Roman Empire and the Rise of Christianity, seminar: 2 hrs.; J. P. Atherton

Classics 336 Ancient Philosophy from Aristotle to St. Augustine, (same as Philosophy 336), lect.: 2 hrs.; A. H. Armstrong.

Classics 336 (Philosophy 336) studies the development of classical and patristic thought from Aristotle to St. Augustine and examines the manner in which the philosophical achievement of ancient Greece came to form, in the thought of the Church Fathers, the intellectual foundation of European culture.

Classroom discussion and occasional seminar papers will focus on a few of the most important texts, while the general continuity of the history will be studied in lectures and supplementary readings.

Classics 338 Medieval Philosophy, (same as Philosophy 338), lect.: 2 hrs.; R. D. Crouse.

Classics 338 (Philosophy 338) studies the development of philosophy in the formative age of European civilization and examines related political, institutional, literary and theological concerns. An attempt is made to show how the legacy of classical and Christian antiquity was appropriated and reformed to constitute the ideology of medieval Christendom.

The class will be devoted mainly to the study and discussion of a few fundamental texts, beginning with Boethius' *Consolation of Philosophy.* Special attention will be given to Anselm's *Proslogion* and the first few questions of Thomas Aquinas' *Summa Theologiae.* It will be the object of lectures to present the continuity of the historical development and to emphasize the broad implications of the philosophical doctrines presented in the texts. In the latter part of the class, some attention will be given to the class, some attention will be given to late medieval Platonism and Mysticism, so that something can be shown of the beginnings of Reformation and modern philosophical and religious thought.

Classics 354 Theory of Drama: Aristotelian and Non-Aristotelian, (same as Comparative Literature 354), lect.: 2 hrs.; R. Friedrich.

Classics 460/560 Seminar on the Philosophy of Aristotle, seminar: 2 hrs.; J. A. Doull.

The purpose of this seminar is to determine the original sense of Aristotlean philosophy through the close study of one or more works. Some previous study of ancient philosophy and the ability to read Greek or Latin are assumed.

Classics 461/561 Seminar on the Philosophy of Plato, seminar: 2 hrs.; J. A. Doull.

Classics 463/563 History of the Interpretation of Aristotle, seminar: 2 hrs.; J. A. Doull.

Classics 470/570 Seminar on the Philosophy of the Church Fathers, R. D. Crouse.

Classics 480/580 Seminar on Neoplatonism, Seminar: 2 hrs.; A. H. Armstrong.

Topics from the history of Neoplatonism and its relation to the theology of the Greek Church will studied.

Classics 486/586 Departmental Seminar, Seminar, 2 hrs.; A. H. Armstrong, J. P. Atherton, R. D. Crouse, and others.

The object of this seminar is to bring together honours and graduate students and faculty members to study a wide range of problems in the areas of history, politics, literature, philosophy, religion, theology and art. The subject of this seminar varies from year to year.

Classes Offered

Classical Languages and Literature

Greek 100 Introductory Greek, lect.: 4 hrs.; R. Friedrich.

This is the beginners' class in the Greek language, and no previous knowledge is required. The aim of this class is to teach the student to read, not simply to translate, a Greek text. After he has become accustomed to the new alphabet - which does not take long - the study of grammar is introduced along with reading and translation of Texts from original Greek literature; in the first term chapters I-VI the Gospel of St. John; in the second, the first book of Xenophon's *Anabasis.* Thus, the student begins with the simpler Greek of the New Testament, and then proceeds to the more complex Classical Greek of the most important authors of the Greek literature that has been preserved.

At least once a week students will pass in for correction grammatical exercises and/or translations from Greek into English. There will be no lab work and no oral classes.

Text: Stephen W. Paine, *Beginning Greek.*

Greek 200 Intermediate Greek, lect.: 3 hrs.; R. Friedrich.

Greek 200 is a continuation of Greek 100. The aim of the class is to develop the student's ability and to read and translate prose as well as poetic Greek texts. At the beginning of the class there will be a brief but systematic review of Greek syntax. This will be followed by the reading of texts of Plato, Herodotus and Homer.

Other topics, treated by students in short papers, will be the life and thought of Socrates; the political and historical background that led to his trial; the judicial system at Athens; Socrates as dramatic character in Aristophanes' comedy; and the historical significance of Socrates' condemnation.

Through the reading of one book of the *Iliad,* students will be introduced to the language of Homeric poems; this will also provide an opportunity to deal with the Greek dialects.

Greek 300 A and B Greek Drama, seminar: 2 hrs.; R. Friedrich, J. A. Doull.

The first term will be devoted to a study of Aeschylus' *Prometheus* and other poetic treatments of the Promethcus myth; the second term to the study of the Oresteia. *Prerequisite:* Greek 200

Greek 301 Greek Historians.

Greek 304A and B Greek Poetry, seminar: 2 hrs.; R. Friedrich, J. A. Doull.

Greek lyric poetry of the Archaic Age will be the subject of this seminar; the works of the poets of this period will be studied against the background of the preceeding period of epic poetry.

In the first term elegiac, iambic and monodic lyric poets will be studied (Archilochus, Solon, Tyrtaius, Alcaius, Sappho, Anacreon); the second term will be devoted to a study of Pindar.
Prerequisite: Greek 200.

Latin 100 Introductory Latin, lect.: 4 hrs.; M. A. Usmiani.

This class is for students who wish to begin the study of Latin in the University. The aim of the class is to enable the student to read classical Latin by the end of the course with the help of the dictionary. In the course a very basic survey of the Roman civilization is also given. The emphasis throughout is on direct reading with the grammar fed in as necessary.

Latin 200 Latin Rhetorical Works, lecture/discussions 3 hrs.; M. A. Usmiani.

This class consists mostly of the reading of the works of Circero, especially his speeches which show the range of his interest and give a vivid picture of the cultural and social circumstances of Rome of his time. A brief survey of Roman literature and the role of Rhetorics in Roman life will be given.

Prerequisite: Senior matriculation in Latin or Latin 100.

Latin 203 A and B. Latin Poetry, lecture/discussions 2 hrs.; M. A. Usmiani.

Latin 204 A and B Latin Philosophical Texts, lect.: 2 hrs.; J. A. Doull, R. D. Crouse.

The purpose of this class is to give students interested in ancient and medieval philosophy experience in reading philosophical Latin. Various authors will be read from Cicero to the late Middle Ages.
Prerequisite: Latin 100.

Latin 205 A and B Roman Historians, lect.: 2 hrs.; J. P. Atherton.

This class studies Roman historical texts (writers, inscriptions, and other documents). During the 1973-74 session, selections of Sallust and Tacitus will be studied. This is essentially a reading class to familarize students with the language and content of the writings of these two great historians.
Prerequisite: Latin 100.

Latin 300A and B. The Roman Satire, lecture 2 hrs.; M. A. Usmiani.

This class can be taken in two sections as two half classes, the first half (A) consisting of the Satires of Horace and the second half (B) of the Satires of Juvenal, but the class is normally given as one full course as described here.

This advanced class is designed primarily for graduate students and undergraduate honours students. By special arrangement the class can also be taken by students from other departments even if they possess little or no knowledge of Latin. They would be permitted to read the texts in translation.

The class follows the development of Latin satire from its origins to Juvenal. The chief representatives of Latin satire that survived are Horace and Juvenal, and a wide selection of their works is read and studied thoroughly. Students are required to read the assignments for themselves and to follow the lectures which are informal and are combined with discussions of problems that arise from the texts. There are also occasional seminars on special topics and problems in the Roman satire.

Additional reading is suggested as an aid and is left to the discretion of the individual student.
Prerequisite: Latin 200.

Latin 302A and B. Roman Comedy, lect.: 2 hrs., M. A. Usmiani.

This class is normally given as one full course but it can be taken in two parts, the first (A) consisting of the Study of Plautus and the second (B) of the study of Terence.

This class consists of readings of selected plays of Plautus and Terence. As an introduction to readings, a brief survey of Greek comedy is given, and in a few lectures the general lines of Roman comedy are sketched. The class work is conducted in seminar style, students reporting on their readings and impressions of the individual plays.

The class may be taken also by students who do not read Latin.
Prerequisite: Latin 200.

Classes Offered

Near Eastern Languages

The classes in Hebrew, Coptic, Syriac and Arabic, are available as electives at the discretion of the Department, only in relation to the needs of the particular students.

Hebrew
101 Elementary Hebrew and Introductory Readings, J. B. Hardie.

This class is taught at the Atlantic School of Theology.

202 Intermediate Hebrew, J. B. Hardie.

This class is taught at the Atlantic School of Theology.

303 Advanced Hebrew, J. B. Hardie.

This class is taught at the Atlantic School of Theology.

Coptic
101 Introduction to the Coptic (Sahidic) Language and Literature, E. Segelberg. (not offered in 1974-75)

200 Reading of Selections from other Coptic Dialects, E. Segelberg

402/502 Reading of Coptic Texts, E. Segelberg.

Partly Nag Hammac Papyri, and partly Manichaean texts.

Syriac
100 Introduction to the Syriac Language and Literature, (Not offered in 1974-75), E. Segelberg.

200 Syriac Language and Literature, E. Segelberg.

Reading of some early writers such as Aphraates and Aphrem, the famous hymnographer.

Arabic
Students wishing to take a class in Arabic must consult with the Department before

registering for the class.

100 Introductory Grammar and Reading of Texts.

This class is taught at the Atlantic School of Theology.

200 Intermediate Arabic

This class is taught at the Atlantic School of Theology.

Graduate Studies
The department offers an M.A. programme in classical literature, in ancient history and in ancient and medieval philosophy. For details, see the Calendar of the Faculty of Graduate Studies.

Commerce

Professors
C. R. Brookbank
R. E. George
M. J. L. Kirby
C. W. Schandl
R. C. Shook

Associate Professors
J. D. Misick (Chairman)
R. H. R. Glube
J. R. Hanrahan
J. W. Matthews
E. W. Scott
J. Scheibelhut
R. G. Storey

Assistant Professors
C. R. Dipchand
C. J. McManus
L. W. Mealiea
I. Muncaster
R. S. Sandhu
G. E. R. Zinck

Part-time Special Lecturers
H. A. McKinley
A. Shaw
R. L. Towler
P. Mason
G. Duncan
P. O'Neil
J. A. Dougall

The Department of Commerce offers a curriculum of undergraduate and graduate studies designed to equip students to serve the community in business, government and the professions. Graduates in good standing from all faculties can apply to enter the graduate programme, leading to the degree of Master of Business Administration. The undergraduate programme includes studies in the humanities and social sciences and in the functional areas of business. Recognition is given to the growing emphasis on quantitative and behavioural analysis.

The Department is committed to providing students with the opportunity of obtaining a degree through part-time study over a period of five years. The normal pattern of part-time study will consist of the equivalent of three full classes each year. Two of these will be taken in the September to May term and one in the summer.

In all courses the main effort is directed towards drawing out the principles which govern traditional and contemporary practice. The principles are related to current developments in business, government and society at large, and special discussion meetings are arranged in which recognized authorities participate.

The students may follow a general programme of study or choose a measure of concentration in one of six special areas. These are Accounting, Economics, Finance, Marketing, Organizational Behavior and Quantitative Methods.

All students entering the Commerce programme will be required to satisfy the department as to their competency in the English language.

General Outline of

Undergraduate Studies

I. Honours Programme
Four years of study are required comprising the equivalent of twenty full classes; nine and one-half required, four and one-half elective classes taken from the core areas, three elective classes from outside the core areas, and three classes chosen without restriction. At least one of the required classes must be an honours seminar. The core areas are Commerce, Economics, and Mathematics.

The honours programme enables the student to study a particular area of commerce in greater depth than is possible in the general programme. Certain practical advantages arise from the possession of an honours degree. These include the possibility of a larger number of exemptions from professional courses of the accounting bodies in Canada, credit for part or all of the first year classes in the Master of Business Administration programmes at some Canadian universities, admission to graduate schools which require an honours degree as a prerequisite to admission and a more complete formal educational background for those who will not attend graduate school.

In accordance with general faculty regulations, students in the honours programme are required to maintain a performance satisfactory to the department in each year of study. If this standard is not maintained, the student may be required to transfer to a general degree programme. The honours programme will, therefore, in the first three years, satisfy the requirements of the general degree. Students in the general degree programme may apply for transfer into the honours programme.

II. General Programme
Three years of study are required comprising the equivalent of fifteen full classes; eleven from core areas (eight and one-half required with two and one half electives), two from outside the core areas and two selected without restriction.

A. Degree Requirements (No special area concentration)

Year I
Three required core area classes:
Commerce 101
Economics 100 or 110
Mathematics 111A plus 112B or 110*

Two classes selected from outside the core areas.

*Those planning further study in Mathmatics should elect Mathematics 110 as Mathematics 111A and 112B will not satisfy prerequisite requirements for higher level Mathematics classes.

Year II
The equivalent of four and one-half core area required classes:
Commerce 204
Commerce 207A/B
Commerce 208A/B
Commerce 209A/B
Commerce 213A/B
Commerce 215A
Commerce 216B
Economics 220A/B or 221A/B

One half core area elective.

Year III
One required core area class:
Commerce 311

Two full classes or their equivalent selected from within the core areas.

Two full classes selected without restriction from those offered within the Faculty of Arts and Science.

For honours students the programme for year III as well as for year IV must be determined in consultation with the department and must be approved by the department.

Year IV (honours)
One required Honours seminar.

Two classes selected from within the core areas.

One class chosen from outside the core areas.

One class selected without restriction from those offered within the Faculty of Arts and Science.

No 100 level classes may be taken in the fourth year.

Note: When selecting their electives, students are urged to seek combinations of classes which form a coherent whole.

B. Special Area Concentration — Sample Programmes
Subject to general faculty regulations and the general outline given above, a student may devise his own programme of study in consultation with faculty in the department. For the general guidance of students, the department has prepared suggested programmes for those who wish to concentrate in a specific area.

1. Accounting
Year I As for those without a special area concentration.

Year II
Required core area classes.
Commerce 204
Commerce 207A/B
Commerce 208A/B
Commerce 209A/B
Commerce 215A
Commerce 216B
Economics 220A/B or 221A/B

1. Accounting
Year I As for those without a special area concentration.

Year II
Required core area classes.
Commerce 204
Commerce 207A/B
Commerce 208A/B
Commerce 209A/B
Commerce 215A
Commerce 216B
Economics 220A/B or 221A/B

Elective
Commerce 310

Year III
Required core area classes
Commerce 213A/B
Commerce 311

Three and one-half full class equivalent electives chosen from:
Commerce 206A/B
Commerce 214B
Commerce 301
Commerce 320A
Commerce 451
Commerce 452

Year IV
Commerce 450 seminar

The equivalent of three classes from one or more of the following areas.
Accounting
Finance
Economics
Mathematics

The equivalent of one elective from outside the core areas.

The professional accounting bodies allow certain exemptions in respect of classes taken in the Department. These differ from province to province.

Particulars can be obtained from the provincial offices of:
The Institute of Chartered Accountants
The Association of Certified and General Accountants
The Society of Industrial Accountants
The Chartered Institute of Secretaries

2. Economics
Year I as for those without a special area concentration.

Year II and **Year III** as for those without special area concentration except that certain electives are listed below. In order to ensure that the prerequisite requirements of the 300 level and 400 level economics classes will be met, it will be necessary for students to postpone one or more of the 200 level Commerce core classes to the third year. The Department of Commerce should be consulted in regard to the classes to be postponed.

Concentration in Micro-Economics
Economics 220A/B or 221A/B*
Economics 320B
Economics 325
Economics 328

One and one-half additional classes in Economics.

Concentration in Financial Management and International Trade
Economics 220A/B or 221A/B*
Economics 324
Economics 326B
Economics 330A
Economics 423A
One and one-half additional classes in Economics.

Concentration in Development
Economics 220A/B or 221A/B*
Economics 230
Economics 329
Economics 334B
Economics 432
One-half additional class in Economics.

Concentration in General Economics
Economics 220A/B or 221A/B*
Four additional classes in Economics.

*Whichever was not taken to satisfy core requirements.

Year IV
Economics seminar
The equivalent of four full electives chosen in consultation with the Department.

3. Finance
Year I As for those without a special area concentration.

Year II
Required core area classes as for those without a special area concentration and one-half class chosen from the list suggested under Year III below.

Year III
Required core area class
Commerce 311

Recommended electives
Commerce 301 or 312A
Commerce 307B
Commerce 331A
Commerce 332B

Suggested electives to total of five full classes.
Commerce 214B
Commerce 310
Commerce 320A
Economics 220A/B or
Economics 221A/B*
Economics 324
Economics 326B

*Whichever was not taken to satisfy core requirements.

Year IV
Commerce 460 seminar

The equivalent of three classes from one or more of the following areas.
Finance
Accounting
Economics (Money and Banking, Price Theory)

The equivalent of one elective from outside the core areas.

4. Marketing
Year I
Required core area classes
Commerce 101
Economics 100A & B
Mathematics 111A plus 112B or 110
Commerce 208A

Core area elective
Commerce 218B

Outside Elective
Psychology 100

Year II
Required core area classes
Commerce 204
Commerce 207A/B
Commerce 213A/B
Commerce 215A
Commerce 216B

Core area electives
Commerce 313A
Commerce 318B

Outside elective
Sociology 100

Year III
Required core area classes
Commerce 209A/B
Economics 220A/B or 221A/B
Commerce 311

Core area electives
Commerce 314A/B
Commerce 319B
Commerce 315B
One-half additional core area elective.

One elective chosen without restriction.

Year IV
Commerce 465 seminar
The equivalent of four full electives chosen in consultation with the Department.

5. Organizational Behaviour
Year I
Required core area classes
Commerce 101
Economics 100A & B
Mathematics 111A plus 112B or 110

Outside electives
Sociology 100
Psychology 100

Year II as for those without a special area concentration.

Year III
Required core area class
Commercial 311

Core area electives
Commerce 322A
Commerce 323B
Commerce 324B
One-half class core area elective.
Two electives chosen without restriction.

Year IV
Commerce 470 seminar
The equivalent of four full electives chosen in consultation with the Department.

6. Quantitative Methods
The area of concentration may be either
(a) Computer Science
or (b) Probability and Statistics
or (c) Operations Research and Programming

Concentration in Computer Science
Year I
Required core area classes
Commerce 101
Economics 110
Mathematics 100 or 110
Two classes selected from outside the core areas.

Year II
Required core area classes
Commerce 204
Commerce 207A/B
Commerce 208A/B
Commerce 209A/B
Commerce 215A
Commerce 216B
Economics 220A/B or 221A/B

Core area elective
Mathematics 240

Year III
Required core area classes
Commerce 213A
Commerce 311

Core area electives
Commerce 309B
Mathematics 335
Mathematics 340 or 225 and 230

The equivalent of one full elective chosen without restriction.

Concentration in Probability and Statistics.
Year I
Required core area classes
Commerce 101
Economics 110
Mathematics 100
Two classes chosen from outside the core areas.

Year II
Required core area classes
Commerce 204
Commerce 207A/B
Commerce 208A/B
Commerce 209A/B
Economics 220A/B or 221A/B

Core area electives
Mathematics 206
Mathematics 306

Year III
Required core area classes
Commerce 213A
Commerce 215A
Commerce 216B
Commerce 311

Core area electives
Commerce 309B
Mathematics 330
Mathematics 410

Concentration in Operations Research and Programming.
Year I as for the concentration in Computer Science.

Year II and **Year III** as for those without special area concentration except that certain electives are listed below. In order to ensure that the prerequisite requirements of the 300 level and 400 level Mathematics classes will be met, it will be necessary for students to postpone one or more of the 200 level Commerce core classes to the third year. The Department of Commerce should be consulted in regard to the classes to be postponed.

Core area electives
The equivalent of four and one-half full classes chosen from:
Commerce 309B
Mathmatics 203A/B
Mathematics 204A/B
Mathematics 225A/B
Mathmatics 230A/B
Mathematics 316A/B
Mathematics 330
Mathematics 410
Mathematics 430

Note: Not all the mathematics classes listed above will necessarily be offered each year.

Classes Offered

101 Introductory Accounting, lect.: 3 hrs.; workshop; 1 hr.: G. E. R. Zinck, J. R. Hanrahan, R. L. Towler, P. O'Neil.

Renumbered Commerce 210 for 1970-71 only.

This class gives an introduction to the principles used by accountants in processing financial data and in communicating such data both within and outside the business, and studies the interpretation and use of financial reports for decision-making purposes.

The first half of the term will emphasize principles and their application in what is generally known as financial accounting. In the second half of the term the focus will be on accounting information for management needs.

There are no prerequisites for this class. The number of students who can be accommodated in this class will be limited. Any student who cannot be accommodated will take the class in his second year.

102 Renumbered Commerce 311 below

204 Statistics for Economics and Business, lect.: 3 hrs.; workshop: 2 hrs.; R. E. George, C. Marfels
(same as Economics 222).

Topics studied include the definition, functions and sources of statistics; the design and execution of statistical enquiries; statistical tables; graphs and diagrams; measures of central tendency, dispersion, skewness and kurtosis; curve-fitting; probability (estimating mean and proportion in population from samples, and testing hypotheses about means and proportions); quality control; index numbers; time series analysis; elementary correlation.

Background knowledge that is essential for this class includes; algebra at approximately Grade XI level; some experience of constructing and interpreting graphs; the ability to think quantitatively, which is usually gained by the study of geometry and algebra at the high school and university level; familiarity with national accounting concepts.

Note: Each of the following A/B classes may be offered only as A or B.

206A/B Computer Applications to Business Problems, lect.: 3 hrs.; P. E. Mason.

Computers are playing an increasing role both in business and in modern society. In order to familiarize the student with the concept of a computer, its advantages and disadvantages and current applications, this class takes a threefold approach:

1. The computer will be introduced as a tool for solving numeric problems commonly encountered while in university. Fortran will be taught in depth and sample problems from such fields as statistics, finance, and market research will be assigned.

2. Large computer systems will be introduced from the point of view of a manager rather than from that of a programmer. Computer Packages actually used for such applications as cost analysis, inventory control and accounts receivable will be implemented, data bases created and simulated production runs made.

3. COBOL, the most commonly used business oriented language today, will be introduced. A survey of the language combined with introductory problems will be conducted.

Prerequisites: There are no prerequisites to this class except the ability to think coherently. It is recommended that this class be taken as early as possible because the use of computer facilities will ease the workload in other classes.

207A/B Introduction to Managerial Finance. lect.: 3 hrs.; C. Dipchand, J. R. Hanrahan, R. Storey.

This class gives an introduction to the problems faced by business managers in the acquisition and effective utilization of the firm's financial resources and presents analytical concepts for evaluating financial decisions. This necessarily involves consideration of how the firm can achieve successful interaction with its external environment and make an appropriate contribution to the operation of the economy.

Essential background knowledge: An understanding of economic principles and the economic environment in which a business operates, and sufficient knowledge of accounting processes and principles to enable the student to use financial data intelligently.
Prerequisites: Economics 100A and Economics 100B and Commerce 101.

208A/B Marketing Management, lect.: 3 hrs.; R. H. R. Glube, I. Muncaster.

This class is designed to give the student a basic understanding of the character and scope of marketing and its role in business operations. It focuses upon the concepts and techniques which a business must employ if it is to anticipate and satisfy consumer needs.

Emphasis is placed on the development of understanding and analytical ability in the following areas: the role of the consumer; product-line development; channels of distribution; pricing systems; selling and promotional activities. Case materials are used to give the student insight into the analytical tools used in problem analysis and decision-making.

No previous training in marketing is assumed. Students wishing to concentrate in marketing should plan to take Commerce 208/B in their first year.

There are no prerequisites for this class, although some knowledge of accounting would be helpful.

209A/B Production, lect.: 3 hrs.; C. McManus.

This half-class is designed to give the student an insight into the applications of management science as a tool to aid in the decision-making process in production.

The topics which will be covered include: the background of management science, principles of model building, the use of models for resource allocation, control of inventories, simulation, scheduling and control.
Prerequisites: Commerce 101, Economics 100, Mathematics 110 and Commerce 204. The latter will normally be taken concurrently.

213A/B Legal Aspects of Business - Contracts, lect.: 3 hrs.; R. S. Sandhu.

The meaning and sources of law, the machinery of justice; torts, formation of contracts, capacity of contract; legality of object, mistake, misrepresentation; statute of frauds.

Privity of contracts; interpretation and discharge of contracts; breach of contracts; agency.

214B Commercial Transactions, lect.: 3 hrs.; R. S. Sandhu.

Contract of sale, bailment, employment; negotiable instruments, real property, tenant and landlord, mortgages; partnerships, corporations, their nature and management; devices for securing credit; bankruptcy, mechanics lien, limitation of actions.
Prerequisite: Commerce 213A/B.

215A Organizational Behavior, lect. 3 hrs.; C. R. Brookbank, L. W. Mealiea, J. D. Misick, R. G. Storey

The purpose of this class is the development of insight into human behavior in organizations and capacity for objective analysis of it. Research and text material drawn from the fields of sociology, anthropology and psychology are used as aids in the development of understanding and objectivity. As well as dealing with substantive data from the behavioral sciences, the class pays considerable attention to case material.

The purpose of this class will be to survey both theory and research pertaining to complex organizations, with emphasis on design, structure and administrative practices in connection with the environmental setting and how the interaction of these variables relates to organizational performance. Concomitant with this exposure to theory and research students will have the opportunity to apply this knowledge to case studies relevant to complex organizations. While the main emphasis is put upon the analysis of this material, time will also be devoted to the formulation of general solutions and decisions for action.

Commerce students are required to take 215A and 216B as a complete unit with 215A taken prior to 216B. Non Commerce students may take either class as a half class.

218B Marketing Management, lect.: 3 hrs.; I. Muncaster.

This class develops on the theory outlined in Commerce 208A/B with the goal of developing in the student the skill of soundly analysing and taking effective action in the marketing situations which face the practising marketing manager. Instruction will be based on the case method, class participation and role playing and thus will be limited to 40 students.
Prerequisite: Commerce 208A/B.

Note: It may not be possible to offer all the classes listed below in every year. Students should bear this in mind when planning their programme for the following year.

301 Cost Administration, lect.: 2 hrs.; workshop: 1 hr.; G. E. R. Zinck.

Cost accounting is studied as an aid to management control and decision-making. The class examines the informational needs of management and the means of accumulating and reporting the necessary information. Cost determination, planning, control and budgeting (cash and capital) are analyzed in relation to the internal needs of the management team.

Essential background knowledge: an understanding of accounting processes and principles and the ability to work with accounting information.
Prerequisites: Commerce 101 and Commerce 310. The latter may, with the approval of the instructor, be taken concurrently.

302 Renumbered Commerce 215A and Commerce 216B above.

305A Small Business Management, lect.; 3 hrs.; R. Glube.

This class uses written and oral cases to adapt and apply business principles to spe-

cific current small-business situations. Students are expected to review and supplement their knowledge of basic business functions, to find and analyze pertinent materials in libraries and from other sources, and to organize and integrate relevant materials and business principles into workable recommendations for managing a variety of small businesses.
Prerequisites: Commerce 101, Commerce 207A/B, Commerce 208A/B or permission of the instructor.

Commerce 306B - Survey of Business Processes and Retail Management. lect.: 3 hrs. R. H. R. Glube.

This course is designed as a survey course for non-commerce students who wish to have an overview of the management problems facing the operator of a retail or service business. Although primarily designed for Pharmacy students, this course is open to Arts and Science students who have had no previous Commerce classes. Commerce 305A is the course available for Commerce students who are interested in this topic. Students may offer for credit only one of Commerce 305A and 306B.

307B Intermediate Finance, lect.: 2 hrs.; E. W. Scott.

A more intensive study of capital budgeting, cost of capital and valuation theory than that of Commerce 207A/B. Special emphasis is placed on long term capital and the bargain for funds vital in financing the business enterprise.
Prerequisites: Commerce 207A/B, Commerce 312A or Commerce 310. The latter may be taken concurrently.

309B Intermediate Production - lect.: 2 hrs., C. J. McManus.

This course is a sequel to 209A/B, which is a prerequisite, and will cover topics such as quality control, inventory control, production scheduling, and methods planning in greater detail. Group and individual projects will be undertaken as part of the course.

310 Financial Accounting, lect.: 3 hrs.; workshop: 1 hr.; J. Matthews.

This class is concerned with the concepts of external reporting by business firms. The theory and procedures involved in the valuation of resources and obligations are explored. The concepts of income determination are also considered.

This class is the foundation for further study in the area of financial accounting and it should be taken by those students contemplating an accounting career.
Prerequisite: Commerce 101.

311 Planning for Profit and Social Responsibility, lect.: 3 hrs.; G. Duncan.

The class examines the role business plays in our society; the economic, social, legal and political environment in which firms operate; the effect of these environmental constraints and opportunities on business decisions; the way in which business decisions are made and implemented; management practices.
Prerequisites: Commerce 101, Commerce 207A/B, Commerce 208A/B, Commerce 215A, and Commerce 216B.

Students who have obtained credit for Commerce 102 in prior years will not be permitted to take this class.

312A Managerial Accounting, lect.: 3 hrs.; E. W. Scott.

Introductory cost analysis for control and decision-making. Budgeting. Selected problems in external financial reporting including consolidated statements, tax allocation, price level changes and leases.
Prerequisites: Commerce 101, Commerce 207A/B.

Note: Students whose major area of concentration is Accounting should take Commerce 301 and Commerce 310 and should not take this class.

313A Consumer Behavior, lect.: 3 hrs.; J. Scheibelhut.

Consumer market structure and behavior and their impact upon the firm's competitive operations and actions.
Prerequisites: Commerce 208A/B.

314A/B Sales Management, lect.: 3 hrs.; J. Scheibelhut.

Organization of sales departments; sales planning and forecasting; quotas; territories; performance standards; analysis and control of distribution costs.
Prerequisite: Commerce 208A/B.

315B Marketing — Promotion - I. Muncaster. This class will develop on a base of consumer psychology and then treat advertising, sales management, re-seller stimulation and other communication tools as part of an overall promotional mix. Problems are viewed through the eyes of the marketing manager in both business and institutional organizations and major emphasis is placed on understanding the factors, both business and social, that affect his decision and mold communications strategy.
Prerequisite: Commerce 208A/B.

318B Marketing Research, lect.: 3 hrs.; J. Scheibelhut.

The class will use the scientific method in solving marketing problems. Emphasis will be on planning and formulating the research problems, research design, application of sampling methods, statistical design of experiment, and analysis of data collected. A real-life research project will be required, its nature to be determined considering student interest and background.
Prerequisites: Commerce 208A/B, Commerce 204 concurrently.

319B Product Management, lect.: 3 hrs., I. Muncaster.

The class will expose the student to the many faceted problems of managing the product function in a variety of situations. The class will be based on use of projects involving actual companies and on the use of cases.
Prerequisite: Commerce 208A/B.

320A Taxation, lect.: 3 hrs.; H. A. MacKinley.

An introduction to the taxation system in Canada, with special reference to the provisions of the Income Tax Act and their effect on business decisions.

Essential background knowledge and technical skill: knowledge of economic principles and the economic environment in which a business operates and the ability to work with accounting information.
Prerequisites: Commerce 101 and Economics 100A and 100B.

322A Interpersonal Dynamics, lect.: 2 hrs.; L. Mealiea.

A more intensive study of selected topic areas which emphasize the processes and possible problems associated with the dynamic interaction between individuals. The intention of this half class is to build upon the knowledge gained in Commerce 216B and will employ such learning techniques as sensitivity training, structured exercises in interpersonal relations, and case studies.
Prerequisite: Commerce 216B or permission of instructor.

323B The Personnel Function, lect.: 2 hrs.; R. G. Storey.

This class provides a knowledge of the various personnel processes required in organizations which employ a substantial number of people. Such organizations must deploy personnel on the basis of skills (task specialization) and be concerned with staffing appraisal, training and development, compensation, collective bargaining, handling grievances, health and safety, leadership and justice with respect to employees. All of these processes comprise the personnel function.

Knowledge of the processes is supplemented by the development of analytical skill in coping with various personnel problems and in the integration of the processes with the many other functions required in the organization. This type of "system and process" analysis is built upon the skill and knowledge acquired in the class on Organizational Behaviour. Cases will be used to simulate reality-oriented work environments.

Finally, the role of personnel management and the administration of the personnel function will be subject to consideration and analysis.
Prerequisites: Commerce 215A and Commerce 216B.

324A/B Labor Relations, lect.: 2 hrs.; C. R. Brookbank.

This class will expose the student to the history of organized labor in Canada: union, management and government policies affecting the Canadian worker; and the process of collective bargaining.
Prerequisites: Commerce 215A and 216B, or permission of professor.

331A Security Analysis, lect.: 2 hrs.; C. Dipchand.

The objective of this class is to introduce students to the theory and philosophies of investment. This class concentrates on investment analysis suitable for the individual, the estate or small group. The main focus is on marketable securities, stocks, bonds, and investment trusts. Case material is primarily Canadian and covers such areas as growth stocks, new issues, convertibles, closed end funds, mutual funds, and warrants. Reading assignments and case-analysis will provide the student with opportunities to handle investment analysis and portfolio management on a problem basis.

Prerequisites: Commerce 207A/B, Commerce 204, and Economics 221A/B.

332B Canadian Capital Markets, lect.: 2 hrs.; C. Dipchand.

Students are introduced to Canada's capital markets and the flow of funds within these markets. Main sectors in the capital markets are identified and emphasis is placed on their historical development and function within the total structure. Other main areas of the course include term structure and risk structure of interest rates, the risk-return relationship on financial assets and the efficiency of Canada's capital markets. The class will be conducted in terms of reading assignments, case-analysis, evaluation of available research results and classroom discussion.

Prerequisites: Economics 221A/B, Commerce 207A/B. The latter may be waived with the consent of the instructor.

450 Accounting Theory and Systems, (for honours students), lect.: 2 hrs.; C. W. Schandl.

The class makes independent investigations in the philosophy of accounting and auditing, based on recent literature.

Topics studied include information theory, role and function of "theory", measurement theory, systems, accounting systems; the concept of control; forms of control; theory of auditing; investigation in the nature of "evidence", current problems of accounting and auditing as they are dealt with in recent publications.
Prerequisite: Commerce 310.

451 Management Control Systems and Auditing, lect.: 3 hrs.; C. W. Schandl.

This class explores the concepts of management control systems, their establishment and review, together with the standards and procedures involved in the attest function (auditing). The role of the computer and statistical sampling in the attest function are examined. The problems of undertaking investigations for special reports are also considered.

This class is required for honours students in accounting and it should be taken by those persons contemplating an accounting career.
Prerequisite: Commerce 310.

452 Advanced Accounting, lect.: 3 hrs., J. Matthews.

The class considers the accounting and reporting theory of business expansion and contraction. Partnerships and consignments are discussed. The theory and problems involved in business reorganizations and liquidations are also explored.

This class is required for honours students in accounting and it should be taken by those persons contemplating an accounting career.
Prerequisite: Commerce 310.

460 Seminar in Finance

Special seminar restricted to honors students in Finance.

465 Seminar in Marketing

Provides an opportunity for advanced students in marketing to examine recent marketing developments and to study intensively selected facets of marketing management. Restricted to honors students in Marketing.

470 Seminar in Organizational Behavior

Special seminar restricted to honors students in Organizational Behavior.

Comparative Literature

Teaching Staff
R. Friedrich (Classics)
R. Ilgner (German)
S. Jones (Spanish)
F. A. Kretschmer (French)
N. Maloff (Russian)
R. M. Martin (Philosophy)
S. Mendel (English)
N. Nevo (Russian)
N. S. Poburko (English)
H. R. Runte (French)
R. Runte (French)
M. C. Sandhu (French)
H. S. Whittier (English)

The Departments of Classics, English, French, German, Philosophy, Russian, Spanish and Theatre, offer the following classes in Comparative Literature. These classes may form part of an area of concentration. All lectures are given in English, and works read in English translation.

100 Introduction to Comparative Literature, R. Ilgner.

This is an introduction to an understanding of man's approach to the problems of life through the study of selective masterpieces of European literature, which may include works by Dante, Chaucer, Cervantes, Shakespeare, Molière, Goethe and others.

Note: English 100 or Classics 100 is acceptable as an equivalent to Comparative Literature 100. For a description of these classes see the entry under Departments of English and Classics.

110 Modern German Literature in Translation, R. Ilgner

(Class description to be found under German 110)

203 Masterpieces of Western Literature, H. S. Whittier.

(Class description to be found under English 203)

210 Theories and Manifestations of Love in Medieval Europe, H. R. Runte.

A literary and anthropological study of major poetic, romanesque, and dramatic works by English courtly poets, French troubadours, and German Minnesänger, with special emphasis on their relation to our time.

212 The Realistic Novel in 18th Century France and England, R. Runte.

A study of memories and epistolary novels in Eighteenth century England and France will reveal a close interrelationship between the works of Marivaux, Richardson, Prévost, Rousseau, Restif and Diderot. Other works representative of these genres by La Clos, Fielding and Smollett will also be studied.

270 Philosophy in Literature, R. M. Martin.

(Class description to be found under Philosophy 270)

305 Twentieth Century Russian Literature, N. Maloff.

(Class description to be found under Russian 305)

306A Dostoevsky, N. Maloff.

(Class description to be found under Russian

306A)

306B Tolstoy, N. Nevo.

(Class description to be found under Russian 306B)

354 Theory of Drama: Aristotelian and Non-Aristotelian, R. Friedrich.

(Same as Classics 354)

Economics

Professors
R. E. George
J. F. Graham
J. G. Head
Z. A. Konczacki
R. I. McAllister
N. H. Morse
Y. Murata
A. M. Sinclair (Chairman)

Associate Professors
R. L. Comeau
P. B. Huber
E. Klein
C. T. Marfels
C. Steinberg

Assistant Professors
F. M. Bradfield
G. A. B. Kartsaklis
B. Lesser
C. M. Ouellette
T. A. Pinfold
U. L. G. Rao

Do you know what inflation means and why it is a problem?
Do you know why unemployment should be a matter of national concern?
Do you know the price that Canada will pay for a clean environment?
Do you understand your newspaper when you read about Gross National Product, Investment, Price Indexes, Seasonally Adjusted Unemployment Rates . . . ?

Are you interested in studying problems in the economics of labour?
Are you interested in studying the economic system of Canada in contrast to that of Russia, Yugoslavia, Great Britain, or Argentina?
Are you interested in studying the international monetary system and patterns of trade between countries? Are you interested in studying the economic problems of the emerging nations of Africa, Asia, and Latin America?
Or
perhaps you are interested in studying problems of regional development in Canada, or Canadian economic history, or problems of the Canadian urban scene.

All of this, and more, is economics.

Economics will provide you with a body of theory that equips you to deal with such questions and applied courses in economics permit you to study any of these questions in detail. The offerings in Economics allow considerable breadth and variety in order to accommodate a variety of interests on the part of students. Students will find that they can major in Economics exclusively or that economics goes hand in hand with work in sociology, political science, or biology. Students who wish to gain a more intensive and broader knowledge of economics may want to take the Honours Programme.

Students graduating in economics find many well-paid and interesting opportunities for employment in teaching, research and administrative positions in universities, business, government and international organizations.

General Degree Programmes

The Department offers undergraduate and graduate programmes in economics. Students should consult the timetable and the Department at the time of registration for changes in or additions to the courses listed here.

Economics can be taken as the major subject in a general B.A. or B.Comm. degree programme, and it may also be taken in conjunction with major programmes in subjects such as mathematics, accounting, political science and history.

The necessary core courses for a major in Economics are: Economics 220 (A or B), Economics 221 (A or B), and Economics 222 or 322.

As a guide to the student who is majoring in Economics, the following outline represents a course structure for a typical well-rounded programme.

Recommended Course Structure
Year I
1. Economics 100 or Economics 110.
2. Mathematics 110, or equivalent.
3-5. Three classes chosen from fields other than Economics.

Year II
6-7. Economics 220 (A or B); Economics 221 (A or B); Economics 222 or 322.
8. One other class in Economics.
9-10. Two classes chosen from fields other than Economics.

Year III
11-13. Three classes in Economics.
14-15. Two classes at least one of which is not in Economics.

Students considering economics as an area of concentration should consult the Department about their programme.

Although students may offer fewer classes in economics than the seven suggested, this number is deemed necessary to provide a basic knowledge of the discipline and should be regarded as the minimum for preparation for a graduate programme in economics.

Students must satisfy the overall requirements for the degree programme in which they are registered. (B.A., B.Com., B.Sc., etc.)

Concentrated Integrated Programme
The Department is now offering an alternative course structure which may be of interest to students who wish to prepare themselves for a two-year M.A. programme or for work as an economist. The Concentrated Integrated Programme differs from the normal course of study since students will work on one class at a time, rather than the usual five, in their third year. The third year consists solely of economics classes taken in sequence, whereas the second year would consist primarily of classes in other subjects.

The integrated third year will be structured as follows (with options depending on whether the student is interested in an M.A. or in employment):

Weeks of Term	Segment of Programme
1 4	Micro theory
5- 7	Macro theory
8-10	Advanced theory or applied field
11-14	Statistics
15-17	Economic History
18-19	History of Economic Thought or applied field
20-26	Applied Fields (3)
27-28	Policy seminar

Students who are interested in applying to enter the programme in September, 1974, or who wish to know more about it, should contact the Department of Economics, before April 30, 1974. The programme is designed for a maximum of 20 students and a minimum of 10 students.

African Studies Programme
The Department is cooperating with several other Departments in offering an African Studies Programme. Interested students should contact Professor Z. A. Konczacki.

Other Programmes
The Department is prepared to assist students who may wish to devise their own programmes under the present curriculum regulations. Interested students should consult the Undergraduate Co-ordinator.

Honours Degree Programme

The necessary core courses for an Honours Degree in Economics are: Economics 100 or 110; Economics 220 (A or B); Economics 221 (A or B); Economics 320A; Economics 321B; Economics 322; Mathematics 110 or equivalent; a course in Economic History; a course in the History of Economic Thought.

The following course structure is recommended:
Year I
1. Economics 100 or 110.
2. Mathematics 110 or equivalent.
3.5. Three classes in fields other than Economics.

Year II
6. Economics 220 (A or B) and 221 (A or B).
7. Economics 322.
8. Economics 232 or other economic history class.
9-10. Two classes chosen from fields other than Economics.

Years III and IV
11-16. Six economics classes including 327, 320A, 321 B.
17-20. Four classes in other areas chosen in consultation with the Department.

The student's programme will be chosen in consultation with the Department and must have the approval of the Department.

Honours students must pass a comprehensive examination at the end of their fourth year, or write a series of short papers, at their option.

Of the classes selected outside of economics in the third and fourth year, students must include at least two classes above the elementary level.

Students are advised that mathematics is required for graduate work in most good graduate schools. The value of Econometrics and of additional mathematics is therefore stressed.

In some instances, the Department may permit students to take classes in other subjects in lieu of classes in economics and may permit minor variations in the required classes.

Students must be careful in arranging their courses to ensure that they satisfy the overall requirements for the General B.A. degree.

Combined Honours
Combined honours programmes may be arranged with other departments. For combined honours programmes with economics where the major concentration is in the other discipline, students should consult the other departments concerned.

Classes Offered

100 Introductory Economics, lect.: 2 hrs., tutorial 1 hr.

Economics 100 provides an introduction to economics that is unique in courses of its type. *Half of the year* is spent analyzing economic problems, with special emphasis on the Canadian economy - problems such as inflation, unemployment, foreign investment in Canada, pollution, regional disparities, the Canadian exchange rate, and others.

During the first term students will be given a quick survey of the important principles, terms, and methods of economics so that during the second term attention can be focused on problems of the type listed above.

At mid-term, students with a grade of B or better have the option of continuing with Economics 100 or of going into Economics 220B or 221B. This is an option designed for the student who has already decided to do major work in economics. Interested students should consult with the Department for further details.

110 Introductory Economics: A Mathematical Approach, lect.: 2 hrs., tutorial 1 hr., T. Pinfold.

This is an introductory class for students with a background in mathematics. Similar to Economics 100, the class is designed to provide a general introduction to economic science and to introduce students to the way in which economic analysis can be applied to resolve economic problems. However, the approach taken to the material will be more rigorous. Mathematical tools will play an integral role in developing the theorems and proofs. A knowledge of differential calculus would be helpful.

At the mid-term, students with a grade of B have the option of continuing with Economics 110 or of going into Economics 220B or 221B.

220A/B Micro-Economic Theory I, lect.: 3 hrs.; (offered both terms).

Microeconomics deals with the economic behaviour of households as purchasers of output and suppliers of input services, and of firms as producers of outputs and purchasers of inputs, as well with the behaviour of groups of households and firms. This class covers material in this area which may be required for other classes in economics at the 200 to 400 level. Geometry and a limited amount of high-school algebra are employed.

In addition to standard topics such as consumer and producer behaviour under various market structures, an introductory treatment of general equilibrium, external economies, and welfare economics is included. Although the major emphasis is on theoretical ideas, applications of these ideas are considered, in order to illustrate the range and power of micro-economic theory in dealing with practical economic issues.
Prerequisite: Introductory Economics.

221 A/B Macro-Economic Theory, lect.: 3 hrs.; (offered in both terms), G. A. B. Kartsaklis, A. M. Sinclair.

This class is intended to provide a sufficient treatement of macro-economic theory to serve as a basis for other classes in economics which require a knowledge of macro-economics. The class is not mathematical in its treatment of the material. Topics covered include: national income accounting; the theory of employment, interest, money, and prices; and the theory of economic growth. Both "open" and "closed" economies are considered. Major emphasis is placed on the development of the theoretical ideas.
Prerequisite: Introductor Economics.

222 Economic Statistics I (same as Commerce 204), lect.: 3 hrs.; workshop 2 hrs.; R. E. George.

Topics studied include the definition, functions and sources of statistics; the design and execution of statistical enquiries; statistical tables; graphs and diagrams; measures of central tendency, dispersion, skewness and kurtosis; curve-fitting; probability (estimating mean and proportion in population from samples, and testing hypotheses about means and proportions); quality control; index numbers; time series analysis; elementary correlation.

Background knowledge that is essential for this class includes: algebra at approximately Grade XI level; some experience of constructing and interpreting graphs; the ability to think quantitatively which is usually gained by the study of geometry and algebra at the high school and university level; familiarity with national accounting concepts.

232 Canadian Economic History, lect.: 3 hrs.; (same as History 222).

This survey class is a study of the economic development of Canada from the age of discovery to the present. However, as Canada from the beginning has formed part of a larger system, the approach taken in the class is to present Canadian economic history in relation to the larger system which can be broadly described and analyzed in terms of the relationships between the Old World and the New. The class therefore covers areas of economic history that are considered to be relevant to an understanding of the economic development of Canada. The aim is to make the class a unit as much as possible by using themes of trade, commodity, technology, vested interests, institutions, and so forth, as a means of developing the argument. As the class proceeds, the focus shifts more and more towards Canada, but the general subject matter deals with the penetration of Europeans coming from across the Atlantic and across Siberia into the Western Hemisphere. The class therefore is a study in the formation and breakup or change in empires, the shifting balance of power between countries and regions, the role of the Caribbean areas, the rise of the United States to a position of pre-eminence, and Canadian responses to these changes and to internal problems as well.

More theory is introduced towards the end of the class than is used in the earlier parts, as some theory is helpful in discussing Canadian problems and policies, especially in the twentieth century. However, no strict prerequisites are required, although a class in economic principles and some

knowledge of history would be beneficial.

234A Pre-Colonial Economic History of Sub-Saharan Africa, lect.: 2 hrs.; Z. A. Konczacki.

The object of the class is to introduce the student to the most important problems of African economic history, with particular concentration on the pre-colonial period, and to prepare him for further reading in this area of study.

The topics considered include: methodology of African economic history; the significance of environmental differenciation; some speculations on economic prehistory; economic contacts between distinct ecological regions and different cultures; introduction and spread of agricultural crops; landholding systems; mining and metal-working; long-distance trade routes and trade centers; overseas trade; slavery and slave trade; Arab and European penetration and its economic impact.

The discussion concentrates primarily on tropical Africa and it is carried up to the times of the partition of the Continent by the European powers in the late nineteenth century.

No prerequisites are required, although Introductory Economics and some knowledge of history is desirable.

235B Economic History of Tropical Africa: Colonial Period, lect.: 2 hrs.; Z. A. Konczacki.

This class deals with an era which began with the "scramble" for African colonies, and ended with the coming of independence. A survey is provided of colonial economic policies, prior to World War II, problems of their implementation and eventual introduction of the "development and welfare" approach. More specifically, the topics discussed include: development of transport; mining; agriculture and trade; some aspects of investment and technological diffusion; growth of labour force and the problems of migrant workers; colonial planning; socioeconomic impact of European colonization on Africans; African response to economic incentives; a balance-sheet of colonialism.

No prerequisites are required, although Introductory Economics and Economics 234A are desirable.

236A Recent Economic Developments in Sub-Saharan Africa, seminar: 2 hrs.; Z. A. Konczacki.

This seminar centres on the discussion of the impact of colonial heritage, present structure of African economies, problems of economic infrastructure, African agriculture, mineral development, industrialization with particular emphasis on import-substitution, problems of trade: overseas and intra-African, foreign investment and aid programs, economic planning, and prospects for the future of African economic development.

Prerequisites: Introductory Economics. Economics 234A and 235B are recommended, though not required. Students may also be admitted by permission of the instructor.

241A Comparative Economic Systems: National Economies, seminar: 2 hrs., P. B. Huber.

The object of this class is to sharpen the student's ability to think about problems of economic organization and control, to improve his skills in writing and speaking with respect to these problems, and to provide him with a broad background of institutional material on the structure and performance of a variety of economies. Reading on specific countries provide the basis for several short papers, but there is no written examination.

The student taking this class must understand the interrelated character of economic activity and have a good grasp of the way in which the price system operates. Preliminary reading should have included *The Making of Economic Society* by R. L. Heilbroner.

Prerequisite: Introductory Economics.

242B Comparative Economic Systems: Economic Organization and Planning, seminar: 2 hrs., P. B. Huber.

Initially, this class examines the economic behaviour of organizations and the ways in which this behaviour can be controlled. This provides the basis for consideration of the theory and practice of economic planning at micro-economic and macro-economic levels in various institutional contexts. Readings include selections from Dahl and Lindblom, Galbraith, Mishan, Tinbergen, and Ward.

Prerequisite: Introductory Economics, plus an additional half-class in Economics.

250 Applied Development Economics, seminar: 2 hrs. and tutorials, R. I. McAllister.

The purpose of this class is to enable participants to review some main lessons from economic development theory and comparative experience, and to apply this background by tackling some current problem in project teams.

The class consists of several main strands, which often run concurrently. These include: —

1. *Economic Development in theory and practice.* A survey of some main development theories and their implications, drawing on the experiences of selected countries and regions — including the Atlantic Provinces.

2. *Development Planning.* Particular attention will be given to the Canadian social, political and economic context. Case studies will be utilised from World Bank experience in developing countries, from Canadian and O.E.C.D. member countries at various levels of government, and from the private sector. Regional, urban and rural, as well as national planning, will be reviewed.

3. *Policy effectiveness.* How do policies really evolve? How do they translate into programs and projects? What is the process of formulation, implementation and evaluation really like? What techniques are available to improve the cost-effectiveness of development planning e.g. programme budgets, cost-benefit analysis, critical-path scheduling, etc.

4. *Application.* The gist of development theory and comparative case study experience is utilised by working on current problems. Project teams will review how agencies in the Atlantic region are planning and budgeting — largely through extensive interviews. Teams will also tackle projects that government agencies and private sector organizations are currently working on. This will provide class members with experience in working at problems that often require an inter-disciplinary approach, and will give them practice in harnessing information and advice from a range of sources.

Class Membership

The class is provided for two main groups of people: —

1. Students interested in applying their background in economics and related subjects (e.g. political science, commerce, sociology) in a working environment, as part of a team that will include colleagues who already have some experience of development economics in practice.

2. Persons who are presently working in government agencies and business, who have an interest in reviewing how they might learn from comparative development experience lessons of value to their present or future, work situations.

Prerequisites: Introductory Economics or degree in a related discipline. The work requirements are streamed to fit students' backgrounds.

Resources. Experienced advisers from government and private agencies will add further perspective and guidance by participating in some aspects of this class.

320A Micro-Economic Theory, lect.: 3 hrs.; G. A. B. Kartsaklis.

This class is mainly concerned with the theory of the firm. The discussion centers around managerial motivation and the equilibrium of the firm in theory and practice. Selected topics include the alternatives to profit maximization, break-even charts, cost-plus pricing, and the pricing of factors of production. This is followed by a discussion of problems of market conduct under oligopoly: collusive behaviour, administered prices, and basing-point prices are the main issues in this part. The last part of the class covers problems of resource allocation and of welfare economics. This class will be of particular value for students intending to do graduate work in Economics. A knowledge of calculus would be useful.

Prerequisites: Mathematics 110 or equivalent and Economics 220A/B which may not be taken concurrently.

321B Macro-Economic Theory, lect.: 3 hrs.; G. A. B. Kartsaklis.

This is a class for persons who wish to do relatively advanced work in economic theory, possibly with the thought of going on to do graduate work in economics. The class will assume some knowledge of calculus. Topics covered include: classical models of income and employment; Keynesian models of income and employment; the theory of economic growth (including two-sector models); and trade cycle models.

Prerequisite: Economics 221A/B and Mathematics 110 (or equivalent).

322 Intermediate Statistics, lect.: 3 hrs.; U. L. G. Rao.

The student who is familiar with the basic statistical theory can appreciate econometric technique better than one who has had a formal training in statistics, which involves training in computational aspects of statistical measures but which does not give the student any understanding of fundamental theory. The purpose of this class is to equip the student with the basic theory of mathematical statistics. Statistics in its applied form has become a basic tool in all fields; recently, statistical techniques, suited to tackle economic problems, have become increasingly sophisticated. This class is designed as an introduction to econometrics; it is presumed that advanced techniques of econometrics can be understood by the student who has taken this class.

This class concentrates on the theory of Probability, building from an axiomatic point of view, mathematical expectation, moment generating function, and statistical inference.

Multiple linear regression models will be discussed and a critique of various problems that arise consequent to violations of the assumptions of the general linear model will be presented. This will prepare the student to undertake applied econometric work; besides, it would provide a springboard for the student to take up advanced econometrics.

The student is expected to have at least a one-year class in calculus (Mathematics 110 or equivalent) and preferably linear algebra too. Introductory Economics is also required.

324 Public Finance, lect.: 2 hrs.; tutorial 1 hr., J. G. Head

Economics 324 is concerned with the principles of public finance and their application. The first part of the class deals with the objectives of public policy and the reasons for market failure. This section provides the elements of a theory of public expenditure which is illustrated by reference to the major economic functions of government.

The second part of the class is concerned with the theory of taxation in relation to the objectives of public policy. This section explores the possible role of a sample of important taxes in the design of a good tax system. The third section examines the role of public finance in relation to economic stabilization. The final section considers the special problems of public finance in a federal system. The analysis of the various sections will be illustrated from and applied to the fiscal systems of Canada and other countries.

Prerequisite: Introductory Economics, Economics 220A/B and 221A/B are desirable.

325 Labour Economics, lect. and seminar: 3 hrs.; C. Steinberg

Some nine million Canadians are directly dependent upon wages and salaries for a living, and their earnings constitute about 65% of the National Income. Over two million of these workers belong to trade unions in critical sectors of our economy. Econmic analysis of the factors affecting wages and salaries, employment and unemployment, the conditions of labour, and the labour market is therefore important to an understanding economy as a whole.

The subject is introduced by reviewing: the emergence of the labour problem; the development and structure of the labour market; the growth, structure and outlook of trade unions; and the historical and legal foundations of labour relations.

Most of the year is spent in:

(a) Analysis of the supply of and demand for labour, opening with a review of classical wage theory.

(b) Examination of the theory and practice of collective bargaining, exploring also the interaction and relative strengths of market (economic) forces, and institutional (government-union-employer) forces.

(c) Study of labour's share of the national income and the relative effect of unions on it.

(d) Analysis of the determinants of employment in the macro-economic sense, and of the measurement and problems of unemployment.

We conclude with a review of public policy with respect to labour, and an effort is made throughout to relate current events to the theoretical framework.

The class structure is intended to be flexible; however, as a base it has two lectures and one seminar (in which student teams of four each provide the materials) each week.

Prerequisite: Introductory Economics and an interest in social science and its methods. Economics 220A/B and 221A/B are desirable.

326B Money and Banking, lect.: 3 hrs.; R. L. Comeau.

This class is concerned with the nature and operation of the financial system, with particular reference to Canadian examples and experience. As such the course is concerned with financial instruments and institutions and with those processes whereby the social control of the supply of money and credit in the system is effected. The course is complete in itself, but is complemented by Economics 426B which continues the analysis with a consideration of the theory and effectiveness of monetary policy.

Prerequisite: Economics 221A/B.

327 History of Economic Thought, lect.: 3 hrs.;

The approach taken in this class is to study "the intellectual efforts that men have made in order to understand economic phenomena". A brief survey of medieval and mercantilist literature is followed by an examination of English classical political economy and Marxian economics together with that of other socialists. The focus then shifts to the marginalists, neo-classicists, and the institutionalists. Problems of economic instability and depression, especially in this century, require that some attention be given to Keynesian economics and its extensions. The time allotted to the study of European writers and schools and of various contemporary writers and current topics depends in part on the interests of students. It is recognized that the tremendous expansion of the literature and the emergence of highly specialized fields in economics makes it necessary to select from recent sources only a relatively small sample of writings which relate this class to others which the student may be taking. The links can be forged, nevertheless, by means of a number of topics such as the following: the theory of value, the treatment of money, the theory of economic growth, the theory of distribution, and the relationship between growth and distribution.

Although this class is intended to supply a background for several other classes in economics, it is also true that other classes serve as background for this one. It is considered essential, however, that students in

knowledge of history would be beneficial.

234A Pre-Colonial Economic History of Sub-Saharan Africa, lect.: 2 hrs.; Z. A. Konczacki.

The object of the class is to introduce the student to the most important problems of African economic history, with particular concentration on the pre-colonial period, and to prepare him for further reading in this area of study.

The topics considered include: methodology of African economic history; the significance of environmental differenciation; some speculations on economic prehistory; economic contacts between distinct ecological regions and different cultures; introduction and spread of agricultural crops; landholding systems; mining and metal-working; long-distance trade routes and trade centers; overseas trade; slavery and slave trade; Arab and European penetration and its economic impact.

The discussion concentrates primarily on tropical Africa and it is carried up to the times of the partition of the Continent by the European powers in the late nineteenth century.

No prerequisites are required, although Introductory Economics and some knowledge of history is desirable.

235B Economic History of Tropical Africa: Colonial Period, lect.: 2 hrs.; Z. A. Konczacki.

This class deals with an era which began with the "scramble" for African colonies, and ended with the coming of independence. A survey is provided of colonial economic policies, prior to World War II, problems of their implementation and eventual introduction of the "development and welfare" approach. More specifically, the topics discussed include: development of transport; mining; agriculture and trade; some aspects of investment and technological diffusion; growth of labour force and the problems of migrant workers; colonial planning; socioeconomic impact of European colonization on Africans; African response to economic incentives; a balance-sheet of colonialism.

No prerequisites are required, although Introductory Economics and Economics 234A are desirable.

236A Recent Economic Developments in Sub-Saharan Africa, seminar: 2 hrs.; Z. A. Konczacki.

This seminar centres on the discussion of the impact of colonial heritage, present structure of African economies, problems of economic infrastructure, African agriculture, mineral development, industrialization with particular emphasis on import-substitution, problems of trade: overseas and intra-African, foreign investment and aid programs, economic planning, and prospects for the future of African economic development.

Prerequisites: Introductory Economics. Economics 234A and 235B are recommended, though not required. Students may also be admitted by permission of the instructor.

241A Comparative Economic Systems: National Economies, seminar: 2 hrs., P. B. Huber.

The object of this class is to sharpen the student's ability to think about problems of economic organization and control, to improve his skills in writing and speaking with respect to these problems, and to provide him with a broad background of institutional material on the structure and performance of a variety of economies. Reading on specific countries provide the basis for several short papers, but there is no written examination.

The student taking this class must understand the interrelated character of economic activity and have a good grasp of the way in which the price system operates. Preliminary reading should have included *The Making of Economic Society* by R. L. Heilbroner.

Prerequisite: Introductory Economics.

242B Comparative Economic Systems: Economic Organization and Planning, seminar: 2 hrs., P. B. Huber.

Initially, this class examines the economic behaviour of organizations and the ways in which this behaviour can be controlled. This provides the basis for consideration of the theory and practice of economic planning at micro-economic and macro-economic levels in various institutional contexts. Readings include selections from Dahl and Lindblom, Galbraith, Mishan, Tinbergen, and Ward.

Prerequisite: Introductory Economics, plus an additional half-class in Economics.

250 Applied Development Economics, seminar: 2 hrs. and tutorials, R. I. McAllister.

The purpose of this class is to enable participants to review some main lessons from economic development theory and comparative experience, and to apply this background by tackling some current problem in project teams.

The class consists of several main strands, which often run concurrently. These include: —

1. *Economic Development in theory and practice.* A survey of some main development theories and their implications, drawing on the experiences of selected countries and regions — including the Atlantic Provinces.

2. *Development Planning.* Particular attention will be given to the Canadian social, political and economic context. Case studies will be utilised from World Bank experience in developing countries, from Canadian and O.E.C.D. member countries at various levels of government, and from the private sector. Regional, urban and rural, as well as national planning, will be reviewed.

3. *Policy effectiveness.* How do policies really evolve? How do they translate into programs and projects? What is the process of formulation, implementation and evaluation really like? What techniques are available to improve the cost-effectiveness of development planning e.g. programme budgets, cost-benefit analysis, critical-path scheduling, etc.

4. *Application.* The gist of development theory and comparative case study experience is utilised by working on current problems. Project teams will review how agencies in the Atlantic region are planning and budgeting — largely through extensive interviews. Teams will also tackle projects that government agencies and private sector organizations are currently working on. This will provide class members with experience in working at problems that often require an inter-disciplinary approach, and will give them practice in harnessing information and advice from a range of sources.

Class Membership

The class is provided for two main groups of people: —

1. Students interested in applying their background in economics and related subjects (e.g. political science, commerce, sociology) in a working environment, as part of a team that will include colleagues who already have some experience of development economics in practice.

2. Persons who are presently working in government agencies and business, who have an interest in reviewing how they might learn from comparative development experience lessons of value to their present or future, work situations.

Prerequisites: Introductory Economics or degree in a related discipline. The work requirements are streamed to fit students' backgrounds.

Resources. Experienced advisers from government and private agencies will add further perspective and guidance by participating in some aspects of this class.

320A Micro-Economic Theory, lect.: 3 hrs. G. A. B. Kartsaklis.

This class is mainly concerned with the theory of the firm. The discussion centers around managerial motivation and the equilibrium of the firm in theory and practice. Selected topics include the alternatives to profit maximization, break-even charts, cost-plus pricing, and the pricing of factors of production. This is followed by a discussion of problems of market conduct under oligopoly: collusive behaviour, administered prices, and basing-point prices are the main issues in this part. The last part of the class covers problems of resource allocation and of welfare economics. This class will be of particular value for students intending to do graduate work in Economics. A knowledge of calculus would be useful.

Prerequisites: Mathematics 110 or equivalent and Economics 220A/B which may not be taken concurrently.

321B Macro-Economic Theory, lect.: 3 hrs.; G. A. B. Kartsaklis.

This is a class for persons who wish to do relatively advanced work in economic theory, possibly with the thought of going on to do graduate work in economics. The class will assume some knowledge of calculus. Topics covered include: classical models of income and employment; Keynesian models of income and employment; the theory of economic growth (including two-sector models); and trade cycle models.

Prerequisite: Economics 221A/B and Mathematics 110 (or equivalent).

322 Intermediate Statistics, lect.: 3 hrs.; U. L. G. Rao.

The student who is familiar with the basic statistical theory can appreciate econometric technique better than one who has had a formal training in statistics, which involves training in computational aspects of statistical measures but which does not give the student any understanding of fundamental theory. The purpose of this class is to equip the student with the basic theory of mathematical statistics. Statistics in its applied form has become a basic tool in all fields; recently, statistical techniques, suited to tackle economic problems, have become increasingly sophisticated. This class is designed as an introduction to econometrics; it is presumed that advanced techniques of econometrics can be understood by the student who has taken this class.

This class concentrates on the theory of Probability, building from an axiomatic point of view, mathematical expectation, moment generating function, and statistical inference.

Multiple linear regression models will be discussed and a critique of various problems that arise consequent to violations of the assumptions of the general linear model will be presented. This will prepare the student to undertake applied econometric work; besides, it would provide a springboard for the student to take up advanced econometrics.

The student is expected to have at least a one-year class in calculus (Mathematics 110 or equivalent) and preferably linear algebra too. Introductory Economics is also required.

324 Public Finance, lect.: 2 hrs.; tutorial 1 hr., J. G. Head

Economics 324 is concerned with the principles of public finance and their application. The first part of the class deals with the objectives of public policy and the reasons for market failure. This section provides the elements of a theory of public expenditure which is illustrated by reference to the major economic functions of government.

The second part of the class is concerned with the theory of taxation in relation to the objectives of public policy. This section explores the possible role of a sample of important taxes in the design of a good tax system. The third section examines the role of public finance in relation to economic stabilization. The final section considers the special problems of public finance in a federal system. The analysis of the various sections will be illustrated from and applied to the fiscal systems of Canada and other countries.

Prerequisite: Introductory Economics, Economics 220A/B and 221A/B are desirable.

325 Labour Economics, lect. and seminar: 3 hrs.; C. Steinberg

Some nine million Canadians are directly dependent upon wages and salaries for a living, and their earnings constitute about 65% of the National Income. Over two million of these workers belong to trade unions in critical sectors of our economy. Econmic analysis of the factors affecting wages and salaries, employment and unemployment, the conditions of labour, and the labour market is therefore important to an understanding economy as a whole.

The subject is introduced by reviewing: the emergence of the labour problem; the development and structure of the labour market; the growth, structure and outlook of trade unions; and the historical and legal foundations of labour relations.

Most of the year is spent in:

(a) Analysis of the supply of and demand for labour, opening with a review of classical wage theory.

(b) Examination of the theory and practice of collective bargaining, exploring also the interaction and relative strengths of market (economic) forces, and institutional (government-union-employer) forces.

(c) Study of labour's share of the national income and the relative effect of unions on it.

(d) Analysis of the determinants of employment in the macro-economic sense, and of the measurement and problems of unemployment.

We conclude with a review of public policy with respect to labour, and an effort is made throughout to relate current events to the theoretical framework.

The class structure is intended to be flexible; however, as a base it has two lectures and one seminar (in which student teams of four each provide the materials) each week.

Prerequisite: Introductory Economics and an interest in social science and its methods. Economics 220A/B and 221A/B are desirable.

326B Money and Banking, lect.: 3 hrs.; R. L. Comeau.

This class is concerned with the nature and operation of the financial system, with particular reference to Canadian examples and experience. As such the course is concerned with financial instruments and institutions and with those processes whereby the social control of the supply of money and credit in the system is effected. The course is complete in itself, but is complemented by Economics 426B which continues the analysis with a consideration of the theory and effectiveness of monetary policy.

Prerequisite: Economics 221A/B.

327 History of Economic Thought, lect.: 3 hrs.;

The approach taken in this class is to study "the intellectual efforts that men have made in order to understand economic phenomena". A brief survey of medieval and mercantilist literature is followed by an examination of English classical political economy and Marxian economics together with that of other socialists. The focus then shifts to the marginalists, neo-classicists, and the institutionalists. Problems of economic instability and depression, especially in this century, require that some attention be given to Keynesian economics and its extensions. The time allotted to the study of European writers and schools and of various contemporary writers and current topics depends in part on the interests of students. It is recognized that the tremendous expansion of the literature and the emergence of highly specialized fields in economics makes it necessary to select from recent sources only a relatively small sample of writings which relate this class to others which the student may be taking. The links can be forged, nevertheless, by means of a number of topics such as the following: the theory of value, the treatment of money, the theory of economic growth, the theory of distribution, and the relationship between growth and distribution.

Although this class is intended to supply a background for several other classes in economics, it is also true that other classes serve as background for this one. It is considered essential, however, that students in

this class have taken a class in economic principles. A class in micro-economics (price theory) and in macro-economics (income determination) would be helpful. The presentation, except for a few specific points, is largely non-mathematical. Therefore, the main requirement of students is an ability to read and assimilate a certain body of literature rather quickly.
Prerequisite: Economics 220A/B and 221 A/B are recommended.

328 Industrial Organization, seminar: 2 hrs.; C. Marfels.

Industrial Organization is the application of the models of price theory to economic reality. In a specific industry, the problems of a firm competing successfully with its rivals in order not only to survive but to acquire a higher market share are far more complex than those in price-theory where we have to deal with more or less simplified assumptions to find a solution at all. The traditional approach to the analysis of the competitive process in an industry is divided into three parts: market structure, market conduct, and market performance. These are the three main parts of the class.

Briefly, market structure refers to the number and size distribution of firms in general and to economic concentration in particular; in market conduct the pricing process is discussed; market performance concerns the problem of the degree of optimality of allocation of resources. The latter part includes a discussion about whether a reallocation of resources is necessary, and this involves looking at the basic elements of public policies directed towards business.
Prerequisite: Economics 220A/B or equivalent micro-economics course.

329 Urban Economics, lect.: 3 hrs.; T. A. Pinfold.

Urban Economics is essentially the application of tools of economic analysis to the problem of urban areas. Urban area is loosely defined so as to include small towns as well as large cities. Topics discussed include: the origin of cities, factors affecting urban economic growth, the goals of an urban area, problems in intra-urban resource allocation, urban transportation, production of public goods in urban areas, and urban planning. Flexibility in selecting class content is considered important. Topics suggested by students are welcome. Students are expected to present papers on topics of their choice.
Prerequisites: It is strongly recommended that students have a sound background in both macro- and micro-economics. Economics 220A|B and 221A|B, or their equivalent would be a minimum. The class is designed as an application of theoretical tools. No theory will be taught. Students will also find a knowledge of calculus useful, but not necessary. If a prospective student is unsure about the suitability of his background, he should consult the instructor.

332B Resource Economics, lect. 2 hrs.; N. H. Morse.

This class is concerned with an analysis of the physical and economic characteristics of renewable and non-renewable resource industries and of environmental philosophy and environmental management in general.
Prerequisites: Introductory Economics. Economics 220A|B and 221A|B are desirable.

330A International and Interregional Exchange, lect.: 2 hrs.;

This class considers the causes of international and interregional exchange of goods and services and analyzes the effects of international integration on the incomes and growth rates of national economies. The theory and practice of commercial policy and other restrictions on trade are considered after the pure theory of international trade and its implications have been explored. Depending upon class interest and availability of time, the subjects of economic integration and of Canadian commercial policy may be discussed in some detail.
Prerequisite: Introductory Economics and 220A|B, or two full-year classes in economics.

333A Theories of Economic Development, lect.: 2 hrs.; Z. A. Konczacki.

The purpose of this class is to provide a theoretical framework for the understanding of the process of economic development in the more and the less developed countries with a view to an eventual application of this framework to the solution of practical problems.

Topics considered include: basic definitions and distinctions; measurement of economic magnitudes; characteristics of the less developed countries; selected theories and models of economic development and their appraisal. The concluding seminars are devoted to the problem of the foundations of the theory of economic development, and a distinction between the concepts of unilinear and multilinear evolution is discussed.
Prerequisite: Introductory Economics. A class in macro-economics equivalent to Economics 221A|B, and History of Economic Thought is desirable.

334B Policy Issues in Economic Development, seminar 2 hrs.

This class is concerned with the application of economic theory to selected developmental problems. The role of capital formation in economic development is examined. Forced saving by inflation, domestic taxation, and foreign aid are considered as alternative ways of increasing the rate of capital formation. The focus of the class then shifts to the problem associated with choosing the best use of investible resources from such alternatives as investment in education, research, population control, and the reformation of institutions and values inimical to growth. This topic leads into a discussion of investment criteria, programming models, and developmental strategies.
Prerequisite: One half-year class in economic development, or Economics 241A and 242B; alternatively 220A|B and 221A|B.

336B Regional Development, seminar 2 hrs.; and tutorials; R. I. McAllister.

This class enables students to examine the process, prospects and problems associated with regional development in Canada in particular, and in the more industralised countries in general. The interdependence of economic, political and social forces is markedly in evidence in the evolution of regional policies, and while this course will be oriented largely from a concern with the economic forces underlying the process — these other factors will be taken into consideration. The approach will contain four main elements: (a) the application of economic 'principles' in the context of regional development; (b) a comparative review of regional development experiences and policies of a number of industrialized countries; (c) Canadian regional development experiences, with particular focus on the Atlantic region; (d) regional field case study; each student will examine the background and role of one pertinent project such as D.E.V.C.O. in Cape Breton, the Newfoundland centralization program, the Saint John multi-industry complex. The class will visit several such projects over the period.
Prerequisite: This class is intended very largely for graduates (not necessarily in economics), who already have a number of years work experience on problems associated with regional development. A limited number of other students (with a substantial background in economics and/or political science) will be admitted.

422 Econometrics, lect.: 3 hrs.; U. L. G. Rao.

This class attempts to introduce Econometric theory at a fairly advanced level and is designed mainly for one who likes to work on theory or model-building.

A review of the general linear model will be made. Violations of the assumptions crucial for least squares estimation brings in various problems. The following problems will be discussed in detail: Stochastic regressions, generalized least squares, Autocorrelation, Heteroskedasticity, distributed lags and dummy variables. All these problems are single equation problems.

Simultaneous equation problems occupy an important place in econometric model-

building. A critical analysis of the problem of identification and single equation bias will be made.

Limited information methods and full information methods of estimation will be discussed.

Monte Carlo methods as alternatives to analytical techniques will be discussed.

This class requires a high level of work and is open to graduate as well as undergraduate students. Minimum prerequisites for undergraduates will be an undergraduate statistics course and undergraduate work in micro- and macro-economics. The prerequisites are Economics 322 and 220A/B and 221A/B.

423A International Economics of Development, seminar: 2 hrs.

This class applies international economic theory to problems of economic development policy. Topics discussed include the terms-of-trade, external balance, foreign aid, private foreign investment, commercial policy, and development through trade. Approximately one-half of the readings is concerned with foreign aid. Subtopics include the economic objectives of foreign aid in relation to national, political and security objectives; the foundations of modern aid theories and strategies in development theories; the macro-economics of aid, including analysis of dual gap models, aid requirements, absorptive capacity, debt service, and loan terms; the micro-economics of aid, including economic criteria for project assistance and aid strategies; and factors affecting the burden of aid upon the donor countries.
Prerequisite: One half-year class in either economic development or international economics.

424B Economic Development and Ecology, seminar 2 hrs.; Z. A. Konczacki.

This seminar is offered to the students whose interest in economics or natural sciences combines with an interest in environmental problems. The approach reflects an economist's view of the relationship between ecological questions and his own discipline. Topics considered include: modern approach to economic development and the lessons of experience; theory of economic development and the scientific view of man and nature; determinants of living levels; population: theory and policy; environmental preservation; problems of economic efficiency; control systems; some problems of research methodology; case studies of the relation between economic development and eco-systems in the less and the more developed parts of the world.
Prerequisite: Economics 333A. Students may also be admitted with special permission of the instructor.

426B Monetary Policy, lect.: 3 hrs.; R. L. Comeau.

This class assumes that students have a basic knowledge of monetary institutions and monetary theory and attempts to develop out of this a critical analysis of the objects and effectiveness of monetary policy, with particular attention to the Canadian experience. The first part of the class deals with the objectives and instrumental role of monetary policy and introduces such problems as the question of rules versus authority, and the question of lags in monetary policy. The second part is concerned with the effectiveness of monetary policy and considers issues such as the structure of interest rates, the elasticity of spending to changes in interest, the availability doctrine, the problems for policy of a fixed versus flexible exchange rate and the discriminatory effects of monetary policy. The last part considers the adequacy of the tools of monetary policy, again particularly in the light of the Canadian money market experience.
Prerequisites: Economics 221A/B. It is advantageous for students to have completed Economics 326A as well.

Economics 431B International Payments, seminar: 2 hrs.

Selected topics in recent international monetary history are examined, the causes of and remedies for external inbalance in national economies are considered, and the reorganization of the international monetary system is discussed. Depending upon class interest, certain issues of international development finance and problems of instability and growth in the international economy may be discussed in detail.

A substantial proportion of class time is devoted to the discussion of papers prepared by students. A comprehensive reading list is distributed.
Prerequisites: Economics 330A or 326B and 220A/B. These are strict prerequisites in the sense that they must be completed before the student enrolls in the class.
In addition the ability to follow arguments covered in terms of high school mathematics is essential since part of the exposition makes use of algebraic and mathematical techniques.

432 Regional Economics, seminar 2 hrs.; F. M. Bradfield.

Regional economics applies economic theory to the problems created by the differential impact of economic change on the regions of a developed economy. The intent of this course is to develop a logical analytical approach to the problems of regional development. The course develops an understanding of the basic problems, their interrelationships, and their correction or amelioration. When the basic problems are understood, policy issues become clarified and easier to analyze. The course will operate as if the class were a research unit assigned the task of preparing a rigorous development plan for a region of class choice (presumably Nova Scotia, or the Maritimes, given the usual interests of the class). The class will define the various areas or components of the plan and assign tasks to members of the class, either as individuals or teams. Class time will be spent analyzing areas, defining needs and directing the individuals working in those areas. Papers will be discussed while being worked and as seminar papers when completed. The professor will not lecture to the class but will, with the rest of the class, question assumptions and analyses, suggest directions, and if necessary, serve as referee.
Prerequisite: Economics 220A/B and 221A/B. Students must have a knowledge of both macro- and price theory, especially the market mechanisms determining factor flows and the production relationships between factor prices, productivities and proportions.

433B Intergovernmental Fiscal Relations, lect., and seminar, 2hrs.; J. F. Graham.

This class is concerned with the principles of intergovernmental fiscal adjustment and their application in a federal political system, particularly Canada, at both federal-provincial and provincial-municipal levels.
Prerequisites: Economics 220, 221, 324. Political Science 313 and other related classes in political science are recommended, though not required. Students may also be admitted by permission of the instructor.

440 Applied Development Economics, seminar: 2 hrs. and tutorials; R. I. McAllister.

For description see Economics 250.

448A Philosophy, Politics, and Economics: Public Goods and Political Choices, D. Braybrooke.
(Same as Philosophy 448A and Political Science 448A. Offered in 1975-76)

449B Philosophy, Politics, and Economics: Applied Social Philosophy - The logic of Questions, Policy Analysis and Issue Processing, D. Braybrooke.
(Same as Philosophy 449B and Political Science 449B. Class description to be found under Philosophy 449B)

Graduate Studies
The Department offers a graduate programme leading to the M.A. and Ph.D. degrees. Details of these programmes, including a list of graduate courses, are given in the Calendar of the Faculty of Graduate Studies. Senior undergraduates may be admitted to some graduate classes at the discretion of the instructors concerned.

Education

Education

Professors

D. J. Dyke (Chairman)
E. Z. Friedenberg
H. J. Uhlman (part-time)

Associate Professors
V. A. Ellis (part-time)
E. T. Marriott (part-time)
S. W. Semple
S. S. Sodhi

Assistant Professors
T. Carter (part-time)
D. Farnsworth (part-time)
R. Gamberg
W. F. Hare
D. J. Huegel
G. B. Jeffery
P. Keane
J. Manos
H. E. Poole
J. B. Roald
H. G. Schwarz (part-time)

Lecturers
M. Bishop (part-time)
R. Ginsberg (part-time)
M. J. Meade (part-time)
P. Richards (part-time)

Field Development Officer
G. B. Punke

Special Lecturers (Part-time)
B. S. Clark
J. Cleveland
V. Cronin
C. Gamberg
Sister P. Hatchett
N. F. MacLennan
H. P. Moffatt
J. Norman
D. M. Paull
M. Ricker
J. Robson
D. B. Roe
L. F. Scobbie
M. Smyth
K. C. Stickings
W. D. VanZoost
N. Watts
R. Whitman

Educational ideas are in ferment at the present time and serious voices can be heard taking very different positions on such matters as student responsibility, discipline, specialization in High School, and teaching methods. At the same time new ideas (or in some cases, old ideas in new guises) challenge the student teacher, e.g. team teaching, micro-teaching, and continuous progress. Is a system of public schooling defensible at all? To what extent is teaching neutrality possible or desirable? Clearly to enter an education programme at such a time is not to enter a form of learning in which one can sensibly expect ready answers to such issues and problems. The Department of Education at Dalhousie is concerned to involve the students in such problems, to call attention to the relevant literature, and to aim at the high level of intellectual inquiry. It is vital that the student challenge ideas which he will encounter, and think out his or her own position on the issues. This is no more than to point out what is true of educational processes at all levels, that they are concerned to develop understanding. Involvement cannot be summarised in terms of "listening and learning" but extends to reading, thinking, contributing, rejecting, debating, experimenting, and so on. The general outlook permeates the whole programme, including academic courses and methods courses as well as the periods of field experience.

Facilities of the Department

The Department occupies a three-building complex, organized around a Learning Resource Centre which consists of four units: Field Development Unit; Learning Materials Unit; Playgroup (pre-school unit); and the Audio-visual Unit. When fully renovated the Centre will place an emphasis on open space and the mobility of people, equipment and materials within the larger area.

The Department offers:
1. a four year integrated course at the end of which students are awarded simultaneously the degrees of B.A. or B.Sc. and B.Ed.,

2. a sequential course of one year which may be taken by students who have already completed a B.A., B.Sc., or B.Comm. degree course or otherwise fulfill the requirements for admission to the B.Ed. programme, and at the end of which the degree of B.Ed. is awarded,

3. B.Ed. for Vocational Teachers,

4. Part-time study toward a B.Ed. and

5. two classes which may be used for credit towards a B.A. or B.Sc. (Education 4000 and one credit from classes 4101 to 4212.)

The instruction offered in the education classes in the sequential and integrated programmes is substantially the same in both courses. In the integrated course, the classes in education are integrated with academic classes in the second, third, and fourth years, the first year being confined to the regular classes required for the B.A. or B.Sc. degree or Kings' Foundation Year. A student wishing to enter the integrated course must apply to the department during the first year at the latest.

Traditionally the programmes are divided into Elementary and Secondary. The divisions are much less distinct now and this is reflected in the large number of options available in some courses. Requests for different course combinations are allowed by the department.

The department is also encouraging the development of experimental projects involving alternative courses to the traditional ones. Students interested in participating in such projects are invited to indicate this on the Departmental Application form and to discuss possibilities during their interview for admission.

Certification of Teachers
Licenses to teach are issued by the Department of Education, Province of Nova Scotia. According to the regulations of the Province of Nova Scotia, every applicant for a Teacher's license or Professional Certificate must submit with his application, documentary evidence (in a form prescribed by the Minister of Education) respecting the applicant's moral character, age, health, training, and qualifications. Further information may be obtained from the Registrar, Nova Scotia Department of Education. A B.Ed. entitles the graduate to a Teacher's Certificate, Class 5 in Nova Scotia. In New Brunswick, a B.Ed. graduate may expect to receive a Class 4 certificate.

Degree Programmes

B.Ed. Elementary and Secondary Sequential (One-year) Course

Entry Requirements
1. B.A., B.Sc., or B.Comm. by September 1974. Candidates with other bachelor degrees should enquire from the Secretary, B.Ed. Programme.

2. Applications from all students are welcomed. Opportunity to draw attention to strengths is provided by the letter of application.

Application
Upon request, a student will receive Dalhousie University Application form, the Department of Education Application form, two reference forms, and further details from the Admissions Office, Dalhousie University, Halifax, Nova Scotia. Students are advised to make early application since the Department of Education limits its enrollment. Application must be made by August 15, 1974 at the latest, although students are encouraged to apply after January 1, 1974.

An interview is arranged with the Department of Education after initial application has been made. The date of interview must be confirmed by the applicant.

Selection is based on:
1. Academic record: All applicants, including Dalhousie graduates, must ensure that their transcripts are forwarded to the Admissions Office.

2. References

3. Interview

Applicants from outside the Maritime Provinces need not attend for interview; other arrangements are made for them.

The Programmes offered by the Department of Education are being revised for the 1974-75 programme. Students are advised to consult the Programme Planning Guide which will be available on and after April 1, 1974 from the Secretary, B.Ed. Programme. A new course numbering system has been introduced for the 1974-75 programme. Please see section "Classes Offered" for an explanation of the new system.

B.Ed. (Elementary), Sequential Course
Candidates for the degree of B.Ed. (Elementary) must complete successfully the following academic classes: Education 4000 (if not already completed), one credit from classes 4101 to 4212 (if not already completed), Education 4703, 4711, 4723, 4732, and two half credit classes from 4301-4371. If either Education 4000 or classes from 4101 to 4212 has been completed previously, another academic class may be taken, subject to the approval of the Department. Candidates must also complete successfully Education 4900 (field experience) and two electives approved by the Department.

B.Ed. (Secondary), Sequential Course

Candidates for the degree of B.Ed. (Secondary) must complete successfully the following academic classes: Education 4000 (if not already completed), one credit from Education 4101-42/2 (if not already completed), two one-half credit classes in secondary methods from Education 4753-4873, and two half classes from 4301-4371. If either Education 4000 or classes from 4101-42/2 has been completed previously, another academic class may be taken, subject to the approval of the Department. Candidates must also complete successfully Education 4900 (field experience) and two electives approved by the Department.

Students planning a B.Ed. following a B.A., B.Sc., or B.Comm. should be aware that at present certain areas of concentration in the first degree might not easily lead to effective teaching. They are advised to consult with the Coordinator of the B.Ed. Programme when drawing up their programme for the first degree.

Transfer of Credit

Decisions concerning transfer of credit will be made following consideration of transcripts and students' intended areas of study. Enquiries should be directed to the Secretary, B.Ed. Programme.

B.Ed. Elementary and Secondary Integrated (Four-year) Course

Education courses in the integrated programme are in the process of being re-distributed. In the integrated course, the classes in education are integrated with academic classes in the second, third, and fourth years, the first year being confined to the regular classes required for the B.A. or B.Sc. degree or Kings' Foundation Year. Details of the distribution of Education courses for new students entering the programme are issued by the Department at the time applications are made.

Enquiries, and application for admission to the Integrated Course, should be made to the Admissions Office, Dalhousie University by August 15 at the latest, of the student's first year at Dalhousie.

Students wishing to obtain a B.Ed. (Secondary) and a B.A. or B.Sc. with honours should consult the Department of Education and the department or departments in which they wish to do their honours work not later than the beginning of their second year in order that a proper sequence of classes may be arranged. Five years from senior matriculation will normally be sufficient to complete this course of study.

B.Ed. (Elementary): Integrated Course

Overall Requirements

The nine classes in arts and science taken in the second and subsequent years must meet the requirements set forth in Degree Programmes, sections 5.2.1.

Specifically,

(A) The major (four to eight classes selected in accordance with major departmental requirements) must be in a subject taught in Nova Scotian schools.

(B) Seven of the nine classes must be at the 200 level or above.

(C) On registration in his second year, the student must declare his major and have it approved by the department concerned.

(D) At least one class in English beyond the 100 level must be taken.

(E) Electives may be chosen from the subjects listed in groups A, B, C, and D (Degree Programmes, section 2), or Art History, up to three classes in Commerce, Computer Science, Engineering, and Humanistic Studies in Science.

B.Ed. (Secondary): Integrated Course

Overall Requirements

The ten classes in arts and science chosen in the second and subsequent years must meet the requirements set forth in Degree Programmes, section 5.2.1.

Specifically,

(A) Seven of the ten classes in arts and science taken in the second and later years must be in two subjects beyond the 100 level; these should be related to subjects regularly taught in Nova Scotian schools. The seven classes must be chosen so that either five classes are taken in one subject and two in the other, or four in one subject and three in the other.

(B) The remaining three arts and science classes taken in the second and subsequent years shall include at least one which is beyond the 100 level and shall be selected from subjects other than those offered to satisfy the requirements in the previous paragraph. The subjects may be selected from group A, B, C, and D (Degree Programmes, section 2), or Art History, up to three classes in Commerce, Computer Science, Engineering, and Humanistic Studies in Science.

(C) On registration in his second year, the student must declare his major and have it approved by the department concerned.

Degree for Vocational Teachers

Entry Requirements

The applicant must:
1. be employed as a teacher in the trades nical occupation fields in a vocational school or in a similar capacity in the field of public or continuing education.

2. have had the required number of years, specified below, of specialized training and experience in the trades or in the industrial, services and technical occupation fields. The number of years will be that required by the Nova Scotia Department of Education for certification as a teacher in the area of specialization.

Application

Write to the Registrar, Dalhousie University, asking for University Application form and mention interest in B.Ed. programme for Vocational Teachers.

B.Ed.

Candidates for the degrees of B.Ed., admitted under the regulations in this section, will complete 15 credits, selected in accordance with the following rules:

1. Education 4000, one credit from 4101-4212, two one-half credit classes in secondary methods from Education 4753-4873, two half classes from 4301-4371, 4371 and 4932.

2. The Department of Education will ensure that the candidate's performance as a

Education

Education

Professors

D. J. Dyke (Chairman)
E. Z. Friedenberg
H. J. Uhlman (part-time)

Associate Professors
V. A. Ellis (part-time)
E. T. Marriott (part-time)
S. W. Semple
S. S. Sodhi

Assistant Professors
T. Carter (part-time)
D. Farnsworth (part-time)
R. Gamberg
W. F. Hare
D. J. Huegel
G. B. Jeffery
P. Keane
J. Manos
H. E. Poole
J. B. Roald
H. G. Schwarz (part-time)

Lecturers
M. Bishop (part-time)
R. Ginsberg (part-time)
M. J. Meade (part-time)
P. Richards (part-time)

Field Development Officer
G. B. Punke

Special Lecturers (Part-time)
B. S. Clark
J. Cleveland
V. Cronin
C. Gamberg
Sister P. Hatchett
N. F. MacLennan
H. P. Moffatt
J. Norman
D. M. Paull
M. Ricker
J. Robson
D. B. Roe
L. F. Scobbie
M. Smyth
K. C. Stickings
W. D. VanZoost
N. Watts
R. Whitman

Educational ideas are in ferment at the present time and serious voices can be heard taking very different positions on such matters as student responsibility, discipline, specialization in High School, and teaching methods. At the same time new ideas (or in some cases, old ideas in new guises) challenge the student teacher, e.g. team teaching, micro-teaching, and continuous progress. Is a system of public schooling defensible at all? To what extent is teaching neutrality possible or desirable? Clearly to enter an education programme at such a time is not to enter a form of learning in which one can sensibly expect ready answers to such issues and problems. The Department of Education at Dalhousie is concerned to involve the students in such problems, to call attention to the relevant literature, and to aim at the high level of intellectual inquiry. It is vital that the student challenge ideas which he will encounter, and think out his or her own position on the issues. This is no more than to point out what is true of educational processes at all levels, that they are concerned to develop understanding. Involvement cannot be summarised in terms of "listening and learning" but extends to reading, thinking, contributing, rejecting, debating, experimenting, and so on. The general outlook permeates the whole programme, including academic courses and methods courses as well as the periods of field experience.

Facilities of the Department

The Department occupies a three-building complex, organized around a Learning Resource Centre which consists of four units: Field Development Unit; Learning Materials Unit; Playgroup (pre-school unit); and the Audio-visual Unit. When fully renovated the Centre will place an emphasis on open space and the mobility of people, equipment and materials within the larger area.

The Department offers:
1. a four year integrated course at the end of which students are awarded simultaneously the degrees of B.A. or B.Sc. and B.Ed.,

2. a sequential course of one year which may be taken by students who have already completed a B.A., B.Sc., or B.Comm. degree course or otherwise fulfill the requirements for admission to the B.Ed. programme, and at the end of which the degree of B.Ed. is awarded,

3. B.Ed. for Vocational Teachers,

4. Part-time study toward a B.Ed. and

5. two classes which may be used for credit towards a B.A. or B.Sc. (Education 4000 and one credit from classes 4101 to 4212.)

The instruction offered in the education classes in the sequential and integrated programmes is substantially the same in both courses. In the integrated course, the classes in education are integrated with academic classes in the second, third, and fourth years, the first year being confined to the regular classes required for the B.A. or B.Sc. degree or Kings' Foundation Year. A student wishing to enter the integrated course must apply to the department during the first year at the latest.

Traditionally the programmes are divided into Elementary and Secondary. The divisions are much less distinct now and this is reflected in the large number of options available in some courses. Requests for different course combinations are allowed by the department.

The department is also encouraging the development of experimental projects involving alternative courses to the traditional ones. Students interested in participating in such projects are invited to indicate this on the Departmental Application form and to discuss possibilities during their interview for admission.

Certification of Teachers
Licenses to teach are issued by the Department of Education, Province of Nova Scotia. According to the regulations of the Province of Nova Scotia, every applicant for a Teacher's license or Professional Certificate must submit with his application, documentary evidence (in a form prescribed by the Minister of Education) respecting the applicant's moral character, age, health, training, and qualifications. Further information may be obtained from the Registrar, Nova Scotia Department of Education. A B.Ed. entitles the graduate to a Teacher's Certificate, Class 5 in Nova Scotia. In New Brunswick, a B.Ed. graduate may expect to receive a Class 4 certificate.

Degree Programmes

B.Ed. Elementary and Secondary Sequential (One-year) Course

Entry Requirements
1. B.A., B.Sc., or B.Comm. by September 1974. Candidates with other bachelor degrees should enquire from the Secretary, B.Ed. Programme.

2. Applications from all students are welcomed. Opportunity to draw attention to strengths is provided by the letter of application.

Application
Upon request, a student will receive Dalhousie University Application form, the Department of Education Application form, two reference forms, and further details from the Admissions Office, Dalhousie University, Halifax, Nova Scotia. Students are advised to make early application since the Department of Education limits its enrollment. Application must be made by August 15, 1974 at the latest, although students are encouraged to apply after January 1, 1974.

An interview is arranged with the Department of Education after initial application has been made. The date of interview must be confirmed by the applicant.

Selection is based on:
1. Academic record: All applicants, including Dalhousie graduates, must ensure that their transcripts are forwarded to the Admissions Office.

2. References

3. Interview

Applicants from outside the Maritime Provinces need not attend for interview; other arrangements are made for them.

The Programmes offered by the Department of Education are being revised for the 1974-75 programme. Students are advised to consult the Programme Planning Guide which will be available on and after April 1, 1974 from the Secretary, B.Ed. Programme. A new course numbering system has been introduced for the 1974-75 programme. Please see section "Classes Offered" for an explanation of the new system.

B.Ed. (Elementary), Sequential Course
Candidates for the degree of B.Ed. (Elementary) must complete successfully the following academic classes: Education 4000 (if not already completed), one credit from classes 4101 to 4212 (if not already completed), Education 4703, 4711, 4723, 4732, and two half credit classes from 4301-4371. If either Education 4000 or classes from 4101 to 4212 has been completed previously, another academic class may be taken, subject to the approval of the Department. Candidates must also complete successfully Education 4900 (field experience) and two electives approved by the Department.

B.Ed. (Secondary), Sequential Course

Candidates for the degree of B.Ed. (Secondary) must complete successfully the following academic classes: Education 4000 (if not already completed), one credit from Education 4101-42/2 (if not already completed), two one-half credit classes in secondary methods from Education 4753-4873, and two half classes from 4301-4371. If either Education 4000 or classes from 4101-42/2 has been completed previously, another academic class may be taken, subject to the approval of the Department. Candidates must also complete successfully Education 4900 (field experience) and two electives approved by the Department.

Students planning a B.Ed. following a B.A., B.Sc., or B.Comm. should be aware that at present certain areas of concentration in the first degree might not easily lead to effective teaching. They are advised to consult with the Coordinator of the B.Ed. Programme when drawing up their programme for the first degree.

Transfer of Credit

Decisions concerning transfer of credit will be made following consideration of transcripts and students' intended areas of study. Enquiries should be directed to the Secretary, B.Ed. Programme.

B.Ed. Elementary and Secondary Integrated (Four-year) Course

Education courses in the integrated programme are in the process of being re-distributed. In the integrated course, the classes in education are integrated with academic classes in the second, third, and fourth years, the first year being confined to the regular classes required for the B.A. or B.Sc. degree or Kings' Foundation Year. Details of the distribution of Education courses for new students entering the programme are issued by the Department at the time applications are made.

Enquiries, and application for admission to the Integrated Course, should be made to the Admissions Office, Dalhousie University by August 15 at the latest, of the student's first year at Dalhousie.

Students wishing to obtain a B.Ed. (Secondary) and a B.A. or B.Sc. with honours should consult the Department of Education and the department or departments in which they wish to do their honours work not later than the beginning of their second year in order that a proper sequence of classes may be arranged. Five years from senior matriculation will normally be sufficient to complete this course of study.

B.Ed. (Elementary): Integrated Course

Overall Requirements

The nine classes in arts and science taken in the second and subsequent years must meet the requirements set forth in Degree Programmes, sections 5.2.1.

Specifically,

(A) The major (four to eight classes selected in accordance with major departmental requirements) must be in a subject taught in Nova Scotian schools.

(B) Seven of the nine classes must be at the 200 level or above.

(C) On registration in his second year, the student must declare his major and have it approved by the department concerned.

(D) At least one class in English beyond the 100 level must be taken.

(E) Electives may be chosen from the subjects listed in groups A, B, C, and D (Degree Programmes, section 2), or Art History, up to three classes in Commerce, Computer Science, Engineering, and Humanistic Studies in Science.

B.Ed. (Secondary): Integrated Course

Overall Requirements

The ten classes in arts and science chosen in the second and subsequent years must meet the requirements set forth in Degree Programmes, section 5.2.1.

Specifically,

(A) Seven of the ten classes in arts and science taken in the second and later years must be in two subjects beyond the 100 level; these should be related to subjects regularly taught in Nova Scotian schools. The seven classes must be chosen so that either five classes are taken in one subject and two in the other, or four in one subject and three in the other.

(B) The remaining three arts and science classes taken in the second and subsequent years shall include at least one which is beyond the 100 level and shall be selected from subjects other than those offered to satisfy the requirements in the previous paragraph. The subjects may be selected from group A, B, C, and D (Degree Programmes, section 2), or Art History, up to three classes in Commerce, Computer Science, Engineering, and Humanistic Studies in Science.

(C) On registration in his second year, the student must declare his major and have it approved by the department concerned.

Degree for Vocational Teachers

Entry Requirements

The applicant must:
1. be employed as a teacher in the trades nical occupation fields in a vocational school or in a similar capacity in the field of public or continuing education.

2. have had the required number of years, specified below, of specialized training and experience in the trades or in the industrial, services and technical occupation fields. The number of years will be that required by the Nova Scotia Department of Education for certification as a teacher in the area of specialization.

Application

Write to the Registrar, Dalhousie University, asking for University Application form and mention interest in B.Ed. programme for Vocational Teachers.

B.Ed.

Candidates for the degrees of B.Ed., admitted under the regulations in this section, will complete 15 credits, selected in accordance with the following rules:

1. Education 4000, one credit from 4101-4212, two one-half credit classes in secondary methods from Education 4753-4873, two half classes from 4301-4371, 4371 and 4932.

2. The Department of Education will ensure that the candidate's performance as a

teacher is satisfactory before recommending the award of the degree.

3. Ten credits, in classes offered in the Faculty of Arts & Science, selected so as to satisfy the following requirements:

(a) Three of the ten credits may be education classes at the 4000 level or the 5000 level.

(b) Seven of the credits must be classes offered in the Faculty of Arts & Science outside the Department of Education. At least two of the seven credits must be at the 200 level or above.

Section 5.1 of General Faculty Regulations, covering the number of Summer School & Extension classes that may be accepted towards the requirement for a degree, will not apply to candidates in the programme.

Part-time study toward a B.Ed.

Students registered part-time at Dalhousie University are permitted to take courses in Education leading to a B.Ed. degree. Individual programmes may be planned in consultation with the Department of Education, Dalhousie University.

Classes Offered

The following list represents the 1974-75 classes. Minor changes will be noted in the pre-registration material sent to students who are accepted into the programme.

This year a new numbering system for Education classes is being introduced. Numbers formerly used have been placed in brackets after the new numbers for the convenience of those familiar with the old numbering system. The last digit of the number represents the credits for the particular course. Courses ending with 0 are one credit, 1 indicates one-half credit class taught in the first term, 2 indicates one-half credit class taught in the second term, 3 indicates one-half credit class spread over both first and second term. The first term ends in December, the second term ends in April.

Certain Education classes are offered in Summer School. Details may be obtained from the Director of Summer School and Extension.

Within several of the classes listed below, separate sections have been scheduled in order to accommodate the varied academic backgrounds, specific interests and future needs of B.Ed. students. The sections thus provide a range of choices within the broad subject area encompassed by the title of the class.

4000 (401) Sociology of Education

This class consists of two lecture hours per week. Mainly theoretical, the accent is placed on the rationale and assumptions of educational systems, socialization in Canadian Society, and the positing of alternatives to traditional educational practices.

4011 (422A) The Education Process and Sex Role Differentiation, R. Gamberg

A critical examination of socialization both in schools and the wider society with special reference to the internalization of sex roles. Biological and social factors will be investigated in an attempt to determine their importance in the definition of sex roles. First term open to all.

4022 (422B) The Education Process and Sex Role Differentiation R. Gamberg

Continuing emphasis will be placed on various male and female roles — actual and potential — in contemporary Canadian Society and the range of methods operative in their inculcation through various social institutions, especially the schools. Economic and political relationships between the sexes will be analyzed with an eye to determining their implications for Canadian social structures. Second term open (a) to those who have taken 4011, or (b) by permission of the instructor.

4101 (402A1/492A1) The History of Western Educational Thought

This class will examine the evolution of significant ideas, problems, and issues in western educational thought from the fifth century B. C. to the nineteenth century.

4112 (402B1/492B1) The History of Western Educational Thought

This class examines the evolution of significant ideas, problems, and issues in western education in the nineteenth and twentieth centuries. Special emphasis is placed upon selected utopian thinkers and other social commentators.

4120 [402(2) / 492(2)] The Development of Scientific and Technical Education, Not offered in 1974-75.

4130 [402(4) / 492(4)] British Education and Its Influence on Canadian Education P. Keane (not offered in 1974-75)

This class will trace the general growth of education in Britain and examine some relationships to developments in Canada. Attention will be devoted to the relative importance of social class, the Church, and the State, in this growth; and a survey made of contemporary British education.

4141 (402A5/492A5) The Historical Development of Education in the Canadian Social Context
J. B. Roald

This class will examine the evolution of education in Canada from Colonial times to the 1870's approximately. Special emphasis is placed on the social context of education.

4152 (402B5/4925B) The Historical Development of Education in the Canadian Social Context
J. B. Roald

This class will examine the evolution of education in Canada from the 1870's to the present day. Special emphasis is placed upon the social context of education.

4160 (402(6)/492(6) An Outline of Adult Education P. Keane

This class will survey the contemporary field of adult education, and examine some of its philosophical and historical antecedents. It is hoped to provide a limited number of students with an opportunity for some field experience in adult education.

4201 (402A3/492A3) / Philosophy 218A Introduction to Philosophy of Education W. Hare

Conceptual analysis of certain crucial ideas in educational theory such as indoctrination, discussion, controversy, and miseducation.

4212 (402B3/492B3) / Philosophy 218B Curriculum Problems W. Hare

Philosophical investigation of important ideas in curriculum theory such as needs, interests, creativity, aims, and relevance.

4220 (419/509) Combined Seminar Readings in Plato and/or Dewey

This seminar is a graduate-level class available also to B.Ed. students and providing an opportunity for the study of theories held by Plato and/or Dewey with important implications for contemporary education.

4301 (406A1/496A1) Educational Psychology for Elementary Teachers S. S. Sodhi

This class will examine varieties of human learning that differ in kind and manifestation. A synthesis of association learning, insightful learning and purposeful learning into an interrelated model will be discussed. Such topics as neurological foundations of learning, cognitive growth and language development, attitude formation, complex motivation systems, educational objectives and individualized lesson procedures will also be considered.

4312 (406B1/496B1) Psychology and Education of the Exceptional Child, S. S. Sodhi

This class will attempt to provide a broader understanding of the term "exceptional child". An attempt will be made to discuss the genetic and environmental causes that determine and sustain the exceptional behavior. Psycho-diagnostic and remedial processes to help children with expressive and/or receptive behavior problems (speech, hearing, vision, neurological and non-sensory impairments) will be considered. Administrative use of standardized tests which has generated artificial labels, and has led to recent court cases in North America, will also be discussed.

4321 (406A2/496A2 and 406A3/496A3) Educational Psychology for Secondary Teachers

The primary purpose of this class will be to investigate and discuss the basic principles of Educational Psychology. Specifically the nature of teaching, motivation, and learning will be examined.

4332 (406B2/496B2) Phychology of Adolescence

The major thrust of this class will be directed toward the examination of various contemporary issues related to adolescence.

4342 (406B3/496B3) Psychology and Education of the Young Child

As the title suggests, the intellectual, social, and emotional growth of the child will be studied. View points of Bruner, Piaget, Hunt, and Skinner will be discussed.

4352 (406B4/496B4) Psycho-social Approaches to Special Education, L. F. Scobbie, S. S. Sodhi

The objective of this class will be to examine special education practices which attempt to help the "special child" "adjust" to the school as it presently exists. Diagnostic approaches which lead to "suspicion of confirming" and "pigeonholing" of the child will be considered: alternatives to special and remedial education will be examined.

4362 (406B5/496B5) Individual Differences B. S. Clark

This class deals with sources of individual differences in growth and development, in cognitive styles, and in adaptability, and considers some techniques of handling heterogeneity in groups.

4371 (407A) Human Relations in the Classroom, J. Manos

Students will study human relations in the classroom. Emphasis will be placed on understanding and helping the pupil on the affective as well as the cognitive level. A practicum in interpersonal relations is offered in conjunction with this class.

4501 (417A) Media in Education, M. Meade

This class will concentrate on planning, producing, and using audio-visuals in teaching settings. This will be a workshop design with emphasis on production of instructional materials, acquiring basic skills in operation of equipment, and a basic understanding of the "why, where, when, which and how" of audio-visuals.

4512 (417B) Media in Education, M. Meade

This class will require completion of 4501 as a prerequisite for admission. It will be more theoretical in nature and will take an in depth look at media as a two-way communication vehicle. Some of the topics which will be dealt with include screen education programmes, multi-media teaching, communication theory, semiology, development of perceptual awareness, film, "McLuhanism", etc. Although more theoretical than 4501, it will also demand active participation in production, research, and projects.

4520 (421) Applied Linguistics for Teachers of French

Introduction to principles of phonetics, morphology, syntax, and semantics as they apply to the practical problem of teaching French in the classroom. Emphasis will be placed on learning and teaching pronunciation, self-expression, reading and an awareness of language as an expression of culture. This class serves as a prerequisite for Education 4843 (Methods of Teaching French).

4530 (411) Drama in Secondary Schools

This class pursues techniques of improvisation that will be suitable to drama in the classroom. Especially directed toward teachers of the humanities, it attempts to demonstrate how active involvement in a situation can invigorate the study of social issues.

4540 (412) Music as a Medium in Education
M. Smyth

This class studies music as a form of expression and its potential contribution to education. The class work is not restricted to specific grade levels or methods of teaching music, but examines the broader question of music and education.

4550 (414) Creative Activity in the Arts

This course is designed to integrate Dance and Movement with reference to the related arts of music and visual forms. In the first term the instructors in Dance and Movement will work separately to explore the basic concepts involved in each discipline. As the second term progresses, projects will pursue methods of realizing the total potential of integrating these forms at the elementary level.

4560 (416) Geography in Education, S. W. Semple

This class is intended to be an introductory one, at the first-year level, in which the major concepts and methods of enquiry in geography are studied. The course will involve independent study, and laboratory work, and will deal particularly with the contribution of geography to general education. Students will also undertake field trips in rural and urban areas.

4571 (420A) Curriculum Planning, D. Huegel and B. Roald

This course will explore and analyze a variety of interpretations and meanings given to the concept curriculum as it relates to teaching. This course will also make extensive use of university and community resource persons and centres in workshop sessions in order to achieve a broad perspective of curriculum and teaching. The focus of these workshops will be on the development of skills and techniques needed in areas of curriculum development, i.e., photography, media tutorial kits, music skills, construction of learning things, etc. First term open to all.

4582 (420B) Alternative Views of the Curriculum

Emphasis in this course will be placed on the analysis, design, and implementation of different curriculum — teaching strategies. Workshop sessions in the spring term will be devoted to the design and production of curriculum materials and preparation for their subsequent implementation. Second term open (a) to those who have taken 4571; or (b) by permission of the instructor.

4703 (403C) Methods of Teaching Language Arts in Elementary Grades, Sister P. Hatchett

This class is geared in the primary grades to the total involvement of the child in all areas of communication through a rhythmical approach to language. The class presupposes an openness on the part of the student-teachers which will facilitate the development of their own potential. Grades 4-6 build on this foundation in the setting up of Language Experience situations.

4711 (403A) Methods of Teaching Mathematics in Elementary Grades, G. B. Jeffery

This class will focus on the learning and teaching of elementary school mathematics through the use of concrete materials. Emphasis will be placed on a "math lab" approach rather than on trying to 'cover' the curriculum and beyond. No particular math background is assumed.

4723 (404C) Methods of Teaching Science in Elementary Grades, D. Huegel

This class will study the ways children investigate and learn about the materia world. Special consideration will be give to the child as the principal agent in his/he own learning with emphasis on concrete ex periences and practical learning activities.

4732 (404A) Methods of Teaching Socia

Studies in Elementary Grades, D. Roe

This class will study ways in which to develop approaches in social studies education appropriate to young children.

Methods of Teaching in Junior and Senior High Schools

Students select two of the following half-credit classes (4753, 4763, 4773, 4783, 4793, 4803, 4813, 4823, 4833, 4843, 4850, 4863, 4873). A 200 level class in the appropriate subject is required as a prerequisite (or it may be taken concurrently) for every methods course except Geography.

4753 (405C) English, D. VanZoost

The general goal of this class is to enable prospective teachers to design and put into effect appropriate English curricula for students of junior and senior high school. The class requires that students do considerable independent planning, work in laboratory and field situations, and extensive reading.

Students taking this class might wish to consult the instructor concerning possible admission to two full and related classes offered by the School of Library Service: LS316 Children's Literature, and LS311 Literature for Young Adults.

4763 (415C) History, J. B. Roald

Various aspects of curriculum development and competing teaching strategies will be explored. This examination is intended to aid the student in developing a consistent approach to history and social studies education.

4773 (425C) Geography, S. W. Semple

The class will explore the objectives of geographic study; the acquisition of skills and the development of concepts and appreciations. It will also deal with the preparation of curricular units and the use of materials in those units.

Students wishing to take this class without previously having taken an undergraduate class in geography will be required to take Education 4560, Geography in Education, as their elective.

4783 (435C) Mathematics, G. B. Jeffery

Computing and mathematics, the nature of mathematical education and its development in school, problem solving, micro-teaching situations, and contact with the work in local classrooms, form the framework for the course.

4793 (436C) Curriculum Development in Mathematics, G. B. Jeffery

Students wishing to concentrate their methods work in mathematics may join this class to study current developments in North America and Europe and examine units suitable for inclusion in the Nova Scotia programme. Students may register for this class only with written consent of the instructor.

4803 (445C) Physics, K. Stickings

A study of the objectives of a high school physics programme, curriculum development, subject evaluation, innovation in science teaching and general instructional methods.

4813 (446C) Chemistry, R. Whitman

This class will study the teaching of chemistry in two ways. The first will involve the development of a rationale for teaching science that is consonant with the nature of the discipline: The second will give consideration to various curriculums and instructional styles, and their basic assumptions and objectives.

4823 (447C) Biology, J. Cleveland

In addition to studying the current classes in Nova Scotia, ways of harnessing student interest in ecological matters as a means of promoting broader study are considered. A variety of teaching approaches are examined and seminars and discussions relating to lesson planning and science projects are part of the programme.

4833 (448C) Geology, J. Robson

This subject is taught in Grade 12 classes in Nova Scotia. The importance of practical work is examined by the use of experimental labs. The applications of general teaching methods to specific lessons and series of lessons are demonstrated and practiced. Laboratory sessions provide the student teacher with knowledge to carry out demonstrations required in the teaching of the class and enable him to become familiar with various kinds and arrangements of learning materials and apparatus.

4843 (465C) Methods of Teaching French
T. Carter

Deals with objectives, methodology, techniques, materials (including visual aids), language laboratories, and testing. Emphasis will be placed on the teaching of spoken French, and practice in the development of teaching skills will be an integral part of this course. Open only to students who have demonstrated adequate competence in French language and culture. Interested students should contact the instructors concerned in the Department of French as soon as possible regarding their eligibility. Prerequisites: (A) for four-year integrated students: Education 421 in conjunction with an approved programme in the Department of French; (B) for one-year sequential students: Please consult with the instructor concerned. *Students may register for this class only with the written consent of the instructor.*

4850 (466C) Methods of Teaching German
H. Schwarz

Deals with objectives, subject matter, techniques, materials, curriculum design and testing in teaching German. For special one-year programme, see the Department of German section.

4863 (475C) Economics, D. M. Paull

This class reviews the basic methods of economic analysis and of teaching economic concepts. The emphasis is on how to relate current economic matters to classroom studies. Types of lessons, curriculum development, and the use of learning materials and aids are examined.

4873 (430C)

Students may apply to instructors for permission to undertake additional work in their first teaching method, for credit, instead of selecting a second method. This might only be done with prior consent in writing from the instructor to the Co-ordinator, B.Ed. Programme. The instructor thus assumes personal responsibility for supervising the work, which would be registered as 4873.

4900 (408) Field Experience

It is the primary objective of the field experiences to provide students with opportunities to analyze, compare, and participate in a variety of teacher-learning settings.

Students who intend to apply for a Nova Scotia Provincial Teacher's Certificate should plan to log a minimum of 100 hours of field experiences in a public school classroom.

All arrangements for field experiences are made through the Field Development Office.

4932 (407B) Measurement and Evaluation
G. B. Jeffery

This class will study the writing of objectives, teacher-made tests, standardized tests, random variation, basic statistical ideas, and the evils of testing.

4940 (496) Other electives approved by the department

4990 (504A) Statistics, G. B. Jeffery

The class covers topics in statistical influence and experimental design used in selected educational research. Some background reading is required of students with no experience in statistics. Details are available from the Department of Education.

Engineering and Engineering-Physics

Engineering
Professor
K. F. Marginson (Chairman)

Associate Professor
A. Creelman (N.S. Technical College)

Assistant Professors
D. M. Lewis
E. N. Patterson

Engineering-Physics
Professors
H. W. King
A. Levin (Chairman)

Assistant Professor
S. T. Nugent

The profession of engineering is today expanding its scope and changing its pattern of activity at an ever-increasing rate; it follows, therefore, that the course of training and education for engineers is adding new classes and changing the emphasis placed on older topics. More sophisticated mathematics, computer application to the numerical solutions of very large sized problems, and the use of recent discoveries in science are now playing major roles in engineering training while conventional topics such as drafting and surveying call for less time and effort on the part of the student. Dalhousie's course of study in engineering closely follows this modern trend and, combined with the subsequent specialized training at the Nova Scotia Technical College, prepares the serious student to play a responsible role in the modern world.

In addition, those students who are keenly interested in the research and development functions in closer association with physics may follow the course leading to the degree of Bachelor of Science with Honours in Engineering-Physics at Dalhousie.

Architecture
Students who plan to study architecture may take the first two years of the course for the Uniform B.Sc. for Engineering. Having completed the course, they will be admitted without further examination to the Nova Scotia Technical College School of Architecture.

Engineering
The work of the Uniform B.Sc. for Engineering covers three years and should follow quite closely the order indicated below. At the end of his studies, the successful student receives a General B.Sc. from Dalhousie and is qualified for admission to the junior year of the Nova Scotia Technical College. Students planning to continue their studies at some college other than the Nova Scotia Technical College should consult the department when they first register.

Degree Programme

Uniform B.Sc. for Engineering
Year I
1. Physics 110
2. Mathematics 100
3. Chemistry 110
4. Elective
5. Elective
Engineering 001

Engineering 001, An Introduction to Professional Engineering, is a non-credit class, which should be taken by all students. The two electives must be chosen so as to satisfy the University regulations for the General B.Sc. Some students will be permitted to enroll in Engineering 200 in their first year, substituting this class for one of the electives, which would then be taken in the second year.

Year II
All student should consult the Department prior to registration for Year II to discuss their programme.

6. Physics 221
7. Mathematics 228
8. Chemistry 230
9-11. Engineering 200, 220A, 220B, 240C

Students planning to specialize in mining or civil engineering may take Engineering 210B and Engineering 211B in addition to the above classes. Mining or civil engineering students who do not take these classes while at Dalhousie will have to elect classes in Surveying at N.S. Technical College; they will thus limit their choice of electives at N.S. Technical College.

Year III
11. Mathematics 328
12-15. Engineering 230, 320, 330A, 330B, 340A, 340B

Students planning to specialize in mining engineering are required to take Geology 100 in addition to the above classes. Students planning to specialize in civil engineering may take Geology 100. Civil engineering students who do not take Geology 100 while at Dalhousie will have to elect a class in Geology at N.S. Technical College; they will thus limit their choice of electives at N.S. Technical College.

Engineering-Physics
Engineering-Physics or Applied Physics is the study of physics oriented towards its application to engineering problems. The area is interdisciplinary and the study is suitable for students whose interests involve experimental work in the physical sciences or who contemplate research or development work in industry or resource development. The mathematical content of the course is similar to that of physics with, however, special emphasis on applications. The physics content is identical with that of honours physics in the first two years, but has special requirements in the last two years dealing with system design, information and control theory, materials science, instrumentation and measurement techniques. The course leads to the degree of Bachelor of Science with Honours in Engineering-Physics.

Completion of the course is excellent preparation for industrial research or graduate studies in applied sciences.

Degree Programme

B.Sc. with Honours in Engineering-Physics
Year I
1. Physics 110
2. Mathematics 100
3. Chemistry 110
4. Elective (Arts)
5. Elective

Year II
6-7. Physics 211 and 231
8. Mathematics 220 or 200
9. Mathematics 200-level class
10. Elective (Science)

Year III
All students should consult the Department prior to registration for Year III to discuss their programme.
11-12. Physics 300, 315
13. Engineering 335
14. Engineering or Physics 300-level class
15. Mathematics 300-level class
16. Elective (Arts)

Year IV
17. Physics 400
18. One other Physics 400-level class
19. Engineering 400-level class
20. Engineering or Physics 400-level class
21. Mathematics 300-level class

Classes Offered

001 An Introduction to Professional Engineering, lect.: 1 hr.; K. F. Marginson.

This class is intended to introduce the new engineering student to some of the broad aspects of the profession.

200 Graphic Science, lect.: 3 hrs.; lab.: 3 hrs.; K. F. Marginson.

This class gives extensive coverage to the third instrument of thought — the graphic or pictorial. Students entering the class should have completed a class in calculus and have a grasp of the basic vector concept. The work begins with a very rapid coverage of essential drafting techniques followed by a study of descriptive geometry with extensive applications. Concurrently students work on conceptual design projects and their graphic presentation. Graphic solutions to the problems of vector algebra are covered parallel with the analytic work of other classes. The same methods ar

used in the study of graphic calculus, up to and including the solution of differential equations and some of the geometric implications of engineering formule. The class is concluded with fairly large design project done on a team basis by the students.
Prerequisites: Mathematics 100; Physics 110.
Text: TBA

210B Surveying, lect.: 3 hrs.; E. N. Patterson.

This class is an introduction to the fundamentals of surveying. Topics covered include the theory of land measurement, precise leveling, transit, stadia and plane table surveys, traverse computations, adjustments and plotting of results, the determination of meridian, azimuth and latitude based on celestial observations, construction surveying, alignments, curves.
Text: (1973-74) Bouchard and Moffitt, Surveying.

211B Survey Field Camp, E. N. Patterson.

The survey field camp will normally be held immediately following final examinations in the spring and will be of three weeks' duration. The use of surveying instruments and equipment will be practiced by all students. Assigned exercises will include the use of tapes, levels, transits and theodolites and map drawings. Traverse computations will be performed by hand as well as by digital computer methods.
Prerequisite: Engineering 210B
Text: Same as in Engineering 210B

220A Engineering Mechanics — Statics, lect.: 2 hrs.; lab.: 3 hrs.; E. N. Patterson.

This class is an introduction to the study of engineering mechanics. Following a presentation of basic concepts, a brief treatment of vector algebra will be given. The student will then study the equivalence, resultant and equilibrium of force systems acting on a particle or on idealized rigid bodies such as trusses, frames and machines.

The class material will correspond closely to that described in the text.
Prerequisite: Mathematics 100, Physics 110.
Text: (1973-74) Meriam, *Statics.*

220B Kinematics, lect.: 2 hrs.; lab.; 3 hrs.; F. K. Marginson.

Students taking this class should have taken a class in calculus and should be proficient at dealing with rates of change. A firm grasp of the vector concept is desirable.

The class will cover the motion of particles, lines and rigid bodies. Displacements, velocities, first and second degree accelerations will be discussed graphically and analytically.

Applications of the theory will be made to the motion of various types of mechanism, and the use of the computer in kinematic analysis and synthesis will be considered.
Prerequisites: Physics 100; Mathematics 100.
Text: Merriam *Dynamics.*

230 Introduction to Electrical Engineering, lect.: 3 hrs.; lab.: 3 hrs.; A. Creelman.

The class is an introduction to electrical engineering. However, it is also a terminal class in this subject for certain engineering disciplines. Consequently, while the analysis of linear circuits is dealt with in some detail, a considerable emphasis is placed upon practical devices and systems. The laboratory periods illustrate the use of electrical measuring devices and introduces the student to conventional methods of testing electronic and electro mechanical equipment.
Prerequisite: Mathematics 100; Physics 110; Engineering 310 (taken concurrently).
Text: (1973-74) Del Toro, *Electrical Engineering Fundamentals.*

240C Engineering Problems by Computer Methods, 1 afternoon per week, D. M. Lewis/E. N. Patterson.

This is a class which will prepare the student to write his own Fortran IV digital computer programs for the solution of engineering problems. It will consist of a series of case studies of actual engineering problems which each student will execute on the CDC 6400 computer. Results will be submitted to the instructor. Students will also have an opportunity to use some of the standard application programs which are available, such as COGO and ECAP.
Prerequisites: Registration in second-year engineering, or consent of instructor.
Text: (1973-74) Murrill & Smith, *Fortran IV Programming for Engineers and Scientists.*

320 Dynamics of Particles and Rigid Bodies, lect.: 2 hrs.; occasional tutorial, D. M. Lewis.

This class completes the study of engineering mechanics begun in Engineering 220A and 220B. The first term will deal with kinematics and dynamics of single particles and in the second term these fundamentals will be applied to rigid bodies.
Prerequisites: Mathematics 100; Engineering 220A, 220B; Engineering 240C.
Text: (1973-74) Merriam *Dynamics.*

330A Materials Science, lect.: 3 hrs.; lab.: 3 hrs.; H. W. King.

The aim of this class is to give an understanding of the importance of structure in determining the useful properties of materials. The relevant properties are mechanical, thermal, electrical and environmental. The approach will be to first describe the properties in engineering terms and then discuss the significance of structure. Elastic properties are shown to be influenced by the nature of the chemical bonds and the plastic properties by the crystal structure and the presence of defects. This approach is continued in the study of fracture, hardening mechanisms, fatigue, creep and viscoelastic behaviour, covering metals, plastics and composite materials, and is continued in the sections concerning thermal, electrical and chemical properties.

The laboratory consists of a series of demonstrations of the dependance of properties on structure or microstructure and includes time set aside for students to prepare an individual project on an aspect of materials science applicable to the particular branch of engineering in which they intend to specialize in the future.
Prerequisites: Chemistry 230, Physics 221 or permission of Instructor.
Texts: Rosenthal and Asimov, *Introduction to Properties of Materials,* (Van Nostrand, Reinhold, 1971);

330B Strength of Materials, lect.: 3 hrs.; lab-tutorial 3 hrs.; D. M. Lewis.

This class is an introduction to the study of the stresses, strains, and deformation of a solid body which results when static forces are applied to the body. Topics discussed include: the definition and transformation relation of stress and strain; torsion of circular sections; stresses and deflection of beams; column action.
Prerequisites: Engineering 220A; Engineering 330A.
Text: (1973-74) Higdon, Ohlsen, Stiles, Weese, *Mechanics of Materials.*

335 Electronics, lect.: 3 hrs.; A. Levin.

This class covers circuit analysis of linear and non linear systems, the physics and resulting properties of solid state devices, the concepts of information and noise and transmission lines and filters. The following topics are treated: network reduction, the 4 terminal network and solutions by matrix methods, non linear systems, modulation, demodulation and rectification; carrier transport in semi-conductors, properties of diodes and transistors; electromechanical analogues and analogue computation methods, feed-back and control systems, stability criteria, nature of information and noise, properties and distributed constant lines and filters.
Prerequisites: Physics 231, Mathematics 200 or 220, which may be taken concurrently.
Text: TBA.

340A Classical Thermodynamics, lect.: 3 hrs.; tutorial/lab.: 3 hrs.; K. F. Marginson.

This class covers the theoretical portion of classical engineering thermodynamics. Calculus to the level of partial differential equations is prerequisite. General topics are: first law for open and closed systems, reversibility, enthalpy; second law, entropy, availability and efficiency, psychrometrics. Various real processes and thermodynamic devices will be discussed. This work covers applications other than those involving chemical reactions.
Prerequisites: Mathematics 100; Physics 100; Chemistry 230 (may be taken concurrently).
Text: (1970-71) Van Wylen, *Thermodynamics.*

340B An Introduction to Fluid Mechanics, lect.: 3 hrs.; lab-tutorial 3 hrs.; E. N. Patterson.

Fluid mechanics is the engineering science upon which such specialties as aerodynamics, gas dynamics, rate processes, hydraulic and marine engineering are based. It deals with the statics, kinematics, and dynamics of fluids.

As this is an introductory class, considerable time will be devoted to the study of fluid properties, fluid statics and the underlying concepts, definitions and basic equations of fluid dynamics. Laboratory experiments will be carried out to investigate some of these basic aspects.
Prerequisites: Concurrent registration in Engineering 320, or the consent of the instructor.
Text: (1973-74) DeNevers, *Fluid Mechanics.*

400 Advanced Physics Laboratory, lab.: 6 hrs.; A. Levin, S. T. Nugent.

This is a physics and engineering-physics laboratory class in which students in groups of two work largely on their own initiative. The experimental work covers nuclear disintegration, gamma and beta spectroscopy and absorption measurements; proton spin quantitative measurements and Planck's constant determination; thermonic emission and ionization experiments using a vacuum pumping and instrumentation system; properties of solid state semiconductors and devices; experiments on the spectral noise distribution of transistors and the use of analysis systems; experiments with a Helium-Neon laser, holography, etc.

Experiments in other areas, such as acoustics, optics and fluid dynamics, are available if requested. A report upon a topic to be agreed with the instructor is required as part of this class.

420A Signals, Spectra and Information Theory, lect.: 3 hrs.; S. T. Nugent.

Topics discussed include: signals and spectra, random signal theory, systems with random inputs and basic information theory.
Text: Carlson, *Communication Systems.*

433B Materials Science, lect.: 3 hrs.; H. W. King.

The physical properties of engineering materials are discussed in terms of their crystal structure and microstructure, using the principles of modern physics as a basis. The properties are first formulated systematically in tensor notation and shown to possess an intrinsic symmetry which must be related to the crystal symmetry of the material. Many useful properties, such as electron transport and plastic deformation, are shown to be strongly dependent on defects in the crystal structure. The nature of such defects, and the methods available for their creation, control or elimination, are considered in relation to the optimization of these properties. This approach is further extended in a discussion of the effects of microstructure on the properties of polycrystalline and polyphase materials.
Prerequisite: Permission of instructor.
Texts: Hutchinson & Baird, *Physics of Engineering Solids,* (Wiley, 1968). Reference: Nye, Physical Properties of Crystals (Oxford Univ. Press, 1969).

435A Electronic Techniques for Energy Conversion, lect.: 3 hrs.; A. Levin.

This course discusses the properties, efficiency and uses of energy conversion systems based on electronic techniques. Topics discussed include: thermojunction generators and refrigerators, solar generators, thermionic generators, fuel cells and related devices.
Reference: Levine, *Selected Papers on New Techniques in Energy Conversion.*

440B Optical Electronics, lect.: 3 hrs.; S. T. Nugent.

Topics discussed include: electromagnetic theory, the propagation of rays and optical beams, optical resonators, interaction of radiation and atomic systems, theory of laser oscillations, some specific laser systems, second-harmonic generation, parametric oscillation, electro-optic modulation and optical detectors.
Text: Yariv, *Introduction to Optical Electronics.*

480B Optimal Control, lect.: 3 hrs.; S. T. Nugent.

Topics discussed include: statistical design of linear systems, state representation of systems, calculus of variations, the maximum principle and dynamic programming.
Text: McCausland, *Introduction to Optimal Control.*

English Language and Literature

Professor Emeritus
C. L. Bennet

Professors
A. R. Bevan
J. Gray (Chairman)
M. G. Parks
M. M. Ross
S. E. Sprott
D. P. Varma

Associate Professors
S. A. Cowan
R. MacG. Dawson
J. Fraser
A. J. Hartley
S. Mendel
A. N. Raspa
R. J. Smith
H. P. Sucksmith
H. S. Whittier

Assistant Professors
R. S. Hafter
G. M. Harvey
M. A. Klug
H. E. Morgan
C. J. Myers
N. S. Poburko
R. L. Raymond
H. D. Sproule
G. F. Waller

Part-time Instructors
E. Horlock
E. Sutherland

Visiting Professor and Senior Killam Fellow (1973/74)
W. Allen

The study of English literature at Dalhousie is not just the study of the literature of England. To be sure, it is largely concerned with the rich written heritage of the British Isles, but ranges far beyond their shores to include the study of writing in Canada, the United States, parts of the English-speaking Commonwealth and indeed, some European countries, in translation.

It ranges widely in time, too, from early Anglo-Saxon works of the eighth century through thirteen centuries of changing ideas and language to the still-changing thoughts, feelings and expression of the 1960s and 70s. The many forms that the written word may take — poetry, fiction, drama, essay, history — are read, not only for an understanding of the literary evolution that brings them to be what they are, but also for an understanding of that which is temporary and that which is more enduring in the values and ideas that they embody.

Indeed, the purpose of English studies at Dalhousie, briefly stated, is the enjoyment and understanding of the written word. Since the word is the principal link between the individual heart and mind and the rest of the world, such studies naturally touch upon philosophy, politics, religion and the fine arts as well. At the same time, the student is himself required to think, and to use language with clarity, judgement and imagination.

English

In more detail, the goals of English studies are to perceive that reading is a source of pleasure, knowledge and wisdom, to sharpen the powers of discrimination between what is good and bad in literature and ideas, to gain some understanding of the process by which great writing is achieved and indeed to inspire the student to his own best expression.

In the first year, English 100 is required by all students who wish to take further English classes. There are some twenty different sections ranging from historical surveys to more specialized studies of periods or themes. To enable students to choose the one most suited to their inclinations and needs the English Department and the Registrar's Office have an English 100 supplement which includes the aims and reading lists of each section. Only under very extraordinary circumstances is exemption from English 100 granted.

Classes numbered from 200 to 228 are especially suited for students who are concentrating in English, studying it as a complement to their main area, or taking an elective, and classes beyond 250 are designed as studies of specialized areas for Honours students. Honours classes are open to General students with the permission of the Chairman and the professor concerned.

Faculty Advisors
As soon as possible in the academic year, each student who intends to concentrate on English is given a Faculty Advisor who will aid in the arrangement of a programme to suit individual interests. All students in the study of the English language and literature should notify the Department of this interest in order that this Advisor may be assigned.

Degree Programmes

The General B.A. in English
Students should consult with their Faculty Advisors about their choice of classes. The Department expects General students to form coherent programmes of four to eight classes in English above English 100. Students should note that:
(1) of the classes beyond English 100 required to constitute a programme in English for the general B.A. degree, not more than three should be drawn from any one of the following three groups of classes:
(a) 203, 214, 218, 224
(b) 205, 206, 208, 215, 216
(c) 209, 210, 212, 213, 217
(2) classes numbered from 201 to 228 (excepting 201, 206, 207, 218) are not accepted as preparation for Graduate Studies in English. Students who may desire to change to an Honours Programme or continue in Graduate Studies should arrange with their Advisor and with the Chairman of the Department to complete several Honours classes before graduating with a General B.A. It is possible to enter a two-year M.A. course on completion of a General B.A. degree, but only if the student has completed four or five Honours rather than General classes for his concentration and has attained at least a second-division average in them.

The B.A. with Honours in English (Major Programme)
The Honours course in English offers a systematic study of the subject which acquaints the student with the major writers and trends from mediaeval times to our century. It is therefore of particular relevance to the student who is interested in detailed study of English as a basis of a liberal education, to the prospective high-school teacher of English who needs a comprehensive understanding of the subject, and to the student intending to proceed to the graduate study of English and to complete in one year the requirements for the M.A. degree.

Students intending to enter the Honour course in Year II must consult the Chairman of the Department in advance to plan their course and be formally enrolled. In subsequent years, Honours students are encouraged to seek advice of the Department in choice of classes.

The Honours course consists of nine classes (in addition to English 250A and 250B) beyond English 100. At least one class must be taken from each of the following six sections:

Section A. English 252 (recommended for third year)
Section B. English 253; English 351
Section C. English 251; English 352
Section D. English 254; English 356
Section E. English 354; English 452; English 457
Section F. English 453; English 455

The student may choose his three remaining classes from those not already chosen in Sections B to E, or from Section G.

Section G. English 201, 206, 207, 218, 454

English 250A (Bibliography) and English 250B (Practical Criticism), non-credit classes which meet one hour per week, are required of all Honours students and are to be taken in the first year of the Honours course. (See page 56 for details.)

The Honours student must meet the requirements for the General B.A. degree. He is advised to select a minor from one of the subjects listed under either Group A or Group B in the "Degrees and Courses" section of the Calendar.

B.A. with Combined Honours
There are several *Combined Honours programmes:*
English and French
English and German
English and History
English and Philosophy
English and Spanish
English and Theatre

Students interested in any of these combinations should consult with the Departments concerned. If a student wishes to combine English and a subject other than those mentioned above, he should see the Chairman of the Department.

A Joint Honours programme, involving co-operation between the Departments of English at Mount Saint Vincent and Dalhousie, has been established. Students interested in this programme are advised to consult the Chairman of the Department for further details.

Classes Offered

100 Introduction to Literature, lect.: 3 hrs.; Members of the Department.

Since English 100 consists of sections taught by many different instructors, statements about its objectives and approach must be confined to generalizations. All instructors of English 100 have these two broad objectives in common:
(a) to involve the student in the serious study of literature as a crucial part of education;
(b) to involve him in the discipline of words so that he will be a more critical and responsive reader and a more exact and imaginative writer.

The subject matter varies from section to section. Detailed syllabi of all sections are available. Practice in writing is carried on throughout the year in fortnightly essays.

Each section attends three lectures per week. In addition, the tutors attached to each section conduct small discussion groups and personal interviews with students.

Classes for General Degree

(Tentative List)

201 The English Language

This class is not prerequisite to, but is useful as an introduction to, English 253 and 351 (Old and Middle English).

203 Masterpieces of Western Literature, lect.: 3 hrs.; H. Whittier.

This class is intended to provide the student with the opportunity to do intensive reading of selected major works from Western literature. The selections vary from year to year. The intensive reading is designed to broaden the student's outlook on literature and also to increase his familiarity with works that are not only stimulating in themselves but also comprise the basis for the development of English and other literatures.

Generally, works will be taken up in chronological order. As the class proceeds, interrelationships and comparisons of theme, form and artistic perspectives in the various works will be developed. Classes generally consist of a combination of lecture and discussion. Voluntary tutorials are held once a week for open discussion in addition to class meetings.

204 The Europen Novel, lect.: 2 hrs.; S. Mendel.

This class is devoted to an intensive study of about a dozen representative European novels of the last two hundred years. The method of approach and the character of tests and examinations are such as to render it necessary for the student to attend most of the lectures. A considerable amount of attention is paid to the philosophical ideas which bulk large in many of the novels studied.

205 Victorian Literature

206 American Literature of the Nineteenth Century, lect.: 2 hrs.; S. Cowan.

This class is an introduction to American Literature through representative works by major writers from 1800 to 1900. Some of the writers studied are Cooper, Hawthorne, Poe, Emerson, Melville, Whitman, Dickinson, and Twain. Each term the student will write one paper of moderate length which he may have an opportunity to read to the class to initiate discussion, and two in-class papers or exercises. There is an examination in the Spring.

207 Canadian Literature, lect.: 2 hrs.; M. Parks, H. Sproule.

This class is a survey of English-Canadian literature with emphasis on poetry and fiction from the 1920's to the present. Some knowledge of nineteenth-century British literature, though not essential, is very useful to the student of Canadian literature. A few representative writers of the nineteenth century (Haliburton, Richardson, DeMille (prose); Howe, Goldsmith, Isabella Crawford, Carman, Roberts, Lampman, D. C. Scott (poetry)) are studied briefly in the first term, and essay topics are set on nineteenth-century writing. Twentieth-century novels and poetry are studied in the last month of the first term and throughout the second term. The following authors will be included: Leacock, Grove, MacLennan, Callaghan, Davies, Raddall, Buckler, Laurence, Watson (prose); Pratt, A. J. M. Smith, F. R. Scott, Klein, Birney, Layton (poetry). (Section 1 - Dr. Parks.)

This course is planned along lines to show the growth and patterns of development in Canadian writing from the pre-Confederation period to the present day, using as much variety as possible in the choice of literary forms and samples for study. Authors will include prose writers noted below (others may be added) and the principal poets for each of the literary periods into which the Klinck and Watters *Canadian Anthology* is arranged, with major emphasis on Roberts, Carman, Lampman, D. C. Scott, Pratt, Smith, F. R. Scott, Page, Avison, and Waddington. While there will not be a final formal, three-hour examination, the final grade of a student will be averaged from three one-hour tests distributed throughout the session and two term papers of substantial length and content. These papers must be submitted by the dates agreed on in class and must be presented in conformity with the rules set forth in either R. M. Wiles, *Scholarly Reporting in the Humanities,* or the *PMLA Stylesheet.* (Section 2 - Professor Sproule.)

208 The English Novel to 1900, lect.: 2 hrs.; D. P. Varma.

This class is designed primarily to acquaint students with the chief landmarks of eighteenth and nineteenth-century fiction and to present a survey of the origins and development of the English novel. This involves a thorough investigation of the antecedents and formative influences of fiction and a close examination of some of the chief works of eighteenth and nineteenth-century novelists. The list of novels is available from the Department.

209 Twentieth-Century Fiction, lect.: 2 hrs.; A. R. Bevan, A. N. Raspa, H. Whittier.

English 209 is intended as an introduction to the main thematic and technical trends in the modern English and American novel. The lectures focus on representative novels of some of the major figures of the first half-century and on significant novels of the past two decades.

This section of English 209 will focus on representative American and Canadian novels of the past fifty years. Novels will be chosen from the works of American novelists such as Fitzgerald, Hemingway, Faulkner, Bellow, McCullers, Kesey, and Ellison and from Canadian novelists such as Buckler, Ross, Laurence, MacLennan, Watson, Richler, and Davis. (Section 2 - Dr. Bevan.)

210 Modern Poetry in English, Lect.: 2 hrs.; S. E. Sprott.

(This may be offered in 1974/75 as an alternative to English 228.)

A study of the creation and development of modern poetry in English is based on the seminal poets Yeats, Pound, and Eliot, with some attention to Auden, Dylan Thomas, W. C. Williams, Stevens, and others, including Canadians.

212 British Literature of the Twentieth Century, lect.: 2 hrs.; N. S. Poburko.

This class is an approach to the reading of twentieth century British poetry, prose and drama. Central themes of this period are viewed through a study of the works of selected authors. The writers considered will be: D. H. Lawrence, T. S. Eliot, James Joyce, G. B. Shaw, Graham Greene, W. H. Auden, Samuel Beckett and Doris Lessing.

213 American Literature of the Twentieth Century.

214 Shakespeare, lect.: 2 hrs.; G. Harvey, C. Myers, N. S. Poburko.

This class is designed for students in the General course who wish to study selected plays by Shakespeare. The aim of the class is simply to discover what the plays are about. Only minimal consideration is given to textual variations, sources and influences.

215 Poetry of the Romantic Period, lect.: 2 hrs.; H. P. Sucksmith.

A class which will focus on the poetry of Wordsworth, Coleridge, Byron, Shelly, and Keats. At the outset some attention will be directed to the pre-Romantic poets and to the intellectual background of the Romantic poets and to the intellectual background of the Romantic movement.

216 The Gothic Novel, lect.: 2 hrs.; D. P. Varma.

This class will survey the origins and development of *The Tale of Terror and Supernatural* during the later half of the eighteenth century and its various manifestations and influences in succeeding fiction. Not only the chief landmarks of gothic fiction will be charted, but the students will also explore the various chambers of horror-literature. There will be no final examination, but students will work on assigned tests and participate in discussions. End of the term papers will determine final grades.

217 African Literature/African Studies, lect.: 2 hrs.; R. J. Smith.

English 217 is a class on African literature written in English. Novels, plays, and poems will be discussed. The bulk of th

material will be by Southern African and West African writers. Works to be studied will mainly be modern, and will reflect the attitudes of various African cultures towards racism, colonialism, and African nationalism.

218 Medieval Literature, lect.: 2 hrs.; H. E. Morgan.

This broad survey concentrates upon a study of heroic and romantic attitudes and ideals in some medieval masterpieces, including *Beowulf, The Song of Roland, Njalssaga, Tristram,* and the saga of King Arthur. Later use of this medieval matter, as in Tolkien's *Lord of the Rings,* is also investigated.

220 English Drama

224 Renaissance Poetry

225 Epic Poetry and Prose

226 Tragedy

227 Comedy and Satire, lect.: 2 hrs.; J. Gray.

The comedian and the satirist are interested in both the laughable and the deplorable antics and eccentricities of human nature. This class will concern itself with their points of view, as expressed in such varied forms as stage comedy, graphic satire, the comic novel, and the humorous essay. It will also consider theories of comedy and laughter in their application to literary types, including situational, romantic, satiric, sentimental and domestic comedy, as well as rollicking farce, slapstick, "sick" comedy and the absurd. Wherever possible, lectures and class discussions will be supplemented by play readings, films and other illustrative materials.
Prerequisite: English 100 and an adaptable sense of humour.

228 Short Poems in English, lect.: 2 hrs.; S. E. Sprott.

(This may be offered in 1974/75 as an alternative to English 210.)

Forms and themes in the short poem are studied by means of critical reading of poems written in English. Topics may include the following: the self in the short poem; other persons; public events; love; nature; the city; the machine; wit; myth; traditional forms; free verse; the hokku; lyric as song; spoken poetry; poetry in print; concrete poetry; and possibly other topics to suit the class.

Recommended Preliminary Reading:
C. B. Wheeler, *The Design of Poetry.*, New York: Norton, 1966.

Classes for the Honours Degree

(Tentative List)

250A Bibliography, lect.: 1 hr.; (first term only), R. L. Raymond.

This class is a departmental (i.e., non-university and non-credit) technical class for honours and graduate students. It is planned to acquaint the student with certain research tools in the library that are most frequently used by students of English (bibliographies, catalogues, indices, digests, journals, dictionaries, microfilms), many of which the student is unlikely to stumble upon himself in his own research. The class also includes instruction in the technical aspects of writing papers (planning, research methods, footnotes, bibliographies), and some discussion of the history of printing insofar as it relates to the establishment of texts, particularly older ones.

The class meets one hour a week during the first term only and includes the assignment of an exercise to be done in the library.

English 250B Practical Criticism, lect.: 1 hr. (second term only); R. L. Raymond.

This is a non-credit class designed to give the student practice (supplementary to that of his regular classes) in the evaluation and understanding of the purpose and significance of literature, largely poetry. The class includes some discussion of recent and current attitudes to literature, but the emphasis is upon the practice of criticism on both well-known and obscure or unpublished work.

251 Sixteenth-Century Non-Dramatic Literature, lect.: 2 hrs.; G. Waller.

The class will study the literature of the English Renaissance, concentrating on Sidney, Spenser, and Shakespeare's poetry. Some attention will be given to the cultural context, including the court, music, and art, and to influential continental writers like Castiglione and Machiavelli. Classes will be conducted by a mixture of lecture and discussions, and there will be frequent use made of slide and other illustrative material.

252 Shakespeare and the Drama of His Time, lect.: 2 hrs.; S. E. Sprott.

About fifteen plays by Shakespeare, some by choice of the class, are read in the context of representative plays by his earlier and later contemporaries, especially Marlowe and Jonson. Students should consult the instructor for a list of plays and suggested preliminary reading.

253 Old English, lect.: 3 hrs.; R. MacG. Dawson.

An introduction is given to the Old English language (700-1100 A.D.), followed by a study of some of the prose and minor poems, and, in the second term, of *Beowulf.* Students will also be introduced to some aspects of Old English art and archaeology. Some knowledge of a classical or modern European language (preferably German) is desirable, though not essential, and an understanding of traditional grammatical terminology will be helpful. This class is not recommended, except in unusual circumstances, to those who are not thoroughly fluent in modern English.

254 Restoration and Eighteenth-Century Literature, lect.: 2 hrs.; J. Gray, H. S. Sproule.

In this class the emphasis will be placed upon three great satirical authors (Dryden, Pope, and Swift), upon a study of Restoration comedy and tragedy, and upon major works of Samuel Johnson. Since the literature of the period is related exceptionally closely to the men and manners of the age, some time will be spent in class on the contemporary climate of opinion that is revealed in the works of a number of writers representative of literary, political, social, and philosophical points of view: Hobbes, Halifax, Pepys, Rochester, Butler, Addison and Steele, Mandeville and Shaftesbury.

351 Middle English, lect.: 2 hrs.; H. E. Morgan.

This class offers an introduction to Middle English language and literature through study of Chaucer's poetry and of major literary works by Chaucer's near-contemporaries. Through his readings, the student should gain some historical sense of the language, of the social milieu and especially of the late-medieval social tensions which contributed to the literature's brilliance.
Preparatory reading: Chaucer's poetry and H. S. Bennett, *Chaucer and the Fifteenth Century* (Oxford History of English Literature, vol. II, 1); W. F. Bolton (ed.), *The Middle Ages* (Sphere pbk.); J. B. Morrall, *The Medieval Imprint* (Penguin); M. Keen, *History of Medieval Europe* (Penguin).

352 Seventeenth-Century Non-Dramatic Literature, lect.: 2 hrs.; S. Cowan.

This class is a study of representative works of Bacon, Donne, Jonson, Browne, Burton, Herrick, Herbert, Crashaw, Vaughan, and Milton. The aim of the class is, through a study of representative writers, to provide the student with an introduction to both the individual and traditional characteristics of poetry and prose of the period. Classes are conducted by a combination of lecture and discussion. Students present brief reports to the class that establish starting points for discussion. A paper of moderate length is written each term. There are examinations at Christmas and in the Spring.

354 Victorian Novel, lect.: 2 hrs.; G. Harvey.

This class is designed to give the student the opportunity of studying the novels of the period from Scott and Austen to Hardy.

356 Literature of the Romantic Period, lect.: 2 hrs.; A. J. Hartley.

A study of the major poetry of Wordsworth, Coleridge, Byron, Shelley, and Keats, supported by a survey of the genesis and development of the romantic movement as well as by representative prose of the period.

452 Nineteenth-Century Thought.

453 Twentieth-Century English Literature, lect.: 2 hrs.; J. Fraser.

This seminar is for honours students and for M.A. students in their make-up year. The procedure in it is to present students with a variety of texts and problems in a meaningful sequence and let them argue about them. Each member of the seminar writes two papers to serve as starting points for the class discussions. There are no examinations, but regular attendance is expected, in the interests of effective debate. The following prose works will be discussed: Joyce, *A Portrait of the Artist as a Young Man* (Penguin); Conrad, *The Secret Agent* (Penguin); *Lighthouse* (Penguin); Lawrence *The Rainbow;* Forster, *Howards End* (Penguin) and *A Passage to India* (Penguin); Orwell, *A Collection of Essays* (Anchor); Beckett, *Endgame;* Pinter, *The Birthday Party;* Cary, *The Horse's Mouth* (Penguin); Durrell, *Justine;* Storey, *This Sporting Life,* (Penguin). Interspersed with these, selections from the following poets will be discussed: Pound, Eliot, Yeats, Hopkins, Auden, Dylan Thomas, Hardy, Graves, Gunn, Hughes, and one or two younger ones. The editions indicated are the ones that the bookstore will be carrying.

454 Literary Criticism, lect.: 2 hrs.; R. Hafter.

This class is intended for senior honours students. It involves the history, theory, and practice of literary criticism from Aristotle to the present.

455 Modern American Literature, lect.: 2 hrs.; M. Klug.

This class will study the growth of American literature over the past seventy years. The first term will be devoted to poetry and will centre on readings from Frost, Eliot, Lindsay, Stevens, Williams, Crane, Lowell, and Roethke. Through the second term we will be working with fiction: Dreiser's *Sister Carrie,* Fitzgerald's *Great Gatsby,* Hemingway's *The Sun also Rises,* Faulkner's *Light in August,* Ellison's *Invisible Man,* Bellow's *Adventures of Augie March,* and Mailer's *American Dream.* The classroom work will involve lecture and discussion. Each member of the class will write one paper in the fall and spring term on a topic of his own choice. A final examination on the year's reading will be set.

457 Victorian Literature, lect.: 2 hrs.; M. Ross.

A study of the major Victorian poets and prose writers (other than novelists). Attention will be given to the changing philosophical, scientific and social pressures of the period. The main emphasis of the class will be on the poetry of Tennyson, Arnold and Browning and the prose of Carlyle, Ruskin, Newman, Arnold and Pater.

Changes and Additions
As the Calendar goes to press before all plans for the next academic year are completed, there may be significant changes in the classes listed above. Students should consult the Department or the Associate Registrar for revised class and text lists.

Graduate Studies
The Department offers graduate classes leading to the degrees of M.A. and Ph.D. Details relating to admission, scholarships and fellowships, requirements for the degree, classes of instruction, etc., can be found in the Calendar of the Faculty of Graduate Studies.

French

Professors
H. F. Aikens
P. Chavy

Associate Professor
D. W. Lawrence

Assistant Professors
E. Boyd
T. P. Carter
B. E. Gesner
W. T. Gordon
S. Journoud
R. Kocourek
F. A. Kretschmer
H. R. Runte
M. Sandhu
C. J. Simon

Lecturers
M. Bishop
J. W. Brown
J. P. Gaillard de Semainville
R. Ginsberg
K. Waterson
M. Leal
E. Messinger
R. Runte

Lecturer (part-time)
H. E. Bednarski

People choose to study French for a variety of reasons — desire to gain understanding of one of the world's richest cultures, interest in the language for its own sake, preparation for certain careers (teaching, translating, etc.), or serving the cause of Canadian unity. The Department offers an excellent opportunity for pursuing such study to those whose interest is strong enough to make them willing to devote a good deal of their time and energy to it.

In general, students are expected to acquire a good knowledge of spoken as well as written French. As students' skill grows, French is used more and more in classes. The accent aimed at is "international"; that is, recognized as standard both in France and in French Canada. Much use is made of the language laboratory in the acquisition of oral skills. The object of our language instruction is to provide, through the judicious use of modern methods, a solid basic training that will enable students who spend a few months consolidating their knowledge in a French-speaking community to develop fluency rapidly and with precision. Students in our major honours programme are normally expected to spend at least one summer in a place where French is the language of communication.

Some students wish or are required only to gain a reading knowledge of French. Provision is also made for their needs.

If your tastes and abilities lie in the direction of French studies, you should consider the possibility of taking a bachelor's degree with Honours in French, or with Honours in French and another subject combined. Those who wish to do so, or to take French as an area of concentration in a General Bachelor's degree course, are encouraged to discuss the matter at any time (but the earlier the better) with a member of the Department. An Honours degree is usually required for or facilitates access to graduate studies.

French Degree Programmes

General Bachelor's Degree
With French as the main area of concentration, the course may be arranged in two ways:

First Year
Either (A) 102 or 134
OR (B) 102/202 combined.

Second Year
Either (A) (If programme A has been followed in the First Year), 202 or 204 and one or more of 230, 231, 232.
Or (B) (If programme B has been followed in the First Year), two or more of 230, 231, 232 and 304.

Note 202 is the normal continuation of 102, while 204 continues 134. The combined class 102/202 will normally be followed by

304. Classes 202 and 204 are mutually exclusive.

Third Year
Up to five of 230, 231, 232, 304, 310, 312, 321, 322, 330, 331, 340, 350 (A or B).

Note The following courses may *not* be counted toward a degree in French: 100, 106, 206.

Bachelor of Arts with Honours in French
A decision regarding admissibility to Honours is not usually made until the end of the student's second year in the Department. Details of the Honours program in French in the Third and Fourth Years are to be arranged by consultation with the Department. Honours students may like to opt at this point for either a language or a literature bias to their studies. Honours standing may be granted to courses taken at the 200 level if the grade awarded (minimum grade B—) is sufficiently high.

Students in the Honours programme with French as main subject are normally required before graduation to:
(a) *Either:* write an Honours essay under the supervision of a member of the Department in an area connected with the programme.
Or: write a comprehensive examination;

and

(b) spend at least one summer in a French speaking community to consolidate their knowledge of the language.

Bachelor of Arts with Combined Honours in French and Another Subject
Programmes may be arranged by consultation (as early as possible) with the departments concerned. Students planning a combined Honours course should consider, however, that the number of classes taken in either subject might be insufficient for admission to many graduate programmes without at least an extra year's work.

Notes
(1) Combinations of classes other than those set forth above should not be chosen to fulfil degree requirements without the express approval of the Department.

(2) A student may, with the permission of the Department, be admitted to a French course at an advanced point because of prior knowledge of the language. Such a student, however, (except as he may be granted transfer credits in the usual way), must normally take the same total number of classes as other students in the same course.

(3) A student admitted to a French course at an advanced level who obtains credit for a class at that level, may not later take a French class at a lower level for credit except with the express permission of the Department.

(4) No more than two classes in French may be taken for credit at the 100 level.

(5) Enquiries concerning prescribed texts should be made at the end of the preceding academic year.

French Classes Offered

100 French and French-Canadian Literature in English Translation (20th century), lect.: 3 hrs. per week.

Not for credit towards a degree in French. This is a class with limited enrolment designed to act as an introduction to French and French-Canadian Literature for non-specialists.

100 Comparative Literature, (Comparative Literature Section).

102 Spoken and Written French (Part I), lect: 3 hrs.; language lab.: 3-5 hrs. per week.

This is an intensive course designed for students who wish to achieve proficiency in spoken and written French, either for general purposes or as a preparation for further study in French language and literature. There will be an emphasis on oral proficiency. Most students will have studied French in high school but may have had limited experience in the spoken language. Students who have not previously studied the language are admissible. Class sections (limited to fifteen students) meet three times weekly. These lecture periods are directly related to individual practice in the language laboratory. Students may choose when they wish to work in the language laboratory. There is no limit on time to be spent in these sessions although a minimum of from two to five hours per week is considered normal. Students interested in this course should complete a special form available from the Admissions Office.

NOTE: French 102, while a full credit course, forms the first half of an integrated two-year programme, the more advanced portion being French 202. French 102 and French 202 may be taken in the same year (for two full credits). Details are explained in the special form referred to above.

106 Proficiency in Reading, lect.: 3 hrs.

For students wishing to acquire or improve skills in comprehending written French, without extensive training in the spoken language or in the active use of the written language. Although designed primarily for undergraduates, this class can also accommodate and meet the needs of graduate students required to show evidence of a basic reading knowledge of French.

134 Written and Spoken French, lect.: 3 hrs. per week.

This course is designed for students who wish to achieve proficiency in spoken and written French. It differs from French 102 in that there is more emphasis on the acquisition of skill in composition and an introduction to literature. Classes are held three times weekly. There is no language laboratory practice in connection with this course. Using a basic text *(Reflex French),* the student memorizes key sentences useful in conversations and illustrating correct usage. A grasp of these basics should lead to simple conversation and written exercises. By the end of the first term, the student should have advanced to dialogue, play scripts and free composition. The primary text is then supplemented with two simple novels to build vocabulary, reinforce the student's knowledge of underlying structure and serve as a basis for conversation in class. Toward the end of the second term students are expected to be capable of writing paragraphs or short essays of a critical nature. Students will be assessed on their written exercises, participation in class and an oral test at the end of each term.

202A Spoken and Written French, (Part II), lect.: 3 hrs.; language lab.: 2-4 hrs. per week.

Continues and completes the basic work begun in French 102. Lab hours are freely chosen as in French 102.
Prerequisite: French 102 or equivalent.

Note: French 102 and 202 may be taken in the same year: see note following French 102.

202B Spoken and Written French, (Part III), lect.: 3 hrs.; language lab.: as required.

Sections will be devoted to the study of a variety of subjects in French. The purpose of this half class is to put to practical use the basic material just covered in French 102 and 202A by investigating a subject (or some aspect of a subject) in French, while at the same time building vocabulary and diversifying the structures at the student's disposal for comprehension and self-expression. In each case, a suitable balance will be sought between the skills of oral comprehension, speaking, reading and writing. The various options offered will depend on a number of factors (students' and instructors' preferences, availability of material, etc.) and will be announced in the course of the first term.
Prerequisite: French 202A or equivalent.

204 Composition, lect.: 3 hrs. per week.

Training towards accuracy in reading and writing French. Exercises in translation from French to English and from English to French; grammar, vocabulary building, free composition.

206 Proficiency in Reading, lect.: 3 hrs.

For students wishing to increase their skills in the reading comprehension of contemporary French texts. The selections studied are mainly original matter-of-fact passages published in the seventies and sixties..
Prerequisite: French 106 or departmental approval.

Suitable for students having reached the appropriate linguistic level, including those who have taken French 106.

230 Introduction to French Literature, lect.: 3 hrs. per week.

Study of "le conte" in French and French-Canadian literature from the 18th to the 20th century.

231 Introduction to French Literature, lect.: 3 hrs.

French and French-Canadian theatre in the 20th century.

232 Seventeenth Century Literature, lect.: 3 hrs. per week.

This class will deal with the theme of love and its treatment in 17th century French literature.

304 Composition, 3 hrs. per week.

Continues the language work of 204 at a higher level.

310 Literary Appreciation, lect.: 3 hrs. per week.

Practical exercises in literary appreciation, "explication de texte". The texts selected will range from the 17th century to the present day. Passages from earlier authors may be used in modernized versions.

312 Civilization of France and French Canada, lect.: 3 hrs. per week.

An attempt to understand and to suggest fruitful ways of studying, from an English-speaking North American point of view, what is essential in "being French".

No specific prerequisite, but a good basic knowledge of spoken and written French is necessary. Lectures mostly in English.

321 General Phonetics, lect.: 3 hrs.

Study of the sounds of language, especially those of English and other languages of particular interest to students; how these sounds are perceived and produced; how they may be classified; how they may be taught; practice in the use of phonetic script; introduction to phonemics. Not a class in remedial pronunciation. Language lab work may be required for some exercises.
Prerequisite: Good knowledge of spoken English and familiarity with the spoken form of at least one other language.

322 General Linguistics, lect.: 3 hrs.

The topics discussed include the nature of human language; branches and applications of language study, including various approaches to foreign language teaching; relation between sound and meaning and problems of translation; relationship between speech and writing; linguistic diversity, bilingualism, and standard language; linguistic change, related language families, and major world languages. Emphasis will be placed on the non-historical aspects of language structure (words, sentences, sounds).

330 French Literature of the 17th and 18th centuries lect.: 3 hrs. per week.

331 French Literature of the 19th century, lect.: 3 hrs. per week.

340 Introduction of French-Canadian Literature, lect.: 3 hrs. per week.

350A Introduction to Medieval French Literature, lect.: 3 hrs. per week.

350B Introduction to 16th Century French Literature, lect.: 3 hrs. per week.

404 Composition, lect.: 3 hrs. per week.

Continues the work of 304 at a higher level.
Prerequisite: French 304

420 History of The French Language, lect.: 3 hrs.

423 Evolution of Linguistics, lect.: 3 hrs.

The development of language study from early times to the present day. Special attention will be paid to the linguistic ideas of the twentieth century.

430A/B Medieval French Literature, lect.: 3 hrs. per week.

431A/B Sixteenth Century French Literature, lect.: 3 hrs. per week.

432A/B Literature of the 17th Century, lect.: 3 hrs. per week.

433A/B Literature of the 18th Century, lect.: 3 hrs. per week.

434A/B Literature of the 19th Century, lect.: 3 hrs. per week.

435A/B Literature of the 20th Century, lect.: 3 hrs. per week.

Geology

Professors
H. B. S. Cooke (Carnegie Professor)
M. J. Keen
G. C. Milligan

Associate Professors
J. M. Ade-Hall
F. Aumento (Chairman)
F. Medioli
P. E. Schenk

Assistant Professors
D. B. Clarke
G. K. Muecke
D. J. W. Piper
P. H. Reynolds (Physics)
M. Zentilli

Visiting Lecturer
J. Jones

Visiting Scientist
S. Capedri

Research Associates (Primary appointments elsewhere)
L. H. King
B. D. Loncarevic
B. R. Pelletier

Post Doctoral Fellows
S. Barr (Oceanography)
J. Dostal
H. P. Johnston

Did you know that Eastern Canada was covered by sheets of ice a few thousand years ago? Do you worry that this ice will return? Can you imagine the economic impact on Nova Scotia if oil is discovered in commercial quantities offshore? Or the even greater impact if uranium is found within one of the poorer countries of the world. Did you know that the Atlantic Ocean may have been barely big enough to bathe in three hundred million years ago? And at that time the equator passed through Nova Scotia, with the day then only twenty hours long? Geology deals with problems such as these. It is the study of the earth and planets - their present nature and their development in time.

Geology can be pursued by people with many varied interests. Volcanoes are spectacular but are only the surface expression of rock melted within the outer parts of the earth. Earthquakes cause great loss of life - can their occurrence be predicted? Earthquakes and nuclear explosions have told us much of what we know about the inside of the earth. Evolution which has led to Man is shown by animal and plant remains now found in rocks as fossils. What atmosphere did these beasts breathe? How salty was the sea at the time they lived? How was the salt at Pugwash formed? Or Cape Breton's coal?

Old beaches, former shore-lines, are found now far above present sea-level around Hudson Bay and Newfoundland. Can a geologist describe conditions at the surface of the earth at any time in the past? Or the temperature inside the earth at these same times? Or even now? How do mountains form? Perhaps the Himalayas rose when

Geology

India and Russia collided. Perhaps the Rocky Mountains are the crumpled leading edge of our continent sailing, as it were, across the Pacific Ocean. Our means of subsistence, food, raw-materials, and energy required for a growing population must be obtained from the outermost rim of the earth. It is one task of the geologist to find these resources.

Classes in geology are offered for different types of students. Some will want to make a career in some aspect of the study of the earth - as geologists, geochemists, geophysicists, oceanographers or teachers. Some may need instruction in geology as an aid to other disciplines; for example, a mining engineer; or a physicist interested in X-ray diffraction spectrometry; or a chemist interested in crystallography; or a biologist interested in protozoas. Students may be interested in a geology degree before they take a professional qualification such as law or business administration. Those whose prime interest is the humanities or social sciences will find that the introductory class in geology stimulates their awareness of their surroundings, and their appreciation of the many facets of science.

Careers open to geologists are many and varied. The largest number of job opportunities is provided by industry, primarily in the search for the production of raw materials such as metals, petroleum and water. Geologists competent in mathematics, or indeed mathematicians with some background in geology, might be involved in processing and analysing data using digital computers; those interested in going to sea might work with the Federal Government's marine institutions. The federal and provincial government employ geologists in their geological surveys and Departments of Mines; the Canadian government is responsible for supplying geologists to agencies such as UNESCO to work in under-developed countries. A graduate with a geology degree and a reasonable background in other sciences would find teaching in high school challenging.

High School Preparation

Students in high schools who plan a *career* in sciences involving the earth, such as geology or geophysics, should note that it is sensible to try to have the following subjects in Grades XI and XII:

Grade XII mathematics, plus two of Chemistry, Physics and Biology. (The third should have been taken in Grade XI if possible).

Note that these are *not* prerequisites, but we do strongly advise them. The student should aim to make up deficiencies in his or her high school preparation in the first year at Dalhousie. Note too that at present Grade XII Geology is *not* counted as equivalent to a Geology 100 level class in Geology at Dalhousie.

Degree Programmes

The tables on the pages that follow are *only a guide*, and are *not rigid requirements*. Any student who wishes a different combination is welcome to consult with Geology staff members, and in particular the Chairman, and ask for advice. A wide range of choices is possible. *A student who intends to take a degree in Geology, or is even considering doing so, should consult the Chairman as soon as possible. First year students should make every effort to seek such advice prior to registration for the first time. All students majoring in geology must consult with the Chairman of the Department prior to registration for the second year.*

Student's who intend to make their careers in Geology, or intend to pursue graduate studies, should consider taking an honours programme and, if possible, take an introductory class in Geology in the first year.

Field work on Saturdays is an integral part of some Geology classes.

All students who expect to graduate with honours in Geology in or after 1975 are required to include Geology 201, 202 and 301 in their programmes.

Table 1: Programme for General Students majoring in Geology

Year I	Geology 100 Chemistry 110 or Physics 110 Math 100 Two classes chosen from two non-science groups.
Year II°	Geology 201 and 202. Two classes from Chemistry, Physics, Biology, or Mathematics. One elective.
Year III	Geology 301 and two other 300-level classes in Geology. One elective and one class in Biology, Chemistry, Physics or Mathematics.

°(By the end of the second year the student should have completed at least one class in each of: Mathematics, Chemistry, and Physics. If possible two of these classes should be included in the first year).

(Note that, in addition to the Geology classes, as suggested here, at least one other 200-level class must be included in the programme to fulfill the general faculty regulations).

Note:
(1) If only one class in Biology is taken, Biology 3321 is relevant to Geology students and may be taken by them with no prerequisites.
(2). If two 200 level Physics classes can be taken, Physics 221 and 230 are sensible choices.
(3) Chemistry 210 is a sensible second class in Chemistry.
(4) Mathematics 200, 220, 228 are all sensible second classes in Mathematics — but note any restrictions there may be on 220 or 228 as prerequisites, if further classes in Mathematics are planned.
(5) Although the general requirements do not demand a class in Mathematics or a foreign language, students should note (a) that any one planning a scientific career may be severely handicapped if he has not taken at least one class in Mathematics, and (b) that many graduate schools demand reading ability in a foreign language.
(6) Any student who is not sure of a suitable programme plan is invited with the Chairman of the Department.

Table II: Honours (Major)

	I Economic Geology	II Geophysics	III Geochemistry	IV Petrology	V Stratigraphy
Year I	Geology 100 Mathematics 100 Two classes chosen from Languages, Humanities or Social Sciences				
	Chem. 100	Physics 110	Chem. 110	Chem 110	Biology 101
Year II	Geology 201 Geology 202 Engineering 210 and 211 Math 200 or 220 or 228 Physics 110 Elective	Geology 201 Geology 202 Physics 230 Math 200, 220 or 228 Chem 110	Geology 201 Geology 202 Chem. 210 or 230 Physics 110 or Math 200 or 206 or 227, or 228 Elective	Geology 201 Geology 202 Chem 210 or 230 Physics 110 Elective	Geology 201 Geology 202 Biology 2000, or 2040A and 2060B Chem. 110 or Math 200 or 206 or 227 or 228 Elective
Year III	Geology 301 Geology 302 Geology 303 Geology 304 Chem. 210 or 230	Geology 301 Geology 306 Physics 221 Geology elective Elective	Geology 301 Geology 302 or 303 Geology 304 or 308 Chem. 210 or 230 Elective	Geology 301 Chem. 210 or 230 Two of Geology 408 or 460 or 304 Elective	Geology 301 Geology 302 Geology 305 Biology 3321 or 3323 or 3063 Elective
Year IV	Geology 400 Geology 306 Geology 404 Geology 403 or 453 Math, Phys. or Chem. elective	Geology 303 Geology 400 Geology 405 Geology 304, 404, 445, or 460 Math, elective	Geology 400 Geology 454 Geology 407 or 408 Geology 460 or 404 Physics, Biology or Math, elective	Geology 400 Two of Geology 407, or 454 or 408 Geology elective Elective	Geology 303 or 304 Geology 400 Geology 455 or 401 or 456 Geology elective Biology, Phy. Chem., or Math, elective

Table III: Honours (combined)

	I with Physics	II with Chemistry	III with Biology
Year I	Geology 100 Mathematics 100 Two classes chosen from Languages, Humanities or Social Sciences		
	Physics 110	Chemistry 110	Biology 1000°
Year II	Geology 201 Geology 202		
	Elective Physics 211 and 231 Mathematics 200, 220, or 228	Elective Chemistry 210 Mathematics 200, 220 or 228	Elective Biology 2000[5] A class in Chemistry, Physics or Mathematics
Year III	Geology 301 Elective		Geology 305 Elective
	Elective Physics 315 or 335 Geology elective	Chemistry 230 Chemistry 320 Geology elective	Biology 3321 Biology 3323 Geology elective
Year IV	Geology 303 Geology 306 Geology elective Physics 320, 416 or 445 Mathematics 200, 220 or 228	Geology 401 Geology 454 Geology elective Physics or Biology elective Chemistry 410	Geology 401, 456 or 457 Geology 302 Geology elective Biology elective Physics 221 or Mathematics 200, 220 or 228

Geology

Note:
(1) A student who intends to concentrate on geophysics might consider auditing Geology 452 in his fourth year.
(2) All students are encouraged to attend one or more non-credit computer programming classes.
(3) A student who intends to concentrate on paleontology should consider obtaining Geology 305 and 456 in his third and fourth years respectively.
(4) Honours students have to satisfy Faculty regulations concerning a comprehensive examination. In recent years this has been met by students writing an honours thesis in their fourth year. They should consult a staff member well in advance, no later than the third year.
In the case of students doing Combined Honours, Geology and Biology this requirement may be met in one of three ways:
(a) Write a comprehensive examination (after 20 classes).
(b) Write an honours thesis (after 20 classes), as an Honours student in Geology alone would do.
(c) Write a thesis to count as a class, Biology 4900, and write a comprehensive examination.
(5) °Students with Grade XII Biology should do Biology 2000, or two of Biology 2010A/B to 2060A/B, not Biology 1000, with appropriate changes in other years.

Classes Offered

Classes in Other Departments
Students doing the major part of their work in geology should be aware of relevant classes in other departments. They change from time to time, but the following guide may be helpful.

Biology
3321 Invertebrates I
3063 Theoretical Ecology
3061B Structure and Functions of Ecosystems I
3062A Structure and Functions of Ecosystems II
4064C Pleistocene Biogeography

Chemistry
510 X-ray Crystallography
512 Crystal Chemistry

Mathematics
206 Probability and Mathematical Statistics
220 Applied Mathematics
227 Numerical Methods and Fortran Programming
228 Applied Mathematics for Engineers I
328 Applied Mathematics for Engineers II

Oceanography
200, 511A, 512A, 513B, 514B Introductory Classes.
522, 523, 524, 525, 531 Advanced Classes.

Physics
335 Electronics
445 Geophysics
645 Advanced Geophysics

Geology 100, Geology 101 and Geology 140. The study of the earth is based upon observation of natural phenomena, upon experiment and inference. In the last few years intensive study of the rocks of the ocean-floor has led to a revolution in our ideas about the processes responsible for the development of continents and ocean basins; it has led, in a sense, to a new geology. Let us illustrate one aspect only. We know that a huge mountain chain is buried beneath the Atlantic Ocean, running many thousands of miles and rising above sea-level at islands such as St. Helena and Iceland. This Mid-Atlantic Ridge is the place where rock is slowly brought from the interior of the earth, increasing the area of the Atlantic Ocean; the Americas slowly move westwards away from this Ridge, and Europe and Africa slowly move eastwards. One consequence of this as a theory is that the youngest rocks will be found in the middle of the Atlantic, but the oldest on either side. This turns out to be true. But ask yourself questions of this sort: how would you find the ages of the rocks? or how would you make a map of the rocks of the ocean floor or of Nova Scotia for that matter? Animals living in the sea die and their remains are found in the mud on the sea-floor. They provide the record of evolutionary changes; it is only by the study of fossils that we can trace the rise of man from primitive organisms living billions of years ago.

But topics such as these are only a part of a study of the earth. How are landscapes formed? Or where would you seek oil? Or why does a compass point north? Does the earth's magnetic field reverse? What happens to living organisms when it does? What did Nova Scotia look like five hundred million years ago?

100 Introduction to Geology, lect.: 3 hrs.; lab.: 3 hrs.; J. M. Ade-Hall, M. Zentilli, F. Medioli.

This is an introductory class for students intending to take a degree in geology, and for engineers.

We see both the basic nature of the earth we live on and its history throughout 5000 million years of geological time. The science of geology is experiencing a revolution in its basic ideas and students are shown how the research of the last ten years has given us a wholly new and complete picture of the crust of the earth, with volcanoes, earthquakes and the ocean basins all playing major parts in the new concept.

Laboratory work is conducted partly in the field.

Text: To be announced

101 Introduction to Geology, lect.: 3 hrs.; lab.: 3 hrs.; (alternate weeks), H. B. S. Cooke and staff.

This is an introductory class for students in Arts and Science. It is intended as a science elective for students from disciplines other than geology. It emphasizes the concepts and major ideas which concern the development and present state of the earth and planets, and the influence of geological history upon the human environment. There are demonstration periods and field trips. A text will be prescribed, and reference made to books and reference material in the library at appropriate times.

140 Introduction to Geology, lect. and demonstration and lab.: 3 hrs.; one evening per week, F. Aumento.

This is an evening class intended, like 101, for those interested in the earth, but do not plan a career in professions involving geology. Examples from Canadian geology are stressed in this class. There are *no* science or Math. prerequisites for this class. Under normal circumstances a student cannot go from this class into Geology 201 or 202, but can enter Geology 240, 241A, and 242B.

Two Hundred Level Classes

The two-hundred level classes fall into two categories.

Geology 201 and 202 are for majors and honours students in Geology and must be taken concurrently. They are classes in which an attempt is made to provide a student with tools needed in 300 and higher level classes, at the same time retaining an awareness of the whole subject. The two classes are integrated through extensive field work in the geology of Nova Scotia. Samples and data collected on the Saturday field trips will be used for subsequent laboratory investigations. One tutorial per week, alternating between 201 and 202, will be an essential part of this program.

Students who do not intend to major in Geology may take either 201 or 202 separately.

Note that the normal prerequisite for Geology 201 and 202 is Geology 100. Under exceptional circumstances Geology 101 and 140 may be acceptable. Students majoring in Geology are strongly advised to select their other classes in Second Year in accordance with the prerequisites for 300-level Geology classes.

Geology 240, 241A and 241B are classes for students who do not intend to major in Geology, but are simply interested in the earth. The only prerequisite for entrance to any of them is one of the 100 level Geology classes. They may *not* be taken for credit as Geology classes by any major or honours student in Geology. The equivalent 300 level class 341A may be taken for credit by majors students but not by honours students. Geology 342B may be taken for credit by both honours and majors students.

201 Introduction to the Study of Minerals and Rocks, lect.: 3 hrs.; lab.: 3 hrs.; F. Aumento, D. B. Clarke, G. K. Muecke.

A rock is an aggregate of physically distinct substances called minerals. Most minerals have characteristic external forms and physical properties which reflect the regular arrangement of atoms of which the minerals are made. This class will deal with the detailed study of these minerals from crystallographic, optical, chemical, economic and genetic points of view.

The study of mineralogy leads naturally into the study of rocks. The mineralogical composition and mode of formations of a wide range of igneous, sedimentary and metamorphic rocks, collected on field trips, will be discussed.

Laboratory studies involve the identification of unknown minerals and rocks both in hand specimen and with the aid of the petrographic microscope.

202 Introduction to Stratigraphy, Paleontology, Structural Geology, lect.: 3 hrs.; lab.: 3 hrs.; P. E. Schenk, G. C. Milligan, F. Medioli.

In combination with Geology 201, this class aims to introduce the student to greater depth and intensity in his study of geology. Geology 202 concentrates on the practical application of field techniques and tools as well as laboratory procedures that a geologist uses to interpret rock. The geological evolution of Nova Scotia is used as a case history to illustrate these principles, techniques, and tools. Field trips are the basis for the class and will follow the rock cycle to build a geologic section of the province. Observations and samples are processed during indoor labs in both 201 and 202. The student is introduced to methods of surveying, simple structural interpretations, paleontological dating and paleoecology, and stratigraphic observations and principles used in deciphering the geological history of an area. Application of plate-tectonics to Nova Scotia serves as an example of the evolution of large crustal blocks.

240 Marine Geology and Geophysics, lect., lab. and discussion: 3 hrs.; one evening per week, D. J. W. Piper.

This class presents the new ideas concerning the earth that have developed in recent years, largely through studies of marine geology and geophysics. It also attempts to show the range of marine geological work, and its relevance to other fields of science, as well as engineering, economics and politics. The class may *not* be taken by students majoring in geology; it is suitable for students who have geology as their minor; and those who would simply like a second class in geology (including high school teachers, or interested professionals at government institutions).
Prerequisite: any first level class in geology.

241A Environmental Geology, lect., lab. and discussion: 3 hrs.; one evening per week, D. J. W. Piper and M. Zentilli.

Geology lies behind many of the environmental problems facing man today. In this class we consider topics such as energy and mineral resources, geological hazards such as earthquakes and landslides, the relevance of geology in the fields of pollution and waste disposal, and the role that geology has to play in planning urban areas, especially in Nova Scotia.

Geology majors wishing to take an environmental geology class should register in 341A.
Prerequisite: any first level class in geology.

242B Geomorphology, lect., lab. and discussion: one evening per week; D. J. W. Piper and H. B. S. Cooke.

The surface features of the earth are undergoing constant modification, and their present form is the result of a variety of erosional and depositional processes, including the action of ice, rivers, the wind and the sea. In this class, we will examine the development of the landforms of Canada, the importance of the last ice age, and the erosional processes still taking place today. We will examine the appearance of these landforms in conventional, aerial, and satellite photographs, and in maps.

Geology majors and honours students wishing to take a class in geomorphology should register in 342B.
Prerequisite: any first level class in geology.

Three hundred level classes

301 Igneous and Metamorphic Petrology, lect.: 3 hrs.; lab.: 3 hrs.; D. B. Clarke/G. K. Muecke.

The mineralogy and texture of rocks are the products of their environment and mode of formation; thus macroscopic and microscopic investigations of these rocks provide clues to the condition prevailing at the time of their formation.

Igneous rocks will be discussed under such topics as mineralogical and chemical classification, methods of depicting chemical data, mechanisms and environment of magma production, various mechanisms of magma evolution and comagmatic provinces.

Metamorphic rocks will be considered as the products of thermal and dynamic processes operating on preexisting rocks. Stability relations of minerals under varying temperatures-pressure conditions and concept of metamorphic facies will be stressed.
Prerequisites: Geology 201 and 202, Chemistry 110.

302 Stratigraphy and Sedimentology, lect.: 3 hrs.; lab.: 3 hrs.; P. E. Schenk.

The purpose of this course is to enable geologists to recreate conditions at the surface of the earth for any area at any selected time in the earth's history. To do so requires knowledge of processes operating today both at the earth's surface and below. The syllabus is: tools, involving sedimentology, paleontology, and sedimentary tectonics to evolve tectonic-environmental models; methods, involving problems in vertical and lateral variations, and in classification, nomenclature, and correlation; and results, involving application of plate tectonics to the evolution of Atlantic Canada.

The course is built around at least five field trips which construct in some detail the geologic history of Nova Scotia. Material collected during these trips is processed by the class so that indoor labs deal with microscopy of sediment as well as thin section. Data from these labs augment field observations and assigned reading, and are presented in an elaborate synthesis of Nova Scotian geology. The class is introduced in the fall to the computer via BASIC and remote terminal so that processing of data and its illustration can be performed by machine.

This class is suitable not only for students specializing in sedimentary rocks but especially for those in other areas of earth science, general course B.Sc., or emphatically, earth science teachers.
Prerequisites: Geology 201 or 202 or equivalent.

303 Structural Geology, lect.: 3 hrs.; lab.: 3 hrs.; G. C. Milligan.

This class is intended as an introduction to the behaviour of rocks during deformation. The emphasis is upon the geometrical aspects of the rock structures and their interpretation but there is also consideration, in an elementary way, of the mechanics of rock deformation. The laboratory work is essentially a brief course in descriptive geometry. This trains the student to visualize the three-dimensional geometry of rock structures of many problems of a graphic and geometrical character encountered in cartography and other geological work, especially in mining.
Texts: There is no prescribed text for the class. *Introduction to the Structure of the*

Earth by Spencer, will be found useful, and students are also referred to other texts and to the geological journals. The class requires a considerable amount of reading.
Prerequisites: Geology 201 and 202.

304 Introduction to Mineral Deposits, lect.: 3 hrs.; lab.: 3 hrs.; M. Zentilli.

This class is an introduction to the principles and processes, both igneous, sedimentary, and metamorphic, that govern the formation, nature, and distribution of metallic mineral deposits and some industrial rocks and minerals. Economically significant mining districts in Canada and elsewhere are discussed to illustrate particular classes of ore deposits, their geologic environments and the methods used in their investigation.

A text will be recommended, but a considerable volume of reading from technical journals will be required.
Prerequisites: Geology 201, 202. Geology 301, 303 may be taken simultaneously. Exceptions are made to meet specific programmes, but the student should consult the instructor and obtain permission.

305 Systematic Palaeontology, lect.: 3 hrs.; lab.; F. Medioli, H. B. S. Cooke.

This class comprises a systematic survey of the major phyla of fossil organisms. The emphasis will be on morphology and taxonomy of invertebrate phyla, but a short survey of the main lines of evolution of vertebrates will be included. The purpose of this class is primarily to enable the student to recognize at sight the members of the various phyla. However, it is intended also that he should learn how to tackle invertebrate fossil material so as to classify it accurately when the resources of a library and museum are available.
Prerequisite: Geology 201 and 202 or Biology 2000 or Biology 3321. Note this class is suitable for Biology students without previous geology classes.

306A/556A Plate Tectonics, lect.: 3 hrs.; lab.: 3 hrs.; J. M. Ade-Hall.

The study of the ocean floors by geologists, and geophysicists over the last 15 years has lead to a revolution in our understanding of the way in which the earth's crust is made. The continents are now known to be islands of light material which are carried on enormous crustal plates. These plates are changing in form all the time, being added to at the mid-ocean ridges and being lost at the deep trenches. The past and present collision of plates has given rise to the fold mountain ranges of the earth. The Coast Ranges, Alps and Himalayas represent active plate collision and older ranges, such as the Appalachians, represent the fossilized effects of former plate collisions.

This class will describe the rapid development of ideas about the oceanic geology leading to the current state of the plate tectonic model of the earth's crust. Contributing evidence from many areas of geology and geophysics will be brought together in a current synthesis. This means that the student will be introduced to earthquake seismology, the nature of the earth's magnetism, the radioactive dating of lavas and to the results of the recent drilling into the ocean floor from the *"Glomar Challenger"*. We shall also be looking at the geology of fascinating areas such as the volcanic Mid-Atlantic Ridge, the Gulf of California and the San Andreas Fault and the West Coast of South America. These are all areas where crustal plate interaction is going on today.

The class will be taught so that current concepts, results and problems will be fully discussed. Maths and physics will be kept at the 200 level.
Texts: Wyllie, *The Dynamic Earth,* and Cox, *Plate Tectonics and Geomagnetic Reversals.*
Prerequisites for Geology majors: Geology 201 and 202. Physics 100 or 110, Math 100; or Math 100 and two 200 level Physics classes. Note this class is suitable for physics students without previous Geology classes.

306B Introduction to Exploration Geophysics, lect.: 3 hrs.; lab.: 3 hrs.; J. M. Ade-Hall.

Canada has major mineral resources in the Canadian Shield, and the sedimentary basins of Alberta, the Arctic and the continental margins contain oil and gas. Exploration geophysics has led in part or in whole to the discovery of many of these. For example, aeromagnetic surveys are used to delineate potentially mineral bearing volcanic rocks on the shield, and seismic reflection studies in the sedimentary basins are used to map structures in which hydrocarbons are trapped. This class is designed to explain the principles of the main techniques used by exploration geophysicists, the seismic, electrical, electromagnetic, magnetic and gravity methods. Students will be able to try out some of the techniques for themselves during the laboratory.
Text: Parasnis, *Introduction to Exploration Geophysics.*
Prerequisites: As for 306A.

307 Special Topic in Geology, conducted by individual faculty.

The class will permit a student to pursue his interests in any selected field of geology and geophysics to a degree not generally found in other classes offered. The student will work closely with his tutor, preparing papers for discussion with him, and may even undertake some investigation and prepare the results in the form of a research paper.

Note that students should consider carefully before registering for this class whether their needs cannot be met by other classes, and *no student may register without permission from the Chairman or appropriate undergraduate advisor.*

341A Environmental Geology, lect., lab. and discussion: 3 hrs.; one evening per week, D. J. W. Piper and M. Zentilli.

This is taught as Geology 241A, but with additional reading and exercises; it is suitable as a Geology credit for majors students only.

342B Geomorphology, lect., lab. and discussion: 3 hrs.; one evening per week, D. J. W. Piper and H. B. S. Cooke.

This is taught as Geology 242B, but with additional reading and exercises; it is suitable as a Geology credit for majors and honours students.

Four Hundred Level Classes

Note (1) Geology 400 is normally a required class for all honours (major) students in Geology, who enter an honours program in 1973 or thereafter. Honours (combined) students in Geology will not be required to take it if to do so would cause undue difficulty in their program. (2) Classes labelled "alternate years" may nevertheless be given if six students or more register for the class.

400/500 Problems concerning the Earth, lect.: 3 hrs.; Staff.

This is a discussion class designed to bring to students' attention problems that an expert in the earth sciences may be expected to meet during the next decade. Some of these problems will concern the recognition and extraction of natural resources in ever more exacting and hazardous natural conditions, the management of natural resources, a very important subject for earth scientists living in a country which is one of the major suppliers of minerals to the world, and the control and prevention of environmental damage caused by mineral extraction, transportation or use. The class will stress the integration of data from different geological fields for the solution of complex problems.

401/501 Sedimentology and Sedimentary Petrology, lect.: 2 hrs.; lab.: 3 hrs.; D. J. W. Piper.

This class follows naturally from 302. Students who have not taken 302 will be expected to make up the background themselves. The class will concentrate on the processes of sedimentation, and the interpretation of these processes in accident sediments by comparison with modern analogues. The main emphasis is on marine clastic sediments. Basic analytical techniques are taught in the lab, with students working on their own material in a small project of their choice.
Prerequisites: Geology 302 completed, or being taken concurrently, or permission of instructor.

403 Advanced Structural Geology, hours to be arranged. G. C. Milligan. (Offered in 1975-76 and alternate years).

This class will consider the life-history of a mountain range as a theme upon which to base discussion of tectonic processes. It is proposed to use the western Cordillera and the Alps as examples.

The class is conducted as a colloquium and participants will be required to read extensively in the relevant journals.
Prerequisites: Geology 303 *or* permission, of the instructor.

404/554 Ore Deposits, Advanced Class, hours to be arranged; M. Zentilli, (Offered in 1974-75 and alternate years).

This course is designated for graduate and senior undergraduate students interested in mineral exploration, mining geology, and in particular aspects of the mineralogy and petrology of metallic ores. Ore deposits are analyzed from the point of view of their regional and detailed geological setting; the unifying concepts of metallogenic epochs and metallogenic provinces are emphasized in light of plate tectonics and classical geotectonic theories. The class is taught in a colloquium in which each student in turn leads the discussion for a 3-hour session. Considerable flexibility is possible to meet the special interests or requirements of the individuals in the class.

The text material is drawn predominantly from the technical journals and reference works and a considerable volume of reading is required.
Prerequisites: Geology 301, 302, 303, 304, Chem. 210 or 230. Exceptions with the permission of the instructor.

407/510 Advanced Igneous and Metamorphic Petrogenesis, lect.: 3 hrs.; lab.: 3 hrs.; D. B. Clarke, G. K. Muecke. (Offered in 1975-76 and alternate years).

A wide range of igneous rocks will be discussed from a petrogenetic standpoint. The petrogenetic problem for each rock type will be defined and then its origin considered in the light of recent information from the fields of geochemistry, isotopic studies and phase equilibrium studies.

Metamorphic rocks will be discussed as products of physico-chemical processes in open and closed systems. Experimentally determined phase relations of metamorphic minerals will be critically examined and correlated to natural assemblages. The development of metamorphic belts will be studied in relation to the evolution of the continental crust and plate tectonics.
Prerequisites: Geology 301, Chemistry 210 or 230.

408/511 Advanced Mineralogy and Crystallography, lect.: 3 hrs.; lab.: 3 hrs.; F. Aumento, D. B. Clarke, G. K. Muecke. (Offered in 1974-75 and alternate years).

Advanced work in crystallography and crystal chemistry preceeds a systematic examination of the chemistry, structure and occurrence of the major rock and ore-forming minerals. Laboratory work includes the use of X-ray and other modern analytical techniques in the identification of minerals and determination of their parameters, symmetry and structure.
Prerequisites: Geology 201 and 202.

445/545 Physics of the Earth, lect.: 3 hrs.; R. D. Hyndman, J. M. Ade-Hall and P. H. Reynolds.

This is a class in solid-earth geophysics and as such complements 306A which deals almost exclusively with crustal geology and geophysics. Topics discussed include: the figure of the earth and gravity, seismology and the internal structure of the earth, the geomagnetic field, paleomagnetism — the prehistory of the geomagnetic field, heat flow and the earth's thermal history, electrical conduction in the earth, radioactive processes and the age of the earth.

Taught concurrently with Physics 445. See also Geology 306A, B, 462/562; Oceanography 511A.
Prerequisite: Registration requires the prior consent of the Department.
Texts: Garland, *Introduction to Geophysics,* and Saunders, *Mantle, Core, and Crust.*

452/502 Earth Science Seminar, one afternoon per week; R. D. Hyndman, J. M. Ade-Hall, P. H. Reynolds, M. J. Keen and others.

This is non-credit seminar class given concurrently with Physics 645, Oceanography 645. All geophysics graduate students are expected to attend.

453/503 Hydrogeology, hours to be arranged; J. Jones and staff, (Offered in 1974-75 and alternate years).

This class studies the occurrence, movement and distribution of water, as related to earth materials, with emphasis on the exploration, development, utilization of groundwater and related environmental issues.

The class work includes the principles of groundwater flow, aquifer hydraulics, water chemistry, hydrologic systems, i.e. groundwater-surface water interactions, and digital modelling. Problems regarding the groundwater flow system and natural and artificial contaminants will be discussed, including such items as solid waste disposal, land use relationships and contamination due to deicing salts, oil and gas, fertilizers, pesticides, herbicides, and other pollution sources. The disruption of the natural groundwater flow system due to construction works will also be examined.
Problems, literature reviews and assignments on special topics are an integral part of the class. Reference texts and pertinent periodicals for reading will be announced.

454/504 Geochemistry, lect.: 3 hrs.; lab.: 3 hrs.; G. K. Muecke.

The abundances of the elements and their distribution in the solar system, the lithosphere, the hydrosphere and the atmosphere will be investigated in the light of chemical processes. The emphasis of the class will be on demonstrating how principles of crystal chemistry, thermodynamics, solution chemistry etc., can be applied to the solution of geological problems. Discussions on such selected topics as exploration geochemistry, environmental geochemistry and lunar geochemistry will be included if time permits. Students will be encouraged to pursue some aspects of the class at depth and to present the results of their investigation in the form of two term papers.

The laboratory will consist of an introduction to methods of rock and mineral analysis and will include an exposure to classical, spectrophotometric, flame photometric, atomic absorption, X-ray fluorescence and neutron activation analysis.
Prerequisites: Geology 201 and 301; *or* a good background in Chemistry. Students wishing to take this class should have a good background in either geology or chemistry and should consult the instructor before registration. Note that this class may be taken by students with a good background in Chemistry who have taken no previous geology classes.

Geology 455/505 Advanced Earth History, lect. and seminars to be arranged; P. E. Schenk. (Offered in 1975-76 and alternate years).

This class is designed to apply plate tectonics to the earth's past, and so to evolve the history of the earth's continental masses. The initial phase will describe in lecture format the geology of these continental blocks. After this survey, the theory of plate tectonics will be applied to the Northern Appalachians and will involve the geology surrounding the North Atlantic basin. After this example, seminars by students will attempt to reconstruct the evolution of chosen continental areas.
Prerequisites: Geology 302 and Geology 401/501.

456/506 Introduction to Micropalaeontology, hours to be arranged; F. Medioli.

The class offers a general systematic study of the major groups of microfossils, mainly foraminifers, ostracoda and calcareous nannoplankton. It is intended to provide a survey for those who do not plan to go further with the subject, and to provide the

necessary basic knowledge of principles and concepts for those who may wish to continue in stratigraphy, historical geology and micropalaeontology.

Particular emphasis will be put on recent microfauna and techniques for sampling and studying them. The class involves only one hour a week of formal lectures, but at least one afternoon laboratory class. Each student will be asked to present a seminar during the year.

457/507 Principles of Pleistocene Geology, H. B. S. Cooke. (Offered in 1975-76 and alternate years.)

A seminar class designed to expose the student to the special problems involved in the interpretation of Pleistocene deposits, rather than to a particular study of Pleistocene stratigraphy. The matters covered include: the origin, distribution and nature of snow and ice; movement in glaciers and ice caps; glacial stratigraphy; sea level fluctuations; ocean floor deposits; climatic changes evidenced in non-glaciated regions; theories of ice ages.

A special half-credit laboratory programme complimentary to this seminar is offered in the Department of Biology as Biology 4064C, Pleistocene Biogeography. All students taking Geology 457/507 are urged most strongly to take the additional half credit class Biology 4064C. It will be counted, where convenient for the student, as a geology credit Geology 464C. For details see entry under Biology 4064C.

Students who are admitted to the class are expected to possess sufficient background to be able to prepare competent seminar talks, which are an essential part of the programme. Although this will normally mean a good background in geology, students with advanced standing in biology will be admitted. Reading forms a substantial part of the class as there is no single text available.

460/560A Principles of Isotope Geochemistry, lect.: 3 hrs.; lab.: 3 hrs.; G. K. Muecke. (Offered in 1974-75 and alternate years).

The study of naturally occurring isotopes, both radioactive and stable, forms a major and ever expanding field of geochemistry. This class introduces the student to the fundamental concepts of nuclear chemistry such as types of nuclear disintegration, nuclide systematics, nuclear reactions, etc. The role of isotope fractionation in geological processes will be discussed with reference to stable isotopes. Particular attention will be paid to the isotope geochemistry of hydrogen, carbon, sulfur and oxygen.
Prerequisites: A good background in Geology *or* Physics, *or* Chemistry, and permission of instructor.

460B/560B Geochronology, lect.: 3 hrs.; lab.: 3 hrs.; P. H. Reynolds; (Offered in 1974-75 and alternate years).

The absolute dating of pre-historic events, be they the shaping of tools by ancient man or the formation of the solar system, constitutes a fundamental problem encountered in most geological and geophysical studies. The emphasis in this class will be on methods of age dating based on the radioactive decay of naturally occurring isotopes; other methods will be discussed briefly. The role of radioactive isotopes and their daughters as tracers in geological processes will also be stressed.
Prerequisites: Geology 460A, or equivalent, plus a good background in geology, *or* physics, *or* chemistry, and permission of instructor.

461/561 Marine Geology and Geophysics, hours to be arranged; M. J. Keen, D. J. W. Piper, R. D. Hyndman.

We are concerned in this class with some modern concepts and techniques in marine geology and geophysics. We will in the course of the year take a few topics and consider them in some detail. A study of one of the inlets of the Atlantic coast of Nova Scotia will be an integral part of the course, occupying a few days in the fall term, to be arranged at the convenience of the class and instructors.
Prerequisites: Geology 302 *or* 306A, B *or* permission of instructor.

462/562 Applied Geophysics, lect.: 3 hrs.; P. H. Reynolds.

This will be a mathematically oriented class designed for senior undergraduates and for graduate students. Substantial background in mathematics and physics will therefore be required.

Topics: Fundamental of elasticity theory and the wave equation, plane seismic waves in layered media, seismic interpretation theory, potential field theory, reduction and interpretation of gravity data, reduction and interpretation of magnetic data, the resistivity method, electromagnetic induction theory, methods and interpretation.
Prerequisite: Interested students should consult with instructor.
Text: Grant and West, *Interpretation Theory in Applied Geophysics*, McGraw-Hill, 1965.

Geology Seminar
Papers are presented by guest speakers, members of the staff and senior students. All graduate students are required to attend.

Field Classes

Spring Class in Field Geology
In co-operation with Mount Allison, St. Francis Xavier, and St. Mary's universities, a field course of approximately two weeks' duration is conducted at Crystal Cliffs, N.S. This class is held immediately following the conclusion of spring examinations. It is compulsory for students specializing in geology after their third year. A fee of about $50, for full board is payable with the second instalment of university fees.

German

Associate Professors
F. Gaede
D. Steffen

Assistant Professors
K. Fricke
R. Ilgner
A. Roulston
H. G. Schwarz

Lecturers
G. Josenhans

German studies may be divided into two programmes. The first is the study of the German language itself, the second the study of German contributions to the European literary and philosophical tradition.

Many students will take German to acquire knowledge of an important foreign language. German is spoken in Central Europe (Germany, Austria, the major part of Switzerland, and some other areas). German will prove useful in academic fields such as philosophy, music, history and the social and natural sciences. It is also relevant to some of the professions involving international relations in government, journalism and business. Several introductory language classes (German 100, 150) intermediate (200, 201, 202), and advanced (300) language classes are offered by the department. Special aids include a language laboratory and the setting up of conversation groups.

Classes in German literature and thought are offered to students who wish to pursue further studies. German culture has produced some of the greatest achievements in the European tradition, particularly in literature, music and philosophy. The years between 1750 and 1830, to mention just a period of eighty years, produced such figures as Goethe and the Romantics, Mozart and Beethoven and Kant and Hegel, the representatives of German idealism.

Classes offered cover all German literature from the 16th to the 20th century, studied either in the context of cultural periods or as the work of individual writers.

Advanced studied in German will prove useful to high school teachers; they will also prepare students for graduate studies and professions such as those of critic, editor, translator and university professor.

Degree Programmes

General B.A. in German
Students concentrating on German should take a minimum of three German classes beyond the 100 level.

B.A. with Honours in German (major programme)
Students considering an honours course are advised to consult the Department of German.

Year I
1. German 100.
2-3. Two classes from Classics 100, Comparative Literature 100, Philosophy 100.
4. A social science class.
5. An elective.

Year II
6-8. German 200, 202, 221.
9. One class from Classics 100, Comparative Literature 100, History 100, Philosophy 100.
10. An elective.

Year III
11-12. German 301, 303.
13. One class from German 300, 302, 352, 353.
14. A class in the minor subject.
15. An elective.

Year IV
16. German 400.
17. German 401 or 402.
18. One class from German 401, 402, 451, 452.
19. One class in the minor subject.
20. An elective.

Combined Honours
It is possible for students to take an honours degree combining German with French, Russian, Spanish, English or Greek. Any student intending to take such a combined honours degree should consult with the two respective departments to arrange the details of such a programme.

Programme for Future Teachers of German.

The Department also offers a special one-year programme in conjunction with the Department of Education for third year students of German. All courses under this programme must be taken as a unit. Any student desiring to pursue this programme should consult with the Department.

1. *Prerequisite:* Successful completion of an intermediate German Class (such as German 200) or equivalent.

2. *Structure of Programme.*
a) intensive language training (German 300)
b) philology and linguistics (German 350)
c) teaching methods (German 351)
d) work in German civilization

Introductory Classes Offered

100 German for Beginners, lect.: 3 hrs.; G. Josenhans, A. Roulston, H. G. Schwarz.

German 100 is a seminar class for beginners, and no previous knowledge other than a reasonable background of English grammar is required. Its equivalent is two years of German in high school with a final mark of 75% or better. While the texts may be similar to those used in high schools, the University class offers more facilities for learning, such as language laboratories and opportunities for oral work, supplies of books, and magazines and papers in German for study. More independent work is demanded of the student than is customary in high schools.

The class is taught mainly in German, emphasizes the spoken language, and provides the student with the knowledge of basic grammar.

Intensive language laboratory work and attendance at small conversation groups is required.
Text: Schulz/Griesbach: *Deutsche Sprachlehre für Ausländer, Grundstufe in einem Band.*
Glossary: *Deutsch-English. Deutsche Sprachlehre für Ausländer, Grundstufe in einem Band.* Huber Verlag, München.

This class or its equivalent is a prerequisite for all classes on the 200 level.

105 German Reading Course for Beginners, lect.: 3 hrs.; A. Roulston.

This class is designed for students who wish to have a good reading knowledge of the German language. A successful completion of the class should enable the student to read German newspapers and texts in the humanities and social sciences. This class may also be chosen as a prerequisite for German 201. To proceed to German 200 a student must have a high second class mark or the permission of the Department.

All students are required to attend a tutorial 1 hour per week to promote reading fluency.
Text: Jannach, *German for Reading Knowledge,* American Book Co., New York. German periodicals and newspapers.

110 German Literature in Translation, lect.: 3 hrs.; R. Ilgner.

Major works by Hesse, Kafka, Brecht, Böll, Grass, Weiss, Dürrenmatt, Mann will be read and discussed in English. Although there is no prerequisite for this class, it is recommended for students taking a beginner's German class concurrently. Detailed reading lists will be available from the Department before preregistration in the summer. Practice in written and oral reports will be carried on throughout the year.

150 Intensified German, lect.: 5 hrs.; lab.: 2 hrs.; R. Ilgner.

This class combines the objectives of both German 100 and 200; no previous knowledge of German is required. German 150 counts as two classes, equivalent to those of German 100 and 200; it is thus designed for those students who wish to take German for their first-year elective. Students who wish to acquire firm command of a foreign language may concentrate their efforts in one year; students planning to proceed to advanced language or literary classes will be provided in their first year with the entrance requirements for classes beyond the 200 level.

The final objectives of the class are the same as those of German 200: oral and writing fluency on the basis of expanded knowledge of grammar and vocabulary.

Students will first become familiar with the basic patterns of spoken and written German and will learn to use them through repetition.

Students will acquire a vocabulary of about 600 words. In the second stage, instruction will concentrate on systematic grammatical studies, translation and writing skills, while speaking competence will be developed throughout the whole year.

Students will spend an average of two hours a week in the language laboratory to support grammatical studies and to develop aural comprehension. One hour a week will be dictated to conversational practice exclusively.
Text: Schulz/Griesbach: *Deutsche Sprachlehre für Ausländer,* Max Hueber Verlag, München.

Intermediate Classes Offered

Intermediate classes are based on German 100, high school German or an equivalent basic knowledge.

At the outset of these classes, the student should have a vocabulary of approximately 600 words and the ability to understand simple questions in German, to write a composition of about 80 words and to summarize or retell a simple story. The student should also have a basic knowledge of grammar including declension of nouns and pronouns, conjugations of verbs, active and passive voice, use of preposition, declensions of adjectives, syntax — main clauses, dependent clauses, questions, imperatives, direct speech. The knowledge required can be found in books of German 100 or Grade X, XI, XII German, and in German basic work lists.

A combination of German 200 and German 202 serves as an accelerated Intermediate German course and is designed for students who want to make rapid progress in the language.

200 Intermediate German, lect.: 3 hrs.; K. Fricke, G. Josenhans, H. G. Schwarz.

The main aim of this class is to develop in the student a certain degree of speaking fluency as well as writing skills through the improvement of grammatical knowledge and vocabulary. The class is based on German 100, high school German or equivalent basic knowledge. Since considerable stress is placed on this class on oral training, study of grammar will be limited to one hour weekly, given in English; the rest of the time is devoted to oral German.

Language Laboratory work is required. Small conversation classes once a week as an aid to speaking fluency are compulsory.

This class will continue to employ learning techniques to which students are familiar from their high school instruction and which are designed to teach students how to use a modern vacabulary and common grammatical and syntactical patterns. Students will find that the type of work they have been accustomed to perform in class will now have to be done in the language laboratory, while most of the instruction time in class is dedicated to the development of their language abilities.

The class work includes the reading of simple and moderately difficult modern German literature and a complete review of the basic grammar.
Prerequisite: German 100 or equivalent.
Texts: Schulz-Griesbach: *Deutsche Sprachlehre für Ausländer.*
Griesbach: *Deutsch fur Fortgeschrittene.*

201 Scientific German, lect.: 3 hrs.; A. Roulston.

This is primarily a reading and translation class designed to enable science students to read scientific papers, reports, and articles in scientific journals in the original language. The grammar text used in the class emphasizes those aspects of grammar that must be known to accomplish this. Class work emphasizes chiefly the analysis of typical sentence constructions found in the reading selections, vocabulary building and sight translations. Reading material is assigned from many sources in the major scientific fields. Students are encouraged to bring in additional reading material of their own interest to discuss in class. Once a student has sufficient knowledge of grammar and the basic vocabularly of scientific texts, he should have little difficulty in acquiring the special terminology of his own particular field, and be able to translate even at sight, with reasonable facility and speed. A reading knowledge of German is a prerequisite for many Ph.D. degrees.
Prerequisite: German 100 or equivalent.
Text: Eichner and Hein, *Reading German for Scientists,* (Chapman and Hall, London).

202 Exercises in Translation and Composition, lect.: 2 hrs.; D. Steffen, G. Josenhans.

English texts from various periods and of different types will be translated into German.

These translations will lead to the discussion of specific difficulties of grammar and construction. Students must prepare translations or compositions for each class. Dictations are given once a week. The class will be conducted mainly in German.
Prerequisite: German 100 or equivalent.

221 Introduction to German Literature, lect.: 2 hrs.; K. Fricke.

A study is made of selected texts representing major periods of German literature which will be related to the various stages in the development of German civilization. The class also serves as an introduction to literary criticism. At the beginning, Middle High German (in translation) and Baroque literature will be studied. The class will then concentrate on the two outstanding periods of German literature: 1750-1830 (Lessing, Goethe, Schiller, Kleist), and the 20th century (Kafka, Brecht).

These texts will also provide the material for a discussion of the characteristics of literary forms: poetry, narrative, prose, and drama. A tutorial "literary language" will be offered once a week.
Prerequisite: German 200 or equivalent.

Advanced Classes Offered

Advanced classes are based on German 200 or an equivalent knowledge.

300 German Composition, 3 hrs.; R. Ilgner.

The aim of the class is to develop in students the ability to express themselves freely and correctly in different styles (e.g. personal and official letters, reports, descriptions) within the vocabulary of present day German social, political, cultural and scientific life. Students will be required to do translations and exercises in syntax, and to write essays on various topics.

The class will also study the various uses of synonyms, idioms, different meanings of similar words, words within changing contexts, and vocabulary within selected word patterns.
Prerequisite: German 200 or equivalent.

301 Baroque Age, lect.: 2 hrs.; F. Gaede.

The class studies German literature between the 16th and 18th centuries as a direct reflection of the important religious, social and scientific developments in Germany after the Reformation and during Absolutism, particularly the 30 Years' War. Poetics, poetry, drama and prose, their origins in Humanism and the Renaissance and their functions for the following literature will be discussed. An introduction will be given to rhetorics, the art of emblematas and allegory, mysticism and mannersim which determine and characterize the European literature of the Baroque Age. The discussion will concentrate on the works of Brant *(Ship of Fools),* Grimmelshausen (picaresque novel), Gryphius (martyrdrama, sonnet), Flemming (Petrachism) and Angelus Silesius (mystic epigram). The study of these texts will give the students a thorough understanding of the epoch.
Prerequisite: German 200 or equivalent.

302 German Literature in the Age of Enlightenment, lect.: 2 hrs.; K. Fricke. (not offered in 1974/75).

303 The Period of Transition: Goethe and his Time Part I, Lect.: 2 hrs.; D. Steffen.

A study is made of German literature and thought of the time which preceded and witnessed the great revolutions of the 18th century. Stimulated by the success of the natural sciences and their rational investigation into nature, the Enlightenment turned against contemporary society, demanding that it be reformed on the basis of reason. The Germans, politically divided, participated in the revolutions not in the form of political action, but in the form of artistic creation and philosophical reflection. German men of letters attempted to understand the tendencies of the age and sought to reconcile the revolutionary spirit with the traditions that the revolution cast aside.

The discussion of major literary and theoretical writings of the time from 1770 to 1800 will first concentrate on later works by Lessing which reflect some of the inherent difficulties of Enlightenment. Following the course of history, the writings of the young Goethe, of Herder, Schiller and their contemporaries of "Storm and Stress" will then be studied. Criticizing Enlightenment, these writers expressed new conceptions of nature, history and individuality. Finally, Goethe's and Schiller's humanism or classicism will be discussed in an attempt to reconcile the individualism of the "Storm and Stress" with the objective forces in both history and nature.
Prerequisite: German 200 or equivalent.

320 German Special Topic Course, lect.: 2 hrs.

This course is designed to present subjects which are not regularly offered by the Department. This may include literary works of the past, contemporary literature, and topics which have connections with other fields of study.
Prerequisite: German 200 or equivalent. (Students who register for a specific program of study will consult their advisor.)

350 German Philology and Linguistics, lect.: 2 hrs.; H. G. Schwarz.

The aim of the class is to familiarize the student with the German language in its historic development as well as its present-day structures. The fields of phonology, morphology and semantics will be extensively covered and will also serve as an introduction to the methods of modern linguistics.

Students are expected to work independently or in groups on set projects.
Prerequisite: German 200 or equivalent.

351 Theory & Practice of Language Instruction, lect.: 2 hrs.; H. G. Schwarz.

This class is given in conjunction with the Department of Education and will introduce the future teacher of German into theory and practice of language teaching.

352 Aesthetic Theories, seminar: 2 hrs.; F. Gaede. (not offered in 1974/75).

353 Modern Theories of Art and Literature, seminar: 2 hrs.; F. Gaede. (not offered in 1974/75).

400 The Period of Transition: Goethe and His Time (II), lect.: 2 hrs.; D. Steffen. (not offered in 1974/75).

401 Literature and Society, 1830-1880, seminar: 2 hrs.; K. Fricke.

This class will concentrate on the literature of the "age of liberalism", the transition between feudal and industrial society. Summarily characterized as "realistic", its literature reflects the profound social changes which the bourgeoisie initiated and experienced and the confusion of values of this society.

Works by the following authors will be studied: Büchner, Heine, Mörike, Droste-Hülshoff, Keller, Storm, Hebbel, and Fontane. A detailed reading list is available at the Department.
Prerequisite: German 200 or equivalent.

Modern German Literature, lect.: 2 hrs.; F. Gaede. (not offered in 1974/75).

451 Studies in German Idealism, seminar, 2 hrs.; D. Steffen.

452 German Philosophy: Hegel's Phenomenology of Mind, seminar: 2 hrs.; D. Steffen.

The Phenomenology of Mind, published in 1807, was Hegel's first major work. He intended to write an introduction to philosophy by demonstrating the necessity of the advance from the most immediate form of knowledge to absolute knowledge. To achieve this he had to write the Phenomenology as an introduction to his own philosophy.

Graduate Studies
The department offers a graduate programme leading to the M.A. degree. Details of the M.A. programme are given in the Calendar of the Faculty of Graduate Studies.

Health Education

HE412 Human Sexuality and Educating About It, lect. and discussion: 3 credit hrs.; normally Spring; E. Belzer.

This class is concerned with basic knowledges and understandings regarding biomedical, psycho-social, historical, legal, religious, semantic and comparative cultural aspects of human sexuality from conception to senility. Consideration is given to adjustment needs and problems of children and adults in contemporary Canadian society and to educational efforts to help with them.
Prerequisite: Permission of the instructor.

History

Professors
P. Burroughs (Chairman)
J. E. Flint
P. Fraser
H. S. Granter
R. M. Haines
G. R. MacLean
P. B. Waite
J. B. Webster

Associate Professors
C. B. Fergusson
J. Fingard
P. D. Pillay
M. Reckord
L. D. Stokes

Assistant Professors
J. E. Crowley
J. F. Godfrey
D. A. Sutherland
G. D. Taylor
Visiting Fellow (1973-74), S. VanKirk

History as a Subject for Study at University
A sense of history is a primitive need felt by individuals and by groups. Just as a person needs to know who he is and how he arrived where he is, so human groups, races, classes, states and nations need a sense of their own past as part of their culture. This primitive sense of history is revealed in myths and legends, when peoples embroider what has come to them from the past to create a comfortable set of beliefs about their own previous exploits and origins. There are still those who wish to use history in this way, as a means to soothe doubt and demonstrate the essential rightness of their own beliefs.

The academic study of history, however, is concerned to discover as much as possible of the reality of the past and to interpret human behaviour in its changes through time. It is a unique subject, scientific in the way it uses evidence, but still an art because the reconstruction of the past requires a disciplined imagination and an effective rhetoric for the communication of meaning.

The contemporary world is one of intensive specialization, in which the varieties of human knowledge have increased well beyond the capacity of any individual to command them all. These developments have reinforced the role of history as the foundation of a person's education, because history can never draw frontiers around itself to exclude any branch of human knowledge, although individual historians will want to select that portion of it especially relevant for them. History's field of study will always be the whole of human experience.

History is the study of how and why changes in human life occur, and with what results.

Aims of Teaching and Study
Many students entering university history classes have difficulty in adjusting to the university levels of study. The ability to repeat what has been heard in lectures and to memorize events which fall between dates at the end of the class title is of little value. Students should *understand* the nature of the problems which have been studied; they should also *command* the knowledge which has been gained, in the sense of being able to arrange it in significant patterns and to allow ideas to be tested against such knowledge.

The subject of history does not have a monolithic body of knowledge. Historical understanding is a matter of interpretation, of offering explanations for events and movements which are subject to constant revision by scholars. Arguments, scepticism and controversy are thus the very stuff of history. The history student does not merely acquire a particular mass of information; he learns to think for himself.

At all levels of study in history, students are guided through lectures and tutorials and encouraged to read books and articles which consider the same problems from different viewpoints. Dalhousie has an excellent collection of historical literature and the Killam Library provides students with good conditions for private study and reading. Students are encouraged to acquire gradually a small, well-chosen personal library from the large number of excellent books published in paperback form.

Degree Programmes

Classes in history are set out below. There are several levels of study. 100-level classes are primarily for first-year students; 200-level classes treat broad geographical areas over specified periods; and 300/400-level classes provide opportunity for specialized study and advanced work for the undergraduate.

The Department appoints advisors to counsel students. Before registration students

should consult with departmental advisors concerning their programme of study and should secure departmental approval for admission to the particular classes they wish to take.

1. General Degree Programmes
Students who wish to major in history choose a 100-level class and at least five or six and no more than eight upper-level classes, of which two or three should be at the 300-level. First-year students may take two 100-level classes in history.

Students who wish to build up a greater specialization in history than the minimum requirements may do so by taking classes in ancient history from the Classics Department, in economic history from the Economics Department and in contemporary history from classes offered in Political Science. The Biology and Physics Departments also offer a class in the history of science. Such classes are listed in the Calendar under the heading of the department concerned.

2. Interdisciplinary Programmes
Medieval Studies Programme.
African Studies Programme (for details consult the Department).
Canadian Studies Programme.

3. Honours Degree Programmes
Students may choose from several honours programmes:

European: A selection of classes in Medieval, Early Modern, and Modern European history with emphasis, if desired, on the national history of a European country.

North American: A concentration of classes in the history of Colonial North America and in Canadian and United States national history.

African: Classes in African history may be combined with classes in British colonial history.

British and British Imperial: A concentration of classes in the history of England and of the British Empire and Commonwealth.

General: A wide selection of classes from North American, British and Imperial, African and European history.

All programmes include related studies in language, literature, philosophy, economics and political science.

Classes Offered at the 100 Level

100 This Century Has Ten Decades, lect.: 2 hrs. plus arrangements, J. F. Godfrey.

Where have we been for the last 100 years and how did we get here? To resolve these questions, this class offers the possibility of experiencing the events, ideas and colour of the modern world through lectures, video tapes, happenings, and rap sessions. This is history for people who think they hate history.

102 European History and Civilization (not offered 1974-75).

120 History of Canada, lect.: 3 hrs.; P. B. Waite.

This class will cover the development of Canada from prehistoric Indian cultures to Pierre Trudeau. It will have a central core of social and political history, but will range across economic history as well as Canadian literature. This is history for people who like Canada.

199 Problems of Historical Study and Writing, seminar 2 hrs.

This class is for first-year students only. It is intended to introduce the student to the problems of historical study, including the nature of historical evidence, how problems are analyzed, what is meant by such concepts as "causes" and "results", how problems are analyzed, what is meant by such concepts as "causes" and "results", and especially how the student can learn to think for himself about historical problems and to express his thoughts in carefully organized written work. No lectures take place; instead, each student registers for a section dealing with the type of history which interests him. The sections are limited to fifteen students and meet once a week. Each student must write an essay per month. The general techniques of study and writing are thus acquired by consideration of particular problems in a field of special interest to the student. This is history for people who like history.

Some of the sections that may be offered:
199/1 Revolutionary America and Republican Culture, 1750-1820, J. E. Crowley.
199/2 Spain, France and England in America: The Indian Experience, J. Fingard.
199/5 Medieval Life and Thought, R. M. Haines.
199/6 Blacks and Whites, 1496-1970, M. Reckord.
199/7 Fascism and Nazism, L. D. Stokes.
199/8 British Imperialism and West African Nationalism, 1850-1920, J. E. Flint, J. B. Webster.
199/9 Canada, 1835-1935: Gentlemen versus Rebels, D. A. Sutherland.
199/10 America and the Cold War, 1940-1970, G. D. Taylor.

Classes Offered at the 200 Level

History 100, 102, 120, 199 provide appropriate preparation for 200-level classes.

European History
200 Medieval Europe, lecture/discussion/tutorial sessions; 2 hrs.; R. M. Haines.

Within a broader framework the class will give particular attention to the Age of Charlemagne, The Twelfth-Century Renaissance, and the concept of decline in the context of the Later Middle Ages.

201 Early Modern Europe, tutorial: 2 hrs.; J. E. Crowley.

This class involves a survey of European history, approximately from 1500 to 1800. Among the topics treated are the Reformation and the Counter-Reformation, economic and cultural expansion overseas, the consolidation of national states and their attendant rebellions, the intellectual history of political and scientific development, and the changes and continuities in economic and social structures.

205 Modern Europe, J. F. Godfrey, L. D. Stokes.

This course discusses selected topics in European history between the French Revolution and the end of World War II. Among these are France during the revolutionary and Napoleonic era; the Industrial Revolution in Britain and on the continent; Marxism and the revolutions of 1848; Darwin, Freud and modern science; the First World War; the Soviet Union under Lenin and Stalin; and Fascism and Nazism between the wars. For each topic, there will be one week of general and a second week of specialized readings, followed by a week devoted to student projects. There will also be several guest lecturers during the year. Attendance and active participation in all sessions are required. One section of the course will be given in the evening.

British and British Imperial History
210 The History of England, lect.: 2 hrs. plus tutorial sections, H. S. Granter, P. Fraser.

The main features of English history, from Anglo-Saxon times to the twentieth century, are given selective treatment and put in historical focus. The emphasis is on the development of a society and culture which, though similar to Western European, has its own particular and peculiar characteristics.

213 British Empire and Commonwealth, lecture/discussion: 2 hrs.; P. Burroughs, M. Reckord, P. D. Pillay.

The class examines a series of topics and themes, chosen principally in the period from the American Revolution to the present, to illustrate the character and motivation of British expansion overseas. Changing British attitudes and policies towards the empire, problems created by the contact of white settlers and indigenous populations, colonial revolts and independence movements will be discussed. A section of this class may be given in the evening.

North American History
220 The Canadian Mosaic: Themes in Canadian History, informal lecture/discussion: 2 hrs.; J. Fingard, D. A. Sutherland.

History 220 explores major themes and problems in Canadian history from the seventeenth to the twentieth centuries. The treatment of events will be topical and concerned with the French Colonial, the British Colonial, and National Periods. Within these periods the emphasis will be upon interest groups and the colonial, regional, and ethnic characteristics of Canadian history. The class is designed to provide the undergraduate with an understanding of the Canadian experience and provide a framework in preparation for more advanced study. A section of this class will be given in the evening.
Prerequisite: A history class at the 100-level.

222 Canadian Economic History, lect.: 3 hrs.; (for details see Economics 232).

230 American History, lect.: 2 hrs.; G. D. Taylor.

The class acquaints students with the process through which a colonial, then provincial, society became a continental force and finally a world power. Lectures and assigned reading give the student a comprehension of patterns of social, political, economic, and cultural development. The writing of essays encourages the mastery of specific knowledge of how those patterns became such. In this way, general themes of American history are the means by which students increase their ability for thinking and understanding.

240 History of Tropical Africa in the Nineteenth and Twentieth Centuries, J. E. Flint, J. B. Webster.

In lectures and tutorials students will be enabled to grasp and absorb some of the major themes of African pre-colonial history by a study of the internal politics and developments of African states and societies such as the Yoruba empire, Ashanti and Dahomey in West Africa, and African states like Buganda around the East African great lakes. The theme of cultural contact and it effects will be prominent in considering Muslim revolutions in West Africa, and Arab penetration in East Africa, as well as the impact of Christian missionaries in both areas. The second term will deal mainly with the impact of European colonial rule; the partition of Africa, the establishment of differing types of European rule, and African responses by resistance and nationalism which culminated in the emergence of independent African states. A section of this class will be given in the evening.

Classes Offered at the 300 Level

300-level classes in history are intended for third-year students who have completed work at the 100 and 200 levels. In general, these classes are concentrated in area and time and allow students to pursue interests developed in 200-level classes. The Department will probably be offering additional 300-level classes, details of which will be available at registration.

European History
300 Medieval Civilization, discussion/tutorial: 2 hrs.; R. M. Haines.

History 200 provides the appropriate background for this class. Each year a number of topics is chosen, wide enough to be used as central themes in the context of which medieval civilization can be studied; for instance, monasticism, universities, papal government, and architecture. Such topics will be studied in depth, with the help of original documents (in translation) where these are available, and using periodical literature. Students are expected to master the basic work in certain areas, but will also be encouraged to develop special interests of their own. Class discussion will be used to unravel more difficult aspects, and all students will be expected to contribute in this way and in the writing of a small number of well argued and documented papers. Some general books should be read before starting the class. Suggestions of this kind, with a list of the topics and appropriate explanation and bibliography will be available well in advance.

302 The Medieval Church, discussion/tutorial: 2 hrs.; R. M. Haines. (not offered 1974-75).

305 Modern Russia, discussion/tutorial: 2 hrs.; (instructor to be announced).

306 Modern France from the Revolution of 1848 to the Collapse of 1940, seminar: 2 hrs.; J. F. Godfrey.

"All my life I have thought of France in a certain way. This is inspired by sentiment as much as by reason ... Instinctively I have the feeling that Providence has created her either for complete success or for exemplary misfortunes. If, in spite of this, mediocrity shows in her acts and deeds, it strikes me as an absurd anomaly, to be imputed to the faults of Frenchmen, not to the genius of the land. But the positive side of my mind also assures me that France is not really herself unless in the front rank; that only vast enterprises are capable of counterbalancing the ferments of dispersal which are inherent in her people; that our country, as it is, surrounded by the others, as they are, must aim high and hold itself straight, on pain of mortal danger. In short, to my mind, France cannot be France without greatness". (Charles de Gaulle, *War Memoirs 1940-42*).

307 Modern Germany, discussion/tutorial: 2 hrs.; L. D. Stokes.

History 205 provides the appropriate background for the class which examines selected topics in 19th and 20th century German history. These include German nationalism and liberalism, the role of Prussia, industrialization, the political parties and civil-military relations. Extensive reading in primary and secondary sources is required and each student will prepare a research paper during the second term. A reading knowledge of German is not necessary.

310 History of Science, lect.: 2 hrs.; tutorial: 1 hr.; J. Farley, R. Ravindra.

(Same as Biology 3400 and Physics 340. Class description to be found under Biology 3400.)

English History
314 England under the Tudors and Stuarts, discussion/tutorial with occasional lectures: 2 hrs.; H. S. Granter.

This class will deal with such topics as the religious reformation in England, the rise of the gentry, the age of Elizabeth, the agrarian revolution, Anglican, Catholic and Puritan, the Civil War and the restoration of the establishment, parliamentary monarchy and the rule of law, and the growth of individual liberty.

316 England in the Nineteenth Century to 1867, discussion/tutorial, with occasional lectures: 2 hrs.; H. S. Granter.

The nineteenth century was England's century, the Victorian Age, the time of England's greatness. The class is devoted primarily to the study of the making of Victorian England, examining the impact of new machinery and new ideas on an older agricultural aristocratic society.

317 Late Victorian and Edwardian England, seminar, 2 hrs.; P. Fraser.

The class will examine selected aspects of political, social and intellectual history, such as the transformation of the Liberal party under pressures from Socialist groups, the Labour movement and the varied forces of Imperialism; the ideals and policies of special movements associated with temperance, social reform, imperial federation, tariff reform, women's suffrage, national service and defence; and the methods of political organization (whether of central or local government), parties, electioneering or campaigns in the press.

North American History
325 Canada Within the Empire, 1760-1896, discussion/tutorial: 2 hrs.; P. Burroughs.

History 213 or History 220 provide the appropriate background for this class,

which examines the political, commercial, and cultural relations of Canada with Britain from the conquest to the eve of nationhood; the changing attitudes of Canadians and Englishmen to the developing empire; and the interplay of imperial policies and colonial conditions.

327 The Nova Scotian Experience, tutorial: 2 hrs.; D. A. Sutherland.

Either History 120 or History 220 provides an appropriate background, and admission is restricted to third and fourth year students. This class examines the evolution of Nova Scotian society from the settlement era to the 20th century. Emphasis will be placed on analysis of the internal and metropolitan pressures which together moulded the character of the provincial community. Students are encouraged to use local archival sources in the preparation of their research papers.

328 The Age of Macdonald and Laurier, seminars with some lectures, 2 hrs.; P. B. Waite.

This class will deal with the growth and expansion of British North America from 1840 through the Confederation period to 1914. There will be emphasis on social and political history, but students can expect substantial excursions into Canadian economic history and Canadian literature. History 120 or 220 is an essential prerequisite, and admission is restricted to third and fourth year students. A reading knowledge of French is not essential, but it is helpful.

329 Canadian Social History, seminar: 2 hrs.; J. Fingard.

History 220 provides the appropriate background for this class which examines social attitudes and problems of various elements in the population in the 19th and early 20th centuries. The topics include: British and American influences; immigration, settlement, and class structure; moral and social reform movements; manifestations of nativism; cases of privilege and inequality. For their essays, students will be encouraged to write research papers, which may be based on Nova Scotian sources.

334 The Anglo-American World: 1600-1815 (Not offered in 1974-75).

This class considers the interaction of British and North American colonial experiences during the exploratory and commercial ventures of the Elizabethans, the development of permanent colonies, the consolidation of mercantile and imperial organization, the American Revolution, and the establishment of national economic and governmental institutions. The general problem studied is that of cultural diffusion and interaction. Focusing on patterns of growth and change in political, economic, social and religious institutions, the class integrates the American colonial experience with British expansion elsewhere overseas and with political and cultural conflict at home. The major themes of the class are the interplay of British and American politics, the role of ideas as guides to action and limits of perception, the transplantation and modification of British institutions, and the effect of the new world on the old.

335 Colonial America, tutorial: 2 hrs.; J. E. Crowley.

337 Colonized and Colonizers: Studies of Emergent Nations in the Caribbean, seminar: 2 hrs.; M. Reckord.

This class will examine the impact of imperialism on the Caribbean: analyze the characteristics of Spain, French and British colonial societies and the nature of the recurrent struggles for independence.

339 The United States in the Twentieth Century: The Architecture of Complexity, tutorial: 2 hrs.; G. D. Taylor.

This class investigates the response of American political and economic institutions to the problems of industrialization and urbanization. Study focuses on patterns of organization: the growth of public and private corporate forms of bureaucracy; the emergence of new interest groups; and the impact of these developments on the traditional American political and social structure. The class will emphasize discussion and individual research by the student within this general framework.

African History

344 The Origins of Tribalism and Nationalism in Africa, J. E. Flint, J. B. Webster.

History 240 or History 213 both provide an appropriate background for this class. Students who do not have this preparation may be admitted, but should consult the instructor before registering.

The class involves the comparative study of various types of nationalism as they developed in Africa during the nineteenth and twentieth centuries. The emphasis will be on tropical Africa, which involves consideration of whether distinctions can be made between "nationalism" and "tribalism", but comparative material from Afrikaner and Egyptian nationalism will be used. The class will consider such questions as the influence of Christian and Islamic missionaries on nationalism, the extent to which such movements were a reaction against colonial rule, the social context of such movements and the nature of their political, social and economic goals. Students will be expected to use documentary sources.

345 History of South Africa, lecture/tutorial, 2 hrs.; P. D. Pillay.

History 213 provides an appropriate background for this class, or History 220 for students wishing to make comparative studies with themes from Canadian history. The class concentrates on the period since the British acquisition of Cape colony, and examines the development of relationships and tensions between the English and Afrikaans speaking groups, and between the white population and other races. The main topics considered are the rise and fall of the Zulu nation, the opening up of the interior, the imperial factor and its effects on Cape and Transvaal politics of the late nineteenth century, South African Union, Afrikaner nationalism and the development of apartheid.

Classes Offered at the 400 Level

Both History 460 and History 499 are required of fourth-year history honours students; first-year M.A. students may also attend History 460.

400 Palaeography, discussion/tutorial: 2 hrs.; R. M. Haines.

This class is intended to provide an introduction to the study and use of mediaeval records, mainly those from English archives, as well as practical instruction in their transcription. The records studied will be almost exclusively in Latin, so some knowledge of the language is required at the outset.

460 History in Theory and Practice, discussion/tutorial: 2 hrs.; P. Fraser.

The topics covered will be adaptable to the needs and preferences of students, but in general terms the class will consist of studies in historiography, schools of history, the diversity of historical topics such as art history or the history of science, and the debate about the theory of the discipline of history.

499 Honours Essay, Staff

All history honours students and those in combined honours courses in which history is their principal subject, must write a substantial essay on a topic to be chosen in consultation with the Undergraduate Committee. The essay will be related to one of their 300 or 400 level classes and will be supervised by the appropriate staff member.

Graduate Studies

M.A. and Ph.D. programmes in history are offered. For details of classes, see the Calendar of the Faculty of Graduate Studies.

Humanistic Studies in Science

Attention is drawn to the following classes, offered in several departments. All of these classes are concerned with the humanistic aspects of scientific thought and its development.

History of the Sciences

Biology 3400/Physics 340/History 310, The History of Science; J. Farley, (Biology), R. Ravindra (Physics).

Physics 120, Science and Heresy, W. Silvert.

Biology 4404, History of Biology, J. Farley, K. von Maltzahn.

Physics 402B, Special topics in the History and Philosophy of Science; R. Ravindra.

Psychology 358, History of Psychology; J. W. Clark.

Philosophy of Science

Philosophy 305, Epistemology, A. Rosenberg.

Philosophy 465, The Philosophy of Science; A. Rosenberg.

Sociology of Science

Sociology 325, Sociology of Science and Ideas, D. H. Elliott.

Details of the above classes will be found under the appropriate departmental listings.

Linguistics

The departments of French, German and Spanish each offers classes in linguistics, details of these classes will be found under the departmental listing.

Mathematics

Professors

J. Ahrens
E. Blum
M. Edelstein
A. J. Tingley

Killam Research Professor

P. A. Fillmore

Associate Professors

H. Brunner
D. S. Chehil
R. P. Gupta
E. L. Heighton
S. N. Sarwal
W. R. S. Sutherland (Chairman)
S. Swaminathan
A. C. Thompson

Assistant Professors

J. C. Clements
K. A. Dunn
C. A. Field
J. F. Goodfellow
L. A. Grünenfelder
C. S. Hartzman
R. D. Holmes
I. Jolliffe
L. L. Keener
E. B. Mercer
R. Paré
F. J. Servedio
W. R. Smith
P. N. Stewart
K. K. Tan
K. L. Weldon

Senior Killam Research Fellow

H. Radjavi

Research Associates

J. Bastian
S. Fesmire

Lecturer

D. Naugler

Post-Doctoral Fellows

T. Melnyk
M. Radjabalipour
S. Sorensen
Y. Tago

Degree Programmes

Mathematics as an Area of Concentration.

Students who plan to major in Mathematics should arrange a programme in consultation with a member of the Department. A major programme will include 200, 203-204 (or 213) (or equivalent courses) and at least one course numbered 300 or above. The courses 102, 106-107, 110, 111-112, 220, 228, and 328 may not normally be included.

The Department offers courses of interest to majors in the following areas of Mathematics: Calculus and Differential Equations: 200, 300, 311, 312.
Analysis: 250, 302, 304, 350.
Geometry, Logic, Theory of Numbers: 202, 205, 305, 307.
Algebra: 203, 204, 213, 303.
Probability and Statistics: 206, 306, 310, 316.
Numerical Analysis: 225, 227, 320.
Operations Research: 230, 330, 331.

Those students who wish to arrange interdisciplinary programmes (with such fields as Computer Science, Physics, Chemistry, Biology, Psychology and Economics) are invited to discuss their interests with the Department.

Honours in Mathematics

Students who wish to take honours in mathematics may not be able to complete their courses in the usual four years if they do not have senior matriculation mathematics, unless they take a "make-up" class during the summer immediately preceeding or following their first year at the University. Such students should consult the chairman of the department when accepted. Other students interested in an honours degree should consult the chairman of the department before the end of their first year if possible, but in any case during the second year.

The following programme will normally be followed by students who plan to take Honours in mathematics. Adjustments which do not conflict with the general regulations may be made.

Year II

Mathematics 250 (or 200), 203, and 204 will normally be taken. Math 203 and 203 and 204 may be taken in Year I by well-qualified students with the consent of the instructor, in which case another course may be selected in Year II.

Year III and Year IV

Math 350 (or 300) and Math 303 and five additional classes at least two of which will be numbered 400 or above. Of these five classes, normally at least three will be selected from groups I and II below with at least one from each group. Other classes may be selected from these or other offerings of the department.

I	II
205*	306*
302 and 304	310*
305*	311 and 312
307*	320
401	330 and 331
403	402

*Note: These classes are usually offered only in alternate years.

Honours Comprehensive Examination

The Honours Comprehensive examination will be a verbal presentation of a suitable topic requiring comprehensive knowledge. The topic is to be selected in January of the graduating year for presentation in March.

Combined Honours

Students interested in taking honours in mathematics and another subject as a combined programme should consult the chairman of the department, through whom a suitable course of study can be arranged.

A combined honours programme may be appropriate for many. Students contemplating a combined honours course in mathematics and another subject should, however, bear in mind that the work in either subject would probably be insufficient for admission to a regular graduate programme. A qualifying year would usually be necessary.

Classes Offered

All students please note the following:

The listed prerequisites indicate the mathematical background expected of students entering any class but may be waived with the consent of the instructor.

In any one academic year, the mathematics

department offers only a selection of the classes described here. The student should consult the 1974-75 university timetable or the department to determine those classes which are given in 1974-75.

001 Fundamentals of Mathematics, lect.: 3 hrs.
This class may be offered in place of senior matriculation mathematics as a prerequisite for first year classes at the University. Normally, junior matriculation mathematics as taught in Grade XI in Nova Scotia is expected as a background but mature students or others who are well motivated are able to cope with the work of this class. The text has been chosen to include analytic geometry and elementary trigonometry for those going on to the calculus, but the evolution of the number system, functions and matrices are studied along with other topics to provide a good background for those wishing to build up their knowledge of the fundamentals of mathematics for other reasons.

100 Differential and Integral Calculus, lect.: 3 hrs.

Part 1. Review of precalculus mathematics, sequences, convergence, limits, functions, continuity, differentiation of polynomials, trigonometric, exponential and logarithmic functions. Applications. Differentiation techniques. Mean value theorem. Antiderivatives and definite integrals. Elementary differential equations and applications.

2. Topics will include some of the following:- Series, Taylor series, parametric equations. Differential equations and applications. Numerical techniques. Vectors, arc length, curvature, polar coordinates. Higher derivative tests for maxima and minima. L'Hospital's rule. Hyperbolic functions.

Sections (3) and (5) of this class are primarily for engineering students while section (13) combines the study of calculus with an introduction to the use of a computer.

Not more than one credit will be given for Math 100, 110, 111, 112, 151.

Prerequisite: Familiarity with Euclidean geometry, polynomials, elementary trigonometry and Euclidean plane analytic geometry. In addition to these specific topics, a degree of mathematical maturity is required. A student completing Grade XII mathematics in Nova Scotia or a similar course elswhere should be ready for calculus.

102 Mathematics for Liberal Arts Students, lect.: 3 hrs.

The course is intended for students at the university who wish to become acquainted with mathematics as an art rather than as a tool for the sciences. It will discuss some of the more elementary yet interesting and entertaining aspects of mathematics for a student who has completed senior matriculation in high school and who wishes to see more of mathematics.

Topics will include truth tables, examples of axiom systems and models, the integers, mathematical induction, properties of the "infinite" versus the "finite"; the real numbers, some calculus — definitions and examples of the derivative and the integral and their elementary properties as far as the Fundamental Theorem of Calculus.

Historical facts and cultural significance will be stressed continually.

This class will be offered only if there is sufficient enrollment.

Prerequisite: Senior High School Mathematics.

106 Introductory Statistics for Non-Mathematicians, lect.: 3 hrs. (Half-course).

Through extensive use of illustrative real-life examples, the student is introduced to the basic concepts of statistics: data reduction, estimation, and hypothesis testing. These examples will be drawn from a wide variety of disciplines. The emphasis of the course will be on statistical concepts, rather than mathematical manipulations. The course is open to students of any year.

The principal aim of the course will be to enable students to identify and formulate the statistical aspects of real-life problems and to become familiar with the statistical vocabulary most commonly used in scientific journals. The student must also become aware of the pitfalls that await the naive user of statistics. Students requiring a more extensive exposure to the statistical methods of scientific experimentation are encouraged to follow this course with Math 107.

Topics will include descriptive statistics, elementary probability and distributions, estimation, hypotheses testing and regression.
Prerequisite: High school algebra.

107 Statistical Techniques of Scientific Experimentation, lect.: 3 hrs. (Half-course).

This course extends the introduction of statistics provided by 106 to include a collection of techniques that are widely used in the experimental sciences. Topics will include regression and correlation analysis, analysis of variance, and curve-fitting techniques. The presentation of these topics will include consideration of the statistical aspects of experimental design.

The objectives of this course are:
1) to explain what information can be obtained from experiments through use of these techniques.
2) to explain the assumptions that must be satisfied before these techniques can be applied.
3) to illustrate the nature and methods of the necessary computations.
Prerequisite: Math 106.

110 Mathematics for Commerce and Economics, lect.: 3 hrs.

The class provides a survey of mathematical techniques which are useful in analyzing mathematical models in economics and management. The material covered in the class is similar to that presented in mathematics 100. However certain topics (such as Taylor's series, volumes of revolution) included in Mathematics 100 are not covered in Mathematics 110. In their place Mathematics 110 includes an introduction to matrix algebra, maximization of functions of two variables and Lagrange multipliers.

This class is intended as a survey class for students who are not going to take further work in mathematics. Students who are going to take other mathematics classes should take Mathematics 100 rather than Mathematics 110 as Mathematics 100 uses a more rigorous mathematical approach. Throughout the class, applications of mathematical techniques to economic and management problems will be stressed.
Prerequisite: High school mathematics.

111 Finite Mathematics for Commerce, lect.: 3 hrs. (Half-course)

This half course is designed to give the student an introduction to finite mathematics with an emphasis on applications in commerce. This course and Math 112 together satisfy the mathematics requirement in the Commerce department. Students planning to take more advanced courses in mathematics may wish to take Math 100 and should consult the department in this regard.

Topics include: probability theory, linear algebra, linear programming, decision theory, and the mathematics of finance.
Prerequisites: High school mathematics.

112 Introductory Calculus for Non-Mathematicians, lect.: 3 hrs., (Half-course).

This course is designed primarily to fit the specifications of the departments of Commerce and Pharmacy (with different sections for each). The essence of calculus is extracted and computational techniques are stressed. These techniques are extensively applied to those functions which occur most often in commerce and pharmacy; namely, power functions, exponential functions and logarithmic functions. Topics studied include limits and continuity, the derivative, the definite integral and applications of these to pertinent examples. In addition, commerce students will study functions of several variables while pharmacy students will study elementary differential equations.
Prerequisite: High school mathematics.

151 Differential and Integral Calculus for Honours Students, lect.: 3 hrs.

This class, to be formed in the second term, is designed for students who, after a one-term exposure to Mathematics 100, have shown the ability and interest for a more rigorous introduction to Analysis.

Syllabus: The real line R (as a complete ordered Archimedean field); basic topology for R; the concept of mappings, in particular those of R into itself. Sequences, convergence and criteria for convergence. Limits and continuity of functions. Properties of continuous functions (like attainment of intermediate values, attainment of lub, etc.) Uniform continuity. Differentiation, Rolle's Theorem, Mean-value Theorem, Taylor's Formula, Taylor's Series. Theorems on uniformly convergent series of functions. Integration, definition and properties of Riemann integrals, evaluation. Fundamental Theorem; some techniques of integration; improper integrals.
Prerequisite: Good standing in Math 100 (December mark) and consent of instructor.

200 Intermediate Calculus, lect.: 3 hrs.

It is assumed that students taking this class have already acquired some knowledge of Calculus. Conceptual aspects will be treated, while stress is laid on manipulative techniques which lend themselves readily to applications in physics and engineering.

Topics include: real number systems, continuous functions and their fundamental properties, partial derivatives and applications, convergence and divergence of infinite series, power series, double integral, functional determinants, geometry of euclidean vector spaces with emphasis on three dimensions, elementary differential equations.
Prerequisite: Mathematics 100.
Credit will not be given for more than one of Math 200, 220, 228 and 250.

202 Basic Concepts of Mathematics, lect.: 3 hrs.

Basic concepts from set theory and logic form the basis of the course. From set theory — partitions, partial and linear order relations, equivalence relations, functions, and the number systems (constructed using decimal rationals). Fundamental algebraic structures are defined and applied in the development of the real numbers. From mathematical logic — symbolic logic (special attention to tautologies), propositional and predicate calculus as far as Henkin's Completeness Theorem.
Prerequisite: Math 100.

203 Matrix Theory, lect.: 3 hrs. (Half-course).

Topics will include the following: solutions of systems of linear equations, matrices and matrix operations, equivalence, rank, inversion, diagonalization, canonical forms, determinants, and applications of matrix techniques to other branches of mathematics as well as to social sciences and other disciplines.
Prerequisite: Math 100, 110 or 151.

Not more than one credit will be given for Math 203, 204 and 213. Math 213 may be substituted for Math 203 and 204 wherever these are required as prerequisites or to fulfill a programme of study.

204 Linear Algebra, lect.: 3 hrs. (Half-course).

Topics will include the following: Vector spaces, bases, dimension, linear transformations, representation of linear transformations by matrices.
Prerequisite: Math 203.

Not more than one credit will be given for Math 203, 204 and 213. Math 213 may be substituted for Math 203 and 204 wherever these are required as prerequisites or to fulfill a programme of study.

205 Projective Geometry, lect.: 3 hrs.

We begin with a brief discussion of the role of the "postulates" of Euclidean geometry, especially the Parallel Postulate of Euclid, and go on to some elementary theorems of Non-Euclidean Geometry. Some of the basic properties common to the Euclidean and Non-Euclidean geometries are investigated. We introduce axioms for geometry which describe these properties and the axioms are shown to be consistent and independent by giving finite models or finite geometries. The axioms are those for Projective Geometry.

Projective geometry is then studied in detail with topics including duality, Desargue's Theorem, the harmonic relation, algebraic models for the projective plane, cross ratios, Pappus's Theorem, the Fundamental Theorem of Projective Geometry, conics. Introduction of Coordinates in a projective plane, discussion of Klein's Erlanger Program.

This course is intended for anyone with an interest in Mathematics and geometry, especially for those who enjoy engaging in deductive reasoning.

Prerequisite: Math 203 or concurrent registration in 203.

206 Probability and Mathematical Statistics, lect.: 3 hrs.

The following topics will be included:
Probability theory, random variables, probability distributions, mathematical expectation, sampling and sampling distributions, estimation criteria and methods. Testing of hypotheses, nonparametric estimation, regression analysis, and correlation.
Prerequisite: Math 100.

213 Linear Algebra, lect.: 3 hrs.

This class is designed for students who are interested in a broader and more basic understanding of the theory and techniques of linear algebra than is provided by 203 and and 204. Topics include: the material of 203 and 204, canonical forms including the Rational Form and Jordan Form, inner product spaces including the Spectral Theorem for normal operators on finite dimensional vector spaces, linear programming and further topics in pure and applied linear algebra.
Prerequisite: Math 100 or 151.

Not more than one credit will be given for Math 203, 204 and 213. Math 213 may be substituted for Math 203 and 204 wherever these are required as prerequisites or to fulfill a programme of study.

220 Applied Mathematics, lect.: 3 hrs.

This class is designed with the needs of science students in mind. It includes the topics: Functions of several variables, vector analysis, line and surface integrals, integral theorems, differential equations, series, complex analytic functions.

Students who complete Math 220 are admitted to classes where Math 200 is the normal prerequisite. Credit will not be given for more than one of Math 200, 220, 228 and 250.

Prerequisite: Math 100.

225 Introductory Numerical Methods and Fortran Programming. lect.: 3 hrs. (Half-course)

This class provides an introduction to the use of desk calculators and to the FORTRAN computer language, which is in wide use throughout the sciences. Examples and applications are included. Particular emphasis is placed on numerical techniques appropriate to linear algebra.
Prerequisite: High school mathematics.

227 Numerical Methods, lect.: 3 hrs. (Half-course)

This class provides an elementary introduction to some of the numerical methods used in almost all fields of the sciences. The numerical techniques studied include those for the solution of polynomial equations, the approximation and interpolation of functions, some methods for numerical integration and differentiation and differential equations. These techniques are applied to a variety of problems chosen from the physical and social sciences. A knowledge of Fortran programming to the level of Math 225 is assumed.
Prerequisite: Mathematics 100 and 225 (or equivalent).

Credit will not be given for more than one of Math 227 and 230.

228 Applied Mathematics for Engineers I, Lect.: 3 hrs.

This class, which is a sequel to Math 100 for engineers, covers topics which include: vector algebra and analysis in three dimensional space; functions of several variables; multiple integration; complex variables; infinite series.
Prerequisite: Math 100.
Credit will not be given for more than one of Math 200, 220, 228 and 250.

230 Introduction to Operations Research, lect.: 3 hrs. (Half-course).

This class provides an elementary introduction to some of the numerical methods which are being applied to problems in business, economics and the sciences. These methods generally determine a best, or optimal, solution to a model of the original problem. Using digital computers it becomes feasible to consider some of the actual applications of these methods.

The mathematical methods studied include optimization techniques from the calculus, solution of polynomial equations, the simplex method for linear programming and the special versions for the assignment and transportation problems, as well as methods for dynamic and random processes as in inventory and queueing problems. These techniques are applied to a variety of problems chosen from business, government and the sciencies.
Prerequisite: Math 100 and 225 (or equivalent).
Credit will not be given for more than one of Math 227 and 230.

235 Foundations of Mathematical Astronomy, lect.: 3 hrs.

This class is designed to give the students the mathematical background for a good understanding of the structure of the universe and a solid foundation for possible further study. It provides up-to-date information about recent achievements in stellar astronomy. The history of the development of astronomical thought from ancient times to the present will be considered in connection with the presented material.

The class starts with geometrical considerations about the sphere, spherical coordinates and some concepts of spherical trigonometry. Then the topics celestial sphere, diurnal motion, equatorial coordinates, mean time, parallax, eclipses, and problems in connection with the stars and stellar motions, are treated.

The mathematical treatment is of an elementary nature: students will require knowledge of trigonometric functions, simple differentiation and polar coordinates.

This class will be offered only if there is sufficient enrollment.
Prerequisite: Mathematics 100, which, with the consent of the instructor, may be taken simultaneously.

250 Intermediate Analysis, lect.: 3 hrs.

Mathematics 250 is a parallel class to Mathematics 200 and is designed for students who intend to study mathematics as a major part of their undergraduate programme.

The course is mainly concerned with functions from n-dimensional space into m-dimensional space (i.e. functions of several variables) with particular reference to the cases when n and m are equal to 1, 2 or 3. The question of differentiation and integration of such functions is discussed in detail. For this some knowledge of linear algebra is essential.
Prerequisites: Good standing in Math 100 (or Math 151) and concurrent registration in Math 203 and 204.
Credit will not be given for more than one of Math 200, 220, 228 and 250.

300 Advanced Calculus, lect.: 3 hrs.

Functions of several variables, continuity, differentiation, implicit differentiation techniques. Taylor's expansion; Jacobians (their geometric meaning). Implicit function theorem; extreme values; multiple integration (especially transformation of double and triple integrals), line and surface integrals. Green's and Stokes' theorems; series of functions; uniform convergence; Fourier Series (sine and cosine series; convergence theorems). Applications: boundary value problems; partial differential equations. Students who intend to honour in mathematics, or do graduate work in mathematics, should take Math 350, not Math 300.
Prerequisite: Math 200.

302 Set theory and foundations of analysis, lect.: 3 hrs. (Half-course).

The topics discussed in this class will include: Sets, operations on sets and a discussion of an axiomatic basis for set theory. Relations with particular attention to functional and order relations. A fixed point theorem and its application to Zorn's Lemma and related matters (Axiom of Choice, Well Ordering Theorem). Cardinal and ordinal numbers and their arithmetic.
Prerequisites: Math 200 and 204.

303 Modern Algebra, lect.: 3 hrs.

Knowledge of algebra is indispensible to understanding the language within which most mathematical ideas are embodied and formulated. The course includes the following: the concepts, basic theorems and examples of permutation groups, abstract groups, rings, fields, field extensions, Galois theory, and solvability by radicals.
Prerequisite: Math 203 and 204.

304 Metric spaces and elementary topology, lect.: 3 hrs. (Half-course).

The topics discussed in this class will include: Metric Spaces, examples. Bounded, totally bounded, compact, and complete sets in metric spaces. Lipschitz and contraction mappings.

Topological spaces, examples, open and closed sets, bases. Continuity, compactness, connectedness.
Prerequisite: Math 200 and 204.

305 Differential Geometry and Tensor Analysis, lect.: 3 hrs.

The material presented in this course will consist of two parts. The first part will discuss the theory of curves and surfaces in three-dimensional Euclidean spaces. Topics treated will include: Theory of curves, surfaces, first and second fundamental forms, Gaussian and mean curvature, formulae of Weingarten and Gauss, geodesic curvature and geodesics. The second part will consist of an introduction to Riemannian Geometry and, if time permits, an introduction to general relativity as an application of Riemannian geometry. Topics treated will include: Foundations of tensor calculus, differentiable manifolds, foundations of Riemannian geometry, absolute differentiation and connexions.
Prerequisites: Mathematics 200, 203 and 204.

306 Probability, lect.: 3 hrs.

The class is intended to assist the student to acquire as thorough an understanding of basic concepts in probability as is compatible with his mathematical background and to illustrate the great variety of practical applications of probability to science and industry.

The topics covered will include the following: Fundamentals and axioms, combinatorial probability, conditional probability and independence, bionomial, poisson and normal distributions, laws of large numbers and central limit theorem, generating functions, random walks, and recurrent events. Markov chains, sampling from a finite population, derivation of X^2. Students t- and f-distributions, estimation from samples, tests of hypotheses.
Prerequisite: Calculus to at least the level of Mathematics 200. This may be taken concurrently.

307 Theory of Numbers, lect.: 3 hrs.

Congruences and residues; elementary properties of congruences; linear congruences; theorems of Fermat, Euler and Wilson; Chinese remainder theorem; quadratic residues; law of quadratic reciprocity; Legendre, Jacobi and Kronecker symbols. Arithmetic functions; algebraic fields; algebraic numbers and integers; uniqueness of factorization, definition and elementary properties of ideals; ideal classes and class number.
Properties of binomial and Q - Binomial coefficients.
Prerequisite: Consent of instructor.

310 Mathematical Statistics, lect.: 3 hrs.

Random variables, distribution of random variables, discrete distributions, sampling distributions, interval estimation, point estimation, sufficient statistics, maximum likelihood estimation, statistical hypotheses, likelihood ratio tests, regression and correlation, multi-variate normal distribution, sequential analysis.
Prerequisite: Math 206 or the equivalent.

311 Differential Equations, lect.: 3 hrs. (Half-course).

One of the aims of this course is to give the student the ability to analyze and solve a number of different types of differential equations.

Wherever possible, applications are drawn from the fields of physics, chemistry, biology, and other areas. The course is intended mainly for mathematics students interested in applications and for science students who wish to be able to solve problems arising in their major area of interest.
Prerequisite: Mathematics 200 (or equivalent).

312 Differential Equations, lect.: 3 hrs. (Half-course).

The topics discussed in this course are of great importance to any student interested in applied mathematics. Areas treated include Euclidean spaces, Fourier series, orthogonal polynomials, Sturm-Liouville problems, the classical partial differential equations, and some applications to physics, chemistry and engineering.
Prerequisite: Mathematics 311.

316 Data Analysis, 1 hr./week throughout the academic year. ½ credit.

This course provides the students with experience in solving real statistical problems. The course is organized so that students act as statistical consultants, under the supervision of the instructor, to scientists and others requiring assistance with data analysis. The problems facing a statistical consultant are the following: i) identify clearly the statistical component of the problem facing the consultee ii) decide whether the problem can be handled using standard techniques and, if not, iii) develop a new technique.

Students will be encouraged to develop novel approaches to the consultee's problem. In so far as it is possible, a student will be able to follow up those consulting problems which interest him most. Consultation contact hours will on occasion be replaced by survey lectures prepared by students on topics in applied statistics. Evaluation will be based on participation in consulting, the student survey lecture, and an examination relating directly to the highlights of the consultation sessions.
Prerequisite: One full course in statistics. The usual precursor to this course will be Math 206.

320 Introduction to Numerical Analysis, lect.; 3 hrs.

One aim of this class is to derive efficient methods for the numerical solution of problems from various branches of mathematics. The other, more important aim is to provide an understanding of these methods by using rigorous mathematical analysis: under what conditions does a particular algorithm work, and, perhaps even more essential, when and why does it fail to yield the desired results.

The class will cover the following topics: Iterative solution of nonlinear algebraic equations (and systems of such equations), direct and iterative methods for systems of linear algebraic equations, iterative methods for eigen-value problems of matrices, linear approximation of functions (interpolation, least-squares approximation, Chebyshev approximation, approximation by spline functions), numerical differentiation and integration, linear difference equations, finite-difference methods for ordinary differential equations (initial-value problems and boundary-value problems).
Prerequisite: Mathematics 200 (or 250).

328 Applied Mathematics for Engineers II, lect.: 3 hrs.

The following topics will be discussed:

First term:
(a) Linear algebra: matrix theory, systems of linear algebraic equations (theory and numerical methods for solution), eigenvalue problems for matrices.
(b) Linear ordinary differential equation: linear differential equations of order one and two, systems of linear first-order equations, reduction of higher-order equations to systems of first-order equations; applications.
(c) Numerical solution of ordinary differential equations: one-step methods for a single equation and for systems of first-order equations, discussion of stability properties (absolute stability, A-stability) of these methods, examples of multistep methods for first-order equations.

Second term:
(a) Fourier series and integrals, orthogonal functions.
(b) Linear partial differential equations of order two; Model problems from mathematical physics (wave equation, heat equation, Laplace's and Poisson's equations).
(c) Elementary probability and statistics.

Students offering Mathematics 328 will not be given credit for Mathematics 300.
Prerequisites: Mathematics 228 or 200, or equivalent class.

330 Linear and Integer Programming, lect.: 3 hrs. (Half-course).

Linear programming, at its simplest, consists of a procedure for finding the optimal allocation of scarce resources. It is perhaps the most widely used technique in Operations Research and has been applied to a wide range of problems in business, government, and even to proving theorems in linear algebra.

In this class, the mathematical structure of the LP model will be studied and several solution methods developed. The duality theorem and its uses will be emphasized. An economic interpretation of LP models will be presented using activity analysis concepts (or possibly game theory). The efficiency of several solution methods will be compared by using computerized packages on certain applied problems. Finally the cutting-plane method will be developed for the all-integer problem
Prerequisite: Math 200 and 204.

331 Discrete and Dynamic Programming, lect.: 3 hrs. (Half-course).

This class extends the variety of optimization models of Math 330. Initially the study of integer LP problems is continued with the assignment and transportation models. This leads into the general network problems and to matching problems in graph theory. The basic theory of convex programming and the method of Lagrange multipliers is presented. This is followed by an introduction to models of dynamic and Markovian programming. Finally some special methods for large scale problems are considered. In each topic, applications will be presented. These include capital budgeting decisions, production scheduling and multi-period planning models.
Prerequisite: Math 330.

350 Introductory Real Analysis, lect.: 3 hrs.

Real analysis is that branch of mathematics that has grown out of the study of the real number system and its properties. A large portion of this course will be devoted to a rigourous development of the classical theory of functions of a real variable. The course will also include many of the important theorems from integral calculus.

Class Outline: Development of the real number system and its properties. Sets, metric spaces and the topology of metric spaces, particularly Euclidean space. Compactness. Sequences and continuity. The Riemann-Stieltjes integral. Infinite series

and power series. Sequences of functions and uniform convergence. The Stone-Weierstrass theorem. Functions of several variables. The inverse function theorem and the implicit function theorem. Line and surface integrals. Differential forms and the theorems of Stokes and Gauss. An introduction to the theory of complex variables.

Students who intend to honour or do graduate work in mathematics, are advised to take this class, not Math 300. Credit is given for only one of Math 300 and 350.
Prerequisite: Math 204, Math 200 or 250.

401 Measure Theory and Integration, lect.: 2 hrs.

The fundamental position of the Lebesgue integral in modern mathematics makes this course a requirement for serious students of the subject. Topics include measure, outer measure, integration, the classical function spaces, differentiation, product measures, and the Riesz representation theorem.
Prerequisites: Linear algebra, advanced calculus.

402 Theory of Functions of a Complex Variable, lect.: 2 hrs.

Topics include: topology of the complex plane, integration, analytic functions. Cauchy's theorem, elementary functions, maximum modulus theorem, conformal mapping, power series, analytic continuation, Riemann surfaces, Laurent series, theory of residues, meromorphic functions, normal families, Riemann mapping theorem, harmonic functions.
Prerequisite: Mathematics 300 (or 350).

403 Advanced Modern Algebra, lect.: 2 hrs.

This class will take up topics in modern algebra beyond the level of Mathematics 303. The structure of groups, rings, modules, sums, products, coproducts, tensor products, direct and inverse limits will be formulated and studied in the language of universal algebra and category theory.
Prerequisite: Math 303.

405 Introduction to Algebraic Geometry, lect.: 2 hrs.

Introduction to the basic concepts of algebraic geometry, starting from the classical point of view to the way in which algebraic geometry is done today. Many concrete examples will be studied. Some topics are: irreducible algebraic sets, the Zariski topology, affine varieties, pre-varieties, dimension, spec, affine schemes, pre-schemes.
Prerequisite: Math 303.

406 Statistical Inference, lect.: 2 hrs.

Sampling statistics are generally used to obtain information concerning the known group character of the population. Such generalization from sample to universe is statistical inference. When we reach a conclusion by inference from sample data, we do so at the risk of being in error. This risk can be calculated numerically. It is the purpose of this class to describe methods which lead to valid inferences and to calculate the risk of error in those inferences. Sereral tests of hypothesis will also be derived regarding these inferences. Treatment will be of a mathematical nature. Students will be able to apply statistics competently in such fields as the social sciences, biological sciences and medical sciences. After this class, every branch of statistics will be open for further study.

The topics covered will include the following: point estimation, consistent, sufficient, efficient and unbiased parameters, method of maximum likelihood, method of least square, method of moments, method of minimum X^2 minimum variance unbiased estimation, interval estimation, minimax and Baye's estimation, Neyman-Pearson's lemma, composite hypotheses, goodness of fit tests, likelihood ration tests, critical region, locally most powerful tests, non-parametric tests.
Prerequisite: Mathematics 200 and 306.

410 Decision Theory and Theory of Games, lect.: 2 hrs.

In the last few years, statistics have been formulated as the science of decision-making under uncertainty. Decision theory applies to statistical problems the principles that a statistical procedure should be evaluated by its consequences in various circumstances. This model for decision theory is a special case of game theory. A game is characterized by a set of rules having certain formal structure, and governing the behaviour of certain groups.

The central ideas and results of game theory and related decision-making models will be studied in this class: general decision problems, Bayes and minimax solution of decision problems, construction of Bayes decision rules, sequential decision estimation rules, empirical decision rules and testing as aspects of decision theory, rectangular games, games in extensive forms, games with infinitely many strategies, continuous games, separable and cooperative games, zero sum and non zero sum n person games.
Prerequisite: Mathematics 306 or 310.

412 Ordinary Differential Equations, lect.: 3 hrs.

Ordinary differential equations in the real and complex domains. Successive Approximation Ascoli-Arzela Theorem, existence and differentiability of solutions. Linear systems with constant and periodic coefficients. Analysis of singular points. Poincaré Bendixson theory, perturbation theory, Sturm-Liouville theory and asymptotic expansions. Applications to physical, biological and economic problems.
Prerequisite: Consent of the instructor.

413 Ring Theory, lect.: 2 hrs.

Structure of associative rings including Grothendieck's functional representation of commutative rings. Primary decomposition. Jacobson's theorems. Goldie's theorem. Artin-Wedderburn theorem.
Prerequisite: Math 303 and consent of instructor.

414 Introduction to Functional Analysis, lect.: 2 hrs. (Half-course).

An introduction to the basic principles of functional analysis including the following topics: infinite dimensional vector spaces, normed spaces, inner-product spaces, Banach and Hilbert spaces, linear and continuous linear functionals, the Hahn-Banach Theorem, the Principle of Uniform Boundedness, dual spaces, weak topology, weak-* topology and the Alaoglu Theorem, the Open Mapping and Closed Graph Theorems, and consequences and applications.
Prerequisites: Math 204 and 304, or the equivalent.

415 Functional Analysis, lect.: 2 hrs. (Half-course).

Topological vector spaces, locally convex spaces, normability, function spaces, strict convexity, uniform convexity, reflexive spaces, support functionals, geometry of convex sets, and other topics.
Prerequisite: Math 414.

416 Operator Theory, lect.: 2 hrs. (Half-course).

An introduction to the theory and applications of continuous linear operators on Hilbert spaces, culminating with the Spectral Theorem, and including such topics as spectrum; adjoint; symmetric, self-adjoint, unitary, and normal operators; polar decomposition; differential and integral operators; C*-algebras; Gelfand Theorem; spectral theorem.
Prerequisites: Math 401 and 414.

417 Introduction to General Topology, lect.: 2 hrs. (Half-course).

Topological spaces, examples. Classification in terms of cardinality of bases, separation, etc. Product spaces, Tychonoff Theorem. Compactness, Compactifications, Tychonoff Spaces. Metrization.
Prerequisite: The equivalent of Math 304.

418 Introduction to Algebraic Topology, lect.: 2 hrs. (Half-course).

Homotopy type and the Fundamental Group, geometry of simplicial complexes. Homology theory of complexes, chain complexes, homology groups for complexes, subdivision, induced homomorphisms, applications. Axioms for algebraic topology. Singular homology, the singular complex. Properties of cell complexes.
Prerequisite: The equivalent of Math 417.

421 Introduction to Partial Differential Equations.

Classification, study and solution of differential equations of applied mathematics. Hilbert space, separation of variables and Sturm-Liouville theory. Green's functions, eigenfunction expansions and generalized solutions. Fourier and Laplace transforms. Applications to some problems in physics, chemistry and engineering.
Prerequisites: 204 and 312.

430 Optimal Control Theory and Applications, lect.: 2 hrs. (Half-course).

This class retraces the historical path in the search for optimal solutions using methods from differential calculus. Initially the calculus of variations will be studied and the sufficiency conditions emphasized. A constructive solution of the Euler equations will be presented. Then the modern theory of optimal control will be developed using techniques of mathematical programming. This approach will be applied to a variety of problems such as economic growth theory, inventory control and regulator problems. Numerical methods will also be presented.
Prerequisite: Math 300 and 331.

431 Nonlinear Programming, lect.: 2 hrs. (Half-course).

This class presents a complete treatment of the mathematical theory which underlies the general problem of optimization of a real-valued function subject to a system of constraints. Examples and exercises of an Operations Research nature are used to illustrate the theory. The material studied in this course is a basic prerequisite for understanding and contributing to recent developments in mathematical programming.
Prerequisite: Math 300.

Computer Science

J. H. Ahrens, Professor (N.S.T.C.)
G. Finke, Assistant Professor (N.S.T.C.)

Classes in Computer Science are offered by personnel of the Nova Scotia Technical College. These classes are accepted for credit by both N.S.T.C. and Dalhousie. The following may be offered in 1974-75 on the Dalhousie Campus.

240 Introduction to Computer Science, lect.: 3 hrs.

Comprehensive Fortran class with problems and applications. History of computation, number systems, coding. Description of computer systems: general structure, central processor, memory, peripherals. Introduction to machine codes with exercises in assembler programming. Data storage and elementary sorting. Application programs. Introductions to high-level languages: Algol, COBOL, APL, simulation languages. Interactive programming in Basic. Applications in numerical analysis and optimization.
Prerequisite: Mathematics 100 or 110. An introductory class on the efficient use of digital computers.

335 Data Processing, lect.: 3 hrs.

Review of Fortran. Basic concepts of data. Arrays, lists and strings. Storage allocation. Files management, updating, searching, merging and sorting. Report generators. Cobol programming with applications to payrolls, accounting, sales analysis, business statistics and inventory control. Simulation of industrial processes. Management games.
Prerequisite: Mathematics 240 or Commerce 206.

340 Computer Science, lect.: 3 hrs.

Algorithms. Basic concepts, single and multi-precision arithmetic. Implementation of mathematical functions. Combinatorial and enumerative algorithms. Random number generation and transformations.

Data structures. Lists, strings, arrays and trees. Storage media and allocation. Symbol tables. Up-dating and searching. Core sorting algorithms and external sorting and merging.

Computer architecture. Operating systems. Batch processing, multi-programming and time-sharing.

Introduction to selected advanced topics: heuristic programming, learning algorithms, pattern recognition and picture processing. Elements of abstract languages and compilers.
Prerequisite: Mathematics 240.

Mediaeval Studies

The period commonly called the Middle Ages (approximately A.D. 400-1500) offers a unique opportunity to study Western culture as a whole. Indeed, any attempt to study a part of this period in isolation leads to a conviction that such an investigation can never be satisfying and that the walls between disciplines must be broken down and the literature seen in relation to the philosophy, the philosophy in relation to the history, and the history in relation to the languages. No matter what the vernacular tongue of any geographical area, there was one common language throughout Europe and one church, and the study of these leads inevitably to a consideration of paleography, art, architecture and music.

The field is a very large one and could become a fascinating and rewarding area for a certain type of student - the one who likes to immerse himself in his work and who feels that university studies need not involve storing knowledge in separate pigeon-holes because his language course has nothing in common with the social science he is required to take.

The regulations for the Honours degree permit a structured programme to be set up in Mediaeval Studies which cuts across traditional departmental lines while allowing considerable freedom in choice of classes.

The professors currently involved in this programme are: R. Crouse, J. Doull, E. Segelberg (Classics); R. Dawson, H. Morgan (English); H. Rasmussen, H. Runte (French); K. Fricke (German); R. Haines (History); J. Aitchison (Political Science). A student who is interested in entering the programme in Mediaeval Studies should speak to one of these faculty members, who will then refer him to the Administrative Committee for the planning of his course.

Structure

The Honours degree in Mediaeval Studies must have a major field consisting of 9 classes, selected from those with Mediaeval Studies numbers, which will include at least one in each of: a literature, history, philosophy and Latin. Other classes will depend on the individual student's interests, but all four disciplines must be represented. The minor field may be varied to suit the taste of the student: he may wish to continue into later periods in his favourite discipline or he may wish to acquire another language to help him in his work. No class in the minor field may be from the Mediaeval Studies group. The four classes not in the major field may be widely scattered: one or more of them may be 100-level prerequisites which were not taken in the first year but which may be necessary for later mediaeval work, e.g., introductory German or Latin or Political Science.

Some sample programmes which might be followed are:

Literary: English. Major: Med. Stud. 201, 202, 203, 204, 211, 301, 302, 401, 261. Minor: 2 classes in English, possibly English 251 and 252. Four additional classes: possibly Philosophy in Literature (Phil. 270), History of England (Hist. 210), German for Beginners (German 100), and Intermediate German (German 200).

Literary: non-English. Major: Med. Stud 211, 212, 221, 222, 204, 301, 303, 261, 402. Minor: 2 additional classes, possibly in French or German. Four additional classes: possibly Latin 100, Philosophy 100, plus another Latin and another Philosophy.

Historical. Major: Med. Stud. 301, 302, 303, 304, 311, 401, 414, 202, 261. Minor: History 210, and 314. Four additional classes:

possibly introductory and intermediate Latin and two French.

Philosophical. Major: Med. Stud. 402, 401, 403, 414, 301, 302, 204, 211, 261. Minor: possibly two classes in the earlier or later history of philosophy. Four additional classes.

Classes

The classes available from which a mediaeval grouping may be formed are given below. Some of them are on an *ad hoc* basis, depending on the needs of students in any given year. The numbering of the classes reflects subject and department, rather than order of difficulty or of priority.

Med. Studies

201 History of the English Language (Eng. 201)

202 Old English (Eng. 253)

203 Tales from Chaucer & Malory (Eng. 218)

204 Middle English (Eng. 351)

211 Intro. to French Lang., and Lit. of the Middle Ages (French 430)

212 Intro. to Provençal & Lit. of the Middle Ages

221 Middle High German I

222 Middle High German II (1973-74)

261 Intro. to Mediaeval Latin

262 Intro. to Mediaeval Greek

301 Mediaeval Life & Thought (Hist. 199/5)

302 Mediaeval Europe (Hist. 200)

303 Mediaeval Civilization (Hist. 300)

304 Roman History (Classics 223)

311 Palaeography (Hist. 501)

401 Mediaeval Philosophy (Classics 340)

402 Latin Philosophical Texts (Latin 204)

403 Seminar on the Church Fathers (Classics 467)

404 History of the Interpretation of Aristotle (Classics 466)

414 Mediaeval Political Philosophy (Poli. Sci. 207)

It is possible that in the future some of the following may be added to the programme, though they are not offered at present:

Intro. to Med. Spanish Lang. & Lit.

Old English Archaeology

Old Icelandic

Byzantine and Latin Liturgiology.

Microbiology

Classes given by the Department of Microbiology are fully described in the offerings of the Department of Biology since the departments cooperate in providing courses in this discipline. These classes are:

302 General Microbiology (Equivalent to **Biology 3110A + 311B)**

3112B Microbial Ultrastructure

4113 Bacteriology

4114 Virology

4115 Immunology

4033A Microbial Genetics

4117C Advanced Topics in Immunology

4118B Immunological Techniques

The faculty list of the Department of Microbiology may be found in the calendar of the Faculty of Graduate Studies. Students wishing to take classes given by the Department or who wish further information should consult the Departmental Secretary, 7th floor, Sir Charles Tupper Building.

Music

Teaching Staff

Peter Fletcher *(Chairman)*
Ray D. Byham
Vernon Ellis
Dennis M. Farrell
James M. Gayfer
Gary Karr (String Bass) *(Artist in Residence)*
D. Harmon Lewis (Harpsichord) *(Artist in Residence)*
H. Philip May (Voice)
John McKay (Piano)
A. G. Scott-Savage (Voice)
Jack E. Sorenson
J. Stephen Tittle
David F. Wilson
Part-time tutors covering all orchestral instruments

Halifax is the home of the Atlantic Symphony Orchestra as well as being one of the centres of musical activity in Canada. It is therefore possible to engage experienced performers to teach every orchestral instrument. The Music Department's well-equipped offices, lecture studios, teaching studios, rehearsal and practice rooms are situated in the Dalhousie Arts Centre. Included in this Centre is the fine 1200 seat Rebecca Cohn Auditorium, to which the Music Department has frequent access. This auditorium is the major concert hall in the Atlantic Provinces, and there are regular orchestral concerts by the Atlantic Symphony, performances by internationally famous artists sponsored by Dalhousie University, chamber music recitals by Canadian artists sponsored by the CBC and regular recitals and concerts sponsored by the Music Department, by Scotia Chamber Ensembles and by nova Music. Regular Sunday afternoon concerts are free to the public and students may buy tickets for most other concerts at reduced prices.

Objectives

The aim of the Department is to produce musicians of high practical ability with experience and understanding of the professional approach to musical performance; and to temper these abilities by producing minds alert and alive to the functions and problems of the medium as seen in history and to their implications in today's changing society.

Students passing through the B.Mus.Ed. programme will be trained as musicians and teachers and the programme is sufficiently flexible to allow for concentration in depth in either the performing or researching fields. Practical and general musicianship are prerequisites of both the performer and the teacher. Schools have a need of performing musicians to pass on their skills to the young, and performing musicians have a need to understand the practice of educational institutions, which are shaping the attitudes of their future audiences. The Department's concentrated courses are aimed at musicians of high performing ability who, as a result of that ability, feel an inner compulsion to follow a career which involves specialized practical music making of one sort or another. Because musical talent usually embodies an inner compulsion to develop and exercise that talent, the first and major objective will be to develop the greatest possible degree of excellence as a performer. It follows that many students will wish to attempt to gain a foothold in the performing profession and come into teaching only if they are unsuccessful. This is a natural and common process and does not necessarily reflect adversely on the subsequent ability or enthusiasm for teaching. Whatever their ultimate goals, alive students should welcome the chance to consider teaching methods alongside their own musical training and to learn something of how their own specialized subject fits into current educational practice. Students will therefore need to make an early observation of current classroom and studio teaching as a basis for further studies in teaching skills and for teaching practice.

If teachers or performers are to excite others with music, they must themselves have been constantly excited by music. This excitement is usually born out of an increasing insight and ability for solo and ensemble performance and by a continuing discovery of music, new and old. It must be the first obligation of a University Music Department to incite ever improving performance standards and a curiosity and wonder about music through ensemble playing, creativity, informed inquiry into musical trends and styles and a critical awareness of the living musical scene.

The Nature of Concentrated Music Study

Western music has developed into a most complex language. Music is conceived aurally and written down in notation in order to be translated into sound. Before musical notation can be translated into sound, three demanding skills are required: a thorough knowledge of musical theory, the ability to hear complex scores aurally and the practical facility needed for performing. No profitable study of music in depth can be undertaken until these skills have been acquired. If these basic skills are to be acquired in the first two years, so that study in depth, greater practical facility and the teaching and education studies can be programmed for the remaining two years, time will not allow for any prolonged study of other subjects. However, in pursuing the degree courses outlined, music students will inevitably be brought into contact with many other relevant fields of study.

Admission to Music Major Courses

Students who wish to enroll in a degree programme in the Department of Music must satisfy the requirements for admission to the Faculty of Arts and Science and must satisfy additional requirements in the Department of Music. Candidates will be required to demonstrate proficiency as an instrumental or vocal performer, and answer a written paper on basic rudiments and theory of music.

Under the discretionary powers of the Admissions Office, students who do not meet the normal requirements of the Faculty of Arts & Science may be considered for admission if they can demonstrate sufficient skill as instrumentalists.

When making application for admission to the University, music applicants should request the supplementary application form for the Department of Music.

Degree Programmes

The *B.Mus.Ed.* is a four year course which covers a Nova Scotia Teacher's Certificate (Class 5), provides continuous instrumental or vocal instruction with ensemble opportunities, basic theoretical and aural skills, opportunity to study and research into a variety of musical styles and periods and the teaching observation, skills and practice required for teacher's certification. Students are required to take five full credit classes in each of the four years. The relationship of the various facets of study are set out in the diagram below. Students will not automatically be placed in the general musicianship remediation classes on arrival, but at a level appropriate to their ability. Students able to bypass these remediation classes will be able to take a larger number of project classes. Students wishing to take a further Arts Elective may consult the Department about the possibility of substituting this for one of the Music classes.

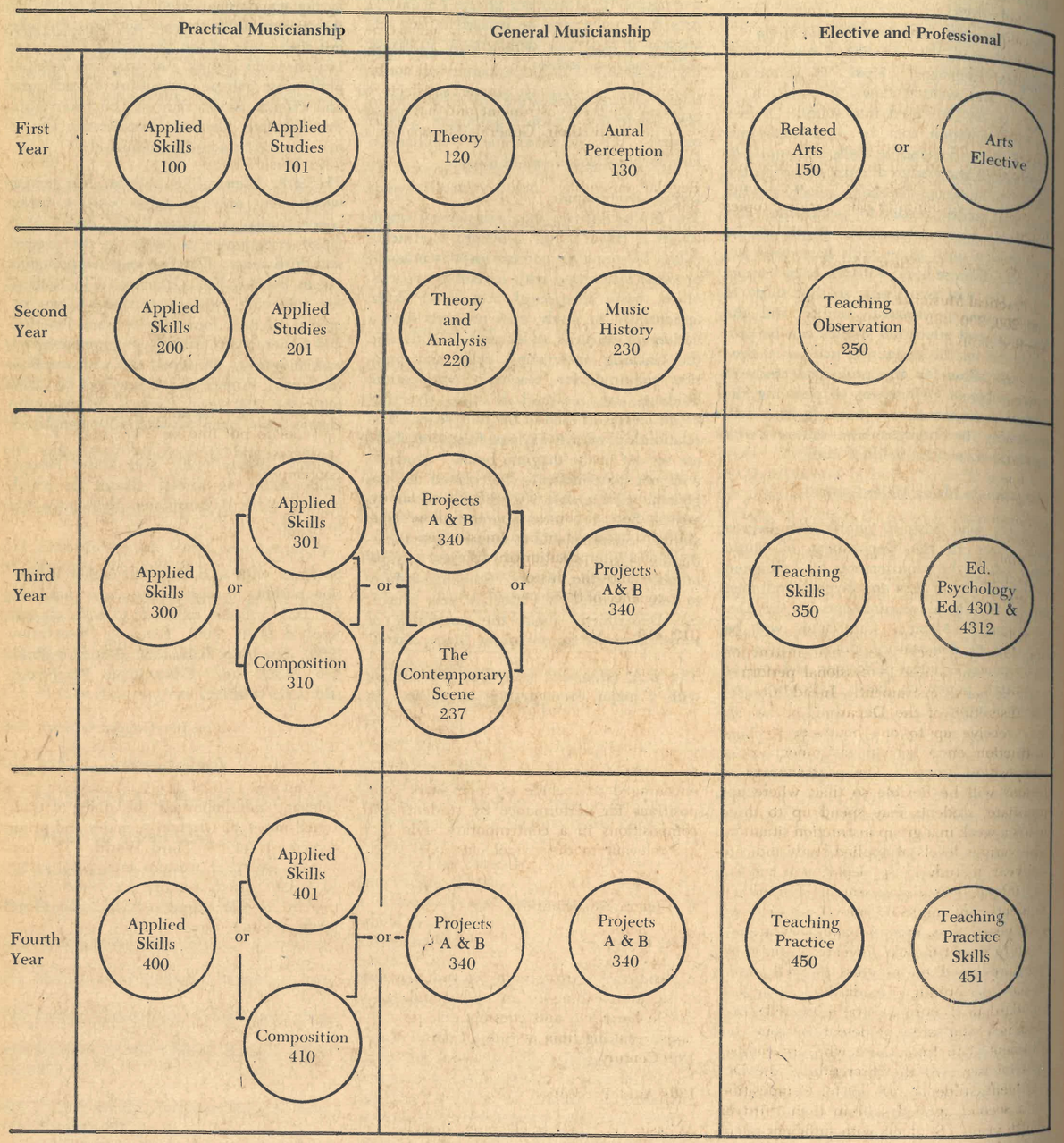
The *B.A. (Honours)* is a four year course with a major concentration in music. In their first year, students will be required to take the classes in Applied Skills and Theory at the appropriate level. In the following three years, students may not normally take less than eight of the Practical and General Musicianship classes. At least one Applied Skills class will be compulsory in each year and Project classes may not be taken until the 200 level General Musicianship classes have been satisfactorily completed.

The *B.A. (General)* is a three year course which may only be taken with a major concentration in music if the coordinated music programme is taken in the second and third years. The first year requirements are as for the *B.A. (Honours)*. In each of the following two years, students are required to take four classes from Practical and General Musicianship programme up to, and including, 300 level. As with the B.A. (Honours), Project classes may not be taken until the 200 level General Musicianship classes have been satisfactorily completed.

Classes: Theory (120), and Music History (230) count as formal classes in which written work is considered frequently and in detail.

Students with a B.A. from another institution wishing to spend one year qualifying for TC5 will be required to take classes: Applied Skills (400), Teaching Observation (250), Teaching Skills (350) Teaching Practice (450), and Educational Psychology (Ed. 4301 & 4312).

Bachelor of Music Education: each circle represents a full credit class
For B.A. Hons. and B.A. General, students select from practical and general musicianship classes as described.



Summer Schools
The first Summer School period will be available for Practical and General Musicianship classes and for Practice Teaching. Students with high performing potential will be encouraged to use this period for concentrated applied study.

Service Classes
These will be directed specifically at non-music majors and will provide an introduction to an examination of the social and cultural background to the various topics listed.

Classes offered for Music Majors

A. Practical Musicianship
100, 200, 300, 400, 301, 401
Applied Skills

a) Violin
b) Viola
c) Cello
d) Bass
e) Flute
f) Oboe
g) Clarinet
h) Bassoon
i) Horn
j) Trumpet
k) Trombone and Tuba
l) Percussion
m) Piano
n) Organ
o) Harpsichord
p) Voice

In general, all students will receive at least one hour per week individual instruction from an experienced professional performer of their major instrument. In addition, at the discretion of the Department, students may receive up to one hour per week of instruction on a second instrument or in composition groups. The programming of lessons will be flexible so that, where appropriate, students may spend up to three hours a week in a group instruction situation. The various levels of applied study indicate the year of study in the department and are not intended as an assessment of standard. Students automatically move up a level each year unless, exceptionally, they are advised to repeat the whole year. Term gradings are based on progress as well as on actual performing standard. A higher standard will normally be expected from students who are competent on one instrument than from those who are competent on two. At the discretion of the Department, students may opt for Composition as a second applied skill in their third or fourth years. Students with sufficient talent and achievement may be permitted to take two full credit classes on their major applied instrument in their third or fourth years.

Students will be encouraged to do as much ensemble playing as possible and chamber groups will be scheduled according to the range of abilities and specialities within the Department. Students will also be encouraged to perform in weekly, informal, lunch time concerts and occasionally in formal, public recitals in the Rebecca Cohn Auditorium. All students will be expected to perform a recital in their final year. In this, students will be expected to show that they have fulfilled their potential: those with less aptitude for solo performance will not be penalized if they have made satisfactory progress on their instrument and have also done well in their General Musicianship studies.

Regular ensembles include the Orchestra, Band, Chorale and Chamber Singers. Other chamber groups are scheduled according to needs and circumstances.

101, 102: Applied Studies

a) String instruments
b) Woodwind instruments
c) Brass instruments
d) Keyboard instruments
e) Voice

These classes support the performing skills and are intended to provide a greater understanding and insight to the playing. Studies, based on the student's instrument family, will include a survey of the basic solo, concerto and chamber music repertoire, style and interpretation in different musical periods and the history, construction and maintenance of the instruments.

310, 410: Composition

Particular works from any period of history will be analysed to serve as a springboard for original composition by the students. Student's work will be evaluated in small group discussions and in individual sessions with the instructor. Students will be encouraged to include in their work compositions for performance by students and compositions in a contemporary style that are relevant to the school classroom situation.

B. General Musicianship

120: Theory

A basic class starting with the rudiments of music and leading to an understanding of simple harmonic and contrapuntal progressions, resulting from a study of music of the 18th Century.

130: Aural Perception

A basic class of ear cleaning, designed to increase the clarity and sensitivity of aural responses to music. Work will include the aural recognition of intervals, melodies, rhythms, sonorities and textures, as well as group improvisations on pitched percussion instruments based on simple modal and harmonic progressions and group improvisation and compositions in the contemporary music studio, using live and synthesized sonorities.

220 Theory & Analysis

A more advanced study of harmonic and contrapuntal styles, based on music of the baroque and renaissance periods, providing the Basic Skills for musical analysis and criticism. Work will include harmonic analysis, exercises in harmonic and contrapuntal writing, sight singing and aural diction.
Prerequisite: Music 120 and 130

230: Music History

The study of a number of set works, covering stylistic periods from the Renaissance to the present day will be used to illuminate the social and cultural background to various periods of history.
Pre-requisites: Music 120 and 130

237: The Contemporary Scene

A study of music today, including a history of pop music, jazz and blues. The couse will aim to put into perspective the various syntheses and cross cultural influences of contemporary music and will consider some technical and sociological problems arising from these.
Prerequisites: Music 120 and 130.

340: Projects

The study of music history has expanded vastly in the past few decades. Scholarship has opened up an increasing awareness of medieval and renaissance music. The acceleration of change in our society has turned the study of contemporary music into a confusion of diverse and opposing trends demanding differing types of sensory responses and new critical values. It has also made relevant and important the study of traditional music of Oriental societies and primitive music of the Third World. The convenient study of western music from 1500 to the twentieth century has been supplemented to the extent that it is no longer profitable to attempt a study of the whole history of music. "Music" has become "musics": study in depth must be selective and preferably, diverse.

The purpose of the projects class is to enable groups of students to study in some depth periods, styles or aspects of music of their own choosing, to interrelate the various aspects of their previous study and to develop lively and intelligent attitudes toward research. The role of the tutor responsible for each project will be to guide the students towards appropriate source material, records and books, to enlist the services of other members of the staff who have specialisms

relevant to the project and to correlate the activities, researches and practical presentations of the students. Within each project group, students will work on different aspects of the subject, singly, or in splinter groups, and then pool and correlate their various researches and activities to provide an exhaustive coverage of the subject. In this way, students will be able to work on aspects of the project to which they are best suited or at which they most need experience. Individual and group activities could include performances, arranging, original and pastiche composition, study and collection of documentary and background material, compilation of tapes and slide sequences, presentation of the subject with audio-visual material for school use, a short thesis, a combined presentation of the subject to the rest of the Department, etc.

Each project is intended to last a term, so that participation in two projects will constitute a full credit class. Project subjects and groups will be discussed with the students concerned and settled each Spring for the forthcoming year. The possibilities for project subjects are virtually unlimited and will be decided in the light of the students' interests and needs and of the research materials available. The following are mere suggestions: authenticity in performance, the year 1600, Music in Contemporary Culture, the baroque concerto, the Lutheran chorale, the concerto principle, the impact of Beethoven, the string quartet, the madrigal, the Council of Trent, Mozart Opera, Gesamkunstwerk, Bach's keyboard style, Rock as a social phenomenom, the Oratorio in England, Music in 18th Century courts, etc.
Prerequisites: Music 200, 220 and 230.

C. Electives and Professional

150: Related Arts

A general class that will survey specific periods in Western culture in relation to their social historical backgrounds. The class will examine music, painting, architecture and theatre and the ways in which art and artists have acted and reacted to their cultural environments. Parallels will be drawn with contemporary culture and an examination of the role of the artist today will form an integral part of the course.
Prerequisites: None. Also available to non-majors.

250: Teaching Observation

Observation of selected classroom and studio situations in the district, followed by discussion and evaluation of teaching objectives. Visits to schools may also include some single, isolated teaching experiences.
Prerequisites: Music 100, 120 and 130.

350: Teaching Skills

All students will take introductory classes covering the objectives, possibilities and organization of music teaching in schools, with special attention to the appropriate uses of music in the classroom at various stages of child development. Thereafter, in consultation with the Department, students will choose to study not less than four of the following subjects:

Conducting techniques
Basic approaches to instrumental techniques
Choral training and voice production
Vocal music repertoire in schools and guitar or ukelele accompaniment
Creative approaches to music in the elementary and primary school
Creative and contemporary music in the secondary classroom
Prerequisites: Music 200, 220, 230.

450: Teaching Practice

Supervised classroom or instrumental teaching in Public Schools.
Prerequisites: Music 300, 340, 350, Education 406 A&B.

451: Teaching Practice Skills

In a seminar situation students can discuss and evaluate their experiences of practice teaching. Further instruction in various teaching skills will arise from this.

Courses for Non-Music Majors

105 and 205: Applied Skills

Students who already play a musical instrument may apply to the Department for a credit class consisting of instruction in that instrument and ensemble participation. Admission will be subject to availability of specialist tutors and a successful audition.

125: Music Theory for Non Majors

This class will deal with basic rudiments, analysis and aural perception and is designed to assist non-specialists in the understanding of music.

120: Theory

See courses for Music Majors.
Available only to Music Minors admitted to course 105.

135: Music and Western Man

A course that examines historical trends in Western music in relation to the history of Western society.

136: Experimental Music

This class will use the percussion instruments and electronic resources of the sound studio to provide experience of group improvization and composition in a contemporary medium. Students will use percussion instruments to explore basic musical structures and will learn the use of synthesizers, special recording techniques and tape mixing and editing. Detailed musical knowledge will be of less use in this course than imagination, an interest in contemporary culture and an interest in electronics.

150: Related Arts

See Courses for Music Majors
Prerequisites: None

237: The Contemporary Scene

See Courses for Music Majors
Prerequisites: Music 120, 125, 130 or 135

336: Non Western Music

This course will examine the functions and styles of musics outside the Western tradition and will use recordings, films and, where possible, live demonstrations.
Prerequisites: Music 120, 125 or 230

Oceanography

Oceanography is a broad, inter-disciplinary science which includes studies of tides and currents, the chemistry of sea water, plants and animals that live in the sea, and ocean bottom sediments and underlying crustal structures. Career oceanographers are presently employed in Canada in a few universities and in various federal laboratories that are engaged in both basic research and applied problems which meet a national need, such as fisheries investigations, exploration for offshore mineral resources, and studies of ice in navigable waters.

A good background in basic science is a necessary prerequisite, followed by specialization in oceanography at the graduate level. Dalhousie is one of three Canadian universities offering M.Sc. and Ph.D. programmes in this subject. However, properly prepared undergraduates are permitted to take one or more of the classes as electives. There are introductory classes which survey the entire field and advanced classes in each of the major specialties - physical and chemical oceanography, marine biology, and marine geology and geophysics. Further details about this programme are given in the Calendar of the Faculty of Graduate Studies.

In addition, one undergraduate class is offered.

200 Introduction to Oceanography, lect.: 3 hrs., R. O. Fournier.

This class will attempt to survey the field of Oceanography in general and to show how the oceans, which account for more than 70% of the earth's surface, function as a dominant environmental force. In addition, consideration will be given to man's impact on this ecological system.

This course is designed to give the student a background or feeling for the ocean, what oceanographers do. It is not a good "background to science" course, since little feeling will be obtained for scientific techniques which would otherwise be acquired in a laboratory course. Most of the material which will be covered will be descriptive rather than basic, inasmuch as it is impossible in the time allowed and the material covered to also teach the basic required sciences.
Prerequisite: Any first year science course.

Philosophy

Professors
A. H. Armstrong (Dept. of Classics)
D. Braybrooke
J. A. Doull (Dept. of Classics)
F. H. Page
R. P. Puccetti (Chairman)

Associate Professors
R. D. Crouse (Dept. of Classics)
I. A. MacLennan
R. H. Vingoe

Assistant Professors
S. A. M. Burns
R. M. Campbell
W. F. Hare (Dept. of Education)
R. M. Martin
A. Rosenberg
P. K. Schotch

Unlike some subjects, philosophy is not taught in high school. The new student can therefore safely assume that no previous knowledge is required as a prerequisite for the introductory class, Philosophy 100. Philosophy has concerned itself in the past with a number of traditional questions. For example, are men in any sense free, or are they merely conditioned and determined by their environment, heredity, etc. Again, have men souls which might conceivably survive death, or is individual life merely an emergent quality of matter doomed to vanish with the dissolution of the body?

Then there are questions about the nature of knowledge. Are there some truths which can be proven to be true without relying on experience? Or is all our knowledge empirical? Does science require certain principles, like causality, which are more than inductive generalizations from experience? Then there is philosophical theology. Can any reasonable proof be given of God's existence? Finally, there are many problems of an ethical kind. For example, is there an absolute morality or are all ethical standards relative to the society in which they are practised? Related to these questions are certain existentialist questions as to the meaning and purpose of life. How does one deal with the problematic nature of human existence?

The student may already realize that no final dogmatic answer can be given to the above questions. Nor need he be expected to endure a set of formal lectures. It is the aim of all classes of philosophy to proceed by class discussion. As a result of continually discussing the above questions, and many others like them the student will acquire a certain philosophical technique, which will be of great benefit to him, whatever subject he may decide to specialize in.

The Arrangement of the Classes

Students who are interested in taking a beginning class in philosophy may take either Philosophy 100 or any class numbered in the 200's. These classes have no prerequisites and are open to freshmen and anyone else, with or without background in philosophy. This fact makes it possible for students, including students in the first year of their university study, to begin work in philosophy in different ways, chosen to suit their present interests. However, students intending to take 300-level classes should note that for these classes one or more of Philosophy 100 or Philosophy 200, 201, 202 (the classes in logic) are prerequisites. The 400-level classes are normally open only to advanced students in philosophy.

Of the classes open to beginners, Philosophy 100 gives a comprehensive introduction to philosophy: Several of the main branches of philosophy are represented in the topics treated and the class is divided into sections small enough to give a good deal of practice, oral as well as written, in basic philosophical skills of analysis and argumentation. Some attention is given to important philosophical authors of the past, both ancient and modern; but Philosophy 100 is not a class in the history of philosophy. Philosophy 230 is; and students primarily interested in history and the history of ideas may find this class the most inviting way to begin philosophy. The classes in logic, 200, 201, and 202, are in one sense narrow by comparison, being devoted to one rather sharply defined branch of philosophy; however, skill in this branch is an indispensable advantage in all advanced work in philosophy - as indispensable as, say, the calculus is in physics - so these classes, too, can be looked upon not only as introductions to philosophy, but also as direct entry-routes into the central concerns of the subject. The other 200-level classes are both specialized and less central. However, they are addressed to interests that are uppermost in the minds of many students: religion, treated in two classes on the philosophy of religion, Philosophy 220 and 225; and questions, very much like some of those raised by religion, about the meaning of life and the present condition of man, treated in Philosophy 217 (on the Continental tradition of philosophy known as "existentialism") and Philosophy 270 (on these questions and related ethical questions as they figure in great literature of the 19th and 20th centuries); and, finally, fundamental questions about the meaning and purpose of education, treated in Philosophy 218.

Degree Programmes

General B.A. in Philosophy
Students are strongly urged to take at least one of Philosophy 200, 201, 202, 305, and at least one of Philosophy 230, 310, 319, 320, 335. All students proposing to take a General degree in philosophy should arrange their course in consultation with Professor I. A. MacLennan.

B.A. With Honours in Philosophy
Students intending to specialize in Philosophy should take the honours course. It is the normal preparation for graduate study in philosophy. The honours course generally consists of ten classes in philosophy, two classes in a minor subject approved by the Department and four elective classes in at least two subjects other than philosophy. The ten philosophy classes in an honours course must include: Philosophy 200 (or 201 or 202), 230, 305, 310, 320 and one 400-level class. Philosophy 100 may be included in the ten classes of the honours course, if it was taken at the beginning of the course. In addition, students taking honours in philosophy must satisfy the regulations for the first year of study for the General B.A. and also the overall requirements for the General B.A. Students intending to take honours in philosophy should arrange their course in consultation with Professor I. A. MacLennan.

Combined Honours
There are several combined honours programmes:

Philosophy and Economics
Philosophy and English
Philosophy and Psychology
Philosophy and Sociology
or other combinations that can be arranged.

Students interested in taking any of these combined honours programmes should consult with Professor I. A. MacLennan.

100 An Introduction to Philosophy, 3 discussion meetings weekly, D. Braybrooke, S. A. M. Burns, W. F. Hare, R. P. Puccetti, A. Rosenberg, P. K. Schotch, R. H. Vingoe.

Students in this class will pursue in some detail four topics, chosen from four of the chief branches of philosophy, and treated so as to illustrate basic principles of philosophical analysis, as well as some of the major historical contributions to philosophy. The four topics, taken up in an order varying with different sections, are:
(1) arguments for and against the existence of God;
(2) ethics and political obligation;
(3) the mind-body problem;
(4) the varieties of explanation.

The professors assigned to the class will specialize on one or another of these topics; and every section will be taught, in turn, by four different professors, as the section changes from one topic to another. Plato, Anselm, Aquinas, Descartes, and Hume are among the historical authors to be studied.

The Department of Philosophy has assigned an extraordinarily large proportion of faculty time to this class so that it can be carried on wholly in small sections limited each to 30 students; even so, the number of sections, and hence the total enrolment in the class, must be limited. *Only students who value the chance of continuous discussion in a small group highly enough to commit themselves to continuous attendance should enrol in Philosophy 100.*

200 Symbolic Logic, lect.: 3 hrs.; I. A. MacLennan.

Whenever we draw conclusions from permisses in such fields as mathematics, physics, engineering or economics (not to mention the other sciences), we are using a simple deductive system, which it is the aim of this course to develop. By taking a course in logic the student should have a better understanding of how we may derive the correct conclusions from our scientific hypotheses. One easy way of understanding the nature of inference is to create a simple, artificial language, in which the derivation of one formula from another is analogous to playing a game with pencil and paper. The aim of Philosophy 200 is to create this language, and to discover its most useful properties. Although symbolic logic in this course will be sufficiently related to arguments in a natural language, the emphasis will be on the systems themselves. Because many students find this kind of study to be quite new in their academic career, great care will be taken in presenting the material, and in addition there will be five assignments, which, when done, should lead to a fuller understanding of the subject.

The student should realize that the relation of classical two-valued logic to classical mathematics is explored in Philosophy 403. *Text:* MacLennan, I.A., *Structure-generating Games (vol. 1).*

201 Logical Forms of Argument, lect. with discussion: 3 hrs.; R. M. Campbell.

This class teaches the *application* of symbolic logic to arguments expressed in natural language, as in philosophy, science, ethics, law and politics. Its principal aim is to develop the student's capacity to analyze the logical structure of such arguments so that he can better assess their validity. Unlike Philosophy 202, this class deals extensively with formal manipulations, within a logical system. Unlike Philosophy 200, symbolic logic will not be studied for its own sake, or for its relevance to the foundations of mathematics. *No previous acquaintance with symbolic logic is presupposed.*

202 Basic Principles of Reasoning, discussions: 3 hrs.; R. M. Martin.

This is a class in applied practical logic. Symbolic logic techniques will be avoided as far as possible; instead, attention will be paid to the forms of reasoning as exemplified in good or bad real arguments, definitions, explanations, etc. The aim is the development of techniques to produce clear and valid reasoning; and to distinguish this from its opposite.

215 Philosophy and Psychoanalysis, lect. with discussion: 2 hrs.; R. M. Campbell.
(Not offered in 1974-75)

This class will examine some of the philosophic problems that lie in the intersection of ethics and philosophy of mind and that are of special interest to contemporary psychoanalytic writers. The problems may be grouped, somewhat arbitrarily, into questions about the meaning and possibility of (1) free, rational choice; (2) self-identity and tolerance; (3) mental health. This class is designed to be an introduction to philosophy and presupposes no acquaintance with either philosophy or psychoanalysis.

217 Existentialism, lect.: 2 hrs.; I. A. MacLennan.

The aim of this class is to study the works of four major philosophers in the existentialist tradition. The first term and part of the second will be devoted to the works of Kierkegaard and Nietzsche. The remaining time will then be devoted more or less equally to the works of Sartre and Heidegger.

218 Philosophy of Education, lect.: 2 hrs.; W. F. Hare. Same as Education 402 Section 3.

(a) In the first term an attempt is made to analyse some of the *crucial concepts* in educational theory. What is teaching, and is it distinct from training, conditioning and indoctrination? Certain slogans in educational theory, e.g. "We teach children not subjects", and "there's no teaching without learning" are carefully examined. How is education distinct from teaching, and is it possible to identify criteria which a process must satisfy if it is to be considered educational? Is there any conceptual connection between the idea of teaching and that of authority?

These are the kinds of issues discussed though the specific direction depends a good deal on the class.

(b) In the second term the class focuses on philosophical issues concerning *curriculum.* For example: Is it meaningful/useful to base a curriculum in schools on needs and/or interests? What is involved in the claim that a curriculum should be relevant? Are there any *educational* arguments in favour of a broad curriculum? How are we to assess curriculum goals such as creativity, mental health? An attempt is made to demonstrate the importance of analysis of the fundamental concepts involved in such issues.

220 Philosophy of Religion, lect.: 2 hrs.; F. H. Page.

An introduction to the philosophy of religion. Since there are many religions, is it possible to identify anything that is essentially religious? What sorts of evidence would provide good reasons for the belief in a divine being? Is the concept of God a coherent one? Is the notion of divine activity, for example in creation and miracle, intelligible? Is it possible to have knowledge of a divine being? Do revelations and religious experiences reveal more than the mental state of the experiencer? Are faith and reason alternatives or correlatives? Is the existence of evil and suffering compatible with the existence of a God who is both omnipotent and morally perfect? Does rationality demand that traditional views of the divine be modified, or abandoned? What religious alternatives are there? In considering questions like these the student will encounter many of the issues around which philosophical discussions revolve. He will also gain some acquaintance with the views of a variety of philosophers, past and present. Hence the class also provides one form of introduction to philosophical study as such.

Readings from an anthology by W. P. Alston and paperbacks by W. C. Smith, Ninian Smart, John Hick and Nelson Pike.

225 Religion and Human Behaviour, lect.: 2 hrs.; F. H. Page.

A study of religion as a form of human experience and behaviour. Can religion be plausibly explained in naturalistic terms, for example as a social device or as a merely subjective product of human psychology? With what human needs may religious behaviour be correlated? How do religious experience and behaviour change throughout the life-history of the individual? How are the concepts of development and maturity to be analyzed when applied to religion? How does the moral conscience develop in the individual and how is this related to his religious development? What is known about the preconditions and consequences of a religious conversion? What part do so-called peak-experiences play in religious development? Are drug-induced states genuinely religious? Are Eastern and Western mysticism radically different? Why are Westerners frequently attracted to the Eastern religions? Are there different types of the religious ideal, for example the mystical, prophetic, priestly, intellectual, saintly? An introductory class; no prerequisite.

Readings from Sigmund Freud, G. W. Allport, R. H. Thouless, William James, W. H. Clark, and others.

230 General History of Philosophy, lect.: and seminar: 2 hrs.; R. H. Vingoe.

The purpose of this class is to help students discover those philosophic traditions which have played a part in moulding western civilisation and still persist in the contemporary world. Since the field of study is large, an attempt will be made to concentrate upon some of the greatest and most influential of western philosophers. Since a general history is apt to degenerate into vague and inaccurate generalisations, students will be asked to present short papers, outlining and evaluating some parts of a given philosopher's writings.
Texts: B. Russell, *History of Western Philosophy,* (Allen and Unwin, Ltd., London, 1961); K. E. Eble, R. E. Helbling (eds.), *The Intellectual Tradition of the West,* Vols. I and II, (Scott, Foresman and Co., Glenview, Illinois 60025, 1967); D. J. O'Connor (ed.), *A Critical History of Western Philosophy,* Collier-Macmillan Canada Ltd., Toronto, 1964).

270 Philosophy in Literature, lect. with discussion: 2 hrs.; R. M. Martin.

This is an introduction to some issues in philosophy through the reading of some important literary works. Much modern literature is heavily influenced by philosophical trends; sometimes, in fact, the reader cannot fully appreciate such works unless he has an understanding of the philosophical issues and traditions involved. The class is designed for two sorts of students: those with literary interests who wish to learn about and discuss some of the more important philosophical influences on modern literature; and those interested in philosophy who would like to investigate literary occurences of philosophical ideas. In addition to the two hours of official meeting per week there will be optional discussion meetings at various times to be announced during the year. Readings will include short works by Dostoyevski, Melville, Kafka, Beckett, Sartre, Camus, Hemingway, Peter Weiss, Brecht, Atwood and Beauvoir.

Note: This class is cross-listed as Comparative Literature 270; it may be registered for under that title.

305 Epistemology, lect. with discussion: 2 hrs., P. K. Schotch.

An introduction to issues in the theory of knowledge, especially those which cast light on the conceptual aspects of the social and natural sciences. Among the issues normally treated are: the philosophical analysis of the concept of knowledge: perception and its relation to knowledge (and especially the claims of empiricism); the logical problem of induction; other minds and the relation between psychological and physical language. Questions to be raised include: Does knowledge to be found exclusively in perceptual experience? Are any non-deductive inferences justified, and more particularly what ground is there to believe the claims of science if the evidence for these claims is always formally incomplete? What evidential relation obtains between claims about persons' behavior and claims about their beliefs, emotions, and other mental states. Readings will consist mainly of the work of contemporary authors.
Prerequisite: Philosophy 100 or 200 or 201 or 202 and consent of the Department.

310 Ethics, lect. with discussion: 2 hrs.; R. M. Campbell.

A systematic discussion of traditional topics in moral philosophy: the nature of pleasure and happiness, psychological and ethical egoism, Kant's Categorical Imperative, Hume on moral belief and argument, utilitarianism, moral rules, and justice. The class will consider the relation of these topics to some contemporary problems, such as pacifism and the morality of induced abortion.
Prerequisite: Philosophy 100 or 200 or 201 or 202.

319 Descartes and the Search for Indubitable Knowledge, seminar: 2 hrs.; R. H. Vingoe.

This seminar will highlight one extremely influential line of thought: philosophers have often sought indubitable knowledge. In this search Descartes is quite important because his position marks a radical break with ancient and medieval thought and because this break made epistemology the main preoccupation of modern philosophy. The first half of the class will consequently be devoted to Descartes. The second half will range beyond Descartes (e.g., Hume, Moore, and Ryle) to consider alternative sources of indubitable knowledge, e.g., sensory experience, self-awareness, logic, and common sense. Students will be expected to present short papers.
Prerequisite: Philosophy 100 or 200 or 201 or 202.
Texts: R. M. Eaton (ed.), *Descartes, Selections,* (Charles Scribner's Sons, 1969); J. R. Weinberg and K. E. Yandell, *Theory of Knowledge,* (Holt, Rinehart and Winston, 1971).

320 The Philosophy of Hume and Kant, seminar: 2 hrs.; A. Rosenberg.

A close study of Hume's *Treatise of Human Nature,* Book 1, and Kant's *Critique of Pure Reason,* disclosing parallel problems and alternative responses to them in these works. The class will also consider the accounts of some contemporary commentators, and the relevance of these two classics to present philosophical concerns.
Prerequisite: Philosophy 100 or 200 or 201 or 202.

335 Greek Philosophy from Thale to Aristotle, lect. and discussion: 2 hrs.; S. A. M. Burns.

The beginning of Western philosophy is studied in the Presocratic fragments, major works of Plato and Aristotle's *Organon.*
Prerequisite: Philosophy 100 or 200 or 201 or 202.

336 Ancient Philosophy from Aristotle to St. Augustine, lect.: 2 hrs.; A. H. Armstrong/ J. A. Doull.

This class studies the development of Classical and Patristic thought from Aristotle to St. Augustine, with concern to explore the manner in which the philosophical achievement of ancient Greece came to form, in the thought of the Church Fathers, the intellectual foundation of European culture. Works most closely considered will be Plato's *Timaeus,* parts of Aristotle's *Metaphysics,* parts of Plotinus' *Enneads,* and St. Augustine's *City of God* and *De Trinitate.*
Prerequisite: Philosophy 100 or 200 or 201 or 202.

338 History of Medieval Philosophy, lect.: 2 hrs.; R. D. Crouse.

A study is made of the development of philosophy in the formative age of European civilization, with attention given to related political, institutional, literary and theological concerns. The authors studied most closely will be Boethius, Anselm of Canterbury, Thomas Aquinas, some thirteenth-century Augustinians and Averroists, Ockham, and one or more of the Late Medieval Mystics. The class will be conducted partly as a seminar, partly as a course of lectures.
Prerequisite: Philosophy 100 or 200 or 201 or 202.

346 Problems of Mind, seminar: 2 hrs.; R. P. Puccetti.

These problems of mind will be explored: (1) How are a person's corresponding mental and physical states related? Is the concept of a person, and particularly of his mental states, exhausted by descriptions of his behaviour? Or, by descriptions of changes in certain parts of his nervous system? Or does the concept of a person require reference to a third entity, over and above his mental and physical states? (2) What kinds of entities might possibly count as persons other than human persons? Could machines do so? Could organic artifacts? Could non-material entities? How are we to make decisions about the application of mental and personal concepts to non-human entities? (3) What effects upon traditional problems of the mind/body relation are indicated by recent neurophysiological developments, such as brain bisection in humans and investigation of animal intelligence?
Prerequisite: Philosophy 100 or 200 or 201 or 202.
Texts: Self-Knowledge and Self-Identity, by Sydney Shoemaker; recent articles on the problem of personal identity; *Mentality and Machines,* by Keith Gunderson; *Self and the World,* ed. by J. A. Ogilvy.

347B Freedom and Responsibility, lect. and discussion: 2 hrs.; W. F. Hare.

The purpose of this class is to examine philosophically issues which are significant in

many disciplines, such as psychology, law and education. For example, what is meant by saying that a person has a responsibility to do something; And what is a person requesting when he asks to be given more responsibility? If there is a difference here, is it to be explained in terms of the freedom the agent has in acting? But perhaps the possibility is undermined by auguments which purport to show that a person has no freedom to choose his actions? And then in what sense can a person be held responsible for his actions?

Readings will include recent articles by such authors as Pennock, Frankena and Hart, and certain papers in Sidney Hook, ed. *Determinism and Freedom* (Collier Books, New York, 1961), B. Berofsky, ed. *Free Will and Determinism* (Harper and Row, New York, 1966).
Prerequisite: Philosophy 100 or 200 or 201 or 202.

355A/555A Marxist Theory and Its Upshot in the World Today, Seminar: 2 hrs.; D. Braybrooke.

Social objectives inherited from earlier socialist thinkers, especially Saint-Simon, inspired Karl Marx's life work and thought. General philosophical ideas imparted by Hegel contributed some crucial features of overall framework and inclination. The analytic apparatus developed by classical economists of the British school, especially Ricardo, gave the thought its cutting edge as a critique of standing social arrangements. The class will spend some time identifying each of these influences upon Marxist theory; then consider the classical Marxist analysis of capitalism and various attempts, which have not come to an end, to accommodate it to developments which Marx appears not to have anticipated in some important respects.

355B/555B Marxism as an Alternative Approach in Contemporary Social Science, seminar: 2 hrs.; D. Braybrooke.

This class will discuss the implications for the study of politics of contemporary Marxist economics (by Western writers like Baran and Sweezy, Mandel, and Sherman); the critique of capitalist culture developed by philosophers associated with the Frankfurt School; and Jean-Paul Sartre's use of Marxism as a methodology for social science.
Prerequisite: 355A or equivalent acquaintance with the works of Marx and their influence.

357B/557B Philosophy of History, seminar: 2 hrs.; D. Braybrooke.
(Not offered in 1974/75)

365 Philosophy of Science, lect. with discussion: 2 hrs.; A. Rosenberg.

An examination of concepts crucial to the expression of scientific theories, as well as a consideration of the interpretation of controversial physical and social theories. Topics change from year to year. In any given year problems treated may include causality and scientific law, the nature of theories and theoretical entities, relativity and changes in the status of space and time, behaviourism and simulation in experimental psychology, the interpretation of quantum mechanics, the nature of microeconomic theory. See the instructor for details about the class in any given year.
Prerequisite: Philosophy 100 or 200 or 201 or 202 or 305, or relevant science courses, or permission of the instructor.

385 Metaphysics, lect. and seminar: 2 hrs.; S. A. M. Burns.

This class will study some primary philosophical questions about the nature of substance and change, space and time, cause and effect, and (self-)identity.
Prerequisite: Philosophy 100 or 200 or 201 or 202.

390 The Philosophy of J. P. Sartre, seminar: 2 hrs.; I. A. MacLennan.

The course will consist of an intensive study of Sartre's *Being and Nothingness.* However, in the second term Sartre's philosophy will be related to, and contrasted with the philosophy of M. Heidegger.
Prerequisite: Philosophy 217 or 270.

403 Advanced Symbolic Logic, lect.: 3 hrs.; I. A. MacLennan.
(Not offered in 1974/75)

404 Topics in Philosophical Logic, seminar: 2 hrs.; P. K. Schotch.

This course will survey some of the main themes of contemporary formal logic as it deals with matters of interest to philosophers. Some of the areas of major concentration will be: Modal logic including various kinds of semantics, contemporary theories of implication, tense logic, formal analysis of natural language and the problem of 'truth-value gaps', many-valued logic.
Prerequisite: One course in logic, or consent of the instructor.

448A/548A/ Seminar in Philosophy, Politics, and Economics: Public Goods and Political Choices, seminar: 2 hrs.; D. Braybrooke. (Same as Econ. 448A/548A and Pol. Sci. 448A/548A.)
Not offered in 1974/75

449B/549B Seminar in Philosophy, Politics, and Economics: Applied Social Philosophy - The Logic of Questions, Policy Analysis, and Issue-Processing, seminar: 2 hrs., spring term; D. Braybrooke.
(Same as Econ. 449B/549B and Pol. Sci. 449B/549B)

This class will consider the logical character of policies, taking them to be best defined as social rules and the logical character of issues, regarded as disjunctive questions in which various rules figure as alternative policies. It will then move on to consider various criteria for resolving such questions - criteria in which philosophical concerns with values join up with topical concerns about social indicators. Finally, it will study various aspects of institutional arrangements for defining issues and bringing social indicators to bear upon them. Readings will include von Wright, *Norm and Action;* Belnap on the logic of questions; Bauer, *Social Indicators;* and Lindblom, *The Intelligence of Democracy.*

450 Philosophy of Language, seminar: 2 hrs.; R. M. Martin.

The elements of language have meaning, but The elements of language have meaning, but what is the meaning of 'meaning'? Various theories of meaning will be examined. Related issues of philosophical importance will also be discussed (e.g. the analytic/synthetic distinction; synonymy).
Prerequisites: Philosophy 100 or a logic class, and at least one class beyond the 100 level in analytic philosophy; or by permission of the instructor.

460 Contemporary Philosophy of Religion, seminar: 2 hrs.; F. H. Page.

A phenomenon of quite recent philosophy is the amount of activity in the field of the philosophy of religion. The seminar investigates examples of this current interest and endeavours to map the salient features. Students will be admitted at the discretion of the instructor. Some acquaintance with the traditional problems of the philosophy of religion together with some familiarity with one or more of: epistemology, ethics, the philosophy of language, the philosophy of mind, twentieth century philosophy, would be an advantage.

Physics

Professors
W. J. Archibald
M. G. Calkin
E. W. Guptill
C. K. Hoyt
M. J. Keen (Oceanography and Geology)
G. F. O. Langstroth

Associate Professors
D. J. W. Geldart
M. H. Jericho
R. D. Hyndman (Oceanography)
D. B. I. Kiang
W. Leiper
R. H. March (Chairman)
R. Ravindra
W. L. Silvert

Assistant Professors
B. L. Blackford
J. G. Cordes
D. F. Goble
B. E. Paton
P. H. Reynolds
A. M. Simpson
C. G. White

Instructor
G. Stroink

Postdoctoral Fellows
M. C. Jain
S. D. Jensen
P. L. Li
Y. Matsumoto
F. Tagaki
D. A. Tindall

We are surrounded by complex objects. A transistor radio is a typical example; their size and complexity varies enormously but the common element is the partnership of basic science and technology which has produced them.

We are also surrounded by simple and subtle phenomena not made by man. A rainbow, or the waves on the shore may cause us to look and, perhaps, cause us to wonder.

The science called 'physics' is for those who wonder. The teachers of physics will strive to impart not only basic knowledge. In addition, and often at the same time, students will be helped to develop the skills required to connect seeming unrelated events or observations, and via this connection to come to an understanding of a physical concept.

A physical concept is a powerful weapon for those who wish to mould their wonder and curiosity into a systematic scientific inquiry, whether this inquiry concerns a rainbow or a clinical diagnosis. For example, only a few concepts are required to understand classical mechanics - the study of force and motion.

Material objects are found to behave predictably; they can be said to obey 'laws.' Waves of various sorts, such as light and sound, also obey laws and a knowledge of these laws will help us to understand the behaviour of an optic or acoustic system, or, more important, to predict the behaviour of an untried system.

Electricity and magnetism form an important part of elementary physics. In several classes the nature of electric and magnetic forces is discussed. This collection of physical phenomena includes such distant cousins as a toy electric motor and an extensive communications network.

In the study of these and related subjects, deductive skills are encouraged and practiced; these skills can then be used to study more subtle physics, or carried over to any discipline which may be the goal of a student.

First Year Classes

There are three first year classes. They give a general introduction to the subject and cover to a varied extent the more modern aspects of physics - relativity, properties of nuclear radiations and quantum mechanics.

Physics 100 is a survey class requiring no previous preparation in physics and offered primarily for students in arts or a pre-professional programme.
Physics 110 is intended for students intending to make a study of engineering or a physical science. Previous background in physics is helpful but not essential.
Physics 120 is primarily for non-science majors and will study in detail a limited number of revolutionary developments in physics with an emphasis on their philosophical, historical and political ramifications.

For second and subsequent years, an important part of the course each year after the first is the laboratory work which establishes a connection between the theoretical and mathematical ideas of the lectures and the world of physical reality. In the third and fourth years the student is encouraged to follow his own interests as much as possible, both by designing and carrying out experiments of his own choosing in the laboratory and by selecting suitable classes from amongst the electives available.

Degree Programmes

General Degree/Major in Physics
Students intending to major in physics should include Physics 110 and Mathematics 110 in their first year programme. Physics 100 and 245 may not be included in a 'major' and at least one 300-level class must be included. Physics 340 may not count as the *only* 300-level class.

Students wishing to take a general degree in Physics might be interested to note that P120 and the four non-honours-oriented courses at the 200-level (P221, P222A and B, P230 and P250) between them cover essentially all of the major topics in Physics. This 'package' includes: the history and effects of physics, astronomy and cosmology, elementary nuclear physics, introductory quantum mechanics, relativity and atomic physics.

Students interested in both physics and biology may wish to examine the section on 'Combined Honours.' The first three years of the 'Biophysics' combined honours programmes constitute a three-year B.Sc. (General Degree) programme which has been put together by both departments. Again, it should be noted that alternatives are available for specific classes in this programme of study.

B.Sc. Major in Physics *(example only,* other possibilities exist):

Year I, 110 (Math 100), science, arts, elective

Year II, 221, 230 (Math 200 or 220), science, elective

Year III, one or two of 222A/B, 250; one or two of 300, 315, 320, 335, elective(s).

B.Sc. with Honours in Physics
All students who intend to take a B.Sc. with Honours in Physics are encouraged to discuss their programme with staff members of the department and to consult with the Chairman of the Department at the beginning of the second year.

Year I
1. Chemistry 110.
2. Mathematics 100.
3. Physics 110.
4. Arts or Science elective.
5. Arts elective.

Year II
6. Science elective.
7-8. Two mathematics' classes.
9-10. Physics 211 and 231.

Year III
11. Arts or Science elective.
12. Class in Mathematics.
13-15. Physics 300 and two other physics classes.

Year IV
16. Arts, science or mathematics elective.
17-20. Four physics classes at the 400 level, one of which will normally be Physics 400.

Combined Honours
Physicists study, and try to understand, the fundamental laws of nature. Because of this, physicists find themselves becoming increasingly involved with other sciences where attempts are being made to understand the phenomena as well as to describe them. For example, geologists have mapped the magnetic field of the Earth and are now working with physicists, trying to explain the underlying mechanisms. Biologists and physicists are collaborating on studies of diffusion through cellular membranes, as well as on a variety of other topics.

It is important, therefore, to have scientists with training in more than one subject.

All manner of combined honours physics programmes can be generated. Two cases where details of such programmes have been worked out are combined honours with GEOLOGY and with BIOLOGY. Details of a possible 'Geophysics' programme are included in the Geology section of the Calendar. A possible programme for students wishing to do a 'Biophysics' combined honours programme is outlined below:

Combined Honours Physics and Biology

Year I	Year II
Physics 110	Physics 221, 230
Biology 201A, 2030B	Biology 2000
Math 100	Math 220
Philosophy 100	Chem 110

Language or Social Science

Year III	Year IV
(one of) Physics 315, 320, 315	One Biology (e.g., Biology 3030A/B) or one 300-level Physics
Biology 2020A, 2040B	Physics 300
Biology 3012A, 3013B	Chem 230 or 241
One other Biology or 300-level Physics	Half-class in Biology + Physics 470B
Elective	Physics 340/Biology 3400/History 310

Students contemplating these, or any other combined honours programme may obtain further details from the Department, and should in any case consult the Departments before the beginning of their second year of study.

100 General Physics, (3 sections), lect.: 3 hrs.; problem session: 3 hrs.; C. G. White, W. J. Archibald, J. G. Cordes.

This is a survey class requiring no previous preparation in physics, and offered primarily for students in arts, pre-medicine and pre-dentistry. It will not normally be accepted as a prerequisite to advanced classes in physics.

The class surveys physics from its beginnings to the present day. The four major topics are: Newtonian mechanics (motion, force, mass, momentum, energy); electromagnetism (charge, electric and magnetic forces and fields); relativity (space, time, mass, energy); quantum theory (elementary particles, atoms).

The major topics are dealt with mainly in historical sequence. To a large extent the ideas in later topics are built on the ideas presented in earlier topics. In particular, the four major topics mentioned are not at all isolated from each other, but are rather closely inter-related.

Throughout the class, mathematics is used as a language for expressing the basic ideas of physics and also for deductive reasoning from these basic ideas. The mathematics used is *not* in advance of high school algebra and trigonometry, but some time is spent in the class developing greater facility with high school mathematics. It must be stressed that mathematical formulae are not used simply for "plugging in" numbers; rather, the emphasis is placed on a thorough understanding of the meaning and range of applicability of the formulae.

A large part of the class consists of developing understanding of physical principles through specific problems. For this reason, there is a 3 hour session each week during which students do problems with the assistance, when required, of the lecturer and graduate students. The problems are linked closely to the lecture material, and sometimes extend the subject matter of the lectures. The problem sessions are conducted informally and students are free to discuss the problems with each other as they work. There are no laboratory experiments in this class.
Text: J. B. Marion, *Physics and the Physical Univers*, Wiley.

110 General Physics, lect.: 3 hrs. (2 sections); tutorial: 2 hrs.; E. W. Guptill, R. H. March.

This class introduces the student to the elementary physical laws of our universe and the way in which these laws are used to forecast such natural events as the flight of a projectile, the relativistic variation of mass, the flow of electrical current in a circuit, etc. Newton's laws, for example, are stated and then one proceeds by asking "what do these laws say about the position of a projectile after a certain time has elapsed?" Intuitive reasoning or educated guessing is eliminated. Reasoning of this kind requires more sophisticated mathematics than one normally uses in high school and consequently a considerable fraction of the first few weeks of lectures is used introducing such topics as vector algebra, differential calculus and integral calculus.

Throughout the year students will have an opportunity to assess their progress by the results of fortnightly quizzes which are given during afternoon tutorials. These tutorials replace the conventional laboratory work and give the student ample time to discuss his problems with the tutor. Most of the experimental work is confined to lecture room demonstrations.

Students beginning this class should be familiar with trigonometry, the solution of quadratic equations, binomial expansions and should now be prepared to start vector algebra and differential calculus. Previous work in physics is not essential.
Text: Weidner and Sells, *Elementary Classical Physics*, Vols. 1 and 2, Allyn and Bacon, 1973.

120 Science and Heresy, lect.: 3 hrs.; W. Silvert.

This class is primarily for non-science majors, and no prior knowledge of science or mathematics is required. The object of the class is to show students how scientists think, how they do research, and how they have profoundly affected our culture and our society. The method is to study in detail a limited number of revolutionary developments in physics with strong emphasis on the philosophical, historical, political and religious problems involved.

The first part of the class deals with space, time, and motion, starting with Aristotelian physics and continuing through the Copernican revolution to the mechanistic theories of Newton. Then we leap from the 17th to the 20th century to study special and general relativity. The next part of the class deals with electricity, magnetism, and the nature of light. Finally we study the theory of elementary particles, which includes some elements of quantum mechanics. After the first part of the class (space, time, and motion), the development of ideas is logical rather than historical — thus the existence of magnetism is seen to be a direct requirement of special relativity, and quantum mechanics appears as a logical consequence of Newton's optics.

The recurring theme of the scientist as heretic is emphasized throughout the class. Many revolutionary developments in science have had profound cultural consequences — these include the Copernican revolution, which overturned biblical cosmology, and Darwinism, which did away with man's unique role in the universe. As a consequence, scientists have often been branded as heretics — Galileo was forced to recant his theories, Bruno was burned at the stake, Stalin purged geneticists and Hitler outlawed relativity. A central question of this class is whether this recurrent pattern is only a series of aberrant episodes, or whether it reflects a basic characteristic of science itself.

There is no scheduled laboratory in this class. However, each student must carry out an experimental research project each term, on the theory that one learns physics by doing it.
Text: L. N. Cooper, *An Introduction to the Meaning and Structure of Physics*, Harper & & Row, 1968, and several supplementary paperbacks.

211 Mechanics, lect.: 3 hrs.; lab.: 3 hrs., A. M. Simpson.

and

231 Electricity, lect.: 3 hrs.; lab.: 3 hrs., W. Leiper.

These two classes are intended to be complementary, and for second-year honours students. Unless the circumstances are unusual, they should be taken together. The classes have a common laboratory, i.e. work done in the laboratory periods is included in the grade for both classes.

Prerequisites are also common: Physics 110 and Mathematics 100. (Statistics have shown that a student with less than a "B" grade in Physics 110 can be expected to have difficulty with 211 and 231).

It is assumed that students are familiar with elementary mechanics and the concepts of work, energy and momentum as developed in Physics 110; and with the application of simple integral and differential calculus to the solution of physical problems.

211 Mechanics.

The class is divided into 2 parts: mechanics and wave motion. The first part deals with basic vector mathematics and its application to physics. Newton's laws of motion and the description of motion in unaccelerated reference frames, the two principles of special relativity and their use in describing space and time intervals in unaccelerated reference frames, conservation of energy and momentum from both the classical and relativistic view point. The last topic in the first part of the class is harmonic oscillation, which provides an introduction to the second part, wave motion. In the study of wave motion, examples are taken from many branches of physics: mechanics, electromagnetism, quantum theory. Fourier analysis of wave packets and pulse will be included.
Text: Berkeley Physics Course, Vol. 1 *Mechanics*, McGraw-Hill, 1965; Berkeley Physics Course, Vol. 3 *Waves and Oscillations*, McGraw-Hill, 1965.

231 Electricity.

The material discussed in this class forms part of the *Berkeley Physics Course*. The class begins by studying electrostatics, distributions of static charges, and the concepts of electric field and electric potential as physical quantities. Next, the motion of charge in conducting materials is discussed leading to the solution of circuit problems involving capacitance and inductance. By considering the electric field of a moving charge in the light of the theory of relativity, the nature of the magnetic field is introduced and its properties discussed. The relationships between electric and magnetic fields are then studied and it is shown how these relationships imply the existence of electromagnetic radiation. Electric and magnetic fields in matter are also discussed.

The laboratory work is designed to illustrate the physical principles discussed in the lectures and simultaneously to introduce students to the use of electronic apparatus and to the design of some simple circuits.

Students are expected to have an introductory knowledge of the nature of electric charge, electric field, magnetic field, and of electrical current as developed in Physics 110.
Text: Berkeley Physics Course. Vol. 2 *Electricity and Magnetism*, McGraw-Hill, 1965.

221 Waves and Modern Physics, lect.: 3 hrs.; lab.: 3 hrs.; C. K. Hoyt.

This class is intended mainly for those who do not plan to take honours physics but who wish to learn more about 20th century physics than is possible at the first year level.

Waves are studied first, since their properties and the terminology used in connection with them have an important relationship to much of modern physics. Wave equations are deduced both for mechanical and for light waves, and it is shown how all the various wave properties can be derived and used.

The central role played by light in forcing a revision of 19th century ideas is brought out. The resulting relativity and quantum theories are applied first to simple idealized situations, and then to more realistic ones in discussions of the hydrogen atom, the structure of atoms and molecules, and the statistical properties of large assemblies of molecules. The necessity of using the newer theories will be apparent by the existence of phenomena which cannot be explained by the older ones.

Finally, the world of sub-atomic particles will be explored to show how the experimental facts are still compelling physicists to revise their conception of nature.
Prerequisite: Physics 110, Mathematics 100. Students are expected to be familiar with calculus, complex exponential functions, simple harmonic motion, and the simpler aspects of special relativity.
Text: H. D. Young, *Fundamentals of Optics and Modern Physics*, McGraw-Hill, 1968.

222A Radiation and Environmental Physics, lect.: 2 hrs.; lab.:3 hrs.

This is a physics class which does not involve the use of calculus. The properties of atomic and nuclear radiations are explained and the uses of these radiations are discussed. As an example, one of the laboratory periods is devoted to a visit to the Nuclear Medicine Department of a local hospital, where x-ray machines and radioactive sources are used for treatment of patients.

The lectures also cover the instruments used to detect and monitor radiations (geiger counters, cloud chambers, etc.); pollution monitoring; radio-isotopes in agriculture, rock-dating and radio chemical analysis.

In the laboratory periods the students become familiar with equipment such as sodium iodide gamma-ray counters (which measure the energies of gamma rays passing through them), geiger counters and radioactive sources.
Prerequisites: Any first year physics class. Other students will have to seek approval of instructor.
Books: Hurst and Turner, *Elementary Radiation Physics*, Wiley, 1970.

222B lect.: 2 hrs. per week plus demonstrations, visits, films as arranged.

Based on the background obtained in P222 A, the lectures cover the various kinds of devices used to accelerate nuclear particles to high energies - the 'atom smashers'. The increasing use of such gigantic and expensive machines in health physics is discussed. The major radiation hazards to the environment are nuclear reactors and H-bombs. Their construction, properties and effects are explained.
Prerequisites: P 222A
Books: TBA

230 Mechanics, Electricity and Magnetism, lect.: 3 hrs.; W. L. Silvert.

This class is designed for second year science and engineering students who wish to take a second class in physics, in addition to Physics 221, or who for some reason are unable to take that class. Students may take third year physics classes if they have taken this class and Physics 221. The class will include discussion of the essence of classical mechanics, with an introduction to relativistic mechanics, and the essence of classical electricity and magnetism. Substantial emphasis will be placed upon the important ideas which arise from these fields of physics, and upon their present relevance.
Prerequisite: Physics 110, Mathematics 100.
Text: to be announced.

231 Electricity.

See description with Physics 211.

245 Planetary Science and Astronomy, lect.: 3 hrs., P. H. Reynolds, R. H. March.

This course is aimed at developing an understanding of our physical environment, both on the scale of the solar system and on the scale of the universe. We shall use some of the major findings of geophysics and oceanography to study the Earth as a planet. We shall discuss the contributions made by the space program — for example, the Apollo flights to the Moon and the Mariner flights to Mars. The constitution, age and origin of our solar system will be considered as will the interactions of its component parts (for example, Earth-Moon and Solar-planetary interactions).

The second part of the course will consider stars — their origin, constitution and evolution with time; the structure and age of our Galaxy and the universe of galaxies; pulsars, quasars and other recent interesting developments in optical and radio astronomy; and finally, various cosmological models.
Prerequisite: one first-year science course.
Texts: One or more will be selected.

250 Astronomy, lect.: 3 hrs., P. H. Reynolds.

This is a basic course designed primarily for students who may wish to pursue more advanced studies in astronomy or in astrophysics.

Students will be given the option of either writing one or two major term papers or doing an equivalent number of laboratory experiments. The latter may involve some telescope observing.

I. The Solar System: the Earth, Moon, meteorites and planets; planetary motions and celestial coordinate systems; the origin and age of the system.
II. The Stars: their distances and motions; the motion of the Sun; magnitudes, luminosites, colours and stellar spectra; building stellar models — the Sun as a star; variable stars; binary star systems; clusters of stars; interstellar gas and dust; stellar evolution.
III. The Galaxies: structural features and dynamics of our Galaxy; particular features of the exterior galaxies.
IV. 'Gee-Whiz' Astronomy: pulsars (neutron stars); black holes; quasi-stellar objects (quasars); an introduction to cosmology.
Prerequisite: Physics 110 or Physics 100.
Text: Whyatt, Principles of Astronomy (Second Edition), Allyn and Bacon, 1971.

300 Experimental, Physics, lab.: 6 hrs.; lect.: 1 hr., B. E. Paton.

A course in experimental physics designed to give students a chance to do non-set experiments and thereby encounter and solve on their own the problems of experimentation. As the number of experiments is small (four to six), students should achieve a real understanding of a few physical phenomena. Topics for experimental study cover a wide range of fields such as atomic physics, mathematical physics, solid state physics and electronics. A measurement of one of the fundamental constants such as c, G or e is required and other than this the student is free to choose the field of experimental study.
Prerequiste: The class is designed for honours and engineering-physics students and has Physics 231 as a prerequisite. In addition, two other physics classes must be taken concurrently. Exceptions have been made.

315 Modern Physics, lect.: 3 hrs.; D. Kiang.

This is an introductory class in quantum mechanics and atomic spectroscopy. Wherever possible quantum mechanical concepts and quantities will be discussed in terms of research projects going on in the Physics Department.

The first term deals mainly with basic quantum mechanics. In the second term, selected topics in atomic physics, solid state physics, nuclear and particle physics will be discussed.
Prerequisite: Mathematics 200 or its equivalent.
Text: (1973/74) McGervey. *"Introduction to Modern Physics,"* Academic Press (1971). This text will not necessarily be used in 1974/75.

320 Thermodynamics, lect.: 3 hrs.; D. J. W. Geldart.

This class studies the basic principles of statistical mechanics and the relation that they have to thermodynamics together with the application of these principles to the study of ideal gases and certain physical systems.
Prerequisite: Some knowledge of partial derivatives: Mathematics 200, which may be taken concurrently with the class.
Text: Reif, *Principles of Statistical and Thermal Physics,* McGraw-Hill, 1965.

335 Electronics, lect.: 3 hrs.; A. Levin.

The class covers advanced circuit analysis of linear and non-linear systems, the physics and resulting properties of solid state devices, the concepts of information and noise and transmission lines and filters.
Topics treated: network reduction, the 4 terminal network and solutions by matrix methods, non-linear systems, modulation, de-modulation and rectification, carrier transport in semi-conductors, properties of diodes and transistors; electromechanical analogs and analog computation methods, feedback and control systems, stability criteria, nature of information and noise, properties of distributed constant lines and filters.
Prerequisite: Physics 230 or Physics 231, Mathematics 220 or 228 to be taken concurrently.
Text: Milman and Halkias, *Electronic Devices and Circuits,* McGraw-Hill, 1967.

340 History of Science, lect.: 2 hrs.; tutorial: 1 hr.; R. Ravindra (Physics), J. Farley (Biology). *(Same as Biology 3400 and History 340. Class description to be found under Biology 3400).*

400 Advanced Physics Laboratory, lab.: 6 hrs.; A. Levin, S. T. Nugent.

This is a physics and engineering-physics laboratory class in which students in groups of two work largely on their own initiative. The experimental work covers nuclear disintegration, gamma and beta spectroscopy and absorption measurements, proton spin quantitative measurements and Planck's constant determination; thermionic emission and ionization experiments using a vacuum pumping and instrumentation system; properties of solid state semiconductors and devices; experiments on the spectral noise distribution of transistors and the use of analysis systems; experiments with a Helium-Neon laser, holography, etc. If they wish, students may do experiments in other areas, such as acoustics, optics, fluid dynamics. A report, on a topic to be agreed with the instructor, is required as part of this class.
Prerequisite: Fourth-year standing in physics or engineering-physics or permission from the instructor.

402B Special Topics in the History and Philosophy of Science, seminar: 3 hrs.; *(Not offered in 1974/75).*

410 Advanced Classical Mechanics and Electro-dynamics, lect.: 3 hrs.; M. G. Calkin.

In the first term the class will study Lagrangian and Hamiltonian mechanics, covering, for example, the material in Goldstein, Chapters 1, 2, 3, 7, 8, 9, 10; Lagrange's equation, Hamilton's principle, the two body central force problems, Hamilton's equation of motion, transformation, the Hamilton-Jacobi equation, and small oscillations.

In the second term the class will study electrodynamics, covering topics such as electromagnetic waves, radiation from antennas and from moving charges, energy loss of charged particles passing through matter, plasma physics, semi-classical theory of radiation.
Texts: Goldstein, *Classical Mechanics,* Addison-Wesley; Jackson, *Classical Electrodynamics,* Wiley.

415 Quantum Mechanics, lect.: 2 hrs.; B. L. Blackford.

Topics discussed include: concepts and formulation of quantum mechanics, harmonic oscillator, potential well and barrier, angular momentum and the central force problem, perturbation methods, scattering theory.
Prerequisite: Physics 315. Students should be familiar with elementary wave mechanics and with the mathematics necessary to discuss the Schrodinger wave equation.
Text: TBA.

416 Mathematical Methods of Physics, J. G. Cordes.

Topics discussed include: ordinary differential equations, complex variables, integral transforms, special functions, partial differential equations, eigenfunctions, eigenvalues, Green's functions, scattering theory, perturbation theory, integral equations and calculus of variations.
Prerequisite: Registration requires prior departmental consent.
Texts: Arfken, *Mathematical Methods for Physicists* (2nd ed.), Mathews and Walker, *Mathematical Methods of Physics* (2nd ed.).

421B Nuclear Physics, lect.: 3 hrs.; W. Leiper. *(Not offered in 1974-75).*

423A Introduction to Solid State Physics, lect.: 3 hrs.; M. H. Jericho.

This class introduces the basic concepts of solid state physics which are related to the periodic nature of the crystalline lattice. Topics will include crystal structure, X-ray diffraction, phonons and lattice vibrations, the free electron theory of metals, and energy bands.
Prerequisite: Physics 315. Registration requires prior departmental consent.
Text: Kittel, *Introduction to Solid State Physics,* 3rd. ed., Chapters 1-9, Wiley, 1966.

433B Materials Science, lect.: 3 hrs.; H. W. King.

This course applies the principles of solid state physics to the study of real materials. Physics to the study of real materials. Physical properties are shown to have intrinsic symmetry which interacts with the symmetry of the crystal structure of the material, thereby defining the number of coefficients necessary to completely describe the property. The concept of thermodynamic equilibrium, governed by diffusion in the solid state, is discussed as the basis for a description of the microstructure of metals and alloys. Although solid state properties such as electron transport, magnetism, semiconductors, superconductors and the optical properties of dielectrics and semiconductors owe their existence to the quantum properties of electrons, it is shown that in practice, the magnitude of these properties is strongly influenced by microstructural effects such as solid solution alloying, crystal defects, grain boundaries, textures and plastic deformation.

Prerequisite: Physics 315, preferably Physics 423A, and permission from the instructor. Registration requires prior departmental consent.
Text: Hutchinson and Baird, *Physics of Engineering Solids,* Wiley 1968.
Reference: Nye, *Physical Properties of Crystals,* Oxford Univ. Press, 1969.

435A Electronic Techniques for Energy Conversion, lect.: 3 hrs.; A. Levin.

This course discusses the properties, efficiency and uses of energy conversion systems based on electronic techniques. Topics discussed include: thermojunction generators and refrigerators, solar generators, thermionic generators, fuel cells and related devices.

Reference: Levine, *Selected Papers on New Techniques in Energy Conversion.*

440B Optical Electronics, lect.: 3 hrs.; S. T. Nugent

Topics discussed include: electromagnetic theory, the propagation of rays and optical beams, optical resonators, interaction of radiation and atomic systems, theory of laser oscillations, some specific laser systems, second-harmonic generation, parametric oscillation, electro-optic modulation and optical detectors.
Text: Yariv, *Introduction to Optical Electronics.*

444A Optics, lect.: 3 hrs.; C. H. Hoyt.

Topics include a detailed study of the radiation from accelerated charges, the statistical properties of the fields from assemblies of radiators, interference, diffraction, with attention to the approximations of the Kirchhoff theory, and the application of Fourier transforms to the structure of images, the resolving power of instruments and the characterization of coherence.

A few topics in geometrical optics may be included to assist in understanding the behaviour of optical instruments and to provide a background for the better appreciation of some of the topics in physical optics.
Prerequisite: Physics 230, or Physics 231, or Physics 221 and Mathematics 220. The student should be familiar with vector analysis, Maxwell's equations and the use of complex exponential functions. Registration requires prior departmental consent.
Text: Stone, *Radiation and Optics,* McGraw-Hill, 1963.

445 Physics of the Earth, lect.: 3 hrs.; P. H. Reynolds, R. M. Hyndman and J. M. Ade-Hall.

This is a class in solid-earth geophysics. Topics discussed include: the figure of the Earth and gravity, seismology and the internal structure of the Earth, the geomagnetic field, paleomagnetism — the prehistory of the geomagnetic field, heat flow and the Earth's thermal history, electrical conduction in the Earth, radioactive processes and in the age of the Earth, global geophysics - continental drift and sea-floor spreading.

Taught concurrently with Geology 445.
Prerequisite: Registration requires the prior consent of the Department.
Texts: Stacey, *Physics of the Earth,* Wiley, 1969; Garland, *Introduction to Geophysics,* Mantle, Core, and Crust, Saunders, 1971.

462 Applied Geophysics, lect.: 3 hrs.; P. H. Reynolds.

This will be a theoretically-oriented course designed for senior undergraduates and for graduate students. Substantial background in mathematics and physics will therefore be required.

Topics: Fundamentals of elasticity theory and the wave equation, plane seismic waves in layered media, seismic interpretation theory, potential field theory, reduction and interpretation of gravity data, reduction and interpretation of magnetic data, the resistivity method, electromagnetic induction theory, methods and interpretation.

Taught concurrently with Geology 462/562. See also geophysics courses offered in the Geology and Oceanography Departments.
Prerequisite: Interested students should consult with instructor.
Text: Grant and West, *Interpretation Theory in Applied Geophysics,* McGraw-Hill, 1965.

Other geophysics classes are also offered in the Departments of Geology and Oceanography.

Physics 470B Topics in Biophysics, lect.: 3 hrs.; M. Jericho.

The purpose of the course is to introduce students with a background in physics to the field of Molecular Biophysics. Topics that will be covered include: Physical methods of determining the sizes and shapes of molecules, X-ray analysis of molecular structures, intramolecular and intermolecular forces, physical properties of membranes as well as questions related to thermodynamic properties of living organisms.

A background in biology will be helpful but is not essential. The main reference books for the course are *Molecular Biophysics* by P. B. Setlow and E. C. Pollard, and *Molecules and Life,* by M. V. Volkenstein.
Prerequisites: A class in basic thermodynamics (such as Physics 320), some background preparation in Modern Physics and Quantum Mechanics, and the permission of the instructor.

Graduate Studies

The Department of Physics provides courses of study leading to the advanced degrees of M.Sc. and Ph.D. Areas of research undertaken at Dalhousie include: solid state, geophysics, low energy nuclear physics, low temperature, theoretical physics, and oceanography. Further details are given in the Calendar of the Faculty of Graduate Studies.

Political Science

Professors
J. H. Aitchison
J. M. Beck
D. Braybrooke
K. A. Heard (Chairman)
M. K. MccGwire

Associate Professors
D. M. Cameron (Coordinator, Public Administration Programmes)
A. P. Pross (on leave, 1974-75)
D. W. Stairs (Academic Director, Centre for Foreign Policy Studies)

Assistant Professors
P. C. Aucoin
R. Boardman
R. L. Dial
W. R. Mathie
J. D. McNiven
D. J. Munton
D. H. Poel
T. M. Shaw
J. A. Wouk

Special Lecturers
K. Antoft
R. K. Daley
C. J. Gardner

Foreign Policy Research Fellows
G. R. S. Hawkins
T. A. Levy
J. McDonnell
J. McDougall

Foreign Service Officer in Residence
M. Meagher

"Politics: Who Gets What, When, How." So one political scientist has defined his subject. It is a definition, some might say, for cynics. Still, it captures what many people regard as the essence of politics. It also suggests a large part of what political scientists are constantly trying to find out. Of course, their interests vary, and so do their methods. Some, for example, are interested in the exercise of power within the nation-state. Who are the 'rulers'? Where do they come from? How do they get there? Whose interests do they serve? Under what constraints do they function? In pursuit of answers to questions as fundamental as these, political scientists are drawn to investigate, among other things, the functions and practices of political parties, the attitudes and perceptions of voters, the objectives and tactics of pressure groups, the origins and capacities of legislators, the processes and actions of governments. For many, the principal concern is to deal with these problems, and dozens of others like them, in the context of a single country — Canada, for example, or China, or Tanzania. Others seek to discover patterns of a more general kind, which they try to expose by examining a variety of countries and comparing the political phenomena of each. From this type of research they may hope, for example, to learn why some countries appear to be politically more "stable" than others. Or they may want to know how it happens that in some societies armed forces, exercising their monopoly over the ultimate instruments of brute force, seize control of the government, whereas in others they remain placidly obedient to the commands of politicians. And so also with an almost endless variety of questions of a similar sort.

Other political scientists, although still very much concerned with the play of political forces within the nation-state, focus their attention somewhat more narrowly on what we might call the "policy machine" — the complex mix of political leaders, bureaucratic administrators, and technical experts whose job it is to decide what the "government" will actually do. The process by which these decisions are made is an intricate one, complicated by the fact that bureaucracies of government, like bureaucracies everywhere, have a political life of their own. To study this process, to assess its implications, to consider the usefulness of various possible remedies (where remedies are required) — these are among the preoccupations in particular of specialists in "Public Administration".

The pursuit of politics is not, of course, confined to the internal affairs of national communities. It extends as well to the world at large, where it can become a raw and brutal game in which the question of "Who Gets What, When" is sometimes settled only by the most violent and destructive of means. It is partly the function of political scientists who specialize in International Politics to investigate the origins and conduct of the foreign policies of particular states — to discover, in effect, why they individually behave in the way they do. It is also their function to examine the workings of the international community as a whole — to distinguish, for example, the causes of war from the conditions of peace, and to evaluate the effectiveness of alternative means of securing the maintenance of international stability. In dealing with such questions they are led to examine the principles of nuclear deterrence, the workings of alliance systems, the functioning of the balance of power, the politics of the United Nations, the concept of imperialism, and a host of other diverse, yet inter-related, phenomena.

It will be obvious that the emphasis in these various political science pursuits is on the study of politics as actually practised in the world around us. But many political scientists would agree that this is only a first step, and that we should also address ourselves to questions having to do with how politics ought to be. It is not, after all, simply *self-evident* that political leaders should be subject to election, or that ignorant men should have the same voting power as educated men, or that we should be allowed to spend our money as we please, or that there is merit in the principle of equality before the law. Issues of this sort have been debated by reflective men for thousands of years, and none of them has found after careful examination that the answers come easily. To consider the very difficult problems raised by these sorts of questions is the principal task of political philosophy. It is a task which lies at the core not merely of political studies, but of political life itself.

Students who are interested in these various fields of inquiry within the discipline of Political Science will find all of them represented in the class offerings and programmes outlined below. Some will wish to specialize, while others may want to pursue interests in a number of different areas. In either case, the members of the Department will be happy to offer whatever advice and assistance they can in the development of any student's personal programme of studies.

Degree Programmes

Students concentrating in Political Science may take a one-year, two-year, or honours programme. The specific courses to be taken in each individual programme are chosen in consultation with a faculty advisor from the Department, in accordance with the general requirements listed below. Undergraduate programmes may consist of specialization in one subfield of Political Science or a general selection of courses from a number of sub-fields of Political Science or a general selection of courses from a number of sub-fields. These sub-fields are noted below.

Requirements

A *one-year programme* will consist of not less than 3 nor more than 4 classes in Political Science in addition to a 100-level class.*

These classes must be drawn from at least two of the four sub-fields under which the 200-level and 300/500 level classes are listed.

A one-year programme will normally consist of 200-level classes but may include one or more at the 300-level.

*NOTE. The requirement of a 100-level class for a one-year programme may be waived, especially for third-year students.

A *two-year programme* will consist of a 100-level class and not less than 4 nor more than 7 additional classes in Political Science.

Classes at the 200-level must be drawn from at least two sub-fields.

In the 2nd year of a two-year programme as many classes as possible should be at the 300-level. At least one of the student's classes *must* be at the 300 level.

An *honours programme* will normally consist of a 100-level class and not less than 8 nor more than 10 additional classes in Political Science.

It will include,

(i) at least two classes in two sub-fields at the 200-level,

(ii) at least four classes at the 300-level (two of these may be taken as 500-level classes),

(iii) and an honours essay.

The honours essay will be worth one credit. It will be prepared during the fourth year under the supervision of a faculty member. The essay will be expected to show the student's ability to develop a systematic argument with reference to pertinent literature and such other data or analytical materials as may be appropriate.

D. *Interdepartment programmes* will be worked-out with the individual student and his advisor in consultation with the appropriate people in the other departments.

Combined Honours
There are several combined honours programmes:
Political Science and Philosophy
Political Science and History
Political Science and Economics
Political Science and Sociology

Students interested in taking any of these combined honours programmes should consult with the Chairman of the Department or his deputy.

Graduate Studies
The Department offers M.A. and Ph.D. programmes in Political Science, details of which are given in the Calendar of the Faculty of Graduate Studies. Programmes leading to a Graduate Diploma in Public Administration and to the degree of Master of Public Administration are also available through the Department.

Undergraduate Programme in Public Administration
The Certificate in Public Administration requires the completion of six classes which may be taken on a part-time basis. Further information may be obtained from the Co-ordinator of the Programmes in Public Administration, Department of Political Science.

Undergraduate Programme in African Studies
The Department offers courses which may contribute towards a B.A. degree in African studies. Further details of this interdisciplinary programme are available in a calendar section above and from the co-ordinator of the programme in African studies.

Undergraduate Advisory System
The advisory system in the Department of Political Science is intended to assist the student in designing a specific program in accordance with his own interests and the requirements of the Department.

Selection: A student wishing to have a member of the Political Science Department as undergraduate advisor must be either:

(a) enrolled in a 100-level class and contemplating a Programme in Political Science (in which case the advisor will normally be the instructor of that class, or (b) registered for a programme in Political Science. Upon entering the programme a student may indicate a choice of advisor. Normally the advisor will be a faculty member teaching in the student's sub-field of concentration (if any). The student's choice will be respected unless the member chosen is unable to serve in this capacity. For the student who has no preference, or whose choice cannot be honoured, the Department's Undergraduate Studies Committee will assign an advisor on the basis of the student's apparent interests and the present advisory load of the members of the Department.

The advisory relationship may be ended by the student or the advisor at any time and for any reason. One faculty member may continue to advise the same student throughout his programme.

Role of the Advisor: Basically, the advisor is intended to be available to the student throughout the year as a consultant on broad academic matters. The advisor is not, however, a tutor with regard to specific classes.

Prior to registration (or, in any event, before the time for class changes has ended) the student must contact the advisor to discuss his/her choice of courses for that year.

Classes Offered

(A supplement to this list of classes containing additions and possibly minor changes will be issued by the Department in the summer of 1974. Students in their second and subsequent years are advised to obtain a copy of the supplement from the Department.)

General Information
100-level classes are intended as introductions to the field of Political Science and to the study of politics in the broadest sense. No student may take more than one 100-level class in Political Science.

200-level classes are intended as introductions to specific fields of enquiry in Political Science. The departments' offerings at this level are organized into four general subfields: Political Theory, Comparative Politics and Government, International Politics and Foreign Policy, Canadian Politics and Public Administration. Not all classes at the 200-level have Political Science 100 as prerequisite.

300/500-level classes are seminars for both upper-level undergraduate and graduate students. Graduate students will, and 4th-year honours students may, register in these classes at the 500-level. Individual instructors vary in the degree (if any) to which they differentiate formal requirements for 300 and 500-level students. In general, it is expected that 500-level students will produce written and oral work of a quality that reflects their greater academic experience.

Admission to 300/500-level classes is at the discretion of the instructor. The prerequisites listed with each class are intended to show the sort of preparation the instructor anticipates. The instructor retains the right to judge the suitability of each prospective student's qualifications for successful completion of, and contribution to, these seminar classes.

Note: Classes will be listed under the following headings:
(1) Introductory

(2) Political Theory and Methodology

(3) Comparative Politics and Government

(4) International Politics and Foreign Policy

(5) Canadian Politics and Public Administration

(1) Introductory

100 Introduction to Politics and Government. The basic introductory course in Political Science is offered as a number of different sections, with different instructors and different emphases. These sections are described below.

Section I **Democratic Government and Politics,** lect.: 3 hrs.; J. H. Aitchison.

The core of this section of Political Science 100 will be a comparative study of the institutions, processes and problems of government in western democracies. Attention will be paid mainly, but not exclusively, to the political systems of Great Britain, Canada and the United States but with greater emphasis on Canada than will be the case in other sections of Political Science 100.

The emphasis on Canada is for those who at least initially, do not intend to take furthe classes in Political Science, and who wish to become more knowledgeable about the federal democracy of Canada and its problems. The scope of the sections, however, will be sufficiently broad to provide a foundation for those who wish to proceed to higher level classes in Political Science.

Section 2, **Democratic Government and Politics,** lect.: 3 hrs.; J. M. Beck.

The class is designed not only for the student who desires to continue in political science, but also for the student who will take no other classes in political science. During a short introductory section such questions as the following will be posed: Can there be a genuine science of politics? What approaches may be adopted in a study of political phenomena? This will be followed by an examination of the operative ideals of liberal democracy, fascism and communism, and a discussion of the conditions that are likely to be prerequisite for the successful working of liberal democracy. The basic part of the class will be a comparative study of the governmental institutions of Great Britain, the United States, and Canada (with emphasis on Canada) especially designed to acquaint the student with some of the basic problems in the working of modern liberal democracy.

Section 3, **Introduction to Political Science,** lect. and discussion: 3 hrs.; R. Boardman.

Three major fields of political science are introduced in this class: (1) *comparative politics,* in particular the workings of politics and government in Canada, the United States, and the Soviet Union; (2) *political philosophy,* which will include study of some of the ideas of Hobbes, Rousseau and Marx, in the light of the knowledge of comparative politics gained in the first part; and (3) *international relations,* where we will be analysing the causes of war, and the kinds of factors that shape the foreign policies of the great powers and other states.

Section 4, **An Introduction to Politics and Government,** lect. and seminar: 3 hrs.; P. Aucoin.

The aim of this course is to introduce students both to politics and political science, that is, what constitutes politics, why politics is an important dimension of human existence, and how political phenomena can be examined, analysed and evaluated. Following an initial consideration of these general questions, the class will investigate and then discuss a number of political issues of current interest in the urban, provincial, national, and/or international arenas. From these investigations and discussions general questions of political behaviour, forms of government, and political principles will be singled out for greater consideration. Accordingly the class will then proceed to examine such matters as (although not necessarily in this order) political participation, representative government, the rule of law, executive leadership and administration, intergovernmental (including international) relations, federalism and nationalism, and ideologies. Included in this part of the course will be student investigations and discussions of topics of current interest in the urban, provincial, national, and/or international arenas.

This class will be conducted mainly as a seminar, the basis of discussion being selected readings and student presentations. A small number of introductory lectures, throughout the course, will be presented by the instructor (or invited lecturers). When appropriate, and when possible, political actors (elected and non-elected politicians, civil servants, interest group spokesmen, etc.) will participate in discussions. Each student will be required to prepare, individually and/or in a group, *two* presentations. Students will be evaluated on the basis of these presentations and their participation in discussion, although an *optional* written examination may be included in a student's evaluation for those who so wish.

Section 5, **Introduction to Politics,** seminar: 3 hrs.; W. R. Mathie.

Politics has been understood by some as a necessary but unattractive condition of our social existence, by others as the source of unnecessary limits upon our freedom as individuals, by others still as an opportunity for the development of human potentiality and even as an activity which is itself fulfilling. In this class we will be concerned to weigh these alternative notions of politics while exploring certain political problems which have arisen in a concrete form within our own political history and have been treated generally in various major works of political philosophy. Specifically, we will discuss a variety of conflicting claims to rule and the possibility of a just reconciliation of these claims, the nature of representative government, federalism, nationalism, and statesmanship. For the most part the class will proceed through the careful reading of assigned materials and the discussion of these in class. Several short papers will be prepared by each member of the class and these will be the primary basis for evaluation.

(2) Political Theory and Methodology

201 Justice, Law and Morality, seminar: 2 hrs.; W. R. Mathie.

The main aim of the class is to seek a clarification of the concept of justice and of the relations among justice, law, and morality through a careful reading and discussion of these matters as they are presented in several major works of political philosophy. We will pursue this aim, first, through the discussion in turn of parts of Plato's *Republic,* Aristotle's *Ethics* and *Politics,* Hobbes's *Leviathan,* Rousseau's *Social Contract,* J. S. Mill's *Utilitarianism,* and John Rawls's *A Theory of Justice;* and, secondly, through the examination of several general topics. These topics will include the place of equality in an adequately formulated notion of justice, the psychological genesis and nature of the notion of justice, civil disobedience, the relation of positive laws to justice, and the relation between law and morality. In order to facilitate our discussion of these topics the class will be divided into small groups assigned severally to engage in a careful examination of one of these topics and to prepare a presentation for the class as a whole on that topic. In addition to participation in classroom discussion of the assigned readings and work within a group on one of the topics, members of the class will be asked to prepare four short papers and one mid-year paper of intermediate length. There is no prerequisite for the class.

207 Political Philosophy from the Stoics to the End of the Fifteenth Century, lect.: 3 hrs.; J. H. Aitchison.
(Not offered in 1974-75)

341C/541C The Political Philosophy of Plato, seminar: 2 hrs.; W. R. Mathie.

Members of this class will be engaged in an exploration of the character of classical political philosophy as embodied in Plato's *Laws.* Some previous work in political philosophy, philosophy generally, or classics would be indirectly useful but is not strictly prerequisite. This class will receive the same credit as that given for a half-year class and the required work will be such as would normally be prescribed for such a class, but the class will meet over the full academic year to allow a greater opportunity for reflection upon the text under examination. It would be appreciated if those intending to participate in this class would inform the instructor of their intention to do so.

342/542 The Political Thought of the Sixteenth and Seventeenth Centuries, lect. and discussion: 3 hrs.; J. H. Aitchison.

This class will first be concerned with the political thought of the 16th century on the continent, then with that of the 16th and 17th centuries in England, and finally with the 17th century on the continent. In the first part special attention will be given to Machiavelli, Luther, Calvin, the Toleration Controversy, and the political writings of the French religious wars particularly those of Bodin; in the second to More, Hooker, the Levellers, Hobbes, Locke and Harrington; and in the third to Althusius, Grotius, Spinoza and Pufendorf.

The text for the 16th Century is J. W. Allen, *Political Thought in the Sixteenth Century.* There is no single text for the 17th Century.

There is no prerequisite but students will find it useful to have taken a previous class in political philosophy or Philosophy 100 or 310.

343B/543B Max Weber and the Foundations of Contemporary Theory in the Social Sciences, (Not offered in 1974-75).

345/545 Man, Society, and Politics: the Concept of Community, seminar: 3 hrs.; W. R. Mathie.
(Not offered in 1974-75)

351A/551A - The Nature of Findings, Explanations, and Theories in Political Science, seminar: 2 hrs.; D. Braybrooke; (Not offered in 1974-75).

352/552 Introduction to Research Methods and Data Analysis, seminar: 2 hrs.; D. Munton.

A knowledge of the promises and pitfalls of social science research is as important today to the average citizen as it is to the administrator or researcher. This seminar is intended to be a broad, non-technical introduction to the assumptions, procedures, and problems of empirical investigation in political science. The five major stages common to all such research - theory, research design, data-collection (surveys, simulation, aggregate data, etc.) measurement, and analysis - are explored using substantive readings from various sub-fields of the discipline.

The major assignment in the course will be a research project of the student's own choice and design. It is not expected that students will have any background in statistics or computer programming, but it is hoped that all are or can become excited by the joys of disciplined discovery.

353B/553B Contemporary Empirical Theory: A Survey, seminar: 3 hrs.; P.C. Aucoin and W. R. Mathie; (Not offered in 1974-75).

355A/555A Marxist Theory and Its Upshot in the World Today, seminar: 2 hrs.; D. Braybrooke.

Social objectives inherited from earlier socialist thinkers, especially Saint-Simon, inspired Karl Marx's life work and thought. General philosophical ideas imparted by Hegel contributed some crucial features of overall framework and inclination. The analytic apparatus developed by classical economists of the British school, especially Ricardo, gave the thought its cutting edge as a critique of standing social arrangements. This class will spend some time identifying each of these influences upon Marxist theory; then consider the classical Marxist analysis of capitalism and various attempts, which have not come to an end, to accommodate it to developments which Marx appears not to have anticipated in some important respects.

355B/555B Marxism as an Alternative Approach in Contemporary Social Science, 2 hrs.; D. Braybrooke.

This class will discuss the implications for the study of politics of contemporary Marxist economics (by Western writers like Baran and Sweezy, Mandel, and Sherman); the critique of capitalist culture developed by philosophers associated with the Frankfurt School; and Jean-Paul Sartre's use of Marxism as a methodology for social science.
Prerequisite: 355A or equivalent acquaintance with the works of Marx and their influence.

448A/548A Seminar in Philosophy, Politics, and Economics: Public Goods and Political Choices, seminar: 2 hrs.: D. Braybrooke.
(Not offered 1974-75; to be offered again 1975-76)

The economists' conception of "public goods" is one promising source for empirical political theory, as the works of Mancur Olson *(The Logic of Collective Action)* and Norman Forhlich et al. *(Political Leadership and Collective Goods),* which will be studied in this class, show. The conception of public goods also has important implications for normative political theory (political philosophy) and these implications will be followed up, both in the discussion of the books just mentioned and in the course of exploring the connections between their findings and formal theories of rational choice (to which philosophers have contributed as well as economists and political scientists).
Prerequisites: Students taking this class should ideally have had previous classes in all three subjects; but it will suffice for them to have worked to an advanced undergraduate level in at least one of them. Students taking the class for a credit in philosophy should have had a class in logic (200 or 201 or 202) and one in ethics (310); students taking the class for a credit in Political Science should have had at least one 300-level class in Political Science (315A and 355B are recommended); students taking the class for credit in economics should have had at least one 300-level class in that subject.

449B/549B Seminar in Philosophy, Politics, and Economics: Applied Social Philosophy - The Logic of Questions, Policy Analysis, and Issue-Processing, seminar: 2 hrs.; D. Braybrooke.

This class will consider the logical character of policies, taking them to be best defined as social rules and the logical character of issues, regarded as disjunctive questions in which various rules figure as alternative policies. It will then move on to consider various criteria for resolving such questions - criteria in which philosophical concerns with values join up with topical concerns about social indicators. Finally, it will study various aspects of institutional arrangements for defining issues and bringing social indicators to bear upon them. Readings will include von Wright, *Norm and Action;* Belnap on the logic of questions; Bauer, *Social Indicators;* and Lindblom, *The Intelligence of Democracy.* (Same as Philosophy 449B/549B and Economics 449B/549B.)

(3) Comparative Politics and Government

203 European Comparative Politics, lect. and discussion: 2 hrs.; R. Boardman.

This class is not a comprehensive survey of European politics, as the region includes more than 30 countries. The emphasis in the first term will be on the three major western powers: France, West Germany, and Britain. In the second term the class will concentrate on Soviet and East European politics; there will also be a short exploration of some features of Scandinavian and Mediterranean political life. Countries will however be approached comparatively, and we will be looking at such things as their political culture, relations with other countries, legislative bodies, ideologies, and so on.

205 Theory and Practice of Government in the United States, lect. and discussion: 2-3 hrs.; D. Braybrooke.

This class considers American government not only for its own sake, as the government of a great power, but also as the most intensively studied illustration of democratic government. After tracing the political philosophy of the American Revolution and the United States Constitution through the modifications of constitutional development, the class measures that philosophy against the realities of contemporary American politics, where the rivalry of parties and interest groups and the increasing power of the Presidency vis-a-vis Congress seem to signify great departures from the original intentions of the Republic.

208 Comparative Government and Politics of the Far East, lect. and discussion: 3 hrs.; R. L. Dial.

This class will deal in a comparative fashion with the socio-political development of Modern East Asia. The survey will pick up on China, Japan, Korea, and Vietnam at roughly the mid-nineteenth century mark, and trace the patterns of development and modernization through to the present day.

This course is open to students without prerequisite. There will be one lecture (1½ hours) per week. In addition the class will be divided into discussion groups of reasonable size, and each group will meet with the instructor for an additional session weekly.

209 Nationalism & Nationalist Movements, lect. 2 hrs.; J. A. Wouk.

The aim of this class is to develop a better understanding of the issues, political and social dynamics, and future prospects of Québec nationalism (& separatism) and Canadian nationalism. This aim is pursued through an examination of "nationalism" as a political force in the internal development of states and in international relations. Among the phenomena to be explained in detail are
(i) The Unification of Italy (1850's & 60's)
(ii) The Unification of Germany (1830's-1871)
(iii) Sinn Fein and Irish Independence (1905-23)
(iv) Zionism and the Establishment of Israel (1897-1948)
(v) The National Socialist (Nazi) Revolution in Germany (1921-34).
Requirements: a minor (about 300 pages a month) amount of reading, lectures, two final exams, two mid-term exams. Students unacquainted with the political history of Québec and Canada will probably feel impelled to do additional readings.
No prerequisites.

217A Politics in Africa South of the Sahara, seminar: 2 hrs.; K. A. Heard.

As part of the Departments' offerings in Comparative Political Systems, this course constitutes (a) a different area for the study of politics which may be compared, e.g., with European or Asian politics, and (b) a basis for comparison among African states themselves. The course concentrates on the domestic problems of the new African states - e.g. problems of nation-building and of social and economic change - and the various strategies, both ideological and institutional, that have been adopted in response to these problems, including strategies of political participation on the one hand and political exclusion on the other.

235A Public Opinion and Voting Behaviour, lect.: and discussion: 2 hrs.; D. H. Poel.

The traditional title given is really an excuse to look at a broader area which might be called micro-politics. The most general concern of the class is with the questions of how individuals perceive, relate to and participate in political systems. Public opinion and voting studies are obvious subsets of micro-politics, as are areas of political socialization, personality and political culture.

306A/506A Comparative Provincial and State Political Systems, seminar: 2 hrs.; D. H. Poel.

Students will be able to critically review the research dealing comparatively with aspects of the American state and Canadian provincial political systems. The main topics will be individual participation, political parties, interest groups, legislative process, the executive and civil service, and the measurement of provincial policy.

310/510 Comparative Governments, lect. and seminars, 2-3 hrs.; J. Wouk.

Despite the diversity of political idealogies, constitutional forms, and levels of economic development, national governments perform a limited number of similar activities. This class is concerned with ways of classifying "political systems" and comparing their behaviour. There will be systematic comparison of the governments and politics of Canada, France, Federal Germany, USSR, Chile, Cuba, Ecuador, and Iran in terms of basic structural-functional and Marxian conceptualizations. More specific theoretical approaches and/or addition or substitution of countries to be studied will be arranged at the initial class meetings.

Requirements: to be arranged in detail at the initial class meetings; should be the equivalent of one mid-term exam, plus one term paper, plus a few short "seminar papers" per term. Weekly readings.
Prerequisites: A Political Science class at the 200 level *or* Political Science 100 & permission of the instructor.

318B/518B South Africa: The Dynamics of Political Groups and Group Domination, seminar: 2 hrs.; K. A. Heard.

What accounts for continued Afrikaner political domination in South Africa? Why do English-speaking South Africans apparently play such a passive role? Why have the Blacks in South Africa not mounted a revolutionary movement? What are the prospects for "homelands" independence?

These are the types of questions that will be explored in this class, with the object not only of acquiring an understanding of South African politics but also of formulating hypotheses concerning the formation, persistence and behaviour of political groups.

324A/524A Problems of Development: The Politics of New States, lect. and discussion: 2 hrs.

This class deals with the internal problems and theories of development. It will cover such subjects as conepts of development and underdevelopment: cultural patterns in developing nations, the impact of colonial regimes on political and economic development; industrialization; urbanization and socialization; communication; ideology and nation-building; economic problems and policies; the role of the military; stability and instability of political systems.

It is intended primarily for graduate students, but senior undergraduates may be admitted on application to the instructor.

324B/524B Problems of Development: New States in a Stratified International System, seminar: 2 hrs.; T. M. Shaw.

New states are relatively open and underdeveloped actors in the global system; this class examines their attempts to maximise national control and to achieve equivalence with selected models. We will focus primarily on the external dimensions of change, and will begin by reviewing theories of underdevelopment, stratification and imperialism. Our focus will be, therefore, on the interactions of political development at the national, regional and global levels.

The seminar will include such topics as: international stratification; subordinate state systems; nonalignment and self-reliance; Third World diplomacy, and international law and organisation, race and ethnicity; economic nationalism; imperialism and interdependence; aid and dependence; the implications of new states for world order; selected case studies of new state foreign policy-making; and, technical change and peripheral states.

326A/526A Sinology - The Study of Chinese Politics 1840-1950, seminar: 2 hrs.; R. L. Dial.

This class is designed for three purposes. The first is to reach a better understanding of this period of Chinese political development through expanded and more detailed readings. However, of equal importance will be the epistemological assessment of the various "theories and models of history" put forward by the authors; what underlying assumptions the writers have and share, and how might their conceptualizations be made better and more useful in understanding the subject matter.

A third and related objective of the class will be to assess the relative merits of four mediums of explanations: the chronological text, the research monograph, the biography, and the novel.

This is a very heavy reading seminar. Students not able to keep up on a weekly basis should definitely not attempt the class. The seminar is open to students without previous work in Chinese politics, provided they are prepared to pursue additional readings on their own to compensate for their lack of background.

326B/526B Sinology - The Study of Chinese Politics 1950-1972, seminar: 2 hrs.; R. L. Dial.

This class will seek to define the existing paradigm in the study of Chinese politics and to locate the causes and areas of changing thought about the subject. Each week the class will undertake discussion of a particular social science appraoch, its effects on the larger paradigm, and its utilities and disutilities in explaining particular phenomena. The readings will cover the application of the following models to the Chinese case: communication theory, rural marketing systems, Maoist mobilization theory, organization and bureaucratic concepts, management concepts, radical economic theory, the concepts of political culture, urban sociology, and totalitarianism.

326A/526A is NOT a prerequisite for this class.

(4) *International Politics and Foreign Policy*

223 Techniques of Statecraft and Problems of Order in International Politics, lect.: 2 hrs.; D. W. Stairs.

This class is designed as a basic introduction to the study of foreign policy and international relations, and its primary purpose is to equip students with rudimentary concepts and tools for analyzing the actions and interactions of the various participants in international affairs. There are perhaps as many approaches to the study of international political phenomena as there are questions to which the phenomena give rise. In this particular case, two general perspectives are employed, and these serve to divide the class material into two main parts.

The first part is concerned primarily with the formulation of foreign policy, and it seeks to deal with such questions as: What are the principal processes and ingredients of foreign policy decision-making? How do these processes and ingredients affect the content of the decisions that are made? What instruments do the decision-makers have at their disposal in pursuing their objectives in international affairs? Under what conditions are the various instruments likely to be effective or ineffective? And, what criteria are employed in selecting one "mix" of instruments as opposed to the other available combinations? These and similar issues are discussed under a variety of headings, including in particular: (A) Intelligence and Foreign Policy Decision-Making; (b) The Planning of Foreign Policy; (c) Negotiation as a Foreign Policy Instrument; (d) Propaganda as a Foreign Policy Instrument; (e) Economic Manipulation (including various forms of economic sanctions as well as such positive devices as foreign aid); (f) Informal Penetration, or Subversion; and (g) Military Force.

The second part approaches the study of international relations not from the perspective of individual actors and their capabilities, but from that of the international community as a whole. It involves consideration of a variety of "theories" of international politics, but the core problem around which the readings and class discussions are arranged in the problem of the maintenance of international order, and of conditions which permit the resolution of conflict by peaceful means. The various influences and mechanisms which contribute, or are alleged to contribute, to the performance of this function are discussed under a number of headings, including (a) International Law; (b) Disarmament and Arms Control; (c) Concert Systems; (d) Balance of Power and Alliance Systems; (e) Collective Security; (f) Peacekeeping; (g) Public Opinion; and (h) Regional Functional Organizations. It is obvious that these mechanisms, taken singly or in combinations, often fail, and an attempt is therefore made to explain the nature of their respective limitations.

There is no single text, and students are required to read selections from a variety of sources.

228 Comparative Foreign Policy, lect. and discussion; 2-3 hrs.; R. Dial and staff.

The contemporary policies of a number of countries — Canada, the United States, the USSR, China, Britain, and the African States. — will be analyzed in a comparative way. Discussion of a particular state's foreign policy will be the responsibility of a member of the Department having a detailed and expert knowledge of that country. Study of these countries will be organized around a common framework; for each, we will emphasize such factors as the role of political parties and interest groups in the formulation of foreign policy, the impact of broader consideration such as geographical location, history or economic growth, the demands made by other governments in alliance-systems, the part played by ideology and military capability, governmental bureaucracies, the roles and personalities of top-level decision-makers, and so on.

317A/517A Foreign Policies of African States, lect. and seminar: 2 hrs.; T. M. Shaw.

This study examines the four levels of international interaction in Africa: the foreign policies of contrasting African national actors, regional subsystems, African continental politics, and Africa's impact on the global system. New states have produced novel discontinuities in the international system and we are concerned with the diplomatic, developmental and methodological implications of African participation. After a theoretical introduction to the behaviour of new state actors and Third World organisations in the international milieu, we turn to an examination of particular issues and states, from alternative African ideologies to the external linkages of diverse actors.

This range of topics will include: African autonomy — socialism and self-reliance; African unity — the OAU and ECA; African integration — EAC, the *Entente,* Arab States and OCAM; Africa's inherited problems — underdevelopment, border conflicts and refugees; Africa and race — human rights and Southern Africa; African foreign policies — Tanzania, Ghana, the Ivory Coast, Senegal, Egypt and Botswana; and conflict and cooperation in Southern Africa.

320/520 Conceptual Development in the Study of International Politics, lect. and discussion: 2 hrs.; Staff.

This class will treat in a survey fashion the variety of conceptual approaches to the study of: (1) foreign policy behavior of states; (2) relations among states in the international system. It will be, in other words, a class dealing primarily with the abstract models, conceptual frameworks, and theories that underlie our present and future understanding of international politics. It will, however, stop short of any extensive dealings with the explicit methodological techniques which are often enlisted in the service of research within given schools.

Some of the analytical schools to be studied and assessed are: systems analysis and alliance theory, integration theory, field theory, learning and perception approaches, organization and decision making approaches interest group theory, game theory, crisis behavior models, and others.

The instruction of this class will be a group exercise. Each approach to the study of international politics will be undertaken by instructors knowledgeable about that given school.

321/521 International, Regional and Transnational Organisations, lect. and seminar: 2 hrs.; T. M. Shaw.

Non-state actors play increasingly important roles in the international system. This class will focus on three types of such non-state actors: international, regional, and transnational organizations.

We will investigate their origin, goals and effectiveness after an historical, theoretical and empirical overview of such international sub-systems. In particular, we will examine their effect on global, regional and functional integration and analyse their impact on sovereignty, peace and development. The range of cases will include the UN and its specialised agencies, military alliances, continental political structures, regional economic arrangements, and transnational relations, such as the multinational relations, such as the multinational corporations, churches and guerilla groups.

322/522 Canadian Foreign Policy, seminar: 2 hrs.; D. W. Stairs and D. J. Munton.

This seminar focuses on the recent history and contemporary problems of Canadian foreign policy. The first part of the course analyses major developments and situations in Canada's post war relations. These historical developments include the framing of the United Nations, Canadian initiatives in the establishment of NATO, participation in the Korean War, the Suez Crisis and Canada's UNEF proposal, the nuclear weapons question, relations with Quebec and France, recognition of China, Nixon-economics and continental interdependence.

The second part of the course takes a more analytical approach to the factors that underlie Canadian policy. Using the historical cases as illustrations, the seminar will consider the influence of external factors (for example, the Cold War, the hierarchical nature of the international system, and the policies of other countries) and domestic factors (public opinion, interest groups, Parliament, the federal bureaucracies, leaders' personalities, etc.).

Finally, some policy prescriptive questions will be considered: Is nonalignment appropriate or possible? What should Canada do about American economic domination? Should Canada become a major "foreign aid power"? And so on.

324/524B Problems of Development: New States in a Stratified International System, seminar: 2 hrs.; T. M. Shaw.

(see description under Section 3 above)

327A/527A The Formulation of U.S. Foreign Policy, seminar: 2-3 hrs.; J. A. Wouk.

Governmental policy is, in large measure, affected by the mechanics of the decision process as well as by the explicit aims of policy makers. This class will study the foreign policy formulation process under the Nixon Administration. It will seek to understand the present system in terms of the development since World War II of the agencies involved in this process. The weekly seminars will be built around readings pertaining to both the formulation of US foreign policy and to aspects of administrative and organizational behaviour in general.
Requirements: Seminar readings and presentations. Also probably: one term paper, one final exam, short seminar papers. (These are potential requirements. The actual requirements will be worked-out at the first class meeting).
Prerequisites: Some knowledge of US Governments and of the history of US foreign relations, especially since 1945. *All students will be required to have met with the instructor prior to the second class meeting to ascertain their eligibility in terms of these prerequisites.*

327B/527B Ideological Foundations of U.S. Foreign Policy, seminar: 2-3 hrs.: J. A. Wouk.

Seminars will, initially, deal with writings by US policy-makers and academics, which appear to provide insight into the motivations for major features of recent US foreign

policy. The application of these ideas, as modified by characteristics of the policy process, will be examined through the *Pentagon Papers* and short studies of policy formulation in the Nixon Administration.
Requirements: See 327A.
Prerequisites: See 327A. 327A is not a prerequisite, but (i) it will be useful for the second half of this class, (ii) preference for admission to this class will be given to those who have taken 327A.

362/562 The Politics of the Sea, seminar: 3 hrs.; G. S. Hawkins and M. K. MccGwire.

In the past, the sea has been important primarily as a transportation medium for people, goods and military force. But during the last two decades, technological advances have caused the sea and its bed to become important as resources in their own right. Through sea-borne deterrent systems and their counter-systems, the oceans have become an arena for continuous and direct tactical naval confrontation. The sea now carries pollution to innocent shores, and its vital role in the ecological balance is itself in danger. For these and other reasons, established conventions about the freedom of the seas, the control and exploitation of maritime resources, territorial rights, international ownership, and various related matters, are all being re-thought. About one-third of the course will consider the environmental factors, and the remainder will concentrate on the policy implications, with particular concern for the legal implications, strategic considerations and the effect on international relations.

364/564 Military and Strategic Studies, seminar: 3 hrs.; M. K. MccGwire.

Strategic studies are concerned with military power, and consider four aspects of international relations: the causes and prevention of war, methods of insuring national (or international) security, the national pursuit of acquisitive goals, and the insurgent promotion of political change. This seminar (which can only serve as an introduction to the subject) seeks to develop judgment about the uses of military power in international politics, and an awareness of the many different (and frequently conflicting) approaches to the underlying problems. To achieve this understanding it is necessary to devote some time to studying the historical development of warfare and strategic theory prior to the nuclear age, before moving to a more detailed consideration of contemporary problems and doctrines. There are no simple text-books in this area, and the seminar requires a substantial amount of selective reading.

365B/565B Chinese Foreign Relations, seminar: 2 hrs.; R. Dial.

This course will focus on various aspects of Chinese foreign affairs, including Chinese motivational factors, decisional processes, diplomatic institutions, and relations with various countries and regions. Our approach however will not be chronological; rather, each week we will discuss some key issue of Chinese behavior. In each case these will be contentious issues (e.g., China does/does not make a practice of fomenting international revolution?; Chinese foreign trade is politically OR economically motivated?; Policy decisions reflect Mao's authority OR factional bargaining?) The readings will be composed in the form of debates and in class we shall discuss the conflicting perspectives and conclusions reached by the authors. In addition to introducing students to some elemental facts about China's international behavior, the aim of the course is to expose the crucial relationships between personal values (beliefs), conceptual choices (analytical tools) and knowledge (interpretations).

366/566 Theories of War and Peace, lect. and discussion: 2 hrs.; D. Munton.

Perhaps the most important problem that has always faced human civilizations is whether or not they were able to live in peace with their neighbours. The current, perhaps temporary, thaw in the Cold War has not made international conflict obsolete, as continuing troubles in Indochina and the Middle East demonstrate.

Many theories exist as to the causes of war: some emphasize man's "inherently aggressive" nature, others the nationalistic or imperialistic drives of the nation-state, and others the anarchistic nature of the international system. Likewise, there are numerous theories about how to achieve peace, including deterrence, alliance, negotiation, and passive resistance. Each of the theories of war suggests a means to achieve peace; for example, if one thinks war is caused by the lack of a central authority in the international system, then the "solution" is to create a world government. Correspondingly, each theory of peace assumes a particular cause of war. If one thinks that negotiation will stop wars, then one is assuming that wars result from misunderstandings rather than incompatible interests.

The course will explore the assumptions, implications, and weaknesses of these theories through a variety of classical and contemporary writers, including: Thucydides, Sigmund Freud, Lin Piao, Margaret Mead, Jean Jacques Rousseau, Quincy Wright, Pierre Trudeau, Inis Claude, and B. F. Skinner. A number of international conflicts - the Arab-Israeli, 1914 Crisis, Vietnam, and the Cold War - will be used as examples for these ideas.

(5) Canadian Politics and Public Administration

(i) Canadian Politics

202 The Canadian Political System, seminar: 2 hrs.; P. Aucoin/D. W. Stairs

There will be two sections of this course. The content will vary slightly from one to the other, but the central focus will be very similar.

Among the major topics which may be considered are: Canada as a federal political community; Canada as an independent nation-state; representative government, political authority and political freedom; and, the structure and processes of parliamentary government. While considerable attention will be given to national politics, the provincial and municipal political arenas will be included in our examinations and discussions. The course will not be concerned exclusively with "government" but will encompass all aspects of politics, including "non-governmental" groups and processes such as political parties, pressure groups, the mass media, political socialization, and political participation.

This class is open to students who have completed an introductory political science course or by the approval of the instructor.

313/513 Intergovernmental Relations in Canada, seminar: 2 hrs.; D. M. Cameron.

This class will examine concepts and issues relevant to the territorial division of governmental power, the nature and substance of relations between governments in Canada (federal, provincial and local) and the intergovernmental system as a factor in the formulation of policy. Undergraduates will be accepted in this class only with permission of the instructor.

314A/514A The Policy Process in Canada, seminar: 2 hrs.; A. P. Pross.
(Not offered in 1974-75)

314C/514C Public Policy Analysis, seminar: 2 hours; P. Aucoin.

The purpose of this course is (1) to introduce students to the art of policy analysis, its objectives, scope and methodology, and empirical frameworks, and, (2) to provide them the opportunity to undertake analysis of specific issues in various fields of Canadian public policy. Under the first objective, students will read and discuss the literature on both policy analysis and policy-making processes in Canada. The second objective will be met by way of student examinations of an aspect or field of Canadian public policy. For 1974-75, the following topics are proposed for analysis:health care policy in Nova Scotia, science policy in Canada, regional development policy in the Maritimes, provincial-municipal relations in education policy in Nova Scotia. Other policy topics may be proposed and examined by students with the approval of the instructor. The first part of the course will be held during the first part of the fall term. The presentation of student projects will take place in the latter part of the spring term.

315/515 The Politics, Government and Constitution of Canada, seminar: 2 hrs.; J. M. Beck.

This class is open to those students who have demonstrated competence in Canadian politics and government by attaining at least second-class standing in Political Science 202 or its equivalent and in exceptional circumstances to those students who have obtained high standing in Political Science 100. It takes the form of a seminar class in which the students' papers will explore the background, nature and significance of current problems in the politics, government and constitution of Canada. The relation of the political culture, and especially environmental, institutional and personal factors to these problems will be examined in detail by posing such questions as: Is there a Canadian political culture or simply a unifying device in contemporary Canada? Can participatory democracy be a practicable concept in Canadian federal politics? Do the Trudeau reforms permit the executive branch to meet the demands of contemporary society? Have the changes in the procedures of the House of Commons since 1968 finally taken that body out of the horse-and-buggy era? How well do the Canadian mass media and pressure groups perform the functions which liberal democratic theory contemplates? Should a charter of human rights be entrenched in the Canadian constitution? How suited is the Supreme Court of Canada to performing the functions of a constitutional court of last resort? What is and ought to be the competence of the provinces in external affairs? Que veut le Québec, and are classical federalism and separatism the only alternatives? Is the B.N.A. Act good enough or is a completely new written constitution desirable?

316/516 The Politics and Government of Nova Scotia, seminar: 2 hrs.; J. M. Beck.

The work of the first term will consist of a detailed examination of the Nova Scotian political process since Confederation. In the second term research papers prepared by the members of the class will be used as the basis for analyzing and appraising the functioning of the cabinet, House of Assembly, civil service, political parties, pressure groups, and municipal institutions in contemporary Nova Scotia. Some time will also be devoted to federal-Nova Scotia relations. Special attention will be paid to the political culture of the province and its effect on the general character of Nova Scotian politics.

319A/519A - The Budgetary Process, seminar: 2 hrs.; D. M. Cameron.

This class is designed for students specializing in Canadian government and public administration. While the content of the seminars will remain flexible to accommodate the interests of the participants, major attention will be focused upon two areas: the development of the budgetary process in Canada, and the models and techniques for analysis and/or reform of the budgetary processes in general.

330B/530B Canadian Political Parties, lect. and discussion: 3 hrs.; J. M. Beck.
(Not offered in 1974-75.)

332A/532A Science, Technology and Public Policy, seminar: 2 hrs.; P. C. Aucoin. (Not offered in 1974-75).

333C/533C Research Seminar: Maritime Political Systems. A. P. Pross. (Not offered in 1974-75).

334A/534A Local and Regional Government in Canada, seminar: 2 hrs.; K. Antoft.

This class will deal with the origins, development, and present legal and fiscal positions of various forms of local and regional government in Canada. Special attention will be paid to three problem areas; the territorial extent of local government, policy formulation in a fractionalized political system, and the unique dimensions of urban government.

It is open to graduate and senior undergraduate students. Participants must have completed Political Science 202 or an equivalent class in the Canadian political system.

338B/538B The Politics of the Environment, lect. and discussion: 2-3 hrs.; R. K. Daley.

A discussion of the policy process as it relates to issues in the "environment crisis". Special attention will be directed to the evolution of socio-cultural values (e.g., the recent growth in importance of wilderness areas) and their impact on the policy process as a dynamic interaction, media, political parties, pressure groups (including spontaneous protest groups). socialization processes and administrative organizations.

373B/573B Urban Problems, seminar: 2 hrs.; J. D. McNiven.

Each year this seminar will be oriented toward a theme related to Canadian urban politics, chosen after consultation with the Institute of Public Affairs. Topics related to the theme will then be investigated by the class, through library and fieldwork.

375A/575A The State and the Economy, seminar: 2 hrs.

The aim of this course is to explore the interaction between governments and economic organizations, especially businesses, from the viewpoint of political science. Topics include the nature of government regulatory policies and problems related to multi-national corporations. Others centre upon the role of government as a stimulus to economic activity, especially in the developmental and technological fields. Finally, discussion will include some evaluation of the impact of political ideologies, democratic socialism for instance, upon businesses and the economy as a whole. The implications of these topics for Canadian society will be of prime concern.

504B Canadian Government, seminar: 2 hrs.; D. M. Cameron.
(Not offered in 1974-75)

(ii) Public Administration

310 Public Administration, lect. and discussion: 3 hrs.; J. H. Aitchison

This class will deal with the classification, recruitment and promotion of public servants, their role in the formulation of policy and the question of their impartiality in the performance of that role; with the organization of government into departments and the organization of departments themselves; with the co-ordination of policy through interdepartmental and (in Canada) intergovernmental co-operation and by means of a centralized staff under Prime Minister or President or "overlord"; with the exercise of delegated legislative and "quasi"-judicial power; with the appointment of a politically-oriented staff to the offices of ministers; and with the responsibility of government for the management of nationalized industries.

Prerequisites: Some class in which Canadian Government has been studied; otherwise by permission of the instructor.

511 Public Administration, lect. and discussion: 3 hrs.; J. D. McNiven.

This course is designed to introduce students to the basic concepts of organization theory and administrative behaviour within the context of the operation of governments at the federal and provincial levels. Emphasis is placed upon the relationship between theory and actual practices. This course will attempt to give students a general overview of most of the behaviours and techniques he is likely to encounter in more advanced courses or in administrative situations.

312B/512B Provincial Public Administration, seminar: 2 hrs.

This is an advanced research class designed for those who have taken at least one previous class in Public Administration and a class in Canadian Government. Students may be admitted only with the permission of the instructor.

339A/539A Public Administration Techniques, seminar: 2 hrs.; C. J. Gardner.

This is an introduction to techniques which are being used increasingly in the public sector and which, in themselves, are becoming subjects of specialization. It is important that the public administrator should know (a)

the principal characteristics of these techniques, (b) the areas of possible application in public service activities and (c) the circumstances in which the application can be most effective.

The subject matter covered includes: Organization and Methods Services; Organization Analysis; Position Classification and Description; Programme and Performance Budgeting; Procedures and Methods Analysis; Communication and Reporting Systems; Mechanization and Data Processing; and Forecasting and Planning, including an elementary and non-mathematical introduction to Cost-Benefit Analysis and Operations Research.

540C Problems in Public Administration, seminar: 2 hrs.; C. J. Gardner.

The object of this seminar is to give students some experience in dealing with some specific public administration problems. Part of the time will be devoted to meetings with public administrators to discuss their particular roles and problems and part of the time may involve conducting on the spot surveys of particular public administration activities. Preparatory reading and research will be required for all activities. Report writing and class presentations will be required. It is intended for first year M.P.A. students and should provide background for the research project in Public Administration required in the second year.

571B Research Project in Public Administration, seminar: 2 hrs.; Staff.

Intended for senior graduate students in public administration, the course may be treated as a vehicle for undertaking original research in public administration or as a means of bringing together a group of students to undertake a practical project 'commissioned' by a local public body. Practical projects are intended to provide the student with an opportunity to apply the knowledge acquired in the Public Administration Programmes and to expose them to evaluation by non-academic bodies.

574B Advanced Public Administration.

This class requires a high level of knowledge of political systems and of the Canadian political system in particular. (Students in the M.B.A. programme can substitute for this a familiarity with administrative theory.) The course concentrates on an examination of the behavioral aspects of administration, particularly the relationship between bureaucracy and society and the development of organization theory.

576C Public Administration Practicum, seminar; Faculty in Public Administration.

A reading course associated with part-time or summer employment in a public agency. Open only to senior graduate students in Public Administration, the class requires that the student obtain the agreement of his employer to an 'internship' scheme... designed to facilitate the students' exposure to administrative processes. Students will be expected to attend periodic seminars and to complete reading assignments intended to complement on-the-job learning experience.

Psychology

Professors
W. K. Caird
G. V. Goddard
W. K. Honig
J. A. McNulty (Acting Chairman)
R. S. Rodger

Izaak Walton Killam Research Professor
P. H. R. James

Associate Professors
T. R. Anders
J. W. Clark
P. J. Dunham
B. Earhard
M. Earhard
V. LoLordo
B. R. Moore
S. Nakajima
R. L. Rudolph
M. Yoon

Assistant Professors
E. O. Boyanowsky
M. Cynader
N. Innis
D. E. Mitchell
F. J. Mortenson
J. P. Wincze

Research Associates and Postdoctoral Fellows
R. Adamec
R. Blanchard
D. N. W. Doig
D. Foree

Men see and hear, get hungry and fall asleep, and for an instant remember in great detail events which have just happened to them. Sometimes they hear but do not listen; often they remember only a fraction of what happened five minutes previously. They make love and play dangerous games, solve problems and go mad, drink far more than they need to quench their thirst; and they fight. Animals behave in the same way; if we knew the reasons why they did so we would have gone a long way towards understanding ourselves.

Psychology is an experimental science, and almost all the work which is done in the subject is done in the laboratory; its purpose is to discover the conditions which control the activities of animals and men to measure these conditions and the responses they produce, and to use this knowledge to invent ways of predicting behaviour and changing it. It is a subject for inventive rather than imitative men, better suited to those who want to find out for themselves than to those who want to be told what to believe. Although it has been the major achievement of psychology in the past two or three decades to discover the remarkable precision with which the behaviour of animals and men is controlled by their internal and external environments, - and as a student you will be expected to master the technology which has made these discoveries possible - this achievement has increased, not diminished, the challenge. We know for certain that there are at least two memory systems in the brains of vertebrates, but we do not know how these systems are linked together; we know (contrary to common sense) that things look larger the further away they seem to be, but no one understands why the moon on the horizon looks larger and closer than it does in the sky; there is reason to believe that at least some of the mental diseases are not diseases at all, but forms of behaviour which are learned like habits - yet we do not understand why some people learn these disordered behaviours while others escape scot-free.

The laboratory facilities of the department are amongst the best in Canada, and students who are willing to learn the necessary technical skills, and whose initiative is tempered only by a sense of compassion for other creatures, will be given the opportunity to use these facilities to the full.

Degree Programmes

General B.A. or B.Sc. in Psychology
Students enrolled in the general (i.e., three year) degree programme must take at least four and no more than eight classes beyond the introductory level in their areas of concentration. Required and recommended classes for students who intend to major in psychology are listed below, together with one additional class which is open to students in their final year. Students who intend to major in psychology may consult with Dr. Marcia Earhard for further information.

Year I
Psychology 100.

Year II
Psychology 200/Two of 201B, 202A and 203A are recommended.

Year III
One of Psychology 304, 305, 307, or 313 is required./One of Psychology 308, 309, or 312 is recommended/Psychology 300 is optional.

B.A. or B.Sc. with Honours in Psychology (Major Programme).
In the major honours programme students must take the nine psychology classes beyond Introductory Psychology that are listed below. All students who intend to take an honours degree in psychology should consult with Dr. Marcia Earhard.

Year I
Psychology 100.

Year II
Psychology 200; Psychology 357; at least one other 300-level class in psychology.

Year III
Psychology 305, Psychology 307; at least one other 300- or 400-level class in psychology. If Psychology 304 was not taken in Year II it must be taken in Year III.

Year IV
Psychology 465; Psychology 470; one other class in psychology.

Combined Honours
It is possible for students to take an honours degree combining psychology with a related arts or science subject. In such a combined honours programme the student must take eleven classes beyond the 100 level in his two areas of specialization, with not more than seven classes in either area. The student in the combined honours programme will normally write a thesis (or the equivalent) in the area that he elects as his major and in which he takes the majority of his classes. The following programme is based on the assumption that the student is taking the maximum number of classes in psychology. Any student intending to take a combined honours degree should consult with the two respective departments to arrange the details of his programme.

Year I
Psychology 100.

Year II
Psychology 200; Psychology 357; at least one other 300-level class in psychology.

Year III
Psychology 304, one of Psychology 305, 307, 308, 309, 312, 313, 358, 450 or 464.

Year IV
Psychology 465; Psychology 470.

Other Programmes

A variety of other programmes are available in co-operation with other departments. These programmes are designed to meet the needs of students whose specific interests may lie in areas other than those covered by the major and honours programmes offered by the department. Interested students should contact Dr. Marcia Earhard for further information.

Junior Research Assistantships
A number of Junior Research Assistantships will be available, during both the academic term and the summer vacation, to students who are taking an honours degree in psychology. Details of these assistantships, and of the stipends attached to them may be obtained from Dr. B. Earhard.

Classes Offered

100 Introduction to Psychology, lect.: 3 hrs.; tutorials, demonstrations, films and labs may be arranged as required. J. W. Clark/ and other members of the department.

Many people confuse psychology with either common sense or psychoanalysis, and most of them believe that human behaviour is unpredictable in principle, or so complex that we can have no hope of understanding it. The lectures and demonstrations which are given in this class should disabuse you of these ideas, and at the same time achieve something more constructive and useful; they will provide you with an understanding of the ways in which an individual's environment, his past experience and his heredity control the working of his brain and the choices and decisions which he makes.

The class will be taught in a number of sections. Each section will have a number of instructors who will deal with topics basic to an understanding of psychology. The topics vary from year to year and may vary somewhat in the different sections of the class, but the four described below are representative of the kinds of topics which will be covered.

1. The evolution and development of behaviour
The idea that the behaviour of animals is controlled by instincts, and the behaviour of man by innate intelligence, is dead. So is the contending idea that man's behaviour is solely determined by his environment. We now have a clear understanding of the fact that the behaviour of man and animals depends upon both hereidty and environment in much the same way as the area of a room depends upon both its length and its width. Our intelligence, for example, is a product of a complex and continuous interaction between our genetic endowment and the environments in which we exist from conception to death.

Like that of all other species, the genetic endowment of man has been shaped by biological evolution. Unlike other species, man has progressively modified his environment. Thus we are creatures both of biological evolution and of our cultural heritage. A proper understanding of the nature of our aggression, sexual behaviour, intelligence, and other characteristics must take into account our evolutionary history, our cultural history, and the often subtle interactions between heredity and environment in the course of our development.

2. Learning and motivation
What one learns obviously varies from one circumstances to another. *Whether* one learns depends upon a much more restricted set of conditions, and it is now possible to describe these in considerable detail, and the measure many of them with great accuracy. This part of the class will give you an understanding of how two fundamental forms of learning have been isolated and studied, as well as provide you with a knowledge of the laws which govern these two kinds of learning. We will also study the motivational conditions - the physiological drives, the emotional states, the acquired needs - that determine whether and when an individual will learn and make use of what he has learned. In addition, you will be asked to think about some of the problems in this area which are still unsolved: for instance, how do we learn to avoid (as opposed to escape from) pain, does punishment erase learning or simply suppress it, is learning a gradual process, or an all-or-none one?

3. Sensory processes and perception
..We experience colour, form, movement, sound, odour, warmth, and so on in the world about us. The brain receives information from this world in the form of coded messages transmitted through sensory systems. Psychologists are concerned not only to measure perception but also to explain why we experience things as we do. In considering such questions as why some parts of the skin are more sensitive to cold than warm objects, or why things normally look single even though we view them with two eyes, psychologists have developed theories about the means used by the nervous system to signal information. These theories have often been successful in predicting which conditions affect perception.

Detailed attention will also be given to the way experience influences perception. Do animals reared without the opportunity of pattern vision tumble over 'cliffs' when first permitted to see; are normally sighted people able to avoid obstacles in the dark as easily as blind people; why do young children often confuse "b" and "d"? Questions like these have been studied experimentally, partly because of their practical implications but also to satisfy man's curiosity about the way we know the world about us.

4. Human Performance
This part of the class is concerned with the general characteristics of human performance in a variety of situations. The discussion will hinge mainly on the idea that the mind (or the brain) acts as a device which processes and stores information. A memory is not, in any sense, a literal picture of what actually happened; it is the end product of number of complex steps in which the evidence of our senses is sorted and encoded, rejected or amplified, and integrated with other memories which are already in store.

When a child learns to talk, he does not simply parrot all the sounds which are spoken to him by his elders. The structure of his nervous system, the limitations of his ability to attend and remember, and his past experience all force him to select and process only part of what he hears. How he does so, and how he manages to construct for himself an intuitive understanding of the grammatical rules of his native language, will serve as one of the examples in this class

of the interplay of heredity, perception and learning.

Finally, some emphasis will be given to the practical implications of the research discussed in this section for education and teaching, industrial design, and the adaptations of men to new environments.

200 Problems in Experimental Psychology, lect.: 2 hrs.; lab.: 2 hrs.; P. Dunham/and other members of the department.

This class has two basic goals: (a) to teach you something about science in general and experimental methodology in particular; and (b) to give you some idea of the content of that business which we call experimental psychology.

The class is divided into two major components which are to some extent independent in the sense that: (a) there is little attempt to coordinate the topics which are covered from week to week in the lecture with those covered in the laboratory; and (b) there are different people involved in the teaching and grading of the lecture and laboratory material.

The general sequence of events in the laboratory is the following. During the first part of the class you will find yourself running experiments which we have planned in order to give you some orientation to the apparatus and procedures you will need to know in order to plan your own experiments later. Following the procedural experiments, you will design, conduct, and report an independent research project which meets your own interests.

As you might imagine, you will make extensive use of primary source material in the library in formulating your own independent research projects. In addition to this journal reading, two textbooks are used in the class. One is Robert Plutchik's *Foundations of Experimental Research;* the other is *Statistical Concepts* by McCollough and Van Atta.

The lecture section of the class will be devoted to a discussion of experimental psychology in general. This includes reference to the specialized methodologies which have been developed by experimental psychologists and the research problems which are thought to be important in contemporary experimental psychology.
Prerequisites: Psychology 100; restricted to major and honours students, but other students will be admitted with the consent of the instructor.

201B Applied Psychology: Behaviour Modification, lect.: 3 hrs.; J. P. Wincze.

The class will examine behaviour therapy procedures applied to the modification of problems in human behaviour. The emphasis of the class will not be on abnormal behaviour but rather on techniques derived from the principles of learning theory which may be used to modify problem behaviour. Discussion will cover the historical roots of behaviour therapy and will compare the behavioural model of therapy to the medical model. In addition, the following topics will be covered: classical and operant conditioning, systematic desensitization, token economy therapy, aversion therapy, modelling, and implosion therapy.
Prerequisite: Psychology 100.

202A Applied Psychology: Social Issues, lect.: 3 hrs.; E. O. Boyanowsky.

The class on social issues will survey research findings of social psychology directly applicable to everyday life. The social performance involved in human interaction will be examined - that is, how we create an image for others with our mannerisms, speech, dress and the use of such nonverbal cues as posture, eye contact, and expressions. How the environment affects human relations in diverse settings ranging from abortion clinics, convents and beer halls to airports will be discussed, as well as such social behaviours as aggression, learning and altruism. Topics will vary according to current issues and may include social psychological analyses of pornography and drugs, religion and other supernatural phenomena.
Prerequisite: Psychology 100.

203A Applied Psychology: Psychological Measurement, lect.: 3 hrs.; R. S. Rodger.

After some of the abstract properties of measurement systems are described (e.g., representation theorems, uniqueness theorems, meaningfulness, admissible scale transformations, scale types, fundamental and derived measurement), aspects of psycho-physical measurement will be discussed. Further elaboration of measurement procedures in Psychology requires a knowledge of statistical theory. The required amount of this theory is given and then used in the context of signal detection theory and the analysis of data from paired comparison experiments. The course ends with consideration of mental test technology (especially with cognitive tests of the multiple choice type), including item analysis, reliability and validity. Class notes have been prepared by the instructor. Exercises are scheduled regularly for students to do out of class. A knowledge of higher mathematics is not necessary to understand the material in this course: a knowledge of high school arithmetic and algebra is generally a sufficient background.
Prerequisite: Psychology 100

300 Selected Research in Modern Psychology, seminar and lab.: 4 hrs.; R. L. Rudolph.

This class is designed primarily for students who wish to gain further experience and understanding of contemporary psychological research. A student who enrolls in the class chooses a member of staff who will serve as his class advisor throughout the academic year. The student will be expected to conduct independent research of his own under the supervision of his class advisor.
Prerequisites: Previous or concurrent enrollment in two other 300-level classes; and may be registered for only with the prior consent of the instructor.

304 Learning and Motivation, lect.: 2 hrs.; lab.: 2 hrs.; R. L. Rudolph, N. Innis.

Psychology 304 deals with the fundamental principles of learning derived from research with animal and human subjects. Since most of these principles have been discovered and investigated in experiments using animal subjects, primary emphasis is placed on animal learning. The discussion of human learning emphasizes those aspects of behavior that are unique to man - language and abstract thinking - in addition to more general phenomena such as transfer and forgetting. Motivation is not studied as a separate topic but is discussed in terms of its effect on learning and performance.

Laboratory sessions involve (a) experiments with animals and human subjects, (b) discussions of the applicability of learning principles to everyday behavior, and (c) an occasional film.
Prerequisite: Psychology 100 (honours students); Psychology 200 or two of 201A, 202B, 203A (general students).

305 Perception, lect.: 2 hrs.; lab.: 3 hrs.; D. E. Mitchell, M. Cynader.

Psychology 305 considers the way in which information about the world is provided by the senses and how we use this information in our behaviour. The material covered in the class falls into four sections:

1. The methodological and theoretical problems peculiar to the study of sensation and perception;

2. The transformation of physical stimulus energy into neural energy, and the processing of this information achieved by the nervous system;

3. The psychological analysis of sensations and their relation to the known facts of sensory physiology;

4. The effects of higher processes, such as recognition, attention, and memory, on the way in which sensations determine how we perceive the world.

The majority of the class will be devoted to vision and hearing in human beings.

The experimental work to be presented has been selected for its importance in the theoretical understanding of perceptual processes, and the student will be expected to

organize his work around theoretical rather than factual questions.

The lab work will consist of a general introduction to the apparatus and methods used in perceptual research, followed by experimental studies designed and carried out by each student individually.
Prerequisite: Psychology 100 (honours students); Psychology 200 or two of 201A, 202B, 203A (general students).

307 Physiological Psychology, lect.: 2 hrs.; lab.: 3 hrs.; S. Nakajima.

Physiological psychology is an attempt to explain behaviour from a biological point of view. The class begins with a review of the structures and functions of the central nervous system, and of the sensory and motor systems. It continues with an analysis of anatomical, physiological, and biochemical mechanisms underlying perception, motivation and learning.

Two types of background knowledge are necessary to understand physiological psychology. First, students should have general knowledge in biology, which can be obtained by taking Biology 1000. Second, they should be familiar with the concepts and methods of experimental psychology.

Psychology 307 is recommended for anyone planning to do graduate study in psychology, and for students intending to study biology and medicine.
Prerequisite: Psychology 200 and at least one class in Biology.

308 Social Psychology, lect.: 2 hrs.; lab.: 1 hr.; E. O. Boyanowsky.

This class concerns the study of individual behaviour as a function of social stimuli with emphasis on extensive student research projects and class presentations. The class develops from discussion of research designs and methods to the study of basic processes such as person perception, social comparison, and social influence, including behaviour within groups and the relations between them. What determines the impressions we have of people, how we evaluate our abilities and emotions, how others influence our beliefs and opinions, how decisions are made, and why people discriminate against members of other ethnic groups are all topics which will be considered.
Prerequisites: Psychology 100 (honours students); Psychology 200 or two of 201A, 202B, 203A (general students).

309 Developmental Psychology, lect.: 2 hrs.; lab.: 1 hr.; T. R. Anders.

The developmental psychologist is concerned with the question of how behaviour is acquired, sustained and altered over time. The answers to these questions have practical importance in child rearing, education and guidance, but the interest of the psychologist is directed first at determining the conditions under which behaviour begins and the conditions under which changes take place. This leads some psychologists to basic studies about activity and quiescence, attentiveness, and indifference, and reactions to positive and negative consequences.

It leads others to questions about the development of intelligence, what sensory experiences influence perception, and how the child acquires such immensely complicated behaviours as those involved in speech and concept formation.

The class is experimentally oriented. Throughout, the emphasis is on learning and transfer operations with less stress on physiological and maturational processes. Because the class is intended for students with some background in experimental psychology, it deals in depth with such topics as paired associate learning, imagery, selective attention, transfer, and behaviour modification in addition to more traditional topics such as language acquisition, perceptual and cognitive development, and intellectual and social processes.
Prerequisites: Psychology 100 (honours students); Psychology 200 or two of 201A, 202B, 203A (general students).

312 Experimental Analysis of Behaviour Disorders, lect.: 2 hrs.; tutorial: 2 hrs.; W. K. Caird, J. P. Wincze.

Psychology 312 is concerned with an examination of neurotic and psychotic disorders from an experimental psychological point of view. The general purpose of the class is to present to the students current psychological thinking regarding behaviour disorders; what the major problems are and the ways in which attempts are being made to solve them. It is primarily intended for honours students and those intending to do advanced work in psychology.

This class is largely descriptive and of a fairly broad nature. The concern is with topics such as: the hypothesized biological and psychological bases of neurosis and psychosis and the various models for the study of these; the rationale and utility of diagnosis and classification; experimental methods of research into behaviour disorders; behavioural descriptions of neurotic, psychotic and character disorders and the psychological concepts used in understanding and explaining these patters of behaviour.

There are detailed discussions of the manipulative aspects of abnormal psychology - by drugs and various types of reinforcers. The major interest is the modification of behaviour by the use of learning theory principles, such as: operant conditioning techniques with schizophrenic patients; desensitization with phobic patients; aversion-type procedures with obsessive-compulsive disorders; modeling techniques with childhood behaviour problems; and conditioning procedures with alcoholism, drug addiction and similar disorders.

The tutorial will consist of weekly meetings where current and/or contentious issues will be discussed. To facilitate an exchange of ideas, each tutorial session will be limited to 10 students.

Students intending to enrol in Psychology 312 should have a clear understanding of some of the fundamental concepts of psychology and human physiology. In particular, they should be familiar with the basic notions of conditioning and learning, motivation and perception.

They should also understand the fundamentals of autonomic and central nervous system processes. In short, a thorough knowledge of a good introductory psychology text (e.g., G. A. Kimble and N. Garmezy: *Principles of General Psychology,* 3rd ed. 1968) is necessary if the student is to derive benefit from the class.
Prerequisite: Honours students or general students who have credit for Psychology 200 and two of 201B, 202A, 203A.

313 Cognitive Processes, lect.: 3 hrs.; B. Earhard.

A child enters this world without a memory, thought or language - with only the requirement that certain basic needs be satisfied. Within two years, a child has a well-developed memory for people, events, and words, as well as the capacity to communicate verbally with others. Cognitive psychology is not concerned with providing a description of the developmental process, but rather with ascertaining the character of mechanisms that must underly such human abilities. Cognitive psychologists ask such questions as: How does an individual recognize an object when it is in different contexts or orientations, when each shift in position or orientation produces a different pattern of stimulation on the eye? How much of daily experience is committed to permanent memory, and by what processes is it memorized? How is information stored in memory, and how is information lost from memory? In general, it can be said that cognitive psychology is concerned with developing explanations and mechanisms to account for thought and language in the human organism.
Prerequisite: Psychology 100 (honours students); Psychology 200 or two of 201B, 202A, 203A (general students).

353B Philosophy of Science and Experimental Psychology, seminar: 2 hrs.; W. K. Honig, A. Rosenberg.

An examination of methodological and conceptual issues in experimental psychology. Topics treated include the character of explanations, general statements, theories and theoretical entities in empirical psychology, as well as particular issues in current re-

search programmes: concept-formation in non-humans; perception studies; computer-simulation. Readings from the works of contemporary psychologists and philosophers.
Prerequisites: One full course in Philosophy or Psychology beyond the 100 level, or consent of instructor.

356 Advanced Motivation, lect.: 2 hrs.; lab.: 2 hrs.; P. J. Dunham.

The topic of motivation is one of the most difficult to describe in psychology. The material which appears in the standard textbooks on motivation could easily have been placed in a textbook on learning on perception, on personality theory, or on physiological psychology. Because of the breadth of the subject matter, Psychology 356 is taught as a seminar dealing with selected topics in the area of advanced motivation. In addition to these special topics discussed in class, outside readings are assigned to familiarize the student with the various classic issues which have persisted in the history of thought about motivation.
Prerequisite: This class is primarily intended for honours students, but other students will be admitted with the consent of the instructor.

357 Statistical Methods in Psychology, lect.: 2 hrs.; lab.: 2 hrs.; M. Earhard.

The object of this class is to familiarize the student with the logic and application of the descriptive and inductive statistical methods that are commonly used in the analysis of data in experimental psychology. The material covered begins with the topic of frequency distributions and their characteristics, and progresses through parametric and non-parametric tests of significance, correlation and regression techniques, analysis of variance and covariance. The general approach is to introduce each of a variety of statistical methods by reasoning through the ideas underlying the topic under consideration, then discussing the general method of attacking the questions asked of the data, and finally working through specific problems in class. The classes are conducted as a combination of lectures and labs, and students are encouraged to participate actively and question often.

Psychology 357 is required for honours psychology students and qualifying graduate students. Other students may be admitted with the consent of the instructor. Although mathematical sophistication beyond the principles of elementary algebra is not required for successful completion of this class, students who are weak in arithmetic and basic algebra are encouraged to consult the instructor during the summer preceding their enrolment for assistance in preparing for the class.
Prerequisite: This class is primarily intended for honours students, but other students will be admitted with the consent of the instructor.

358 History of Psychology, lect.: 3 hrs.; J. W. Clark.

The emphasis in this seminar class is on the evolution of thought about a number of psychological issues that have been of central concern throughout the history of psychology: the localization of function in the brain, the principles of association in learning, the nature of intelligence, the evolution of behaviour, the measurement of sensation, the development of perception, the causes of abnormal behaviour, etc. Speculation on such issues is traced from antiquity to the emergence of experimental psychology in the nineteenth century, and their development is examined in the work of the major psychologists. Structuralism, functionalism, behaviorism, Freudianism, Gestalt psychology - the systematic viewpoints of psychology's first century - are also examined in the writings of their proponents.
Prerequisite: This class is intended for honours students, but other students will be admitted with the consent of the instructor.

450A Functions and Sturctures of the Nervous Systems, lect.: 3 hrs.; M. G. Yoon.

Introduction to basic neurophysiology and neuroanatomy.
Prerequisite: Consent of instructor

450B Neurophysiological Laboratory, lab.: 4 hrs.; M. G. Yoon.

Introduction to research problems in neurosciences with electrophysiological methods.
Prerequisites: 450A *and* consent of instructor

464 Ethology, lect.: 2 hrs.; lab/field work: 3 hrs.; F. J. Mortenson.

Ethology is a relatively new science which bridges psychology and biology. In Psychology 464, we approach ethology through a survey of schools of thought concerning animal behaviour and a review of trends in field and laboratory research. This overview of the science of animal behaviour is supplemented by observations of animals in both natural and experimental settings. These observations illustrate techniques employed to study animal behaviour and allow the student to evaluate some of the theoretical formulations.

The format and the content of the course are somewhat variable and depend on the composition of the class. For example, topics or species of particular interest to the students may be examined in depth through discussions, paper presentations, or direct observations of behaviour.
Prerequisite: This class is primarily intended for honours students, but other students will be admitted with the consent of the instructor.

465 Honours Thesis, Members of the Department.

Psychology 465 is designed to acquaint the student with current experimental problems and research procedures in experimental psychology. Each student is assigned to a staff member who advises the student about research in his major area of interest, and closely supervises an original research project which is carried out by the student. Each student is required to submit a formal report of the completed research before the first of May. The final grade is based upon the originality and skill displayed by the student in designing his project and upon the submitted report.
Prerequisite: Restricted to honours students in their graduating year.

470 Animal and Human Learning, lect.: 2 hrs.; B. R. Moore.

This class deals with selected aspects of Pavlovian and operant conditioning, avoidance conditioning and punishment, discrimination learning, short-term memory, interference effects and forgetting. The techniques and control problems of the various areas are examined in sufficient detail to allow the student to evaluate critically the experimental literature. Certain of the areas are considered within the context of contemporary theories; in other cases the approach is atheoretical.

The format of the class varies. Lectures, brief student presentations, extended presentations and group discussion are intermixed according to the nature of the material to be covered.

The seminar is required of all senior honours and qualifying-year graduate students, and is ordinarily not open to others. The enrolling student who has not taken a previous class in learning and conditioning should prepare by reading *The Psychology of Learning* by J. Deese and S. H. Hulse (McGraw-Hill, 1967), or a comparable work. A detailed knowledge of such a text is not assumed, but the student should be familiar with the technical vocabulary and the major techniques and phenomena described.
Prerequisite: The class is primarily intended for honours students. Other students may be admitted only with the consent of the instructor.

500 Research Assignment, Members of the Department.

The student is assigned to an on-going research project and works under the direction of a staff member. The student is required to submit a report, written in thesis form, of the work completed during the year.
Prerequisite: Restricted to qualifying-year students.

Graduate Studies
Courses leading to the M.A. and Ph.D. degrees in psychology are offered. Further details on graduate courses and general requirements for admission to graduate study may be found in the Calendar of the Faculty of Graduate Studies.

Religion

Professor
Wilfred Cantwell Smith (Chairman)

The study of religion as a phenomenon in human history is the attempt to know and to understand the data of religious life. The aspiration is to achieve such knowledge and such understanding as will do justice simultaneously both to the meaning that the data have had for those persons to whom they have been religiously significant, and to the academic tradition within which the university study of religion lies, which includes the critical analysis of outside observers. The intellectual interpretation of a more than intellectual reality in human life constitutes a challenge; a successful rising to it would enhance human self-consciousness at perhaps its most central point.

This department being new, additional classes not ready at the time of this calendar's going to press may be offered.

100 Introduction to Homo religiosus, Historical and Comparative, lect. 2 hrs.; section meeting 1 hr.: W. C. Smith.

A synoptic presentation of the major religious traditions of mankind, and an attempt to interpret the faith expressed through or inspired by them; with some attention to representative and significant minor traditions. Prehistoric man and modern "primitives"; the Hindu tradition and the Buddhist; other religious aspects of China and Japan; the ancient Near East; and the Judaic, Christian, and Islamic traditions.

200 Hindu and Islamic instances of faith. Lectures/discussion, 2 hrs. W. C. Smith.
Prerequisite: Religion 100

In the first term Hindu, and in the second term Islamic, patterns of faith will be explored, primarily by studying in each case a particular item that will serve illustratively. A text or personality will be chosen to be examined intensively, and in addition there will be extensively a consideration of context, so as to discern how this specific matter fits into the general pattern of the tradition, historically and otherwise.

Russian

It is most evident that Russia's outstanding achievements in the liberal arts and sciences are of world-wide significance. We can no longer ignore a country of 240 million people whose culture has produced such literary giants as Dostoevsky, Tolstoy, Chekhov, Pasternak and Solzhenitsyn; composers such as Mussorgsky, Tchaikovsky, Stravinsky and Shostakovich and whose scientists have gained many firsts in space exploration, research in environmental pollution, medicine, geology, oceanography and in all other walks of life.

Moreover, man's very existence will be possible only through mutual cooperation, exchange of knowledge and the pooling of each other's resources. Here is where Canadians must play a leading role in furthering a better understanding of the Soviet people. Interestingly enough, the most widely studied foreign language in the U.S.S.R. is English, whereas we have a great shortage of qualified Russian-speaking Canadians in the government, industry and the community at large. Contacts with Soviet tourists, scientists, scholars, sailors, government officials and cultural exchange groups are now a daily occurance. Therefore, the ability to converse in Russian, handle Russian correspondence, as well as literary and scientific source materials are great assets in all professions. Russian is also accepted as a second-language which is required in most post-graduate programmes.

Russian at Dalhousie University is taught by native speakers with the aid of one of the most modern and up-to-date language laboratories in Canada. The main emphasis is placed on the spoken language to enable the student to gain an extensive working vocabulary and a basis of grammatical concepts.

In addition to participation in small conversation groups, students may obtain individual tutoring by contacting the Department. A late afternoon class is offered in Russian 100 to accommodate students who work in the day-time. Various extra-curricular activities such as plays, folk-dancing and singing, guest speakers and films provide ample opportunities for broadening the student's scope in Russian studies.

Russian studies are divided into two programmes:

1) Study of the Russian language from the introductory level (Russian 100 and 101), intermediate (Russian 200 and 201), to advanced (Russian 300, 301 and 400).
2) Study of Russian literature, culture and civilization and their influence on the Western literary and philosophical tradition (Russian 203 - Survey of Russian Literature; Russian 204 - Russian Culture and Civilization; Russian 305 - 20th Century Russian Literature; Russian 306A - Dostoevsky; Russian 306B - Tolstoy).

Degree Programmes:

Combined Honours:
Russian may be taken in a modern languages programme with French, German and Spanish.

Classes offered:

100 Elementary Russian, lect.: 3 hrs.; Irène Coffin/Nicholas Maloff/Natan Nevo
No prerequisites.
This class is designed for students who have no previous knowledge of the Russian language. Classes are kept small so that all students can actively participate in the conversations and thereby rapidly develop their proficiency in the language. The programme is closely correlated with intensive language laboratory work. Equal emphasis is placed on developing oral and reading skills with a sound grammatical basis.

101 Intensive Spoken and Written Russian, lect.: 3 hrs.; Natan Nevo.

This is an intensive course for students who wish to achieve proficiency in spoken and written Russian, either for general purposes or as a preparation for further Russian studies. It differs from Russian 100 in that there is a greater emphasis on developing oral skills through a combination of the Audio-Visual and Audio-Lingual methods. This class is limited to 15 students.

200 Second Year Russian, lect.: 2 hrs.; Natan Nevo.

Prerequisite: Russian 100 or 101.
This course must be taken together with Russian 201 or Russian 202 for an additional hour per week. Russian 200 is a continuation of Russian 100 or 101. Greater influence is placed on developing oral and reading skills together with a continuing study of grammatical concepts.

201 Literary Russian, lect.: 1 hr.; Natan Nevo.

This is a make-up section of Russian 200 and it is designed for students who wish to acquire competence in reading Russian literary texts in the original. Several selections from Russian Literature will be studied.

202 Scientific Russian, lect.: 1 hr.; Natan Nevo.

This is a make-up section of Russian 200

and it is designed for students who wish to acquire competence in reading Russian scientific texts in the original. Several scientific texts and magazines will be studied.

203 Survey of Russian Literature, lect.: 2 hrs.; Nicholas Maloff.

(Not offered in 1974-75)

204 Russian Culture and Civilization, lect.: 2 hrs.; Nichoolas Maloff.

Conducted in English.
No prerequisites.
This course traces the development of Russian culture and civilization from their earliest origins to the present day and their influence on literature, drama, art, architecture and music. Numerous masterpieces of the Russian arts will be illustrated with slides, film strips and recordings.

300 Conversational Russian, lect.: 3 hrs.; Irène Coffin.

Prerequisite: Russian 200 or 201, or by arrangement with the instructor.
The aim of this class is to develop in students the ability to express themselves freely and correctly on a variety of concrete and abstract topics on present day Russian social, political and scientific life.

301 Russian Area Studies, seminar; Irène Coffin.

Conducted in Russian.
Prerequisites: Russian 200 or 201, or by arrangement with the instructor.
This seminar traces Russia's past through a study of its history, geography, and culture. Students present reports on various topics concerning Russian life-past and present.

305 Twentieth Century Russian Literature, lect.: 2 hrs.; Nicholas Maloff.

Conducted in English.
No prerequisites.
A study is made of selected works representing the contributions to 20th century world literature by such writers as Chekhov, Tolstoy, Gorky, Bulgakov, Ehrenburg, Mayakovsky, Esenin, Pasternak, Solzhenitsyn and others.

306A Dostoevsky, lect.: 2 hrs.; Nicholas Maloff.

No prerequisites.
Conducted in English. Open to students in all departments. This course is designed to give the student an insight into Dostoevsky's creative work through an analysis of his major works.

"Man is a mystery: if you spend your entire life trying to puzzle it out, then do not say that you have wasted your time. I occupy myself with this mystery, because I want to be a man." From Dotoevsky's letter to his brother (1839).

Dostoevsky takes his rightful place among the great writers of world literature: Dante, Cervantes, Milton, Pascal and Tolstoy. Long before Freud and the school of psychoanalysts, Dostoevsky analysed the depths of the subconscious. Yet psychology for him was not an end but a means. He remarked: "I am called a psychologist; this is not true, for I am a realist in the highest sense, i.e. I depict all the depths of the human soul."

The existence of God has also "tormented" his entire life and he foresaw history in the light of the Apocalypse to be culminated in the transfiguration of the world by the "new and last Resurrection".

306B Tolstoy, lect.: 2 hrs.; Natan Nevo.
No prerequisites.
Conducted in English. Open to students in all departments. This course is designed for students wishing to become acquainted with Tolstoy's thoughts and ideas through an analysis of his major works.

Tolstoy and Dostoevsky are the two great columns, standing apart in the propylaeum of the Russian literature "Golden Age" temple. It seems Tolstoy has been given to the world for the purpose of being "contrasted with Dostoevsky", said D. S. Mirsky. Indeed Dostoevsky is considered the "surgeon of the human soul" and Tolstoy a "doctor of humanity".

Tolstoy's talents and genius enabled him to capture the search for identity in 19th century Russia and to interpret it through his own solipsism - a sense of being the great world he writes about. For him self-awareness among all people should be based on "reason, that is, good".

400 Advanced Russian Conversation and Composition, lect.: 3 hrs.; Nicholas Maloff.

(Not offered in 1974-75.)

Sociology and Anthropology

Sociology

Professors
S. D. Clark
J. J. Mangalam

Associate Professors
D. Q. Brodie
D. F. Campbell (Chairman)
D. H. Clairmont
D. H. Elliott
J. L. Elliott
H. V. Gamberg
J. G. Morgan (part-time)
V. Thiessen

Assistant Professors
G. D. Bouma
P. G. Clark
D. J. Grady
R. E. Schliewen
J. D. Stolzman

The sociologist is concerned in general with the growth and development of societies to modern, complex industrial units. Within any particular society, sociologists may analyze the distribution of wealth, power and prestige, problems of conformity and nonconformity, and social problems such as crime, racism, suicide, overpopulation, or the development of personality.

As part of a liberal arts education, sociology teaches the student to think critically about problems which are part of his own society. His or her willingness to think about the reasons for racial prejudice, poverty, or war, should be increased by exposure to this field. The career possibilities in sociology include research in government, industry, or university and teaching at the university level.

Sociology 100, as a general introduction, is normally a prerequisite for all advanced classes in the department. The content of this class is especially designed to provide students contemplating concentration in sociology with a solid foundation for subsequent study in the field. Multiple sections will be offered and each section will include lectures plus discussion in small tutorials. Students with high school Sociology may be permitted to take selected 200 level classes without having taken Sociology 100. 200-level classes include all the classes normally taken by students concentrating in sociology. 300-level classes are structured primarily as seminar courses and ordinarily presume a fair degree of familiarity with the discipline. 400-level classes are restricted to honours students and qualifying graduate students.

Degree Programmes

Sociology and anthropology are both approved fields for concentration. In addition, the department offers honours programmes in sociology and anthropology. An honours degree is recommended, and frequently required, preparation for most advanced work in sociology and anthropology. Interested students are invited to contact the Undergraduate Advising Committee (sociology) and anthropologists on staff (anthropology) for detailed advice on application and requirements for both programmes. Normally, an application for honours study is made on the basis of the results of the second year, i.e., towards the end of your fourth semester. Study space and limited financial support are available for honours students.

B.A. with Honours in Sociology
The nine sociology classes above the introductory level required for the honours degree should include statistics (301), research methods (310), two classes in theory (401A, 405A/B), and the honours seminar 450. The seminar paper produced in 450 will be examined as an honours thesis, to be presented in an open meeting. This will fulfill the university requirement that a student pass a comprehensive examination covering his honours work in order to receive an honours degree.

Combined and Unconcentrated Honours
The combined honours programme can be taken with economics, political science, philosophy, and psychology. For this programme as well as the unconcentrated honours programme (cf. p. 12), an early consultation of instructors and the Undergraduate Advisor is essential.

Canadian Studies Programme

The Department is cooperating with several other Departments in offering a Canadian Studies Programme. Interested students should contact Professor S. D. Clark.

Sociology Classes Offered

A supplement to this list of classes containing additions and deletions will be issued by the Department in the spring of 1974. Students entering their second and subsequent years are strongly advised to obtain a copy of the supplement from the Department or at the registration desk.

100 Introduction of Sociology, lect.: 2 hrs.; tutorial: 1 hr.;

Sociology 100 is designed to provide both a general introduction to the discipline of sociology as well as a foundation for more specialized study in the field. Emphasis in this class will be placed on basic sociological concepts, the nature of the sociological perspective, the logic of social inquiry, and recurrent theoretical and methodological problems of the discipline. In addition, some of the more important areas in sociology will be surveyed. In particular, this would include the study of family and kinship relationships, deviant behaviour, political and religious institutions, bureaucracies and complex organizations, ethnic and minority group relations, population trends, social stratification, and urbanization.

202 Comparative Sociology, lect.: 3 hrs.

Sociology 202 will investigate the similarities and differences which exist between societies. Major emphasis will be placed on a comparison of modern industrial societies with primitive, non-industrial ones. Such global processes as economic development, modernization, industrialization, and urbanization will also be examined.

203 Deviance and Social Control, lect.: 2 hrs.; tutorial: 1 hr.

Groups make formal and informal rules in an attempt to regulate and make predictable the behavior of their members. Violations of these rules occur in many different ways and stem from various causes. The purpose of the class is to examine both the processes by which groups make rules and the reasons why these rules are violated. Specific issues such as crime, delinquency, narcotic addiction, alcoholism, prostitution, suicide, and minority group relations are discussed in this context.

204 Social Stratification, lect.: 2 hrs.; discussion: 1 hr.

This class analyzes the principal aspects of social inequality in modern, industrial society. The formation of classes, status groups and the organized political expressions are considered.

Questions of the distribution of power and wealth in society, the existence of power elites or governing classes, the impact of bureaucracy on class relations, the extent to which major economic inequalities have been reduced in this century, problems of the mobility of individuals and groups through the stratification system and the impact on social structure are dealt with. Theoretical discussions in the class are largely concerned with the ideas of Karl Marx and Max Weber, but attention is also paid to contemporary theoretical approaches to stratification.

205 Sociology of Religion, lect.: 2 hrs.; tutorial: 1 hr.

This class analyzes the relations between religious beliefs and human behavior and social structure. Major themes include: the impact of social structure on the development of belief systems; the question of whether beliefs guide and direct human behavior; the formal organization of the religious institution, social psychological considerations of religious behavior. The primary focus is on religion in western society.

206 Social Change and Modernization, lect. 2 hrs.; tutorial 1 hr.

This class is primarily concerned with social and economic problems of underdevelopment in the Third World, with emphasis on the political and economic relations between industrially advanced and backward countries, and the forms which these relations have taken since political independence. An attempt is made to identify the economic and social causes of underdevelopment in this relationship. Critical attention is also paid to the traditional nature of pre-industrial societies and values as obstacles to industrialization and social change.

207A Socialization, lect.: 2 hrs.; seminar 1 hr.

This class deals with the processes by which individuals become members of groups. The lectures focus on such substantive issues as: child-rearing, age grading, sex typing, initiation rites, re-socialization of adults, conformity, internalization of norms, and expectation formation. Although theoretical issues will be examined, primary emphasis is placed on empirical research findings in the areas of experimental social psychology and symbolic interactionism. An empirical research project is required.

208 Communities, lect.: 2 hrs.; seminar: 1 hr.

Sociology 208 examines a wide variety of territorially based residential groupings. The emphasis in the first term is on such features of natural communities as the ecology, neighborhood social networks, the power structure, and behavior in public settings. Both the rural village and the metropolis is dealt with, in addition to such sub-communities as ethnic ghettos, slums, suburbia, and bohemia. Emphasis in the second term is on intentional communities such as utopian colonies, communes, company towns, and religious communities. Students are expected to design a model of an intentional community.

211 Canadian Society, lect.: 3 hrs.

The social significance of such population processes as immigration and migration will be considered in an attempt to develop a general perspective on the Canadian society. Social systems within Canada will be analyzed with respect to the social determinants of class, status and power.

212 Minority Groups, lect.: 2 hrs.; tutorial: 1 hr.

The social status of minority groups will be examined in the light of contemporary theories of prejudice and discrimination. The societal consequences of discrimination will be considered with respect to their effect on both minority and majority groups. Special emphasis will be placed upon an analysis of Canadian minorities.

213A Complex Organizations, lect.: 2 hrs.; tutorial: 1 hr.

This class makes a critical study, from the comparative point of view, of theoretical models for the analysis of complex organizations. Students will examine the classical, structural-functionalist, and management-science approaches to organizations. The class will entail a systematic survey of the sociological literature on this subject, with special concentration on organizational structure, strategy and decision-making.

214B Industrial Sociology, lect.: 2 hrs.; tutorial: 1 hr.

Recommended preparation: Sociology 204 or 213A. This class will examine the social relations of industry at both the micro- and macrosociological levels of analysis. The course will deal primarily with the productive system and attendant industrial institutions of advanced capitalist society. Major topics for investigation include the industrialization process, the social structure of in-

dustry, the development of trade unionism, and the sociology of work relationships. Evaluation will be based on examinations and a term paper.

215 Mass Society, lect.: 2 hrs.; lab.: 1 hr.

This class deals with the origin of modern, post-industrial "mass society." Problems associated with industrialization, cybernation, leisure, technology, and environmental degradation are examined in detail. Various attempts at solution of these problems are analyzed. The rise of the "expert" and of counter-cultural movements are given particular attention. Theoretical and methodological innovations for "future forecasting" are introduced. The grade for the class will be based upon two examinations and several papers. This course is not open to students who have previously taken Sociology 215A or 215B.

216B Sociology of Occupations, lect.: 2 hrs.; tutorial: 1 hr.

This class analyzes several social processes basic to occupational careers, professionalization and formal organization of occupations. These processes are treated in the context of their implications for the relations between occupations and both social structure and human behavior. Consideration is given to the role of sexism in occupational processes, the impact of occupation on marriage and dual career marriages.

217 Political Sociology, lect.: 3 hrs.

This class reviews the findings of social science on the issues of political systems, and seeks to account for the uses and abuses of influence and social control in societies. Emphasis is upon comparative study, utilizing the general perameters of political power in national political systems with applications designed for the political experience of Nova Scotia and the Atlantic region.

218A Sociology of Law, lect.: 3 hrs.

220 Sociology of the Family, lect.: 2 hrs.; tutorial: 1 hr.

Family in one form or another is an aspect of all societies. It is the most important agent of early socialization and personality formation. The first part of the course will be devoted to a consideration of some of the cross-societal characteristics of family in general, and of the extended family as found in traditional societies in particular. The second term will be devoted to a consideration of family characteristics in urban-industrial societies, concentrating on the nuclear family. An attempt will be made to understand the processes by which family's structures and functions have changed through time as societies evolved from a traditional to an urban-industrial social organization.

222 Social Psychology, lect.: 2 hrs.; tutorials: 1 hr.

An intensive consideration of selected problems concerning how individuals relate to groups. Theoretical and methodological issues will be equally stressed in an integrated fashion.

224 Sociological Theory - An Introduction, lect.: 2 hrs.; tutorials: 1 hr.

The class provides a systematic introduction into major topics in sociological theory. Part 1 treats classical concepts with reference to theorists up to 1920 (Saint-Simon, Marx, Weber, Durkheim, Pareto, etc.). Part 2 outlines more recent developments in the same and some related topics (Parsons, Homans, Dahrendorf, 'formal' theorists). Boundary problems between sociology and other social sciences will be identified, and ways in which theorizing has informed empirical research will be discussed.

226B Sociology of Knowledge.

301 Statistics, lect.: 3 hrs.

This class is designed to give the student some experience at an elementary level with those branches of statistics which are most frequently used in the social sciences. In particular the student will learn when and how to use non-parametric tests. He will also be given a general introduction to factor analysis.

303 Social Problems and Social Policy, seminar: 3 hrs.

This seminar focuses on the policy implication of research into various social problems. It addresses the issue of moving from delineation of a social problem, to doing the necessary research, to the development of policy relevant to the problem and considers issues in problems of implementation of policy.

306B Sociocultural Change, Modernization, and Development, lect.: 2 hrs.; seminar 1 hr.

The class will treat change, modernization, and development as distinct but related notions. Beyond examining the meanings and implications of these terms, an attempt will be made to outline some of the complex processes involved in planning for national development of traditional societies. For purposes of concrete illustrations, the class will focus on the problems of South Asia.

308 Experimental Analysis of Social Behaviour, lect.: 3 hrs.

This class provides an introduction to the study of the behaviour of small groups. Work in this branch of sociology is usually done under controlled laboratory conditions. Students in this class will become familiar with the literature which describes past work of this kind and will also be involved in experimental projects of their own.

309A Social Demography, lect.: 3 hrs.

Demography is the study of population, emphasising factors of birth, death and migration. Social demography is the study of the interdependent relationships between the processes and products of interaction on one hand, and factors of birth, death and migration on the other. An attempt will be made to include in the discussions such topics as world population, population control, family planning, and sociocultural factors influencing population size.

310 Research Methods, lect.: 3 hrs.

This class is concerned with the construction and testing of "grounded theory." A detailed survey of the basic methods explored at various stages of social research is presented. The topics discussed in the class include the construction of theory, the formulation of a research problem, research designs, measurement, methods of data collection, and analytic theory testing. Special attention is given to the sample survey as one of the main methods of social science research. Practical experience in survey methods is proved through a class project. Class organization: During the first half of the class material is presented in two lecture sessions and then discussed in a laboratory session. During the second half of the class participants participate in research team approach to a problem. Method of evaluation: First term; two examinations and laboratory assignments. Second term; participation and discussion and a final research paper.

311 Sociology of Leisure, lect.: 3 hrs.

Sociology has been interested in work since the early origins of the discipline. Much less attention has been given to leisure. Currently, there is an increased emphasis upon the analysis of leisure by the sociologist. This class deals with the historical and cultural origins of leisure time as a major social phenomenon, with factors affecting variations in amount and use of leisure time among individuals in Western society, and with consequences of trends toward increased leisure. The class is planned as a seminar; readings are primarily based on journal articles.

312B Social Conflict Theories, Seminar: 3 hrs.

Beginning with the conceptual sources of conflict theory in Indian, Chinese, Greek, and Arabian philosophical literature, this class will concentrate upon the development of nineteenth-century conflict theories of Hegel, Marx, Darwin (and the subsequent social Darwinists), Bagehot, Glumpowitz, Ratzenhofer, Sumner, Small, and Oppenheimer. The current contributions of Vold and Coser will be assessed.

313A Sociology of Health and Illness, seminar: 3 hrs.

Beliefs and attitudes surrounding disease concepts and treatment will be examined in primitive and contemporary societies. In addition, the social organization of medicine will be analyzed with respect to the following: the health professions, the hospital as a complex organization, and the larger society.

315 Urban Sociology, seminar: 3 hrs.

316 Sociology of Education, seminar: 3 hrs.

318A Issues in the Theory of Society, seminar: 3 hrs.

This seminar will consider a select number of theoretical issues which beset modern social theory. The substantive focus of the course will be on the social basis of politics in the contemporary world. All students enrolled in the course will be expected to make one seminar presentation.

319B Social Movements, seminar: 3 hrs.

This seminar examines both conventional (formal) and contemporary (action) approaches to social movements — viewed as efforts by individuals and groups to challenge culture-values, social institutions and/or a political order. Focus is upon participant observation, with particular attention to developments in Nova Scotia and the Atlantic region.

320 Social Change and the Canadian Society, seminar: 3 hrs.
The primary interest of this course is in an examination of the way in which the Canadian society has changed, particularly in the years since the Second World War. Before undertaking such an examination, however, an effort is made to develop a general framework for the analysis of the process of change in society. Change in the Canadian society is thus examined within such a framework: how the "old order" of Canadian society became established; how powerful forces of change in the society developed after the Second World War; the shape now being taken by the society. Students are advised to read in advance S. D. Clark, *The Developing Canadian Community.*

325 Sociology of Science and Ideas, lect.: 2 hrs.; tutorials: 1 hr.

The study of the social origins and organization of knowledge is an important aspect of contemporary sociology. This class introduces the student to the major elements of the sociology of knowledge. The class is particularly concerned with the examination of the body of knowledge known as modern science. The historical origins of science will be discussed. The social organization of contemporary scientific research will be examined using empirical data. The interaction between the scientific community and society-at-large will be analyzed; particular attention shall be paid to questions of science policy. The relationship between modern technology and contemporary scientific research will be studied with particular reference to the impact of modern information processing technology upon the development of social science. The class evaluation will depend upon both papers and examinations.

330 Seminar on Family and Socialization, seminar: 3 hrs. Same as Anthropology 330; consult the latter for class description.

401A History of Sociological Thought, seminar: 3 hrs.

This class is designed to introduce the student to some of the main concerns of major contributors to theoretical sociology. Writers considered will include Marx, Weber, Durkheim, Simmel, and Pareto.

405 Contemporary Sociological Theory, seminar: 3 hrs.

In this class a number of recent theoretical developments in sociology will be critically examined. The choice of specific theoretical topics will be left up to the instructor.

450 Honours Seminar in Sociology, seminar: 3 hrs.

The class has two parts; part one covers basic concepts of philosophy of science, such as testability and meaning of propositions in a social science. Part two applies these concepts in a concrete research project of the student's choice. The emphasis will be on oral presentation of assignments and repeated mutual review of proposals and papers.

451A Readings in Sociology

451B Readings in Sociology

452B Readings in Sociology

In a reading class the student is assigned to a member of staff for regular meetings to discuss readings in a selected area. Papers and research projects will be expected.

Anthropology

Professors
L. Kasdan
W. N. Stephens

Assistant Professors
J. H. Barkow
R. R. Larsen

Lecturer
B. Preston (Part-time)

Research Fellow
V. Miller

The Field
Man is a diverse animal, both in his biology and in the way he lives. Anthropology is the comparative study of this diversity, comparing the biology and cultures of human groups. Traditionally, Anthropology has consisted of four subfields: archaeology, anthropological linguistics, physical anthropolvgy, and social/cultural anthropology. Archaeology is the study of the material relics of past cultures, and deals with such topics as the dispersal of early tool traditions, the peopling of the New World, and the development of agriculture and civilization in both the Old and New Worlds. Anthropological linguistics deals primarily with the relationship of language to culture; other topics include language structure and classification, and techniques for analyzing languages not previously studied. Physical anthropology is concerned with the biological evolution of our own and related species and the distribution of physical characteristics of mankind in living populations. Social/cultural anthropology is the study of culture and social organization.

A background in anthropology provides a broad view of the human animal, his diverse cultures and his biological background. Such an orientation is an antidote to provincialism and an invaluable perspective for interests and studies in the other social sciences, the humanities, psychology, and the biological, medical, and legal disciplines.

The anthropology programme has affinities with several other social science disciplines, including economics, history, political science and sociology. Formerly, anthropologists were interested primarily in small-scale, mostly non-literate societies, studying them by "participant observation" and comparing aspects of culture and social structure. In recent years, however, anthropology has applied its unique methodological and theoretical perspectives to such diverse areas as mental institutions, urban life, and governmental regulatory agencies.

The classes offered by this Department are concerned with both biological and cultural aspects of the human species. In Anthropology 100, the student will be introduced to all of the subfields of the discipline, while higher level offerings will permit him to concentrate on his specific concerns.

B.A. With Honours in Anthropology

Nine credits in anthropology above the introductory level, including Anthropology 451, 452, 453, and 459. Anthropology 459 carries two credits and consists of the writing, under supervision, of an honours thesis. The thesis must be acceptable to at least two members of the anthropology staff. Applicants to the programme are asked to contact Professor L. Kasdan, its coordinator. Admission is based upon a personal interview and the examination of any paper which the applicant feels best demonstrates his writing ability. Following admission to the programme, each honours student must select one faculty member to serve as his principal advisor. In accordance with Uni-

versity regulations, a student must pass a comprehensive examination covering his honours work in order to receive an honours degree.

African Studies Programme
The Department is cooperating with several other Departments in offering an African Studies Programme. Interested students should contact Professor J. L. Barkow.

Anthropology Classes Offered
As a general rule, most classes above the 100 level require either Anthropology 100 or permission of the Instructor as a prerequisite. Because Anthropology at Dalhousie is a relatively new programme, you will find that for most classes permission is given more or less automatically.

A supplement containing additions and deletions to this list of classes will be issued by the Department. Students in their second and subsequent years are urged to pick up a copy of the mimeo, "Anthropology Classes for 1974-1975", available next spring in Rm. 415B and 322 Forrest, from any Anthropology professor, and at registration. For further information on these programmes, contact either Prof. J. Barkow (Rm. 414 Forrest, 424-2089), Prof. L. Kasdan (Rm. 415A Forrest, 424-3316), or Prof. R. Larsen (Rm. 414A Forrest, 424-6589).

If you are deeply interested in an aspect of anthropology for which no class is offered, you are invited to discuss the possibility of a reading or experimental class with the faculty.

100 Introductory Anthropology, lect.: 3 hrs.

This class introduces students to all of the subfields of Anthropology. In the first term, students will be introduced to man's evolutionary past, his relationship to other primates, his physical structure, and some of the biological factors involved in his social behaviour. In the second term, cultural evolution will be traced from hunting bands, through tribes, kingdoms, and agrarian civilizations, to modern industrialized states. The primary mode of analysis will be ecological, i.e., how the development of these societies has been partially determined and limited by the environment and their food-getting adaptation to it. In both terms films will be used to present concrete examples for analysis.

200B An Introduction to Archaeology:

The class will be restricted to approximately 20 students and will be held at the Nova Scotia Museum on Thursday afternoons from 3:30 p.m. to 5:00 p.m. during the second term. Additional meetings may be arranged during the term. The following topics will be covered: archaeology and its relationship to history and prehistory; the origins and growth of the discipline of archaeology; the application of archaeological techniques in the field of prehistory; the excavation of a site; the establishment of a chronological framework; the reconstruction of the prehistoric past; an outline of the reconstruction of the prehistoric past; an outline of the prehistory of Eastern North America; the prehistory of Nova Scotia; techniques and procedures used in current archaeological research in Nova Scotia. The course will also involve practical work on the archaeological collections at the Nova Scotia Museum and, weather permitting, at least one field trip. Those interested should contact the Instructor at the Nova Scotia Museum (429-4610) before November 30, 1973.

210 Cultural Ecology, lect.: 3 hrs.
The focus of this class will be the contributions ecological factors make to variations in cultures and patterns of social organization. The relationship between subsistence patterns and social organizational choices will be explored and attention will be directed to problems of understanding how complexes of cultural traits operate in maintaining a balance between a population and its subsistence resources. The emergence of particular complexes of traits and their existence at specific points of time and place will also be discussed. Class will be a combination of lectures and seminar, and two term papers are required.

213 Anthropological Study of Religion; lect.: 3 hrs.

This class examines the various attributes of non-Western belief systems. Topics covered will include: universality of religion; religion, early man, and human evolution; belief systems as symbolic maps; shamanism, spirit possession, and altered states of consciousness; magic and witchcraft, ritual; belief and healing; functions of religion in culture and society. Special attention will be paid to the continent of Africa. This class is not open to students who were registered in Anthropology 222 during 1973-4. No prerequisites beyond a keen interest in the subject required.

220 Social Anthropology, lect.: 3 hrs.

An examination of alternative ways of analysing culture and society. Illustrative case studies will be used which represent a variety of geographical areas, types of society (i.e., from simple band to urban industrial) and theoretical perspectives. Since different theoretical perspectives have been applied to specific institutions (economic, political, religious, kinship, etc.), such institutions will be examined where appropriate.

222 Psychological Anthropology, lect.: 3 hrs.

This class deals with the areas of overlap between psychology and anthropology. Topics to be covered include: culture and personality; methodology; culture and mental health; ethnopsychiatry; culture change and mental health; evolution of psychocultural capacity; and biosocial psychological anthropology. During the Spring semester special attention will be paid to the anthropological study of religion. A paper will be required.

227 Language and Culture, lect.: 3 hrs.

An examination of the medium through which the social and cultural life of men is carried out. This course explores the interconnectedness of language and culture. It examines such things as language as a medium for other cultural forms; linguistic forms and other systems such as kinship, folk classifications, systems of social stratification; the relationship between language and world view. Examples will be illustrated primarily by Spanish language and Hispanic cultures. *Requirement:* Anthropology 100. Students must either be taking or have already taken Spanish 102.

225 Anthropological Theory.

231A North American Indians, lect : 3 hrs.

This class will move through three parts. (1) New World prehistory, demography, language groups; (2) A review of the North American culture areas: Eskimo, Canadian Indians, Eastern Woodlands, Northwest Coast, California, Basin-Plateau, Southwest, and Plains; (3) Modern Indian problems. The class grade will be based on several quizzes, and on two term papers.
Prerequisite: Anthropology 100.

301 Peasant Society and Culture, lect.: 3 hrs.

A comparative examination of peasant societies around the world. Problems of defining salient characteristics which distinguish peasant from other types of societies are dealt with. Various models for describing and analyzing the behaviour of peasants (economic, political, religious, psychological etc.) are examined. The role of peasants in modern social change is a major focus.

307 Biosocial Anthropology, lect.: 3 hrs.

The theme of this class is that many human characteristics, both individual and social, are species traits and are the product of an evolutionary process. Although the range of topics proposed for discussion is eclectic, the core of the class is focused on the biological bases of socio-political organization. Topics to be discussed include evolutionary principles, the evolution of man and other primates, primate sociology, the biological substrata of social behaviour, sex differences, and the biology of politics. The format of the class will be a combination of lecture and seminar, and grades will be determined on the basis of either two term papers or a research project.

316 Africa: Ethnography and Modernization, seminar: 3 hrs.

This class introduces the student to the anthropological study of the peoples of Africa. The class is organized in terms of subject areas rather than ethnic units or geographic regions. Topics to be discussed during the autumn semester will include general background, family and social organization, economics and livelihood, politics and government, and personality and socialization. During the spring semester our focus will be on contemporary, rather than colonial or pre-colonial Africa. The major topic will be the influence of modernization on urban and rural life. A paper will be required. Students in Dalhousie's African Studies Program are cordially invited to register for this class.

320A, 320B Readings in Anthropology.

This class is intended for students who wish to delve deeply into a subject for which no appropriate advanced class is offered. The student and professor jointly decide on the requirements for the course.
Prerequisite: Written permission of instructor.

330 The Family and Socialization in Cross-cultural Perspective.

331 Cross-cultural Study of Socialization, lect.: 3 hrs.

In this class the student will (1) be introduced to the cross-cultural research method, i.e., the testing of general hypotheses on large samples of ethnographic cases, with the analysis, in lectures and in readings, of selected cross-cultural studies of socialization; and (2) become expert on the ethnographic literature on one of the world's major culture areas (Latin America, Europe, Middle East, Africa, Southeast Asia, or whatever) as it treats the problem — the effect of modernization on adolescence — which will be the class research problem for 1974-75. The student will write at least one major paper, and participate in one or more (probably two) cross-cultural investigations.
Prerequisite; Anthropology 100 or permission of the instructor.

451 Proseminar in Anthropology: Staff.

Intensive examination of major issues in anthropology. The first part of the class is devoted to a survey of major issues current in the field. During the second part, the student will present to the seminar his formulation and analysis of a particular problem.

452 Supervised Readings in Anthropological Theory and Method, tutorials: Staff.

The student should secure written permission of the instructor before registering for this class. The student and his instructor will plan a programme of readings appropriate to the former's interests and background.

453 Readings in Ethnology, tutorials: Staff.

The student should secure written permission of the instructor before registering for this class. The student and his instructor will plan a programme of readings essentially dealing with a geographic area (or areas).

459 Honours Thesis, tutorials: Staff.

This class carries two credits. The student writes an honours thesis under the supervision of his principal advisor.

Spanish

Associate Professors
S. F. Jones, Chairman
V. Romano
A. Ruiz Salvador

Assistant Professor
I. A. Luraschi

Lecturer
K. Williams

Spanish
Not only is Spanish, like French, the language of one of Europe's great cultures, but it is also one of the most widely used languages in the world (being the official language not only of Spain but of most of the countries of South and Central America as well) and, therefore, of tremendous social, political, and economic importance. Students interested enough in Spanish to be willing to devote a good deal of their time and energy to its serious study have an excellent opportunity to do so at Dalhousie.

In general, students are expected to acquire a good knowledge of spoken as well as written Spanish. As students' skill grows, Spanish is used more and more in classes. Both the "Castilian" and the "American" accents are used and considered of equal standing. Much use is made of the language laboratory in the acquisition of oral skills. In addition, students are encouraged to attend a conversation group at the appropriate level.

The object of our language instruction is to provide through the judicious use of modern methods, a solid basic training that will enable students who spend a few months consolidating their knowledge in a Spanish-speaking community to develop fluency rapidly and with precision. Students in our major Honours programme are normally expected to spend at least one summer in a place where Spanish is the language of communication.

If your tastes and abilities lie in the direction of Spanish studies, you should consider the possibility of taking a Bachelor's degree with Honours in Spanish, or with Honours in Spanish and another subject combined. Those who wish to do so, or to take Spanish as an area of concentration in a General Bachelor's degree course, are encouraged to discuss the matter at any time (but the earlier the better) with a member of the Department. An Honours degree is usually required for or facilitates access to graduate studies.

Spanish Degree Programmes

General Bachelor's Degree
Course should include:
Spanish 102 and 202.
Two, three or four of Spanish 230, 240, and 300 or 400-level class.

Bachelor of Arts with Honours in Spanish
Course should include:
Year I
1. Spanish 102
2. A class in the minor subject
3-5. Three other classes (one of which could be Spanish 202).

Year II
6-8. Spanish 202 (if not taken in Year I) and either 230 or 240.
9. A class in the minor subject.
10. One other class.

Years III and IV
Details of the Honours programme in Years III and IV are to be arranged by consultation with the Department.

Students in the Honours programme with Spanish as major subject are normally required before graduation to:
(a) write an Honours essay under the supervision of a member of the Department; and
(b) spend at least one summer in a Spanish-speaking community to consolidate their knowledge of the language.

Bachelor of Arts with Combined Honours in Spanish and Another Subject.
Programmes may be arranged by consultation (as early as possible) with the departments concerned. Students planning a combined Honours course should consider, however, that the number of classes taken in either subject might be insufficient for admission to many graduate programmes without at least an extra year's work.

Notes:
(1) The "other" classes chosen as electives in the programmes outlined above must satisfy general degree requirements.

(2) Combinations of classes other than those set forth above should not be chosen to fulfill degree requirements without the express permission of the Department.

(3) A student may, with the permission of the Department be admitted to a Spanish course at an advanced point because of prior knowledge of the language. Such a student, however, (except as he may be granted transfer credits in the usual way), must normally take the same total number of classes as other students in the same course.

(4) A student admitted to a Spanish course at an advanced level, who obtains credit for a Spanish class at that level, may not later take a Spanish class at a lower level for credit except with the express permission of the Department.

(5) Enquiries concerning prescribed texts should be directed to the Secretary of the Department.

Classes Offered

102 Spoken and Written Spanish, (Part I), lect.: 3 hrs.; language lab.: 5 hrs. per week.

For students with no knowledge or only a slight knowledge of Spanish.

Spanish 102 is normally followed in the second year by Spanish 202, which completes it. Students willing and able to cover the material more quickly through concentrated effort are invited to apply (to a Spanish instructor at registration or in the first class) to take Spanish 102 and 202 in the same year. See Spanish 150 listed below.

Comparative Literature 100 *(see Comparative Literature Section).*

202 Spoken and Written Spanish, (Part II), lect.: 3 hrs.; language lab.: 3-4 hrs. per week.

This class continues and completes the work begun in Spanish 102.
Prerequisite: Spanish 102.

150 Spoken and Written Spanish, (Parts I & II), lect.: 5 hrs.; language lab.: 9 hrs. per week.

Able first year students are invited to apply (to any Spanish instructor at registration or in the first Spanish 102 class) to take Spanish 102 and 202 in the same year. Students who take these two classes in the same year will attend classes 5 hours a week and work 9 hours a week in the language laboratory. Upon successful completion of this work, two credits are granted.

230 Introduction to Spanish Literature, lect.: 3 hrs.

Introduction to the main works and trends in Spanish literature from the 16th century onwards; aims at developing a critical point of view.
Prerequisite: Spanish 202 (which may be taken at the same time).

240 Introduction to Latin-American Literature, lect.: 3 hrs.

Introduction to the main works and trends in Latin-American literature of the 19th and 20th centuries. Study of illustrative works.
Prerequisite: Spanish 202 (which may be taken at the same time).

304 Composition, lect.: 3 hrs.

Training towards accuracy in reading and writing Spanish. Exercises in translation from Spanish to English and from English to Spanish; grammar, vocabulary building, free composition.
Prerequisite: Spanish 202.

336 Spanish Prose of the 20th Century, lect.: 3 hrs.
Prerequisite: Spanish 202 (Spanish 304, which may be taken at the same time, is strongly recommended).

341 Latin-American Prose of the 20th Century, lect.: 3 hrs.
Prerequisite: Spanish 202 (Spanish 304, which may be taken at the same time, is strongly recommended).

400 Introduction to Spanish Linguistics, lect.: 3 hrs.
Students will study new methods of linguistic analysis and increase their competence in Spanish through a series of practical exercises based on the theoretical approach taken in class.
Prerequisites: Spanish 202 and 304.

432 The Golden Age, lect.: 3 hrs. To be given 1974-75.

436 Contemporary Spanish Poetry, lect.: 3 hrs. To be given 1975-76.

441 Contemporary Latin-American Poetry, lect.: 3 hrs. To be given 1974-75.

Theatre

Associate Professors
A. R. Andrews
L. H. Lawrence (Chairman)
R. G. Merritt

Assistant Professors
D. Farnsworth
D. R. Overton
P. Perina
G. R. Whitehead

Special Instructors
R. Richards (movement)
A. G. Scott-Savage (voice)
D. Renton (makeup)

Canada Council Artists-In-Residence
Fred Allen
Nancey Pankiw

Theatre is a performing art. The programme at Dalhousie is designed to ensure the student studies both the theory and practice of the theatre. Some classes involve more theoretical work than others, some classes are intrinsincally more practical. On balance though the graduating theatre student can expect to be accomplished in certain key areas of the theatre, and knowledgeable about the theatre as a performing art.

The department is located in the theatre wing of the Dalhousie Arts Centre. The theatre wing is a self-sufficient unit involving one theatre, two studios, a roof theatre, and supporting workshops.

The department is developing close collaboration in certain theatre work with the Neptune Theatre. There are also opportunities to participate with other theatre groups who perform in the city of Halifax.

Some theatre classes by the nature of the work involved have a restricted enrolment. All students wishing to take any class in theatre should therefore first consult with the department.

The Classes

The classes in theatre are designed to provide a sensible programme for a student proposing to graduate with a B.A. with Honours in Theatre. Some of the classes are for students in the honours programme only, but there are others that are open to anyone who is interested in the topic.

B.A. with Honours in Theatre
A student who means to take the honours course should arrange his classes as follows:

Year I
1. Theatre 150.
2. A class from Group A.
3. A class from Group C.
4. Elective.
5. Elective.

Year II
6. Theatre 201.
7. Theatre 270.
8. Theatre 280.
9. One class in the minor (above 100 level).
10. Elective.

Year III
11. Theatre 360.
12-13. A choice of two additional theatre classes at the 300 level.
14. Second class in the minor.
15. Elective.

Year IV
16. Theatre 490.
17-18. Two additional theatre classes at the 400 level.
19-20. Electives.

Combined Honours
Combined honours programmes of study in which theatre is related to some other discipline studied at Dalhousie also exist. Interested students should apply to the department for further information.

Classes Offered

101 Theatre An Introduction to the Theatre, 3 hrs. lect., discussion, demonstration.

The class is designed for students who are concentrating their studies in other fields, but wish to take one class in theatre. The class considers the nature of the theatre, its history and current impact, and what the theatre reveals about societies. Important plays, in script, live performance, television, and film, theatre in different societies, and the component elements of the theatre are analysed, to enable the student to gain a firm understanding of how to appreciate and enjoy the theatre.

150 An Introduction to Theatre Studies, 6 hrs. (lect.: 1 hr.; improvisation: 2 hrs.; stagecraft: 3 hrs.).

This class is intended for students who think they may concentrate their studies in theatre, or know definitely that they will. The class involves: lectures on the nature, past and present of the theatre; improvisations to enable the students to understand some of the basic questions of performance; and, stagecraft work, to familiarize the student with the basic organization, equipment and materials of the theatre. Students taking this class should expect to participate in evening production work, and should not enrol in night classes.

201 The History of the Theatre, 3 hrs. lect./discussion/demonstration.

This class is designed to provide the student with a basic and comprehensive understanding of the development of theatre and drama. Emphasis will fall on the crucial phases of that development, the classical theatre of Greece, the theatre in the medieval period and in the Renaissance, and the evolution of the modern theatre.

220 Creative Drama

This class is designed to show potential or current teachers, or any person involved or interested in the development of children, how drama can be used both to guide personal development and to heighten learning ability. The class considers how best to use creative drama in school situations. Improvisations, theatre games and dramatizations of social issues make up part of the class; various approaches to drama in education are considered. Regular practice runs through the class and each student taking it will work out a detailed syllabus for subsequent use. (This class is offered in the second summer session.)

270 Design 1, 6 hrs.

An examination of two dimensional design, colour composition, perspective, and three dimensional design.

280 Acting 1, 6 hrs.

The first full time class involving work in movement, improvisation, role playing, voice and speech, and scene study.

301 Introduction to Film, 3 hrs.
An introductory class for students with no background in film. Each week a film is screened and analysed. The class also involves an examination of film history, genre, and techniques, and requires extensive viewing of films outside those shown in classes.

360 Playwriting, 6 hrs.

This class is concerned with the creation of theatrical events, usually, but not necessarily, on the basis of a formal written script. It may further involve a study of the playwright's sources for a theatrical event, a structural analysis of existing scripts and practical explorations of the ways in which a script can be prepared.

371 Design 2, 6 hrs.

Part of the class involves an examination of the history of art from the theatrical point of view; part of it includes the basis for technical drawing and theatre construction; and part of it involves directed work in the various technical phases of stagecraft.

380 Acting 2, 6 hrs.

Advanced work in acting involving movement, role playing, character study, and scene work.

450 The Modern Theatre, 3 hrs.

The modern theatre has been characterized by successive bursts of creative energy and experiment. This class gives students an opportunity to study these developments in detail and to examine several important theatrical theories. Their implementation in particular plays and in theatrical practice will also be examined.

460 Directing, 6 hrs.

The procedures that lead to theatrical events are analysed in this class. Specific theories are explored and tested. The work in the class involves directing scenes and one production.

470 Special Topics.

This class allows the student to explore in detail particular areas of the theatre which are of special interest, with the guidance of members of the faculty. Frequency and length of meetings will be decided to meet the needs of the particular topic or project under study. This class is open only to fourth year honours theatre students.

490 Dramatic Theory and Criticism, and the Aesthetics of the Theatre, 3 hrs.

All of the arts face a profound problem in the attempt to establish criteria which will enable creative activity to be evaluated. This class sets out to tackle that problem as far as the theatre is concerned. It looks at the various hypotheses and critical strategies that have been devised hitherto, and attempts to judge their present worth. It also asks what critical values are necessary for the survival and future growth of the theatre. Practical work will form a part of the work of the group when it becomes necessary to test theories in practice.

Drama in Education

The department of theatre is also responsible for Education 4530 and partly for Education 4550, classes offered in the B.Ed. programme to help future teachers understand how drama can encourage the imaginative development of children in elementary and secondary schools. These classes are not available to undergraduate students.

Graduate Studies

Graduate studies in theatre are not at present available at Dalhousie. Members of the department will be glad to help students with advice about opportunities for graduate study at other universities.