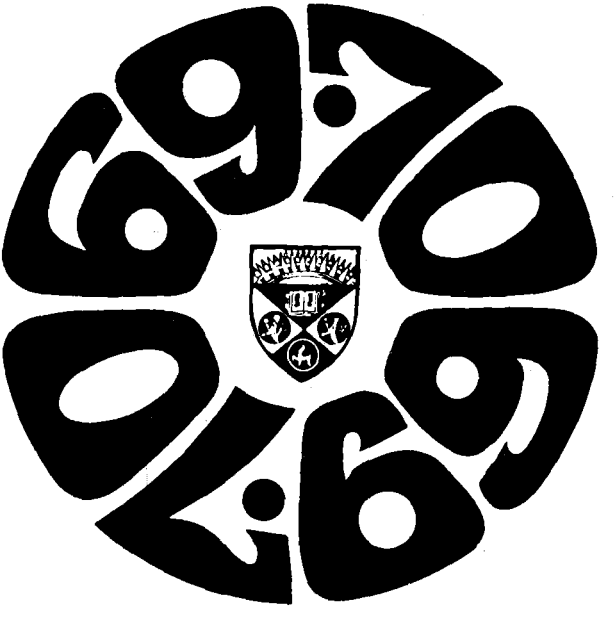
Faculties of Arts
Music
Science
Social Science



THE UNIVERSITY OF WESTERN ONTARIO

LONDON CANADA

EDUCATION • RESEARCH • SERVICE SINCE 1878

THE UNIVERSITY OF WESTERN ONTARIO
FACULTIES OF
ARTS · MUSIC · SCIENCE · SOCIAL SCIENCE

An integral part of this Calendar is the University's booklet, 'GENERAL INFORMATION', and this booklet should be consulted in association with the Calendar.

IMPORTANT NOTICE

1. In view of increasing costs of supplies and labor, residence fees and other charges set forth in this Calendar are subject to change by the Board of Governors.
2. The Councils of the Faculties reserve the right to withdraw any course or subject listed in this Calendar.
3. The courses of study listed in this Calendar are subject to restrictions of time-table.
4. The possession of the minimum admission requirements does not in itself guarantee admission to the Faculty.

The University of Western Ontario
London, Canada



Arts • Music • Science • Social Science

1969-1970

1969

JANUARY 1969						
SUN	MON	TUE	WED	THU	FRI	SAT
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ACADEMIC CALENDAR

1969

April 7, Monday ..... Last day for receiving applications for Summer School — Evening Session
May 5, Monday ..... Summer Session Evening Classes begin
June 2, Monday ..... Last day for receiving applications for Summer Session from students registering for first time
June 16, Monday ..... Last day for receiving applications for Summer Session from students previously registered
July 1, Tuesday ..... Last day for receiving applications for Winter Session 1969-70
July 2, Wednesday ..... Summer Session begins
July 28 - August 2
Monday to Saturday ..... Supplemental Examinations
August 12, Tuesday ..... Summer School lectures end
August 13 to 16
Wednesday to Saturday .. Summer School Examinations
August 29, Friday ..... Final date for auditions, Faculty of Music
September 2, Tuesday ..... Last day for receiving applications for Extension and Correspondence Courses 1969-70 Winter Session
September 8, Monday ..... Registration — Medicine, Dentistry, Law and MBA I
September 10, Wednesday .... Registration — Freshmen
September 11, Thursday ..... Registration — Upperclassmen
September 12, Friday ..... Registration — Graduate, MBA II, 3rd & 4th Year Business
September 15, Monday ..... Classes begin — 8.30 a.m.
September 20, Saturday ..... Extension Classes begin in Out of Town Centres
September 22, Monday ..... Extension Classes begin on Campus
Late registration date
September 29, Monday ..... Late registration date
September 30, Tuesday ..... Last day for course enrollment without penalty
October 8, Wednesday ..... Last day for enrollment of full-time students
Last day for adding any subject
October 13, Monday ..... Thanksgiving Day Holiday
October 31, Friday ..... Autumn Convocation
November 11, Tuesday ..... Remembrance Day Ceremony
November 14, Friday ..... Last day for dropping a course without penalty
December 13, Saturday ..... Classes end — 5.30 p.m.
First Term ends

1970

January 5, Monday Classes resume — 8.30 a.m.
Second Term begins
January 8, 9
Thursday and Friday ..... Summer School Supplemental Examinations

1970

February 16, Monday ..... Last day for receiving applications for Graduation

February 23 — 28

Monday to Saturday ..... *Conference Week*

March 7, Saturday ..... Founder's Day

March 27, Friday ..... Good Friday, Holiday

April 11, Saturday ..... Second Term ends

April 13 — May 2

Monday to Saturday ..... Examinations

May 25 - 29

Monday to Friday ..... Spring Convocation

June 1, Monday ..... Last day for receiving applications for Summer Session from students registering for first time

June 15, Monday ..... Last day for receiving applications for Summer Session from students previously registered

SENATE ELECTIONS 1969

Call for nominations of eligible candidates to represent the academic units, other than the Faculty of Graduate Studies, and the student body as required by the University of Western Ontario Act, 1967:

September 29 - October 10, 1969

Elections — October 20 - 24, 1969

Call for nominations of eligible candidates to represent the Faculty of Graduate Studies as required by The University of Western Ontario Act, 1967:

October 27 - November 7, 1969

Elections — November 17 - 21, 1969

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UNIVERSITY OFFICERS

Official Visitor	His Honour, the Lieutenant-Governor of Ontario
Chancellor	A. W. Trueman, B.A., M.A., D.Litt., LL.D.
President and Vice-Chancellor	D. C. Williams, B.A., M.A., Ph.D.
Vice-President (Academic)	R. J. Rossiter, B.Sc., B.A., D.Phil., B.M.B.Ch., M.A., D.M., F.R.I.C., F.C.I.C., F.R.S.C.
Vice-President (Administration & Finance)	R B. Willis, M.A.
Vice-President (Health Sciences)	O. H. Warwick, M.D., C.M., M.A., M.R.C.P., F.R.C.P.(C), F.A.C.P.
Dean of Men	T. L. Hoskin, M.A.
Assistant Dean of Men	A. D. Mackenzie, M.A.
Dean of Women	Leola E. Neal, M.A., Ph.D.
Registrar	J. K. Watson, M.A., Ph.D.
Associate Registrar	Margaret P. May, B.A.
Assistant Registrar	D. G. Henderson, B.A.
Assistant Registrar	B. G. Browning, B.A.
Admission Supervisors	Mrs. J. Van Fleet, B.A., J. A. McNeil, B.A.
Chief Librarian	J. J. Talman, M.A., Ph.D., F.R.S.C.
Deputy Chief Librarian	J. F. MacPherson, B.A., M.A., A.L.A.
Director, Summer School & Extension	Angela M. Armitt, B.A., M.A.
Director, French Summer School	F. K. Harper, B.A., M.A.
Director, Intercollegiate Athletics	J. P. Metras
Director, Health Services	R. J. Bowen, B.A., M.D.
Awards Officer	E. J. McLeod, B.A.
Placement Officer	C. F. Way, B.A.
Comptroller	R. R. Glover, B.A.
Director, Information Services & University Publications	G. C. McDonald, B.A.
Secondary School Liaison Officer	A. G. McColl, B.A.
Director, Alumni Affairs	G. C. McDonald, B.A.
Director, Physical Plant	John Shortreed, B.A.Sc., P.Eng.
Director, Food Services	George A. Bullas

Faculty of Arts
Dean John G. Rowe, S.B., B.D., M.A., Ph.D.
Faculty of Music
Dean Clifford von Kuster, Mus. Bac., L.R.C.T.
Faculty of Science
Dean Andrew E. Scott, B.Sc., Ph.D.
Assistant Dean Walter C. Howell, B.Sc., M.Sc., Ph.D.
Faculty of Social Science
Dean Grant L. Reuber, B.A., A.M., Ph.D.

THE AFFILIATED COLLEGES

Huron College
Principal: The Rev. J. Grant Morden, B.A., L.Th., B.D., D.D., S.T.M., D.Th.
Brescia College
Dean: Sister Dominica, B.A., M.A.
King's College
Principal and Dean of Arts: D. Owen Carrigan, B.A., M.A., Ph.D.

ADMISSION REQUIREMENTS

Admission requirements to The University of Western Ontario are outlined in the University's publication **'GENERAL INFORMATION.'** This publication is an integral part of this Calendar and should be consulted in association with it.

TERMINAL DATES

Final Dates for the Acceptance of Applications for Admission 1969-70:

APRIL 7, 1969	Applications for Admission to register for 1969 SUMMER EVENING SESSION
JUNE 2, 1969	Applications for Admission to register for 1969 SUMMER SESSION
JULY 1, 1969	Applications for Admission to register for 1969-70 WINTER SESSION (intramural students)
SEPTEMBER 2, 1969	Applications for Admission to register for EXTENSION COURSES 1969-70 WINTER SESSION Final date for auditions in Faculty of Music (To ensure early unconditional acceptance, auditions should be arranged before May 15, 1969)
OCTOBER 1, 1969	Applications for Ontario Student Awards

A non-refundable late application fee of $25.00 must accompany each Application for Admission submitted after the final date.

ACADEMIC REGULATIONS

RESIDENCE REQUIREMENTS FOR A DEGREE

A candidate for a degree must have attended intramural classes of this University for two academic years, or for one academic year and two summer sessions, or for five summer sessions. This requirement may be reduced to one year of intramural classes, or three summer sessions, if other courses for the degree have been obtained through attendance at Extension classes of this University, or by transfer of credits from an approved college or university. A minimum of five senior courses must be taken at this University.

CLASS AND LABORATORY ATTENDANCE

Freshmen and sophomore students are required to attend eighty percent of their lecture and laboratory classes. Any student who, in the opinion of his instructor, is absenting himself too frequently from class or laboratory periods will be reported to the Dean of his College. On recommendation of the Department concerned, and after due warning has been given him by the Dean, the student may be debarred from taking the regular examinations in that course.

EXTRA COURSES

Permission to take an extra course must be obtained in writing from the Dean or his designate either prior to registration or at the time of registration. Only students with overall B averages in the previous year's work may apply.

ADDING AND DROPPING COURSES

Following registration, a student may add a course only with the joint approval of the Dean of the College and the Head of the Department concerned. A course cannot be added after October 8.

A student may drop a course only with the joint approval of the Dean of the College or his designate, and the Head of the Department concerned. A course dropped after November 14 will be considered a failure.

SUBSTITUTING COURSES

A student may substitute a course only with the consent of the Head of the Department of his Honors or Major subject and cannot do so without penalty after October 8. All substitutions must conform to the basic requirements as laid down by the Senate.

UNSATISFACTORY KNOWLEDGE OF ENGLISH

Any student of the two final years who shows an inadequate command of spoken and written English must improve his style until his work satisfies his instructor.

EXAMINATIONS

REGULAR

Examinations for students registered in intramural, extension and correspondence courses are conducted in April and May, and for those in the Summer School in August.

SUPPLEMENTAL

Supplemental Examinations are conducted in August for students conditioned in the regular examinations, and in January for students of the Summer School (subject to Regulations concerning Supplementals, see below). Fee $10.

All supplemental examinations must be written at The University of Western Ontario or at another Canadian university located more than 150 miles from London. This rule does not apply to students serving in the Armed Forces.

SPECIAL

A special examination is any examination other than the regular or supplemental examination, and it may be offered only with consent of the Department concerned and with the permission of the Dean. Fee $15.

A special examination may be written only at this University or at one of its Affiliated Colleges.

COMPREHENSIVE EXAMINATIONS

Students should observe that the purpose of their college work is not simply the creditable passing of courses, term after term, but the gradual acquisition of a broad and deep knowledge of the chosen subjects and an intelligent appreciation of their bearing upon general knowledge and culture. Some Departments

have introduced comprehensive examinations for Honors students. These examinations, which may be written, or oral, or both, are given at the end of the senior year to cover the broad aspects of the student's Honors Program. They are additional to the course examinations.

DEFERRED EXAMINATIONS

Permission to defer an examination is given by the Deans only on compassionate grounds. A student must petition his Dean for this privilege. A deferred examination is normally written during the supplemental examination period. No supplementals will be allowed for a student who is permitted to defer examinations. No fee is charged for deferred examinations.

A deferred examination may be written only at this University or at one of its Affiliated Colleges.

FAILURE TO APPEAR AT EXAMINATION

A student who fails to appear for an examination at the time set in the timetable will not be allowed to write on the examination paper thus missed. He may, with the approval of the Head of the Department concerned, petition his Dean for permission to write a special examination. Petitions will be entertained only when they are submitted on compassionate grounds with supporting documents.

AEGROTAT STANDING IN THE GENERAL PROGRAMS

Aegrotat Standing (academic standing without examination) may be given to students in the graduating year of the General Programs. On compassionate grounds, and with supporting documents, a student may petition his Dean for:

(a) the privilege of writing deferred examinations

or

(b) Aegrotat Standing which would be 50% in non-major courses and 60% in major courses.

ELIGIBILITY FOR SUPPLEMENTAL EXAMINATIONS

A student is allowed two supplemental examinations in his first year and only one in each succeeding year. A student who is granted a supplemental privilege must write the supplemental the first time it is offered. A supplemental thus missed is recorded as a failure.

To be eligible for a supplemental examination a student must:

In the General Program:

Pass two-thirds of his year's work.

Obtain grade E (40% to 49%) in the course in which a supplemental may be written.

Formally apply to the Registrar for the privilege of taking the examination.

In an Honors Program:

Pass two-thirds of his year's work.

Obtain grade E (40% to 49%) in the course in which a supplemental may be written.

Obtain the consent of the Department in which he takes his honors work.

Formally apply to the Registrar for the privilege of taking the examination.

EXAMINATION TIMETABLE

Each course offered has an examination code number. This will be found in the course description following the designation of the number of class hours (e.g. 3 hours—1).

Final examinations in 1970 will be held according to the following schedule:

First Week		Second Week		Third Week	
Mon. Apr. 13	9 a.m. — 13 2 p.m. — 14	Mon. Apr. 20	9 a.m. — 25 2 p.m. — 26	Mon. Apr. 27	9 a.m. — 1 2 p.m. — 2
Tues. Apr. 14	9 a.m. — 15 2 p.m. — 16	Tues. Apr. 21	9 a.m. — 27 2 p.m. — 28	Tues. Apr. 28	9 a.m. — 3 2 p.m. — 4
Wed. Apr. 15	9 a.m. — 17 2 p.m. — 18	Wed. Apr. 22	9 a.m. — 29 2 p.m. — 30	Wed. Apr. 29	9 a.m. — 5 2 p.m. — 6
Thurs. Apr. 16	9 a.m. — 19 2 p.m. — 20	Thurs. Apr. 23	9 a.m. — 31 2 p.m. — 32	Thurs. Apr. 30	9 a.m. — 7 2 p.m. — 8
Fri. Apr. 17	9 a.m. — 21 2 p.m. — 22	Fri. Apr. 24	9 a.m. — 33 2 p.m. — 34	Fri. May 1	9 a.m. — 9 2 p.m. — 10
Sat. Apr. 18	9 a.m. — 23 2 p.m. — 24	Sat. Apr. 25	9 a.m. — 35 2 p.m. — 36	Sat. May 2	9 a.m. — 11 2 p.m. — 12

GRADES

TABLE OF GRADES

The marking system of examinations allows for six grades:

Grade A indicating a mark of 80 percent or higher
Grade B indicating a mark of 70 percent to 79 percent inclusive
Grade C indicating a mark of 60 percent to 69 percent inclusive
Grade D indicating a mark of 50 percent to 59 percent inclusive
Grade E indicating a mark of 40 percent to 49 percent inclusive
Grade F indicating a mark of less than 40 percent.

SESSIONAL AVERAGE

The sessional average is compiled from the marks for all courses taken in an academic session in which a mark of 40% or higher has been obtained. No average will be compiled for a student who has failed a course.

SUPPLEMENTAL EXAMINATION GRADES

A student will receive either a "pass" or "failed" grade for a course after a supplemental examination. A "pass" will give the student credit for the course but will not change his average for the year. A student passing a supplemental examination will receive a mark of 50% to be used in the compilation of major and graduating averages.

GENERAL PROGRAMS

For students in General Program B.A. with majors:

The passing grade in all courses is 50 percent, except as specified for the major subject. (See General Regulations for a B.A. Degree — page 19).

For students in the three year B.Sc. programs:

The passing grade in all courses is 50 percent, except as specified for the major subject. (See General Regulations for a B.Sc. Degree — page 19).

For students in General Programs with options:

No student will be admitted to the degree of Bachelor of Arts in the General Program with Home Economics, Secretarial Science or Music Options who has not obtained a minimum of 50 percent on all the prescribed and elective work of his program, and a minimum of 60 percent in half the courses of his senior year.

HONORS PROGRAMS

A student will be automatically accepted if he has an average of at least 70% with no grade of less than 60% in the courses listed as principal courses by the Department(s) of the subject(s) in which he is specializing. He must also have a passing grade in each of the courses listed as subsidiary courses by the Department(s) concerned.

A student with an average of 60% to 69% in the principal courses of his Honors Program and a passing grade in each of the subsidiary courses, may be accepted by special permission of the Department(s) concerned.

A student who passes all courses in his Honors Program in the Third Year but who has failed to obtain the requisite average for honors (60%) must meet

the requirements of the General Program to qualify for the General B.A. or B.Sc. degree.

A candidate in an Honors Program for the degree of Bachelor of Arts or Bachelor of Science who has obtained 50% in each course of his final year, but has failed to obtain the requisite average for honors in his final year (60%), may be awarded a B.A. or B.Sc. degree without designation. The candidate may write a subsequent examination for an Honors degree.

TERM WORK

Term work in a course will not be credited to a student beyond the year in which the course is taken.

Any student who, in the opinion of his instructor, is absenting himself too frequently from class or laboratory periods will be reported to the Dean of his Faculty. On recommendation of the Department concerned, and after due warning has been given him by the Dean, the student may be debarred from taking the regular examinations in that course.

FAILED YEAR

A failed year is:

(a) A normal year in which the student fails to pass at the Spring examinations two-thirds of the courses in which he is registered after the last date for change of program;

(b) A repeated year in which, regardless of the program taken, the student fails to pass all courses at the Spring examinations.

Summer School and/or supplemental privileges are not granted to a student who has failed his year.

If a student fails and wishes to repeat his year, he may, upon application to the Admissions Committee, be given permission to re-enter the University immediately, or be requested to stay out a year, or be required to withdraw.

CREDIT FOR COURSE IN FAILED YEAR

A student who has failed his year and is given permission to repeat his year's work shall not be allowed to hold credit for any course of that failed year. Courses passed with a minimum of 70% in a failed year will not be repeated but the student shall substitute for such a course another course of equivalent weight approved by his Dean or his designate. When the course passed with 70% or higher standing is a required course in a student's program, he will be credited with meeting this requirement when he has successfully completed the courses substituted for it in his repeated year.

ACADEMIC RIGHTS OF STUDENTS

The Senate has established procedures for petitions and appeals.

PETITION

A petition is an instrument whereby a student may seek to have a regulation of the University waived on academic or compassionate grounds.
Procedure: The student may institute a petition in the Office of the Dean of his Faculty on a form provided for the purpose. He will be notified later of the Dean's decision.
Reconsideration by Senate: A student shall have the right to require the Senate to consider the decision of the Dean by making application to the Secretary of the Senate on a form provided for the purpose.

APPEAL

An appeal is the instrument by which a student is protected against an error in grading or in final standing, unfair prejudice of a professor, or serious negligence in instruction.
Procedure: A student is required to make a formal complaint to the Chairman of the Department concerned. If the problem cannot be solved in this way a written appeal setting forth the grounds of the complaint may be instituted to the Dean of the academic unit concerned who may appoint or request an appropriate committee composed of students and faculty to advise him.
Reconsideration by Senate: A student shall have the right to require the Senate to consider the decision of the Dean by making application to the Secretary of the Senate on a form provided for the purpose.

TEACHERS' PROGRAMS AND CERTIFICATES

PROGRAMS FOR TEACHERS:

The Faculties of Arts, Music, Science and Social Science through the Summer School and Extension Department offers General Program courses leading to a General B.A. degree for students unable to attend the intramural winter sessions. These subjects are available in three ways: (1) at the Summer Session in London, (2) during the Winter Session in London and other centres in Western Ontario and (3) by correspondence.

HIGH SCHOOL ASSISTANTS' CERTIFICATES:

Type B: The academic standing for admission to the course in the Ontario College of Education leading to a High School Assistant's Certificate, Type B, is a degree program approved by the Minister of Education.

The university program should include a minimum of seven full university courses in at least two subjects that provide background for Secondary School teaching.

Type A: Subject to the conditions specified below, an Honors Degree in Arts, Music, Science, or Social Science is the academic standing required for admission to the courses leading to High School Assistant's Certificate, Type A, in Applied Mathematics, Biology, Chemistry, Classics, Economics, English, English and French, English and Russian, English and German, English and History, English and Latin, French and German, French and Russian, French and Spanish, French Language and Literature, Geography, Geology, History, Latin and French, Latin and Greek, Mathematics, Mathematics and Physics, Music, Physical Education, Physics, Political Science, Psychology.

Any student planning to obtain the Ontario High School Assistant's Certificate, Type A, should seek advice from the Registrar, Althouse College of Education, London, Ontario.

Candidates shall attend for at least the complete third and fourth academic years and obtain at least second class standing.

The Minister of Education shall have authority to deal with any case not already covered. The University shall submit to the Minister a recommendation on any case whose merits justify special consideration.

Graduates in General Programs who wish to obtain Type A standing should submit formal transcripts of their university records to the Dean, Althouse College of Education, London, Ontario.

PUBLIC SCHOOL INSPECTORS' CERTIFICATES:

By agreement with the Minister of Education, the work described below satisfies the academic requirements for a Public School Inspector's Certificate:

An Honors Degree in Arts or Science in accordance with the present agreement prescribed for Type A qualifications; or a General Program Degree in Arts and Science with a B standing percent on the work of the final year of the program; and including English in any three of the first, second, third and fourth year courses of study. For professional requirements, candidates should consult the Ontario Department of Education, Toronto 5, Ontario.

COURSE—NUMBERING SYSTEM

Courses 1-9 are equivalent to corresponding subjects of Secondary School Grade 12 (Ontario).

Courses numbered 2 are equivalent to corresponding subjects of Secondary School Grade 13 (Ontario).

Courses 10-19 are equivalent to corresponding subjects of Secondary School Grade 13 (Ontario).

Courses 20-29 are First Year General Courses.

Courses 30-99 are Second and Third Year General Courses.

Courses 200-299 are Second Year Honors Courses.

Courses 300-399 are Third Year Honors Courses.
Courses 400-499 are Fourth Year Honors Courses.

A course-number followed by "a" is offered in the first term only; followed by "b" in the second term only; followed by "x" in an Affiliated College only.

A half course is one which meets less than two hours a week throughout the academic year or less than four hours a week in one term.

Unless otherwise indicated, lecture and laboratory hours are listed on a weekly basis throughout the academic year.

PROGRAMS

The Faculties of Arts, Music, Science and Social Science offer:

Three-Year Programs leading to a B.A. degree or a B.Sc. degree with concentration in a major subject.

Four-Year Honors Programs leading to a B.A. or a B.Sc. or a Mus.B. degree.

Programs leading to admission to other Faculties and Schools: Business, two years; Dentistry, two years; Law, two years; Medicine, two years; Medical Rehabilitation (Physical Therapy), one year.

First Year students will register in one of the following:

Arts, Music, Science, Social Science, Home Economics, Secretarial Science.

Availability of Option: The student's choice of options within any academic program is subject to the constraints both of the lecture and final examination timetables.

Students intending to enter Dentistry, Medicine or Medical Rehabilitation (Physical Therapy) should register in the Faculty of Science (Natural Sciences). For further guidance see the Faculty of Medicine and Faculty of Dentistry Calendars.

FIRST YEAR

The purpose of the First Year General Program is to offer one year of basic general education and to postpone the selection of a specific program until the beginning of the second year. Thus the student can make a final decision as to his future program on the basis of university work which will include subjects not available in the secondary school. On the successful completion of the First Year General Program, the student is eligible to register in the second year of one of the Three Year Programs or the second year of one of the Honors Programs.

The General Programs require two more years for completion and lead to the B.A. or B.Sc. degree. Honors Programs require three more years and lead to an Honors B.A., an Honors B.Sc. or Mus.B. degree, and permit specialization in one or two subjects.

The courses are grouped into four divisions:

Division A - The Arts and Music
Division B - The Social Sciences
Division C - The Natural Sciences
Division D - Other Subjects

Arts, Music and Social Science

The First Year of the General Program in Arts, Music and Social Science leads to the senior years in the General Program B.A. and to Honors Programs

in the Arts, Music, Social Sciences, and fulfills admission requirements for the Faculty of Law.

Natural Science

The First Year of the General Program in the Natural Sciences leads to the senior years in the General Programs and to Honors Programs in Computer Science, Mathematics, the Natural Sciences, some Humanities and Social Sciences, and fulfills the First Year requirements for admission to Dentistry, Medicine and Physical Therapy.

GENERAL REGULATIONS FOR A B.A. DEGREE

For a General Program B.A. a student must pass sixteen courses which must include:

(a) One appropriate course from Division C.

(b) Two courses at the 20 level from:
English
Mathematics or Applied Mathematics
A language other than English.

Select, before he enters the Second Year, a major subject consisting of four senior courses (numbered 30 or higher) in a particular subject, e.g., English, Psychology, etc.

A student in a General B.A. Program must obtain at least a 60% average in the courses of his major subject and at least 60% in each of three of those courses in order to graduate. Deficiencies incurred prior to 1967-68 are not removed by this rule.

Take in the Second Year:
Two courses in the major subject.
Three courses from at least two Divisions (see page 44).

Take in the Third Year:
Two courses in the major subject.
Three courses from at least two Divisions.

No more than six courses in any one subject may be counted towards a degree.

No more than two courses from Division D may be counted towards a degree.

Out of the 10 courses required in the last two years of the program, at least seven must be senior courses.

In addition to these course requirements see attendance requirements on page 10.

GENERAL REGULATIONS FOR B.Sc. DEGREE

For a Three Year B.Sc. a student must:

Pass sixteen courses of which at least ten must be from Division C.

Select, before he enters the Second Year, a major subject from Division C, which shall consist of at least four senior courses (numbered 30 or higher) in a particular subject. See above.

Consult with the major Department in his choice of Division C courses.

Obtain a minimum average of 60% in the courses of the major subject and a minimum passing grade of 50% in every course.

Take in the Second Year:
Two courses in the major subject.
One other course from Division C.
Two other courses.
Take in the Third Year:
Two courses in the major subject.
Two other courses from Division C
One other course.

Students transferring from Honors Programs are not bound by the above sequence.

At the discretion of the Departments in question a student may be permitted or, in some cases, required to take Honors courses (number 200 or higher).

No more than six senior courses in any one subject may be counted towards a degree.

Out of the ten courses required in the last two years of the program, at least eight must be senior courses.

Out of the sixteen courses counted towards the degree a minimum of three courses (but not more than six) must be from Divisions A and B.

In addition to these course requirements, see attendance requirements on page 10.

HONORS PROGRAMS

Students in the Arts, Music, Science and Social Science Programs are not registered in specific honors programs during their first year at this University. There are specific requirements for admission to the Second Year of all 4-year Honors Programs based upon the courses selected and the standing obtained in the First Year. Three types of Honors Programs are offered:

(1) Four-year Honors Programs in the Arts and Social Sciences, leading to the Bachelor of Arts (B.A.) degree.
(2) Four-year Honors Programs in Natural Sciences, Medical Biological Sciences and Computer Science, leading to the Bachelor of Science (B.Sc.) degree.
(3) Four-year Honors Programs in Music leading to the Bachelor of Music (Mus. B.) degree or Bachelor of Arts (B.A.) degree.

The Department of Education accepts a degree in an Honors Program as the academic qualifications for a High School Assistant's Certificate, Type B, for teaching in the elementary and secondary schools of Ontario.

A student expecting to enter an Honors Program should consult that program before selecting his options in his first year.

In all years of all Honors Programs options must be approved by all departments concerned.

Admission to Second and Subsequent Years: A student will be automatically admitted if, for the previous year, he has a grade average of at least 70% with no grade less than 60% in the courses listed as principal courses by the Department(s) of the subject(s) in which he is specializing, and a passing grade in every course listed as a subsidiary course by the Department(s) concerned. A student who fails to qualify for automatic admission, but has a grade average of at least 60% in the principal courses and a passing grade in every course, may be admitted by special permission of the Department(s) concerned.

FACULTY OF ARTS

Dean: John G. Rowe, S.B. Harvard; B.D. Episcopal Theological School, Cambridge, Mass.; M.A., Ph.D. Toronto.

The Faculty of Arts' faculty, courses and programs will be found on the following pages, organized under departments arranged alphabetically. Reference should be made to the first section of this Calendar and to the booklet "General Information" for further information.

FACULTY OF ARTS DEPARTMENTS

Classics (p. 23)
English (p. 30)
Fine Art (p. 40)
French (p. 43)
German (p. 49)
Philosophy (p. 54)
Russian (p. 60)
Spanish and Italian (p. 64)

Programs

The Faculty of Arts offers:

Three-Year General Programs leading to a B.A. degree with concentration in a major subject; English, Fine Art, French, German, Latin, Philosophy, Russian, Spanish.

Four-Year Honors Programs leading to a B.A. degree: Classics, English and Drama, English and French, English and German, English and History, English Language and Literature, English and Latin, English and Philosophy, English and Russian, English and Spanish, Fine Art, French and German, French Language and Literature, French and Latin, French and Russian, French and Spanish, German Language and Literature, German and Russian, German and Spanish, History and German, History and Philosophy, History and Russian, Latin, Latin and Greek, Latin and Spanish, Philosophy, Philosophy and German, Philosophy and Mathematics, Philosophy and Psychology, Russian Studies, Russian and Spanish, Spanish Language and Literature.

Availability of Option: the student's choice of options within any academic program is subject to the constraints both of the lecture and final examination timetables.

CLASSICS

Professors:

Douglas E. Gerber, B.A. M.A.; Ph.D. Toronto;
Chairman of the Department.

A. Ernest Raymond, B.A.; M.A. Toronto; Ph.D. Chicago;
W. Sherwood Fox Professor of Classics

Associate Professor:

Hamilton B. Timothy, M.A., B.D., Glasgow; B.A. London;
Ph.D. Edinburgh.

Assistant Professors:
Valerie A. Broege, A. B. Vassar; M.A., Ph.D. Bryn Mawr.
Nigel B. Crowther, B.A. Leeds; M.A. McMaster; Ph.D. Sheffield.
Donald E. Hill, M.A. Cantab.; M.A. Washington (St. Louis).
Antony R. Littlewood, B.A. Leeds; B.Litt. Oxon.
C. Leslie Murison, M.A. Edinburgh; M.A. Cantab.
David P. Stanley-Porter, B.A. Toronto; Ph.D. London.
Instructor (part-time):
R. Joy Littlewood (Mrs. A. R.), B.A. London.

HONORS PROGRAMS

CLASSICS

Requirements for Admission: First Year General Program (Arts or Social Science) with Greek 20 and Latin 20 as principal courses, English and another modern language as recommended options.

Second Year

Principal Courses	**Subsidiary Course**
Greek 230, 251	One option from Division
Latin 230, 251, 257	A, B or C

Third Year

Principal Courses
Greek 340, 351, 352
Latin, 340, 351, 352
Greek 357 or Latin 457
(whichever is currently offered)

Fourth Year

Principal Courses
Greek 450, 451, 452, 495*
Latin 450, 451, 452, 495*
Latin 457 or Greek 357
(the one not taken in Third Year)
*Comprehensive Examination in the Spring.

LATIN AND GREEK

Requirements for Admission: First Year General Program (Arts or Social Science) with Latin 20 and Greek 2 or 10 as principal courses, English and another modern language as recommended options. The requirements for Greek 20 must be completed by the beginning of the second year. For grades required for admission and progression see page 20.

Second Year

Principal Courses
Greek 20
Latin 230, 251, 257

Subsidiary Courses
Two options from Division A, B or C

Third Year

Principal Courses
Greek 230, 251
Latin 340, 351, 352
Greek 357 or Latin 457
(whichever is currently offered)

Subsidiary Course
One option from Division A, B, or C

Fourth Year

Principal Courses
Greek 340, 351, 352, 495*
Latin 450, 451, 452, 495*
Latin 457 or Greek 357
(the one not taken in Third Year)

*Comprehensive Examination in the Spring

LATIN

Requirements for Admission: First Year General Program (Arts or Social Science) with Latin 20 (and Greek 2, if taken) as principal course(s), English and another modern language as recommended options. If Greek 2 is not taken until the Second Year, the requirements for Greek 20 must be completed by the beginning of the Third Year. For grades required for admission and progression see page 20.

Second Year

Principal Courses
Greek 2 or 10
Latin 230, 251, 257

Subsidiary Courses
Two options from Divisions A, B, C

Third Year

Principal Courses
Greek 20
Latin 340, 351, 352
Greek 357 or Latin 457 (whichever is currently offered)

Subsidiary Courses
Two options from Divisions A, B, C

Fourth Year

Principal Courses
Greek 230, 251
Latin 450, 451, 452, 495*
Latin 457 or Greek 357 (the one not taken in Third Year)

Subsidiary Course
One option from Division A, B, C

*Comprehensive Examination in the Spring

ENGLISH AND LATIN

Requirements for Admission: First Year General Program (Arts or Social Science) with English 20 and Latin 20 as principal courses. For grades required for admission and progression see page 20.

Second Year

Principal Courses
English 237, 256, 270, 299
Latin 230, 251, 257

Subsidiary Course
One of: French 270, Greek 20, 230
German 20, 290

Third Year

Principal Courses
English 360, 380, and 354, or (373)
Latin 340, 351, 352

Subsidiary Course
One of: History 30, 32, 35,
[English 263]

Fourth Year

Principal Courses
English 459, 480
One of: English [327], 436, 438, 444
Latin, 450, 451, 452, 495*
*Comprehensive Examination in the Spring

FRENCH AND LATIN

Requirements for Admission: First Year General Program (Arts or Social Science) with French 20 and Latin 20, as principal courses. For grades required for admission and progression see page 20.

Options are to be chosen in consultation with a Departmental adviser.

Second Year

Principal Courses
French 270, 271
Latin 230, 251, 257

Subsidiary Courses
Two options

Third Year

Principal Courses
French 350, 380, 381
Latin 340, 351, 352

Subsidiary Course
One option

Fourth Year

Principal Courses
French 490, 491, 495* 499
Latin 450, 451, 452, 495*
*Comprehensive Examination in the Spring

LATIN AND SPANISH

Requirements for Admission: First Year General Program (Arts or Social Science) with Latin 20 or Spanish 20 (or 2 or 10) as principal courses. Those who

take Spanish 2 or 10 in the First Year will take Spanish 20 in Second Year and postpone Spanish 231 until Third Year.

Second Year

Principal Courses	**Subsidiary Course**
Latin 230, 251, 257	One option
Spanish 231, 240, 260	

Third Year

Principal Courses	**Subsidiary Course**
Latin 340, 351, 352	One option
Spanish 341, 348, 365	

Fourth Year

Principal Courses
Latin 450, 451, 452, 495*
Spanish 460, 465, 461, 495*
*Comprehensive Examination in the Spring

GENERAL COURSES

CLASSICS

(ability to read Greek and Latin not required).

27. A survey of the development of literary genres in the Greek and Roman world, including prescribed reading of specimens of each type in translation, plus lectures and discussions on general background, with some reference to their influence on the development of modern European literature.
3 hours—8

37. A survey of Classical Mythology, with some references to its influence in modern European literature. 2 hours—18

47. A study of selected topics in the history of the Ancient Mediterranean World, with some reference to the Near East, followed by more intensive study of Greece and Rome. 3 hours—21

GREEK

2. Elementary Greek: An accelerated preparatory course for those who wish to begin the study of Greek at the University, and to have the possibility of proceeding directly to Greek 20. 4 hours—28

10. Intermediate Greek: Selections from Freeman and Lowe, Greek Reader; Plato, "Crito"; composition, sight translation.
Prerequisite: Grade 12 Greek or Greek 2 3 hours—28

20. Advanced Greek: Plato, "Apology"; a play of Euripides; composition, sight translation.

Prerequisite: Grade 13 Greek, or Greek 10, or Greek 2 with permission of the department. 3 hours—5

30. The Attic Orators: Selections from Lysias and Demosthenes; composition, sight translation. (Offered by arrangement with the Department)
Prerequisite: Greek 20 3 hours—12

40. Greek Tragedy: One play each of Aeschylus, Sophocles, Euripides; composition, sight translation. (Offered by arrangement with the Department)
Prerequisite: Greek 30 3 hours—12

LATIN

2. Elementary Latin: An accelerated preparatory course for those who wish to begin the study of Latin at the university, and to have the possibility of proceeding directly to Latin 20. 4 hours—26

10. Intermediate Latin: selections from prose and poetry; composition and sight translation (Normally offered only at Brescia College, in Summer School, or by Correspondence)
Prerequisite: Grade 12 Latin or Latin 2. 3 hours—26

20. Advanced Latin: Tacitus, "Agricola"; Vergil, "Aeneid" IV; composition and sight translation.
Prerequisite: Grade 13 Latin or Latin 10, or Latin 2 with permission of the department. 3 hours—26

30. Selections from Catullus and Horace:
Prerequisite: Latin 20 2 hours—25

34. Cicero, "Pro Caelio"; composition, sight translation.
Prerequisite: Latin 20 2 hours—4

40. Selections from: Vergil, "Aeneid" I-VI; Horace, "Satires"; and Juvenal, "Satires".
Prerequisite: Latin 30 2 hours—14

44. Selections from: Livy, "History of Rome"; composition, sight translation.
Prerequisite: Latin 34 2 hours—34

HONORS COURSES

GREEK

230. The Greek Epic: Selections from Homer.
Prerequisite: Greek 20 2 hours—12

251. The Attic Orators: Selections from Lysias and Demosthenes; composition, sight translation.
Prerequisite: Greek 20 3 hours—21

257. Ancient Civilizations: The Near East, Greece and Rome. Identical with Latin 257. 3 hours—24

340. Greek Tragedy: One play each of Aeschylus, Sophocles, Euripides; lectures on the theatre and the drama.
Prerequisite: Greek 230 or 251 2 hours—12

351. (i) Introduction to the Greek Historians: Herodotus.
(ii) Greek Comedy: A play of Aristophanes.
(iii) Composition and sight translation.
Prerequisite: Greek 251 3 hours—18

352. Introduction to Greek Philosophy: Plato, "Republic".
Prerequisite: Greek 230 or 251 2 hours—34

357. Study of a selected period in Greek history. Prescribed for students in Honors Classics, Latin and Greek, or Latin; optional with the consent of the instructor for other qualified students. Will be offered in 1969-70 and alternate years thereafter. 2 hours first term, half course

450. Greek Lyric poetry: Selections from the early elegiac, iambic, and lyric poets (Not offered 1969-70)
Prerequisites: Greek 340, 351 or 352 2 hours—24

451. (i) The Greek Historians: Thucydides
(ii) Composition and sight translation. (Not offered 1969-70)
Prerequisite: Greek 351 2 hours—25

452. Greek Philosophy: The Pre-Socratics and Aristotle (Not offered 1969-70)
Prerequisite: Greek 352 2 hours—35

495. Comprehensive Examination: A three-hour paper in sight translation of Greek authors, to be written in the final year by students in Honors Classics or Latin and Greek.

LATIN

230. Selections from Catullus and Horace.
Prerequisite: Latin 20 2 hours—25

251. Roman Oratory: Cicero, *"Pro Caelio"; composition and sight translation.*
Prerequisite: Latin 20 3 hours—24

257. Ancient Civilizations: The Near East, Greece, and Rome. Identical with Greek 257. 3 hours—24

340. Vergil: His life and work; "Eclogues", "Georgics", "Aeneid" (partly in translation).
Prerequisite: Latin 230 or 251 2 hours—13

351. Roman philosophical prose: Cicero, "De Amicitia"; selections from Seneca, "Epistulae Morales"; composition, sight translation.
Prerequisite: Latin 251 2 hours—25

352. Roman Drama: One play each of Plautus, Terence, Seneca.
Prerequisite: Latin 230 or 251 2 hours—3

450. Roman Historians: With special reference to Livy and Tacitus.
Prerequisite: Latin 340, 351, or 352 2 hours—19

451. (i) Propertius, Tibullus, Ovid
(ii) Composition and sight translation.
Prerequisite: Latin 351 2 hours—29

452. Lucretius, "De Rerum Natura" (selections); Roman Satire (selections from Horace, "Satires", and Juvenal).
Prerequisites: Latin 340, 351, or 352 2 hours—5

457. Study of a selected period in Roman History. Prescribed for students in Honors Classics, Latin and Greek, or Latin; optional with the consent of the instructor for other qualified students. Will be offered in 1970-71 and alternate years. 2 hours first term, half course

495. Comprehensive Examination: a three-hour paper in sight translation of Latin authors, to be written in the final year by students taking programs including Honors Latin.

ENGLISH

Chairman and Associate Professor:
Paul Duncan Fleck, B.A., M.A., Ph.D. Belfast

Associate Chairman and Assistant Professor:
Donald S. Hair, B.A., M.A., Ph.D. Toronto

Senior Professors:
Carl Frederick Klinck, B.A., M.A., Ph.D. Columbia; F.R.S.C.
Balachandra Rajan, B.A., M.A., Ph.D. Cantab.

Visiting Professor:
Constance B. Hieatt (Mrs. K.), B.A., M.A. Hunter College; Ph.D. Yale

Professors:
William Eric Duncan Atkinson, B.A. Cantab.; Ph.D. Chicago
Alfred Brandon Conron, D.S.O., B.A., M.A., A.M., Ph.D. Harvard
John Whichello Graham, B.A. Manitoba; M.A., Ph.D. Toronto
A. Kent Hieatt, A.B. Louisville; Ph.D. Columbia
James Reaney, B.A., M.A., Ph.D. Toronto
Ross Greig Woodman, B.A. British Columbia; M.A. Manitoba; Ph.D. Toronto

Associate Professors:
Betty Bandeen, B.A., A.M., Ph.D. Radcliffe
Ronald Gordon Nudell Bates, B.A., M.A., Ph.D. Toronto
Anne C. Bolgan, B.A. D'Youville; M.A., Ph.D. Toronto
George E. Buckley, B.A. Mt. Allison; M.A. Columbia
Donald F. Chapin, B.A. M.A., Ph.D. Toronto
Thomas J. Collins, B.A., M.A., Ph.D. Indiana

David Kaula, B.A. Cornell; Ph.D. Indiana
Geoffrey Rans, M.A. Cantab.; Ph.D. Leeds
Clifford Earle Sanborn, B.A., M.A., Ph.D. Toronto
Richard MacMillan Stingle, B.A., M.A. Toronto
Harry Rex Wilson, B.A., M.A., Toronto; Ph.D. Michigan

Assistant Professors:
Terrence C. Cox, B.A. Toronto; M.A.
E. J. Devereux, B.A., M.A. Newfoundland; D. Phil. Oxon.
Larry Garber, B.A., M.A. Toronto
Paul M. Gaudet, B.A. Toronto; M.A. Princeton
David George, B.A., M.A. Manchester; Ph.D. London
Kenneth Gibson, B.A. McMaster; M.A. Queen's
James M. Good, B.A., M.A.
Ian Robert F. Gordon, B.A. Cantab., M.A. California (Los Angeles)
Donald H. Hensley, B.A., M.A. Oregon; Ph.D. Wisconsin
Neil C. Hultin, B.A. Concordia; M.A. Chicago; Ph.D. Johns Hopkins
Bruce R. Lundgren, B.A. Manitoba, M.A.
William Lawrence Meriwether, B.A. California (Riverside), M.F.A. Tulane
Leroy J. Morrissey, B.A. Nebraska; A.M. Chicago; Ph.D. Pennsylvania
Gerald Douglas Parker, B.A. Acadia; M.A. Dalhousie; Ph.D. Toronto
Eugene A. Peyroux, Jr., A.B. Stanford; M.A. Stanford; Ph.D. Carnegie Tech.
Ernest Henry Redekop, B.A. Manitoba; M.A. Toronto
Richard James Shroyer, B.A. Yale College; M.A. Toronto
Mitchell E. Smith, B.A. Texas; M.A. Columbia; M.A. Yale
John A. B. Somerset, B.A. Toronto; M.A., Ph.D. Birmingham
Ann Therese Straulman, B.A. Wellesley; M.A. Kansas City; Ph.D. Wisconsin
Thomas Edward Tausky, B.A. McGill; B.A. Cantab.; M.A. Yale
Archibald M. Young, B.A. Toronto

Lecturers:
Elizabeth Bieman (Mrs. G.), B.A., M.A.
Mary M. Brown (Mrs. C.), B.A., M.A.
Philip Michael Ondaatje, B.A. Toronto; M.A. Queen's
Balachandra Rajan (Mrs. B.), B.A., M.A. Delhi
Jay M. Sayer, B.A. San Fernando Valley State College

Instructors:
Barry W. Chodirker, B.A., Manitoba
Michael D. Manson, B.A., Manitoba
Barbara R. Markovits, B.A. Manitoba
Robert G. More, B.A.
Judith A. Shelbourn (Mrs. J.), B.A., M.A. British Columbia
Samuel Speigel, B.A., Toronto
David J. Vincent, B.A., Oxon.
Margaret E. Yeo, B.A., Carleton

HONORS PROGRAMS

There are two English options in all English Honors Programs: the first emphasizes the study of English literature, the second emphasizes the study of the

English language. Most of the principal courses in each year of every program are common to both of these English options.

In the descriptions of the Honors Programs which appear below, each English language course specifically required as a part of the English Language option is placed in square brackets, and either replaces an English literature course or is included among a group of courses from which a selection is to be made.

Subsidiary courses must be approved by both Departments in the case of double programs and by the Department of English in the case of English Language and Literature and English and Drama.

ENGLISH AND DRAMA

Requirements for Admission: First Year General Program (Arts or Social Sciences) with English 20, French or a foreign language, and any two others, as principal courses. For grades required for admission and progression see page 20.

Second Year

Principal Courses	**Subsidiary Course**
English 256, 270, 290, 291, 299 One of: English 237, 263	One option

Third Year

Principal Courses	**Subsidiary Course**
English 366, 380, 390 One of: English 280, 354, 360, 373 Dramatics 346	One option

Fourth Year

Principal Courses
English 402, 436, 459, 480
One of: English 438, 444

ENGLISH AND FRENCH

Requirements for Admission: First Year General Program (Arts or Social Science) with English 20 and French 20 as principal courses. For grades required for admission and progression see page 20.

Students who elect the English language option (see above) must take the courses in square brackets; others may take them, if they wish to do so.

Options are to be chosen in consultation with a Departmental adviser.

Second Year

Principal Courses	**Subsidiary Course**
English 237, 256, 270, 299 French 270, 271	One option [English 263]

Third Year

Principal Courses	**Subsidiary Course**
English 360, 380, and 354 or [373] French 380, 381 One of: French 338, 350	One option [English 327 or 373]

Fourth Year

Principal Courses
English 459, 480
One of: English [327], 436, 438, 444
French 490, 491, 495*, 499
*Comprehensive Examination in the Spring

ENGLISH AND GERMAN

Requirements for Admission: First Year General Program (Arts or Social Science), with English 20 and German 20 as principal courses. For grades required for admission and progression see page 20.

Students who elect the English Language option (see above) must take the courses in square brackets; others may take them, if they wish to do so.

Second Year

Principal Courses
English 237, 256, 270, 299
German 290, 291

Subsidiary Courses
One of: History 30, 36
Another option [English 263]

Third Year

Principal Courses
English 360, 380, and 354 or [373]
German 391
Two of: German 333, 390, 420, 430, 444, 480, 482

Subsidiary Course
One option [English 327 or 373]

Fourth Year

Principal Courses
English 459, 480
One of: English 263, [327], 436, 438, 444
German 481, 495*
Two of: German 333, 390, 420, 430, 444, 480, 482
*Comprehensive Examination in the Spring

ENGLISH AND HISTORY

Requirements for Admission: First Year General Program (Arts or Social Sciences) with English 20 and History 20 as principal courses. For grades required for admission and progression see page 20.

Students who elect the English Language option (see above) must take the courses in square brackets; others may take them if they wish to do so.

Second Year

Principal Courses
English 256, 270, 299
History 236
History 231 or 234

Subsidiary Courses
French or a foreign language option
Another option [English 237]

Third Year

Principal Courses
English 380, 354 or [373]
History 335
One other course from the Honors History 300 series

Subsidiary Courses
French or a foreign language option
Another option, preferably an honors course [English 263]

Fourth Year

Principal Courses
English 480
English 438 or 459
A third honors English course if chosen [327]
Two or three courses chosen from the Honors History 400 series
Five courses constitute a normal load in Fourth Year

ENGLISH LANGUAGE AND LITERATURE

Requirements for Admission: Sequence A: First Year General Program (Arts or Social Science) with English 20, French or a foreign language, and any two others, as principal courses. **Sequence B:** First Year General Program (Arts or Social Sciences) with English 20, two languages, and any other course, as principal courses. Latin 20 and Philosophy 20 are preferred as First Year options. For grades required for admission and progression see page 20.

Students who elect the English Language option (see above) must take the courses in square brackets; others may take them, if they wish to do so.

Second Year

Principal Courses
English 256, 263 or [237], 270, 280, 299

Subsidiary Courses
Sequence A:
History 30
One of: French 30, German 30, Latin 30, Greek 30, English [237]
Sequence B:
Two of: French 270, German 290, Latin 230, Greek 230, History 30

Third Year

Principal Courses
English 360, 373, 380
One of: English [327], 338, 354, 366

Subsidiary Courses
Sequence A:
One of: History 32, 35, 36, a Philosophy course, French or a foreign language course, English [327], 338, 354 or 366
One option
Sequence B:
One of: French 380, German 390, Latin 340, Greek 352
One option

Fourth Year

Principal Courses	*Subsidiary Course*
English 438, 459, 480, 495*	Sequences A and B:
One of: English 400, 401, 436, 444	English 263, if not already taken,
	or
	One option

*Comprehensive Examination:

Students in the Fourth Year of Honors English Language and Literature must obtain a grade of at least 60% in the English Comprehensive Examination before they may be admitted to an Honors degree in English. A student who fails the Examination may repeat it once only.

The Examination is held on the first Saturday in April and the fourth Saturday in October. Students in the Fourth Year of the Honors English Language and Literature program must write the Examination in April, and may write it in October only if they fail the April Examination. The reading list and any other material on which the examination is based must be obtained from the Department of English.

ENGLISH AND LATIN

Requirements for Admission: First Year General Program (Arts or Social Science) with English 20 and Latin 20 as principal courses. For grades required for admission and progression see page 20.

Students who elect the English Language option (see above) must take the courses in square brackets: others may take them, if they wish to do so.

Second Year

Principal Courses	**Subsidiary Course**
English 237, 256, 270, 299	One of: French 270, Greek 20, 230,
Latin 230, 251, 257	German 20, 290

Third Year

Principal Courses	**Subsidiary Course**
English 360, 380, and 354 or [373]	One of: History 30, 32, 35, [English
Latin 340, 351, 352	263]

Fourth Year

Principal Courses
English 459, 480
One of: English [327], 436, 438, 444
Latin 450, 451, 452, 495*
*Comprehensive Examination in the Spring

ENGLISH AND PHILOSOPHY

Requirements for Admission: First Year General Program (Arts or Social Science) with English 20 and French 20 or German 20 or Latin 20 as principal courses. For grades required for admission and progression see page 20.

Students who elect the English Language option (see above) must take the courses in square brackets; others may take them, if they wish to do so.

Second Year

Sequence A

Principal Courses
English 256, 270, 299
Philosophy 254, 257

Subsidiary Courses
[English 237] and one option
or
Two options

Third Year

Principal Courses
English 354 or [373], 380
Philosophy 256, and one of: 355, 357, 362

Subsidiary Courses
[English 263] and one option
or
Two options

Fourth Year

Principal Courses
Two or three of: English 360, 459, 480, and 436 or 438 or 444 or [327]
One of: Philosophy 456, 458, 466, 467, 477
One of: Philosophy 450, 454, 464, 474
If an additional Philosophy course is required, one of 338, 456, 458, 466, 467, 477

Sequence B

Second Year

Principal Courses
English 237, 256, 270, 299
Philosophy 254, 257

Subsidiary Course
One of: French 270 and 271, German 290 and 291, Latin 230 and 251

Third Year

Principal Courses
English 360, 380
One of: English 354, [373]
One of: Philosophy 256, 355

Subsidiary Course
One of: French 380, German 390, Latin 340, [English 263]

Fourth Year

Principal Courses
English 480, and 438 or 459
Two of: Philosophy 357, 456, 466, 467, 477
An additional Honors English course [English 327] or an additional Honors Philosophy course.

ENGLISH AND RUSSIAN

Requirements for Admission: First Year General Program (Arts or Social Science) with English 20 and Russian 2, 10, or 20 as principal courses. Students who begin Russian at the university will take Russian 20 as an additional principal course in the Second Year. For grades required for admission and progression see page 20.

Students who elect the English Language option (see above) must take the courses in square brackets; others may take them, if they wish to do so.

Second Year

Principal Courses	**Subsidiary Courses**
English 237, 256, 270, 299	History 37
Russian 280, 281	One option [English 263]

Students who begin Russian at the University will take Russian 20 in the Second Year as an additional principal course. Their subsidiary courses in the Second Year will be reduced to History 37 (or English 263 for students electing the English Language option).

Third Year

Principal Courses	**Subsidiary Course**
English 360, 380, and 354 or [373]	One option [English 327 or 373]
Russian 390, 391, 393	

Fourth Year

Principal Courses
English 459, 480
One of: English 436, 438, [327]
Russian 420, 490, 491, 495*
*Comprehensive Examination in the Spring

ENGLISH AND SPANISH

Requirements for Admission: First Year General Program (Arts or Social Science) with English 20 and Spanish 20 as principal courses. For grades required for admission and progression see page 20.

Students who begin Spanish at the University and who desire to enter this program must take Spanish 20 in Summer School in order to qualify for the second year courses.

Students who elect the English Language option (see above) must take the courses in square brackets; others may take them, if they wish to do so.

Second Year

Principal Courses
English 237, 256, 270, 299
Spanish 231, 240, 260

Third Year

Principal Courses	**Subsidiary Course**
English 360, 380	One option
One of: English 354, [373]	
Spanish 341, 365	

Fourth Year

Principal Courses
English 459, 480
One of: English [327], 436, 438, 444
Spanish 460, 461, 465, 495*
*Comprehensive Examination in the Spring

COURSES

Detailed descriptions of the following courses may be obtained from the Department of English, University College, Room 180.

All courses in English scheduled for two hours may meet for additional hours at the discretion of the instructor.

20. General Literature and Composition: An introduction to the romance, ironic (or satiric), tragic, and comic modes of literature. There will be some study of English composition and six assignments (at least one of them a test) will be required. 3 hours—11

No student will be admitted to any of the following courses until he has successfully completed English 20.

GENERAL COURSES

A student who enters the second year of the General Program after September, 1967, as an English major, must take, in either his second or third year, at least one course in a period prior to 1660 (30, 31, 34) and at least one course in a period following 1660 (32, 36, 38, 40, 44, 48, 49).

30. Medieval Literature: A study of representative Old and Middle English Literature, mostly in translation. Reference will be made to contemporary and earlier European works which are relevant. 3 hours—20

31. Renaissance Literature: Selected works by Wyatt, Surrey, Sidney, Spenser, Shakespeare (sonnets), Donne, Jonson, Milton, and other writers. 3 hours—35

32. Literature of the Nineteenth Century: Selected works by Wordsworth, Coleridge, Shelley, Keats, Byron, Arnold, Tennyson, Browning, Newman, Huxley, Pater, and other writers. 3 hours—11

34. Shakespeare: A study of the major plays. 3 hours—2

36. Drama: A study of English and American dramatists against a background of Classical, Renaissance, and Modern European Drama. 3 hours—27

37. The English Language: A study of the history of the language, dealing with changes in sounds, spelling, and grammar, leading to a detailed study of modern English. 3 hours—16

38. Literature of the United States and Canada (English) to 1885. Not offered 1969-70. 3 hours—17

40. Literature of the Restoration and Eighteenth Century (1660-1780). 3 hours—3

41. Creative Writing: Not offered 1969-70.

44. The English Novel: A study of representative English, continental, and American novels from the eighteenth century to the present. 3 hours—33

45. Comparative Literature: A course of reading in English or in English translations of some of the great books of Western civilization from Homer to Joyce with particular emphasis on the growth of epic, drama, and fiction. 3 hours—10

47. Contemporary Literature. 3 hours—13

48. Literature of the United States and Canada (English) from 1885 to the present. 3 hours—25

49. Literature of the Twentieth Century: Selected works by poets and novelists, chiefly British. Not offered 1969-70. 3 hours—8

Film 30. Film Theory and History: An examination of the phenomenon of film in general, with reference to its power to shape mass attitudes, its special demands on ways of perceiving, its influence on the conventions of narrative and drama, and its meaning to theories of cognition. In addition to the lectures there will be two viewings of a film classic a week. 2 hours—28

Speech 39. The major forms of oral discourse. 2 hours—30

Dramatics 46. Problems of the Theatre: Theory and practice. An introduction to theories of the theatre, theatre history, and problems in directing, acting and design. One lecture and two studio-workshop hours per week. 3 hours—9

HONORS COURSES

237. History of the English Language. 2 hours—16

253. Comparative Philology: Offered by the Departments of English, Russian, German, and Romance Languages to students in the Honors Comparative Literature program. 1 hour—1

256. Shakespeare. 2 hours—11

263. Old English Language and Literature: with special emphasis on Beowulf. 2 hours—2

270. Literature of the Romantic Revival (1798-1832). 2 hours—8

280. Literature of the Sixteenth Century, excluding drama. 2 hours—24

290. Medieval to Early Elizabethan Drama: 1300-1560. 2 hours—24

291. Greek and Roman Theatre and Drama. 2 hours—28

299. Bibliography and Methods: An introduction to scholarly practice in research and in the preparation of manuscripts; the use of reference and bibliography collections; the principles of textual criticism. 1 hour a week for six weeks—20

327. Introduction to Linguistics: An examination of the technique and principles of language description together with a review of the development of scholarly concern for language. 2 hours—28

338. Literature of the United States and Canada (English) to 1885. Not offered, 1969-70. 2 hours—17

346. Dramatics: Studies in the principles and theories of directing, acting, and studio design. Not offered, 1969-70. 2 hours—

354. Criticism: A survey of the major critics, and problems in terminology and practical criticism. 2 hours—22

360. Literature of the Victorian Period (1832-1900). 2 hours—7

366. Elizabethan and Jacobean Drama, excluding Shakespeare. Not offered, 1969-70. 2 hours—5

373. Chaucer and his age. 2 hours—36

380. Literature of the Seventeenth Century, excluding drama. 2 hours—12

390. The Drama: Restoration to Romantic. Not offered, 1969-70. 2 hours—

400. Thesis: Individual instruction in the selection of a topic, the preparation of materials, and the writing of a thesis. Students who wish to take this course must apply to Professor D. S. Hair, Associate Chairman, U.C. 177, before the day of registration.

401. Problems course. Not offered, 1969-70. 2 hours—No

402. Drama: Problems course. Not offered, 1969-70. 2 hours—No

436. Modern Drama. 2 hours—23

438. Literature of the United States and Canada from 1885 to the present. 2 hours—27

444. The English Novel. 2 hours—33

459. Literature of the Twentieth Century: Selected works by poets and novelists, chiefly British. 2 hours—9

480. Restoration and Eighteenth Century Literature (1660-1780). 2 hours—31

495: Comprehensive Examination: to be written by students in the Fourth Year of the Honors English Language and Literature Program. Students must obtain a grade of at least 60% on this examination before they may be admitted to an honors degree in English. A student who fails the examination may repeat it once only.

The examination is held on the first Saturday in April and the fourth Saturday in October. Students in the Fourth Year of the Honors English Language and Literature Program must write the examination in April, and may write it in October only if they fail the April examination. The reading list and any other material on which the examination is based must be obtained from the Department of English.

FINE ART

Professor and Head of the Department:
William Scott Abell Dale, B.A., M.A. Toronto; Ph.D. Harvard; F.R.S.A.

Associate Professor:
William Samuel Hart, B.A., M.A. University of California, Berkeley

Assistant Professor:
Anthony Morse Urquhart, B.F.A. Buffalo

Lecturers:
William Roland Fenwick
Terence William Hughes, N.D.D. Middlesbrough College of Art

FINE ART

Requirements for Admission: First Year General Program (Arts or Social Sciences) with Fine Art 20 and two other courses as principal courses.

Second Year

Principal Courses	Subsidiary Courses
Fine Art 220, 221 Two of Fine Art 230, 231, 237, 238	One (or two) options selected in consultation with the Fine Art Dept.

Third Year

Principal Courses	Subsidiary Courses
Fine Art 320, 321 Two of Fine Art 323, 332, 336, 337	One (or two) options selected in consultation with the Fine Art Dept.

Fourth Year

Principal Courses	Subsidiary Courses
Two of Fine Art 410, 420, 423 Four of Fine Art 431A, 431B, 433A, 436B, 452A, 452B	One (or two) options selected in consultation with the Fine Art Dept.

COURSES

20. Introduction to the Study of Art: An analytical survey of art from ancient times to the present, with a related studio program.
(3 hours lecture, 2 hours studio) 5 hours—3

Note: Registration will be limited to 80 students, and priority will be given to students who intend to enter Honors Program in Fine Art. Fine Art 20 is a prerequisite for all studio courses.

30. Classical Art: Greek and Roman Architecture, sculpture and minor arts (not offered 1969-70).
Prerequisite: Fine Art 20 or permission of the Department. 3 hours—25

31. Mediaeval Art: European architecture, sculpture and painting from the 4th century to the 15th.
Prerequisite: Fine Art 20 or permission of the Department. 3 hours—8

37. Art in North America: Painting, architecture and sculpture in the United States and Canada from the 17th century to the present.
Prerequisite: Fine Art 20 or permission of the Department. 3 hours—36

39. Supplementary Studio 1: Primarily for those intending to qualify for the High School Assistant's Certificate, Type A, Art. 4 studio hours—22

49. Supplementary Studio 11: A further development of Fine Art 39, which is a prerequisite for this course (not offered 1969-70). 4 studio hours—12

HONORS COURSES

220. Basic Composition: Exercises in formal analysis and composition in two and three dimensions. 4 studio hours—5

221. Basic Drawing: Drawing from the live model as an exercise in the perception and control of contour, volume and mass 4 studio hours—17

230. Classical Art: Greek and Roman Architecture, sculpture and minor arts (not offered 1969-70). 3 hours—14

231. Mediaeval Art: European architecture, sculpture and painting from the 4th century to the 15th. 3 hours—32

237. Art in North America: Painting, architecture and sculpture in the United States and Canada from the 17th century to the present. 3 hours—1

238. Chinese Art: The sculpture, painting and ceramics of China from prehistoric times to the 15th century. (Not offered 1969-70). 3 hours—27

320. Contemporary Expression: A studio course in the contemporary use of various media in two and three dimensions. 4 studio hours—2

321. Advanced Drawing: A continuation and refinement of Fine Art 221. 4 studio hours—33

323. Basic Print-making: Traditional techniques of intaglio print-making from linoleum, wood-blocks, etc. 4 studio hours—7

332. Italian Renaissance Sculpture: Sculpture in Italy from Jacopo della Quercia to Michelangelo. 3 hours—28

336. Twentieth Century Painting: Painting in Europe and North America since 1900. 3 hours—16

337. The Group of Seven: The rise of the national school of painting in Canada (not offered 1969-70). 3 hours—19

410. Museology: Seminar on the history and function of Art museums, with practical exercises in curatorial duties (not offered 1969-70). 3 hours—No

420. Studio thesis: Individual studio project under staff supervision, with the permission of the Department of Fine Art (not offered 1969-70). 6 studio hours—No

423. Advanced Print-making: A studio course in contemporary techniques (not offered 1969-70). 4 studio hours—9

431a. Mediaeval Manuscripts I: Seminar on a selected topic in the field of manuscript illustration (not offered 1969-70), fall term; half course. 3 hours—No

431b. Mediaeval Manuscripts II: As above (not offered 1969-70), spring term; half course. 3 hours—No

433a. Masters of the Baroque: Seminar on a single artist of the 17th century to be announced in advance—(not offered 1969-70), fall term; half course. 3 hours

436b. Masters of the 20th Century: Seminar on a single artist, to be announced in advance—(not offered 1969-70), spring term, half course. 3 hours

452a. Master Drawings and Prints I: Seminar on a selected topic in the field of drawings and prints—(not offered 1969-70), fall term; half course. 3 hours

452b. Master Drawings and Prints II: As above—(not offered 1969-70) spring term; half course. 3 hours

FRENCH

Professors:

Robert Warren Torrens, B.S. Dartmouth; M.A. Harvard; Ph.D. Cornell: Head of the Department
Norman Adrian Bennetton, B.A., M.A. Southern California; Ph.D. Johns Hopkins
William S. Bush, B.A. John B. Stetson University; M.A. South Dakota, D. de l'U. de Paris
Lionel Jacques Seymour Metford, B.A., M.A., British Columbia; D. de l'U. de Paris
James Bernard Sanders, B.A., M.A. Manitoba; D. de l'U. de Paris
Henri Tuchmaier, D. U. Laval
Constant Venesoen, D. ès L. Laval

Visiting Professor:

Cecil Patrick Courtney, B.A. Belfast, D.Phil. Oxford, Ph.D. Canterbury

Associate Professors:

Mohan Laxman Balsé, B.A., M.A., Ph.D. Bombay; D. de l'U. de Paris
Douglas George Creighton, B.A., M.A., Toronto; Ph.D. Columbia
Frederick Kilburn Harper, B.A., M.A. Manitoba
Lane Murch Heller, B.A., M.A., Ph.D. Wisconsin
Dorothy Franklyn Jones, B.A. Smith; M.A. Columbia; Ph.D. Brown.
Robert Lowell Walters, B.A. Oberlin; M.A., Ph.D. Princeton

Assistant Professors:

John Lewis Cameron, B.A. New Zealand, M.A. Canterbury
Pierre Cardinal, B.A. Loyola, M.A. Laval
Bruce Davies, B.A. McMaster, M.A. Harvard
Louise Henrietta Forsyth, B.A. Sask, M.A. Ph.D.
Alma Collins Saraydar, B.A. California (Los Angeles), M.A. Chicago, Ph.D. California (Berkeley)
Claude Dominique Tatilon, L. ès L. Aix-en-Provence
David Edward Westgate, B.A. Nottingham, M.A. McMaster, Ph.D.

Honorary Lecturers:

Margaret M. Baldwin, B.A., M.A.
Théophile Joseph Casaubon, B.A. Laval

Lecturers:

Ivor Arnold, B.A. London, M.A. British Columbia
Felix Rocque Atance, B.A. Toronto, M.A. Nebraska
David Baguley, B.A. Nottingham, M.A. Leicester
Jacqueline Bossé, L. ès L. Aix en Provence, D.E.S. Aix-en-Provence
Danielle Guestault, L. ès L. Montpellier
Nora Catherine Keeling Hall, B.A., M.A.
Robin Frederick Jones, B.A. Dublin, M.A. Queen's
Deirdre Malone Pearce, A.B. Duke, M.A. Wisconsin

Instructors:

Gaston R. J. Renaud, B.A. Ottawa, M.A.
Monique Pasternak Wonnacott, L. ès L. Paris.

FRENCH AND ENGLISH

(see page 32)

FRENCH AND GERMAN

Requirements for Admission: First Year General Program (Arts or Social Science) with French 20 and German 20 (or 2 or 10) as principal courses. Those who take German 2 or 10 in First Year will take German 20 in Second Year and will elect German 291 as one of the two Second Year options. For grades required for admission and progression see page 20.

Options are to be chosen in consultation with a Departmental adviser.

Second Year

Principal Courses
French 270, 271
German 290, 291

Subsidiary Courses
Two options

Third Year

Principal Courses
French 380, 381 and
One of: French 338, 350
(Students intending to undertake graduate studies in French should elect French 350)
German 391
Two of: German 333, 390, 420, 430, 444, 480, 482

Subsidiary Course
One Option

Fourth Year

Principal Courses
French 490, 491, 495* 499
German 481, 495*
Two of: German 333, 390, 420, 430, 444, 480, 482
*Comprehensive Examination in the Spring.

FRENCH LANGUAGE AND LITERATURE

Requirements for Admission: First Year General Program (Arts or Social Science) with French 20 as a principal course. For grades required for admission and progression see page 20.

Options are to be chosen in consultation with a Departmental adviser.

Second Year

Principal Courses
French 232, 270, 271

Subsidiary Courses
Two options.

Third Year

Principal Courses
French 338, 350, 380, 381

Subsidiary Courses
Two options

Fourth Year

Principal Courses	**Subsidiary Courses**
French 490, 491, 495*, 499	Two Options

*Comprehensive Examination in the Spring

FRENCH AND LATIN

Requirements for Admission: First Year General Program (Arts or Social Science) with French 20 and Latin 20, as principal courses. For grades required for admission and progression see page 20.

Options are to be chosen in consultation with a Departmental adviser.

Second Year

Principal Courses	**Subsidiary Courses**
French 270, 271	Two Options
Latin 230, 251, 257	

Third Year

Principal Courses	**Subsidiary Courses**
French 350, 380, 381	One Option
Latin 340, 351, 352	

Fourth Year

Principal Courses
French 490, 491, 495* 499
Latin 450, 451, 452, 495*
*Comprehensive Examination in the Spring

FRENCH AND RUSSIAN

Requirements for Admission: First Year General Program (Arts or Social Science) with French 20 and Russian 20 (or 2, or 10) as principal courses.

Students who begin Russian in the University will take Russian 2 in the First Year and Russian 20 in the Second Year.

For grades required for admission and progression see page 20.

Options are to be chosen in consultation with a Departmental adviser.

Second Year

Principal Courses	**Subsidiary Courses**
French 270, 271	Two Options
Russian 280, 281	

Third Year

Principal Courses	**Subsidiary Courses**
French 380, 381 and One of: French 338, 350 (Students intending to undertake graduate studies in French should elect French 350)	One Option
Russian 390, 391, 393	

Fourth Year

Principal Courses
French 490, 491, 495*, 499
Russian 420, 490, 491, 495*
*Comprehensive Examination in the Spring

FRENCH AND SPANISH

Requirements for Admission: First Year General Program (Arts and Social Science) with French 20 and Spanish 20 (or 2, or 10) as principal courses. Those who take Spanish 2 or 10 in first year are urged to take Spanish 20 in summer school in order to be qualified for second year Spanish courses. If this is impossible, they should consult the Chairman of the Spanish Department. For grades required for admission and progression see page 20.

Options are to be chosen in consultation with a Departmental adviser.

Second Year

Principal Courses	**Subsidiary Courses**
French 270, 271	Two options
Spanish 231, 240, 260	

Third Year

Principal Courses	**Subsidiary Courses**
French 380, 381 and One of: French 338, 350 (Students intending to undertake graduate studies in French should elect French 350)	One Option
Spanish 341, 348, 365	

Fourth Year

Principal Courses
French 490, 491, 495*, 499
Spanish 460, 461, 465, 495*
*Comprehensive Examination in the Spring

COURSES

The requirement for a major in French in the General Program is four senior courses in French. The Department strongly recommends that one be French 31 and another be chosen from French 30, French 34, French 36 and French 38. Majors in the Department will be expected to take two senior courses in the Second Year and two in the Third Year.

10. Intermediate French: Grammar review, composition, translation, oral practice. (One hour per week in the Language Laboratory may be required)
Prerequisite: Grade 12 French. 3 or 4 hours—23

20. Freshman Course for those students who expect to become French majors or to enter a French Honors Program.

Study of French Literature based on themes which recur over the centuries and an advanced study of French language. The course will be equally divided between study of literature and study of language.
Prerequisite: French 10 or Grade 13 French. 4 hours per week—23

21. A Practical Language Course designed to give training in oral and reading comprehension and to increase ability to communicate easily and fluently in French. (One hour per week in the Language Laboratory is required)
Prerequisite: French 10 or Grade 13 French. 4 hours
N.B. A student who, upon completion of French 21, wishes to take further courses in French will be eligible to take 31 or 32.

24. French Literature . . . A broad panorama of French Literature concerned with the appreciation of the unique quality of this literature in the course of its development. The attempt will be to include a broad spectrum of varying perspectives, both ideologically and stylistically. (1 lecture and 2 discussion sessions per wk.)
Prerequisite: French 10 or Grade 13 French. 3 hours—4
N.B. Students who, upon completion of French 24, wish to register for further courses in French will be eligible to take French 30, 34, 36 or 38.

30. The French Novel: Study of typical examples of the novel taken from French literature of the seventeenth through the twentieth centuries.
Prerequisite: French 20 or 24. 3 hours—21

31. *Grammar, Composition, Phonetics, Oral Practice:* (One hour per week in the language laboratory may be required.)
Prerequisite: French 20 or 21 3 or 4 hours—23

32. French Conversation and French Civilization: Conversations and discussions based on a series of readings drawn from current material concerned with modern French institutional developments.
Prerequisite: French 20 or 21. 3 hours per week—27

34. French Drama: Study of typical examples of French dramatic literature of the seventeenth through the twentieth centuries.
Prerequisite: French 20 or 24. 3 hours—31

36. French Poetry: Study of representative French poems of the 16th through the 20th centuries.
Prerequisite: French 20 or French 24. 3 hours—36

38. French-Canadian Literature: Lectures and reading on the historical and cultural background and on the philosophical and literary contribution of French Canada.
Prerequisite: French 20 or French 24. 3 hours—9

41. Advanced Grammar, Composition and Oral Practice: (one hour per week in the language laboratory may be required.)
Prerequisite: French 31 or by permission of Department Head.
3 or 4 hours—23

42. French Conversation and French Canadian Civilization: Conversations and discussions based on a series of readings drawn from current material concerned with modern French Canadian developments.
Prerequisite: French 32 (not given in 1969-70) 3 hours per week.

43. Commercial French: Advanced transactions, reading. (For students in Secretarial Science).
Prerequisite: French 31 3 hours—22

45. Scientific French: Reading of scientific French from textbooks and journals, supplemented by individual reading in the special field of study of each student.
Prerequisite: French 10 or Grade 13 French. 1 hour; half course—27

HONORS COURSES

All students in Honors Courses will take a comprehensive examination (French 495) at the end of their final year.

232. French Civilization: A study of modern France, her historical background and political, economic, social and cultural development.
Prerequisite: French 20. 2 hours—32

270. The French Classical Period: Study of representative literature of the seventeenth century; reading, lectures, discussion and reports.
Prerequisite: French 20. 3 hours—21

271. Phonetics, Grammar, Composition and Oral Practice: (One hour per week in the language laboratory may be required.)
Prerequisite: French 20. 3 or 4 hours—17

338. French-Canadian Literature: Survey of the literature of French Canada covering characteristic material from 1845 to the present; intensive study of selected modern novels and poems; representative writings from the "ancien régime" may be included.
Prerequisite: French 270. 2 hours—9

350. French Literature of the Mediaeval and Renaissance Periods: Reading lectures, discussion, reports.
Prerequisite: French 270. 3 hours—27

380. French Literature of the Eighteenth Century: Lectures, reading, discussion, reports.
Prerequisite: French 270. 2 hours—24

381. Grammar, Composition and Oral Practice: (one hour per week in the language laboratory may be required.)
Prerequisite: French 271. 3 or 4 hours—15

396. Structure of the French Language: Phonology, morphology, syntax.
Prerequisite: English 327 and French 271. 3 hours
(Not offered in 1969-70)

490. The Literature of the Nineteenth Century: Discussion, lectures, readings and reports.
Prerequisite: French 380. 3 hours—24

491. Advanced Composition and Oral Practice: (one hour per week in the language laboratory may be required.)
Prerequisite: French 381. 3 or 4 hours—12

495. Comprehensive Examination: A written examination, which will test the students' general knowledge of French literature, plus a brief oral examination to test the students' fluency in French. The examinations together will count as one course in the senior Honors Program.

497. History of the French Language: Evolution of the French language from earliest days to present.
Prerequisite: French 396. 3 hours
(Not given in 1969-70)

499. Contemporary French Literature: Study of some typical examples of the novel and drama of the twentieth century; reading, lectures, discussion, reports.
Prerequisite: French 380. 3 hours—1

GERMAN

Professors:
Gordon Lloyd Tracy, B.A. Queen's; M.A., Ph.D. Wisconsin, Chairman of the Department
Herbert Karl Kalbfleisch, B.A., M.A. New York; M.A., Ph.D. Michigan (part-time)

Associate Professor:
Alexander Robinson Anderson, B.A. Toronto; Ph.D. Brown

Assistant Professors:
Gerald Herbert Seufert, Staatsexamen, Tübingen
Hanna Spencer (Mrs. E. Y.), Ph.D. Prague

Instructor:
Renata Purekevich, B.A., M.A.
(The Department of German will have one or two new appointments in 1969-70)

GERMAN AND ENGLISH (see page 33)

GERMAN AND FRENCH (see page 44)

GERMAN LANGUAGE AND LITERATURE

Requirements for Admission: First Year General Program (Arts or Social Science) with German 20 as a principal course. For grades required for admission and progression see page 20.

Options are to be chosen in consultation with a Departmental adviser.

Second Year

Principal Courses	***Subsidiary Courses***
German 290, 291	Two options
One of: English 237, 256, 270	

Third Year

Principal Courses	**Subsidiary Courses**
German 391	Two options
Two or three of: German 333, 390, 420, 430, 444, 480, 482	

Fourth Year

Principal Courses	**Subsidiary Courses**
German 420, 444, 480, 481, 495*	Two options
Two or three of: German 333, 390, 420, 430, 444, 480, 482	

*Comprehensive Examination in the Spring

GERMAN AND RUSSIAN

Requirements for Admission: First Year General Program (Arts or Social Science) with German 20 (or 2 or 10) and Russian 20 (or 2 or 10) as principal courses.

Students who begin either German or Russian at the University will take the intensive course (numbered 2) in the First Year and the Advanced course (numbered 20) in the Second Year. For grades required for admission and progression see page 20.

Options are to be chosen in consultation with a Departmental adviser.

Second Year

Principal Courses	**Subsidiary Courses**
German 290, 291	Two options
Russian 280, 281	

Third Year

Principal Courses	**Subsidiary Courses**
German 391	One option
Two of: German 333, 390, 420, 430, 444, 480, 482	
Russian 390, 391, 393	

Fourth Year

Principal Courses
German 481, 495*
Two of: German 333, 390, 420, 430, 444, 480, 482
Russian 420, 490, 491, 495*

*Comprehensive Examination in the Spring

GERMAN AND SPANISH

Requirements for Admission: First Year General Program (Arts or Social Science) with German 20 (or 2 or 10) and Spanish 20 (or 2 or 10) as principal courses. Those who take German 2 or 10 in First Year will take German 20 in Second Year and will elect German 291 as one of the two Second Year options. Those who take Spanish 2 or 10 in First Year will take Spanish 20 in Second Year and will elect Spanish 231 as one of the two Second Year options. For grades required for admission and progression see page 20.

Options are to be chosen in consultation with a Departmental adviser.

Second Year

Principal Courses	**Subsidiary Courses**
German 290, 291	Two options
Spanish 231, 241, 260	

Third Year

Principal Courses	**Subsidiary Courses**
German 391	One option
Two of: German 333, 390, 420, 430, 444, 480, 482	
Spanish 341, 348, 365	

Fourth Year

Principal Courses
German 481, 495*
Two of: German 333, 390, 420, 430, 444, 480, 482
Spanish 460, 461, 465, 495*

*Comprehensive Examination in the Spring

GERMAN AND HISTORY

Requirements for Admission: First Year General Program (Arts or Social Science) with History 20 and German 20 as principal courses. For grades required for admission and progression see page 20.

Second Year

Principal Courses	**Subsidiary Courses**
History 231, 236	Two options
German 290, 291	

Third Year

Principal Courses	**Subsidiary Courses**
Two of: History 330, 335, 346, 356	Two options
German 391	
Two of: German 333, 390, 420, 430, 444, 480, 482	

Fourth Year

Principal Courses	**Subsidiary Course**
Two of: History 330, 356, 436, 456, 460	One option
German 481, 495*	
Two of: German 333, 390, 420, 430, 444, 480, 482	

*Comprehensive Examination in the Spring

GERMAN AND PHILOSOPHY

Requirements for Admission: First Year General Program (Arts or Social Science), English 20 and German 20 as principal courses and History 20. For grades required for admission and progression see page 20.

Second Year

Principal Courses
German 290, 291
Philosophy 254, 257

Subsidiary Courses
Two options

Third Year

Principal Courses
German 391
Two of: German 333, 390, 420, 430, 444, 480, 482
Philosophy 256, 357

Subsidiary Courses
Two options

Fourth Year

Principal Courses
German 481, 495*
Two of: German 333, 390, 420, 430, 444, 480, 482
Two of: Philosophy 456, 458, 466, 467, 477
One of: Philosophy 450, 454, 464, 474
*Comprehensive Examination in the Spring

COURSES

1. Introductory German: Study of the sounds and structure of the language. Intensive oral and written practice. Readings in prose and poetry. 3 hours—36

2. Intensive German for Beginners: A more intensive course than German 1. Designed for students who begin German at the University and who contemplate making German their subject of concentration or who desire to enter the German honors courses. 3 lecture hours, 2 laboratory hours—36

5. Elementary Scientific German: The elements of German grammar and readings in scientific German. 3 hours—23

10. Intermediate German: Further study of the structure and idiom of the language. Reading in modern prose and poetry. Oral and written practice.
Prerequisite: German 1 or permission of the Department. 3 hours—36

20. Advanced German: Survey of German literature, composition, grammar, conversation.
Prerequisite: Grade 13 German or German 1 (with A standing) or 2 or 10, or permission of the Department. 3 hours—36

22. German Conversation and Composition: Systematic oral practice and discussion and translation of literary texts.
Prerequisite: German 10 or permission of the Department. 3 hours

30. The German Novelle from Goethe to the Present.
Prerequisite: German 20 or permission of the Department. 3 hours—5

35. Intermediate Scientific German: The reading of scientific works in German and a review of basic grammar as an aid to reading.
Prerequisite: German 1 or German 5 or permission of the Department.
2 hours—23

40. German Drama from the Classical Period to the Present.
Prerequisite: German 20 or permission of the Department. 3 hours—24

42. German Lyric Poetry.
Prerequisite: German 20 or permission of the Department. 3 hours—15

44. A study of some major German novels of the nineteenth and twentieth centuries. 3 hours—20

45g. Scientific German for Graduate Students: The reading of scientific works in German from textbooks and journals, supplemented by individual reading in a chosen special field of study. This course may be elected by students without a previous knowledge of German. 2 hours—23

HONORS COURSES

All students in Honors Courses will take a comprehensive examination at the end of the final year.

290. German Prose and Poetry of the Nineteenth Century.
Prerequisite: German 20 3 hours—35

291. Conversation, Composition, linguistic problems.
Prerequisite: German 20 2 hours—24

333. History of the German Language with readings in Middle High German Literature. 2 hours—4

390. German Drama of the Nineteenth Century. 2 hours—26

391. Conversation, Composition. (Much of the discussion will deal with the contemporary society, politics, and public affairs of the German-speaking countries.)
Prerequisite: German 291. 2 hours—34

420. German literature of the Twentieth Century. 2 hours—16

430. German literature of the Sixteenth and Seventeenth Centuries.
2 hours—34

444. The German Novel from the Seventeenth Century to the Present.
3 hours—25

480. German Classicism: Goethe and Schiller. 2 hours—6

482. Lessing and the German Enlightenment. 2 hours—10

481. Conversation, Composition. (Aspects of the intellectual and cultural history of the German-speaking countries will be the basis of much of the discussion and writing.) 2 hours—19

495. Comprehensive Examination: A written examination which will test the student's general knowledge of German literature as well as his critical and evaluative ability.

HEBREW

For course description see page 192 Huron College.

PHILOSOPHY

Professor and Chairman of the Department:
Robert Earl Butts, B.A., M.A. Syracuse; Ph.D. Pennsylvania

Senior Professor:
Allison Heartz Johnson, B.A. Mt. Allison; M.A., Ph.D. Toronto; F.R.S.C.

Professors:
Robert Williams Binkley, B.A. Colorado; Ph.D. Minnesota
John Whitney Davis, B.A., M.A., Ph.D. Boston

Associate Professors:
Peter Adam Angeles, B.A., M.A., Ph.D. Columbia
Irving Block, B.A. Vanderbilt; M.A., Ph.D. Harvard (on leave 1969-70)
Richard Norton Bronaugh, B.A. Oregon; M.S., Ph.D. Wisconsin
Wilbert Cameron Henry, B.A.; M.A., Ph.D. Toronto
Harold Joseph Johnson, B.A. Alfred; Ph.D. Chicago (on leave 1969-70)
James John Leach, B.A. Heidelberg; M.A. Trinity; Ph.D. Michigan State

Assistant Professors:
Edward Beaman, B.A. Cincinnati
Philip Larry Friedman, B.A. Roosevelt
Thomas M. Lennon, B.A. Manhattan; Ph.D. Ohio State
Ausonio Marras, B.A. Colgate; Ph.D. Duke
Patrick Maynard, B.A. Chicago
Robert George Muehlmann, B.A. Indiana; Ph.D. Iowa
Glenn Pearce, B.A. William and Mary
Anne Martin Schrecker, B.A. Kalamazoo; M.A. Wellesley; Ph.D. Bryn Mawr
Martha Elaine Williams, B.S. William and Mary; M.A., Ph.D. Bryn Mawr
W. Kent Wilson, B.S. Marietta; M.A. Pittsburgh

Visiting Professors:
Calvin D. Rollins, D. Phil. Oxford; University of Connecticut (1968-69, part time)
Romane Clark, Ph.D. Iowa; Duke University (1968-69)
Richard Bevan Braithwaite, M.A. Cantab.; King's College, Cambridge (fall term 1969)
Charles E. Caton, Ph.D. Michigan; University of Illinois (1969-1970)

PHILOSOPHY

This program is offered in the Faculty of Arts of the Constituent University.

Requirements for Admission: First Year General Program (Arts, Social Sciences or Natural Sciences). Students planning to enter the program are advised to take Philosophy 20.

Second Year

Principal Courses
Philosophy 254, 256, 257

Subsidiary Courses
A senior course from Division A or Division B
Two options, one of which must be a senior course

Third Year

Principal Courses
Philosophy 357, 362
Two of: Philosophy 338, 350, 351, 353, 355 (351 must be taken if not elected in second year)

Subsidiary Courses
A senior course (which must be a Division B course, if not previously taken.)
One senior option

Fourth Year

Principal Courses
Two of: Philosophy 456, 458, 466, 467, 477
Two of: Philosophy 450, 451, 454, 464, 474

Subsidiary Course
One senior option

PHILOSOPHY AND ENGLISH (see page 35)

PHILOSOPHY AND GERMAN (see page 52)

PHILOSOPHY AND MATHEMATICS

Requirements for Admission: First Year General Program (Arts, Social Sciences or Natural Sciences) with Mathematics 24 or Mathematics 27 as principal courses.

Second Year

Principal Courses
Philosophy 254, 257
Mathematics 250, 256, 278

Subsidiary Course
One course from Division A, B, or C

Third Year

Principal Courses
Philosophy 256, 351
Mathematics 350, 356
One of: Mathematics 340, 351

Subsidiary Course
One senior course from Division A or B

Fourth Year

Principal Courses
Two of: Philosophy 450, 454, 464, 474
Mathematics 470
One of: Mathematics 450, 456, 460
One additional Mathematics or Philosophy course at 300 or 400 level, subject to approval of the Departments.

PHILOSOPHY AND HISTORY

Requirements for Admission: First Year General Program (Arts or Social Science) with History 20 and Philosophy 20 as principal courses. For grades required for admission and progression see page 20.

Second Year

Principal Courses	**Subsidiary Courses**
History 231, 236	One course in English
Philosophy 254, 257	One option (History 20 is not taken previously)

Third Year

Principal Courses	**Subsidiary Courses**
Two of: History 330, 335, 346, 356	Two options
Philosophy 256	
One of: Philosophy 357, 362	

Fourth Year

Principal Courses
Two or three of History 330, 337, 431, 432, 436, 441, 456, 457, 460
One of: Philosophy 456, 458, 466, 467, 477
One of: Philosophy 450, 454, 464, 474
If an additional Philosophy course is required:
One of: 456, 458, 466, 467, 477

PHILOSOPHY AND PSYCHOLOGY

Requirements for Admission: First Year General Program (Arts or Social Science) with Psychology 20 and Philosophy 20 as principal courses. If Psychology 20 was not taken in the First Year, it must be selected as an option in the Second Year. For grades required for admission and progression see page 20.

Second Year

Principal Courses	**Subsidiary Course**
Philosophy 254, 257	One option
Psychology 235, 236, 255	

Third Year

Principal Courses	**Subsidiary Course**
Philosophy 256	One option
One of: Philosophy 351, 357, 362	
Psychology 338, 349	
One of: Psychology 337, 343	

Fourth Year

Principal Courses
One of: Philosophy 456, 458, 466, 467, 477
Two of: Philosophy 450, 454, 464, 474
Psychology 445, 459
One of: Psychology 446, 450

COURSES

20. Introduction to Philosophy: A survey of selected philosophical problems, in the context of classical and contemporary papers. Specimen topics include: the mind-body problem, the existence of God, perception and matter, freedom and determinism. Primarily for Freshmen. 3 hours—1

30. Philosophical Classics: An introduction to philosophy through a historical survey of classic writings. Readings will be chosen from Plato, Aristotle, Descartes, Hume, Kant, and one recent or contemporary philosopher. (A student may receive credit for either Philosophy 20 or Philosophy 30, but not both.) 3 hours—1

31. Introduction to Logic: An introduction to Aristotelian logic, propositional logic, and general quantification. Related problems in the philosophy of logic, semantics, and inductive logic will also be examined. 2 hours—20

34. Introduction to Philosophy of Science: A critical examination of philosophical issues involved in scientific method, confirmation of scientific hypotheses, scientific explanation, concept formation and theory construction. Normally philosophical problems arising in formal and natural sciences will be examined. 2 hours—9

35. Aesthetics: Conceptual problems relating to the production and appreciation of the fine arts. Specimen topics include the nature of the work of art and of artistic expression, artistic criticism, fiction, metaphor, appreciation, and the logic of value judgments. 2 hours—3

36. Ancient Philosophy: A survey of the principal developments from the Presocratics (600 B.C.) to Plotinus (250 A.D.). Primary emphasis will be placed on the critical reading of selected original sources. 2 hours—28

37. Social, Political, and Legal Philosophy: The first term of this course will be devoted to a critical study of contemporary social and political thought. The second half of the year will be given to a critical analysis of current and classical legal philosophy. (Offered alternate years.) 2 hours—8

38. Existentialism: A course designed to acquaint the student with the fundamentals of the existentialist movement. Among philosophers considered will be: Heidegger, Sartre, Merleau-Ponty, Jaspers, Marcel, and Berdyaev.
Prerequisite: one course in Philosophy. 2 hours—17

42. Ethics: Critical discussion of moral issues and theories. 2 hours—31

43. Philosophy of Religion: Conceptual problems relating to personal and institutionalized religion. Specimen topics include: the nature of religious experience and knowledge, analysis of the concept of God, analysis and comparison of important types of religious philosophy. 2 hours—12

44. Philosophy of the Social Sciences and the Philosophy of History: The first term of this course will be devoted to a philosophical examination of the structure and methodology of the social sciences, e.g. psychology and sociology. Special attention will be given to problems of functionalism, teleological explanation, and verification of social theories. The second term will be devoted to a critical examination of various theories of history and historical understanding. Emphasis will be given to problems of explanation, objectivity, chronicling, describing, predicting, etc. (Offered alternate years.) 2 hours—22

47. Early Modern Philosophy: A critical examination of basic philosophical literature from Continental Rationalism and British Empiricism, with special emphasis on such figures as Descartes, Spinoza, Leibniz, Locke, Berkeley, and Hume. 2 hours—35

48. Contemporary Philosophy: A critical study of selected 20th Century philosophers. Movements and figures discussed vary from year to year. Specimen topics include: pragmatism, positivism, existentialism, linguistic analysis: Russell, Moore, Whitehead, Dewey, Wittgenstein.
Prerequisite: one course in Philosophy. 2 hours—14

49. Special Topics in Philosophy: Special topics accommodating the interests of the instructor and students, selected from various areas in Philosophy, e.g., value theory, philosophy of mind, philosophy of mathematics, philosophical ideas in literature. (Offered on demand.)
Prerequisite: one course in Philosophy. 2 hours—33

HONORS COURSES

All Honors Courses are scheduled for three hours each week; however, one of those hours, at the discretion of the instructor, need not be used for a meeting of the class.

254. Introduction to Problems in Theory of Knowledge: Intensive seminar and tutorial study of major problems in epistemology. For Honors students in any department. 3 hours—3

256. Ancient Philosophy: A critical examination of the major philosophers and philosophical schools from the Presocratics to Plotinus. 3 hours—15

257. Early Modern Philosophy: A critical examination of the philosophical literature of the 17th and 18th centuries, with particular emphasis on such figures as Descartes, Leibniz, Locke, Berkeley, Hume. 3 hours—31

338. Phenomenology and Existential Philosophy: A critical examination of representative literature in the fields of phenomenological research and existential philosophy from Husserl to the present day. 3 hours—22

350. Philosophical Texts: An examination of specified source materials in Greek and Modern Philosophy; critical works will also be studied. 3 hours—13

351. Logic and Problems of Philosophical Analysis: First term: formal logic —propositional calculus; quantification theory. Second term: modal logic, problems of meaning and ontology. 3 hours—20

353. Philosophy of Religion: Conceptual problems relating to personal and institutionalized religion. Specimen topics include: the nature of religious experience and knowledge, analysis of the concept of God, analysis and comparison of important types of religious philosophy. 3 hours—12

355. Aesthetics and Value Theory: Conceptual problems relating to the production and appreciation of the fine arts. Specimen topics include: the analysis of "work of art", "artistic expression", the logic of value judgments, the nature of artistic criticism, fiction, metaphor, appreciation. 3 hours—34

357. Modern Philosophy: Later modern philosophy with particular emphasis on the philosophy of the 19th century.
Prerequisite: Philosophy 257. 3 hours—5

362. Ethics: A critical study of moral problems and theories. The course will be based on readings selected from ethical literature from Aristotle to the present. 3 hours—29

450. Epistemology / Metaphysics: Full year courses in basic problems of epistemology and of metaphysics offered in alternate years. Readings from contemporary writings will be stressed. 3 hours—29

451. Formal Logic: Various systems of deductive logic will be reviewed and theoretical properties of these systems will be established. Specimen topics: systems of natural deduction, axiom systems and their properties, naive set theory and problems in the philosophy of logic.
Prerequisite: Philosophy 351 or permission of the Chairman. 3 hours—32

454. Philosophy of Science: Contemporary problems of scientific methodology and of sciences as systems of knowledge. Can be taken by students in natural and social science programs with consent of instructor. 3 hours—4

456. Plato / Aristotle: Full year courses in Plato and Aristotle offered in alternate years. The later dialogues of Plato and selected works of Aristotle will receive special attention. 3 hours—36

458. Dewey, Bergson and Whitehead: A critical study of these 20th century philosophers. 3 hours—14

464. Contemporary Analytic Philosophy: A seminar devoted to the investigation of selected philosophical problems as they arise in the writings of such philosophers as Moore, Russell, Ayer, Carnap, Quine, Wittgenstein, Ryle, Wisdom, Austin, and others. 3 hours—25

466. Mediaeval Philosophy: A survey of the principal currents in philosophy from the breakdown of classical culture to the Renaissance (350 A.D. to 1500). Primary emphasis will be placed on the critical examination of representative works. (Offered alternate years.)
Prerequisite: Philosophy 256. 3 hours—18

467. Rationalism / Empiricism: Full year courses in rationalism and empiricism are offered in alternate years. In the course on rationalism emphasis is placed on the philosophies of Descartes, Leibniz, and Spinoza, and in the course on empiricism emphasis is placed on Locke, Berkeley and Hume. In both courses, however, attention is given to the minor figures of the period.
3 hours—22

474. *Problems of Philosophy.* 3 hours—1

477. Hume / Kant: Full year courses in selected writings of Hume and of Kant are offered in alternate years. In each case an intensive study of several major works of the philosopher will be undertaken. 3 hours—24

RUSSIAN STUDIES

Associate Professor and Head of the Department:
Rudolf Neuhauser, M.A. Toronto; D. Phil. Vienna

Professors:
Leonid Ignatieff, B.A. McGill; M.A., Ph.D. Michigan

Assistant Professors:
Nina S. Bernotas (Mrs.), B.A., M.A. Toronto
Erna V. Froese (Mrs.), B.A. Simferopol
Francis R. Salter, B.A., M.A., Ph.D. Wisconsin

Lecturers:
Roman Piontkovsky, B.A. George Williams; B. Ed. Toronto; M.A. Middlebury

HONORS PROGRAMS:

Requirements for Admission: First Year General Program (Arts or Social Science) with one of Russian 2, 10, or 20 as a principal course. Students seeking admission to a combined Honors Program must have taken in their first year a course numbered 20 (alternatives in German and Spanish: 2, or 10) in the second Honors subject. Students who begin a foreign language at the University are allowed to defer the 20 course in that language to their second year.

All options are to be chosen in consultation with a departmental adviser. For grades required and progression see page 20.

RUSSIAN STUDIES

Students with grade 13 Russian will take Russian 20 in the First Year; such students are permitted to take Russian 390 in the Second Year, if required to complete the minimum course load.

Second Year

Principal Courses	Subsidiary Courses
Russian 280, 281, 290 (if offered), 20 (unless taken in First Year)	History 37 One option

Third Year

Principal Courses	Subsidiary Courses
Russian 290 (unless taken in Second Year, in this case 440 must be taken in the Third Year) 390, 391, 393	Two options

Fourth Year

Principal Courses	Subsidiary Courses
Russian 420, 440 (unless taken in the Third Year) 490, 491, 495*	Two options

Russian 290 and 440 will be offered in alternate years (check under COURSES).

Students are advised to spend one summer at a recognized Intensive Russian Language Summer School during their senior years.

RUSSIAN AND ENGLISH (see page 36)

RUSSIAN AND FRENCH (see page 45)

RUSSIAN AND GERMAN (see page 50)

RUSSIAN AND HISTORY

Students who did not take Russian 20 during their First Year will take it in the Second Year as an additional principal course. Their subsidiary courses in the Second Year will be reduced to one option and History 37.

Second Year

Principal Courses	Subsidiary Courses
History 236 Russian 280, 281	History 37 Two options, or one option and Russian 20 (a principal course)

Third Year

Principal Courses	Subsidiary Courses
History 335, 337 Russian 390, 391	Two of: Politics 349, 434; Economics 32; Geography 464

Fourth Year

Principal Courses	Subsidiary Courses
2 History courses at the discretion of the Chairman of the Department Russian 420, 491, 495*	One of: Politics 348, 434; Economics 32; Geography 464

RUSSIAN AND SPANISH

Students who did not take Russian 20 during their First Year will take it in the Second Year as an additional principal course. Their subsidiary courses in the Second Year will be reduced to one option.

Second Year

Principal Courses	**Subsidiary Courses**
Russian 280, 281	Two options, or
Spanish 231, 240, 260	One option and Russian 20 (a principal course)

Third Year

Principal Courses	**Subsidiary Courses**
Russian 390, 391, 393	*One option*
Spanish 341, 348, 365	

Fourth Year

Principal Courses
Russian 420, 490, 491, 495*
Spanish 460, 461, 465, 495*
*Comprehensive Examination in the Spring.

COURSES

Students in the Russian Major or Honors Programs are advised to take History 37 as an option.

Russian majors enrolled in Russian 30 and 40 may be required to meet for additional hours (tutorials) at the discretion of the instructor. They will also do part of their reading in Russian.

The Russian courses required for a Russian Studies **Major** *are:*

First year:	Russian 2, or 20
Second Year:	Russian 20 (unless taken in First Year), 30, 281
Third Year:	Russian 40, 391

1. Elementary Russian: A beginning course. Pronunciation, grammar, dictation, translation, and oral practice. 3 lectures, 1 laboratory hour—10

2. *Intensive Russian for Beginners*: This course is intended for students who wish to proceed directly to Russian 20. Prospective Major and Honors students in Russian who have not take Russian at High School will take this course. 5 lectures, 1 laboratory hour—10

2. Introductory Polish: A beginning course with concentration on conversational skill and reading of literary material.
No prerequisites. 4 lectures, 1 laboratory hour—10

10. Intermediate Russian: Review and further study of basic grammar. Composition, oral practice and reading of selected texts.
Prerequisite: Russian 1 or permission of the Department.
3 lectures, 1 laboratory hour—10

20. Advanced Russian: Review of grammar, special problems of morphology, elements of syntax. Readings of selected literary texts. Oral practice and composition.
Prerequisite: Russian 2, 10, or permission of the Department.
3 lectures, 1 laboratory hour—10

22. Russian Conversation: Oral practice to develop fluency in speaking Russian.
Prerequisite: Permission of the Department.
Not offered in 1969/70. 2 hours—(half course)

30. Russian Literature of the 19th Century up to 1917 with emphasis on the great Russian novelists and their contribution to world literature.
No prerequisites. 3 hours—22

35. Intermediate Scientific Russian: Review and further study of grammar; reading and translating selected technical material into English.
Prerequisite: Russian 1, or 2. 3 hours—17

40. Russian Literature of the 20th Century with emphasis on the Soviet period. The interaction of politics with literature and literary theory.
No prerequisites. 3 hours—23

45. Advanced Scientific Russian: Reading and translating scientific texts from Russian, supplemented by individual translating in each student's special field of study. For Honors and Graduate Science students.
Prerequisite: Russian 35, or permission of the Department.
Not offered in 1969/70. 1 hour—(half course)

HONORS COURSES

All students in an Honors Program will write a comprehensive examination at the end of the final year.
Russian 20 is a prerequisite for all Honors courses except Russian 280.
Russian 281 and 391 will also be taken by students in the General Program (Russian Major).

280. Introduction to Russian Literature and Culture: A study of the historical and intellectual background of Russian literature.
No prerequisites. 3 hours—25

281. Composition and Oral Practice: Further study of syntax.
Prerequisite: Russian 20 or permission of the Department.
3 hours and 1 hour for oral practice—31

290. Literary Movements in Russia and the European Influence: A study of basic concepts in Russian literature from Classicism to Futurism in the context of the European literary scene.
Not offered in 1969/70. 3 hours—13

390. Prose of the 19th Century: The Great Masters of the 19th Century from Pushkin to Chekhov. 3 hours—14

391. Composition and Oral Practice: Phonetics and advanced syntax.
Prerequisite: Russian 281. 3 hours and 1 hour for oral practice—29

393. History of the Russian Language: The development of the Russian language to 1700. 2 hours— 5

420. Prose of the 20th Century: A study of Russian Literature from Gorky to the Present. 2 hours—18

440. Seminar in Russian Drama: Authors and plays will be selected by the instructor. 2 hours

490. Poetry of the 19th and early 20th Centuries: From Pushkin to Symbolism. 2 hours— 4

491. Advanced Composition and Oral Practice: Stylistics.
Prerequisite: Russian 391. 2 hours—25

495. Comprehensive Examination: This examination covers the contents of the literature courses taken by the student in the second, third and fourth years and will be administered in March of the final year of the Honors Program. Students who receive a mark below 50% will repeat the examination in the fourth week of August. A minimum mark of 50% is required for graduation with an Honors degree.

SPANISH AND ITALIAN

Professors:
Weston Flint, B.A. Harvard; M.A., Ph.D. North Carolina; Chairman of the Department
Robert Newton Shevrill, B.A.; M.A., Ph.D. North Carolina; Executive Assistant to the President

Associate Professor:
Antonio M. Martí, B.A., Ph.D. University of Barcelona

Assistant Professors:
Jaime Asensio, Lic. de Fil. y Letras, Madrid
Maria Valeria Brizio, Dott. in Fa., Bologna
Wolfram Burghardt, B.A., M.A. Toronto
Jesús López Pacheco, Lic. de Fil. y Letras, Madrid
Jean Cross Newman, B.A. McGill; A.M. Radcliffe; Dra. en Fil. y Letras, Madrid

Lecturer:
Barry W. Munn, B.A. Cantab.

Instructor:
Margarita P. Yuste, Lic. de Fil. y Letras, Madrid

Instructor (part-time):
Sibille A. Lindeboom, B.A. Heidelberg

Visiting Associate Professor:
Florian L. Smieja, B.A. University College, Cork, Ireland; M.A., Ph.D. London

HONORS PROGRAMS

SPANISH AND ENGLISH (see page 37)

SPANISH AND FRENCH (see page 46)

SPANISH AND GERMAN (see page 51)

SPANISH LANGUAGE AND LITERATURE

Requirements for Admission: First Year General Program (Arts or Social Science) with one of Spanish 2, 10, or 20 as a principal course. English 20 is also highly recommended. For grades required for admission and progression see page 20.

Students who begin Spanish at the University and who desire to enter any Honors Program involving Spanish are urged to take Spanish 20 in Summer School in order to qualify for second year courses. If this is impossible they should consult the Chairman of the Department.

Second Year

Principal Courses	**Subsidiary Courses**
Spanish 231, 240, 260	Two (or three) options selected with the approval of the Department

Third Year

Principal Courses	**Subsidiary Courses**
Spanish 341, 348, 365	Two (or three) options selected with the approval of the Department

Fourth Year

Principal Courses	**Subsidiary Courses**
Spanish 460, 461, 465, 495*	Two options selected with the approval of the Department

*Comprehensive Examination in the Spring.

SPANISH AND LATIN (see page 26)

SPANISH AND RUSSIAN (see page 62)

GENERAL COURSES

SPANISH COURSES

Students in the General Program who choose Spanish as their subject of concentration must elect Spanish 31.

It is recommended that students who major in this department elect at least four senior courses in the major subject. Minimum requirements are two in the second year and two in the third.

Students who begin Spanish at the University and who desire to qualify for senior courses are urged to take Spanish 20 in Summer School. Those who are unable to do so should consult the Chairman of the Department.

1. Elementary Spanish: Introduction to understanding, speaking, reading and writing Spanish. Audio-lingual techniques are combined with required practice in the language laboratory. Spanish 1 is offered only in Summer School.

2. Intensive Spanish for Beginners: Introduction to understanding, speaking, reading and writing Spanish. Audio-lingual techniques are combined with practice in the language laboratory. Prepares student directly for Spanish 20.
5 hours—29

10. Intermediate Spanish: Readings in Spanish literature with grammar review and oral practice.
Prerequisite: Spanish 1 or Grade 12 Spanish. 3 hours—29

20. Advanced Spanish: Introduction to Spanish literature with grammar review and oral practice. (One hour per week in the language laboratory may be required.)
Prerequisite: Spanish 2, Spanish 10, Grade 13 Spanish, or permission of the Department. 3 or 4 hours—28

22. Conversation: Systematic oral practice to develop fluency in speaking Spanish. (Not offered in 1969-70)
Prerequisite: Spanish 2, Spanish 10, or permission of the Department.
2 hours: half course

30. Spanish Drama: Study of major dramatists from Lope de Vega to García Lorca.
Prerequisite: Spanish 20. 3 hours—14

31. Spanish Language and Civilization: For students who have completed Spanish 20. Two hours per week will be spent on grammar review and oral practice; one on Civilization.
Prerequisite: Spanish 20. 3 hours—28

32. Hispanic Civilization: A course designed to develop an understanding of the Spanish culture heritage through the study of selected historical, literary and artistic materials. Not offered 1969-70.
Prerequisite: Spanish 20. 3 hours—34

45. Scientific Spanish: A course designed to guide the students in the techniques of translation from Spanish into English. The course is particularly recommended for the advanced student in other disciplines who needs a reading proficiency in Spanish for his higher degree. The materials for translation will be decided according to the field of interest of the student.
Prerequisite: Permission of the Department. 1 hour: half course—19

48. Latin-American Literature: A study of selected works of prose and poetry after 1880.
Prerequisite: Spanish 20. 3 hours—12

Note: Students in the General Programme may elect an Honours Course if necessary to complete their requirements.

HONORS COURSES

SPANISH HONORS COURSES

All students in Honors Courses will take a comprehensive examination at the end of the final year.

231. Spanish Language and Civilization: A course in guided free composition, translation and practical phonetics, supplemented by 15 seminars in Spanish Civilization from 1700 to the present day.
Prerequisite: Spanish 20. 2 or 3 hours—29

240. Spanish Prose of the Nineteenth and Twentieth Centuries: A study of selected prose works from Larra to the present with special attention paid to methods of literary criticism. Emphasis will be placed on Galdós, Unamuno, Azorin, Baroja, Valle-Inclán and Cela.
Prerequisite: Spanish 20. 2 hours—14

260. Hispanic Poetry of the Nineteenth and Twentieth Centuries: A critical study of the works of selected poets from Espronceda to Neruda.
Prerequisite: Spanish 20. 2 hours— 5

341. Spanish Language: A course in guided free composition, translation, syntax and oral practice.
Prerequisite: Spanish 231 or permission of the Department. 3 hours—35

348. Latin-American Literature and Civilization: A study of representative prose fiction of the past 150 years with special reference to the "social" novel of this century. The main part of the course will consider the works of Azuela, Guiraldes, Asturias, Rivera, Carpentier and Borges. During the year there will be 15 seminars on Latin-American Civilization from 1700 to the present.
2 or 3 hours—12

365. Hispanic Poetry from its origins to 1700: A critical analysis of poetic texts from the early "jarchas" to Sor Juana Inés de la Cruz. 2 hours—19

460. Spanish Drama from the "Celestina" to the Present: A study of Spanish drama from its origins to the present day. 3 hours—31

461. *Spanish Language and Civilization:* History of the Spanish Language with special emphasis on stylistic evolution through the ages and dialectic variations. Two hours of language study will be amplified by a series of fifteen seminar periods which will examine Spanish Civilization prior to 1700.
2 or 3 hours—21

465. Spanish Prose of the Golden Age: A study of major prose works of this period including the picaresque novel and the **Quijote**. 3 hours—8

495. Comprehensive Examination: This examination covers the contents of the literature courses taken in the second, third and fourth years and will be administered in March of the final year of the Honors Program. A minimum mark of 50% is required for graduation with an Honors degree. Students who receive a mark of less than 50 will repeat the examination in August.

ITALIAN COURSES

2. Intensive Italian for Beginners: Introduction to understanding, speaking, reading and writing Italian. Audio-lingual techniques are combined with required practice in the language laboratory. Prepares student directly for Italian 20. 5 hours—9

10. Intermediate Italian: Review of grammar, readings from Italian literature, oral practice.
Prerequisite: Italian 1, Grade 12 Italian, or the equivalent. 3 hours—9

20. Advanced Italian: Introduction to Italian literature with grammar review and practice in composition. Readings span the centuries from Saint Francis of Assisi to Pirandello. Reading and discussion of short stories by Alberto Moravia is used to improve facility in spoken Italian.
Prerequisite: Italian 2, 10, or permission of the Department. 3 hours—9

ITALIAN COURSES

30. The Literature of the 'Rinascimento': Study of representative writers of the 15th and 16th centuries. (Not offered in 1969-70)
Prerequisite: Italian 20. 3 hours—26

32. Italian Civilization: A course designed to develop an understanding of the Italian cultural heritage through the study of selected historical, literary and artistic materials. (Not offered in 1969-70).
Prerequisite: Italian 20 3 hours—19

40. Dante, Petrarca, Boccaccio and Their Period.
Prerequisite: Italian 20. 3 hours—16

PORTUGUESE COURSES

2. Intensive Portuguese for Beginners: Introduction to understanding, speaking, reading and writing Portuguese. A course designed for language students and for those in other disciplines wishing to acquire a working knowledge of Portuguese for the purpose of field research. Three hours of language, plus one additional hour of linguistic or cultural emphasis.
Prerequisite: Permission of the Department. 4 hours—19

FACULTY

DEAN AND PROFESSOR:

Clifford von Kuster, Mus.Bac., L.R.C.T.; Piano and Piano Pedagogy

PROFESSORS:

Donald McKellar, A.R.C.T., A.Mus., Mus.Bac., M.Mus.; Chairman of Music Education, Conductor of University Symphonic Band

Alfred Rosé, B.A.; Voice, Music History

Dawson Woodburn, B.A., M.A.; Choral Music, Director of Choral Ensemble

VISITING PROFESSOR:

Tsuyoshi Tsutsumi, Graduate of To Ho Conservatory, Tokyo, Artist Diploma, University of Indiana; Cello

ASSOCIATE PROFESSORS:

Philip G. Downs, B.A., Mus.M., Ph.D.; Music History

Paul Green, A.R.C.T., Mus.Bac., M.Mus.; Music Education, Co-ordinator of Ensembles

Gordon K. Greene, A.Mus., B.A., B.Ed., M.A.; Chairman of Music History, Conductor of University Choir

Carl Haenselman, B.Mus.Ed., M.Mus., Ph.D.; Chairman of Theory and Composition

ASSISTANT PROFESSORS:

Ralph Aldrich, Mus.Bac., L.R.S.M., L.G.S.M.; Viola, Chamber Music and Theory

Damiana Bratuz, Master's diploma in Piano (Trieste, Italy), M.M., Mus.Doc.; Piano, Piano Literature

Peter J. Clements, Mus.Bac., M.M.; Theory and Composition

Arsenio Giron, B.Mus., M.A.; Theory and Composition

John S. McIntosh, A.R.C.T., Mus. Bac., M.Mus., A.A.G.O.; Organ and Theory Chairman of Applied Music

Howard Munn; Piano and Piano Teaching Materials; Principal of Westerr. Ontario Conservatory of Music

Robert Skelton, A.R.C.T., Mus.Bac., M.M.; Violin, String Classes, Chamber Music, Conductor of University Symphony Orchestra

James A. Stark, B.A., Mus.M.; Voice, Music History

Earle Terry, B.A., B.Paed., M.Mus., F.R.S.A.; Choral Music

George VanOstrand, B.S., M.M.; Music Education and Woodwinds

LECTURERS:

Charles Dalkert, B.M., M.M.; Trombone and Theory

James Ford; Brass Instruments

INSTRUCTORS:

Pauline Aldrich, L.T.C.L., L.R.S.M., Premier Prix; Piano

Paul S. Bendzsa, Mus.Bac.; Clarinet

H. Barrie Cabena, A.R.C.M., F.T.C.L., F.R.C.C.O., F.R.C.O.; Organ
Larry Cortner, Mus.Bac., Mus.M.; Organ and Theory
Patricia Giron, B.Mus.; Piano
Robert Head, Mus.Bac.; Bassoon
Joan Hysen; Viola
Wesanne McKellar, A.Mus.A., A.R.C.T., L.R.S.M., Mus.Bac.; Piano
Marian MacLennan, B.A., R.C.A.D. (Artist's Diploma); Piano
Alma Madill, A.T.C.M.; Piano and Theory
Antonia Mazan, B.A., L.Mus., Graduate of Vienna Academy; Piano
G. J. Meyer, Graduate of Royal Conservatory, Amsterdam; Flute
Lesley Munn, B.Mus.; Piano
Philip Murphy, B.A., Mus.G.Paed.; Clarinet
Arnold Rosner, B.A., Theory and Music History
Betty Tracy, A.T.C.M.; Cello
Ian Turnbull; Percussion
Stanley Wood; Principal Oboe, Toronto Symphony Orchestra

GENERAL INFORMATION

The Faculty of Music offers programs leading to the following degrees:

1. Bachelor of Music with Honors in one of (1) Music Education; (2) Performance—Piano, Voice, Organ & Church Music, or Orchestral Instrument; (3) Theory & Composition; (4) Music History.
2. Bachelor of Arts with Honors Music.
3. Bachelor of Arts with Music Options.
4. **Masters** Degree (Refer to the calendar of The Faculty of Graduate Studies)

BACHELOR DEGREE PROGRAMS

These are four-year Honors and three-year General Programs. All students will be enrolled in a common first year. At the beginning of the second year each student will choose an area of concentration and will enrol in one of the four honors programs or two general programs outlined below.

Before graduation all students who elect a four-year Honors Program must reach a minimum of the Associate level in performance in their applied music major. Honors in Performance candidates must be well above this level and, in addition, must present a public recital in their final year. All students are encouraged to perform on student recital programs.

Students who elect the Bachelor of Arts with Music Options Program must reach a minimum of Grade X level of performance, although students who are able will be encouraged to reach the Associate level.

COMMON FIRST YEAR

Music 21	Applied Major	1 hour
21A	Piano Minor (Required for all students except piano majors)	½ hour
24	Instrumental Music	1 hour
25	Theory	5 hours
26	Music History	3 hours
27	Choral Technique	1 hour
28	Ensemble	3 hours
29	*The Child Voice* (For prospective Music Education [Elementary] Majors only)	1 hour
117	Brass and Woodwind class (For prospective Music Education [Secondary] majors only)	1 hour
English 20		3 hours
One other course from Divisions A, B or C (Those intending to major in Honors Music History or Honors in Performance with a major in Voice must take a language other *than English*)		2 to 3 hours
		19 *to* 21½ hours

HONORS IN MUSIC EDUCATION

Students planning to teach music in the secondary schools should enrol in the Honors Music Education (Secondary) program in second year.

Those planning to teach music in the elementary schools should enrol in the Honors Music Education (Elementary) program in second year.

HONORS IN MUSIC EDUCATION (SECONDARY)

The Bachelor of Music in Music Education meets the requirements of the Ontario Department of Education circular 649, and leads to the Type A certificate in instrumental and vocal music.

On application, all other Bachelor of Music programs will be evaluated by the Registrars of the Ontario Colleges of Education for admission to the Type A or Type B programs for secondary school teaching. In some programs other than Music Education, choral technique courses beyond the first year are optional. Students who might enter school music teaching upon graduation are advised to include the choral technique courses in their program.

Choral technique courses beyond the first year are required in all Music Education programs, in the Performance with a Major in Organ and Church Music, and in all Bachelor of Arts programs.

SECOND YEAR

Music 217	Brass and Woodwind Class	1 hour
231	Applied Major	1 hour
231A	Piano Minor (Required for all students except piano majors)	½ hour
232	Music Education Ensemble	1 hour
235	Theory	5 hours
236	Music History	3 hours
237	Choral Technique	1 hour
238	Performing Ensemble	3 hours
247	String Class	1 hour
Any senior English Course		3 hours
One course from Divisions A, B or C		2 to 3 hours
		21 to 22½ hours

THIRD YEAR

Music 317	Brass and Woodwind Class	1 hour
332	Music Education Ensemble	1 hour
337	Choral Technique	1 hour
341	Applied Major	1 hour
342	Conducting	1 hour
345	Counterpoint	3 hours
347	String Class	1 hour
348	Performing Ensemble	3 hours
Physics 33		3 hours
One music elective		2 hours
One course from Divisions A, B or C		2 to 3 hours
		19 to 20 hours

FOURTH YEAR

Music 417	Brass and Woodwind Class	1 hour
432	Music Education Ensemble	1 hour
437	Choral Music Methods and Materials	2 hours
442	Conducting	1 hour
447	String Class	1 hour
447A	Music Education String Repertoire	1 hour
450	Music Education Seminar	2 hours
451	Applied Major	1 hour
455	Orchestration	2 hours
458	Performing Ensemble	3 hours
467	Percussion Class	1/2 hour
One course from Divisions A, B or C		2 to 3 hours
		17 1/2 to 18 1/2 hours

HONORS IN MUSIC EDUCATION (ELEMENTARY)

SECOND YEAR

Music 231	Applied Major	1 hour
231A	Piano Minor (Required for all students except piano majors)	1/2 hour
232	Music Education Ensemble	1 hour
235	Theory	5 hours
236	Music History	3 hours
237	Choral Technique	1 hour
238	Performing Ensemble	3 hours
229	Child Voice (only if 29 was not taken in first year)	1 hour
One of **217**	Brass and Woodwind Class	1 hour
or	(Prerequisite 117)	
247	String Class	1 hour
One course from Divisions A, B or C		2 to 3 hours
		18 to 19 1/2 hours

THIRD YEAR

Music 332	Music Education Ensemble	1 hour
337	Choral Technique	1 hour
339	Communication in Music (Prerequisite 229)	2 hours
341	Applied Major	1 hour
342	Conducting	1 hour
345	Counterpoint	3 hours
348	Performing Ensemble	3 hours

One of **317**	Brass and Woodwind Class	
or	(Prerequisite 217)	1 hour
347	String Class	
	(Prerequisite 247)	1 hour
Physics 33		3 hours
One Music elective		2 hours
One course from Divisions A, B or C		2 to 3 hours
		20 to 21 hours

FOURTH YEAR

Music 432	Music Education Ensemble	1 hour
437	Choral Music Methods and Materials	2 hours
442	Conducting	1 hour
449	Comparative Studies in Music Education	2 hours
450	Music Education Seminar	2 hours
451	Applied Major	1 hour
455	Orchestration	2 hours
458	Performing Ensemble	3 hours
One of the following two combinations:		
417	Brass and Woodwind Class	1 hour
and		
467	Percussion Class	
	(Prerequisite 317)	½ hour
	or	
447	String Class	1 hour
and		
447A	Music Education String Repertoire	
	(Prerequisite 347)	1 hour
One course from Divisions A, B or C		2 to 3 hours
		17½ to 19 hours

HONORS IN PERFORMANCE WITH A MAJOR IN PIANO

SECOND YEAR

Music 231	Applied Major	1 hour
235	Theory	5 hours
236	Music History	3 hours
237	Choral Technique	1 hour
238	Ensemble	3 hours
Any Senior English Course		3 hours
One course from Divisions A, B or C		2 to 3 hours
		18 to 19 hours

THIRD YEAR

Music 337	Choral Technique	1 hour
341	Applied Major	1 hour
345	Counterpoint	3 hours
348	Ensemble	3 hours
351	Chamber Music	1 hour
354P	Piano Literature	1 hour
One music elective		2 hours
Two courses from Divisions A, B or C		4 to 6 hours
		16 to 18 hours

FOURTH YEAR

Music 437	Choral Music Methods and Materials	2 hours
451P	Applied Major (1 hour individual lesson) (1 hour class lesson)	2 hours
453	Piano Pedagogy	1 hour
458	Ensemble	3 hours
461	Chamber Music	2 hours
One music elective		2 hours
One course from Divisions A, B or C		2 to 3 hours
		14 to 15 hours

HONORS IN PERFORMANCE WITH A MAJOR IN VOICE

SECOND YEAR

Music 231	*Applied Major*	1 hour
231A	Piano Minor	½ hour
235	Theory	5 hours
236	Music History	3 hours
237	Choral Technique	1 hour
238	Ensemble	3 hours
One course from Divisions A, B or C		2 to 3 hours
One language course other than English		2 to 3 hours
		17 to 19½ hours

THIRD YEAR

Music 337	Choral Technique	1 hour
341	Applied Major	1 hour
345	Counterpoint	3 hours
348	Ensemble	3 hours
352	Music History Seminar	2 hours
One music elective		2 hours
Two courses from Divisions A, B or C		4 to 6 hours
		16 to 18 hours

FOURTH YEAR

Music 437	Choral Methods and Materials	2 hours
451P	Applied Major (1 hour individual lesson) (1 hour class lesson)	2 hours
452	Music History Seminar	2 hours
453	Vocal Pedagogy	1 hour
458	Ensemble	3 hours
One music elective		2 hours
One course from Divisions A, B or C		2 to 3 hours
		14 to 15 hours

HONORS IN PERFORMANCE WITH A MAJOR IN ORGAN AND CHURCH MUSIC

SECOND YEAR

Music 231	Applied Major	1 hour
231A	Piano Minor	½ hour
235	Theory	5 hours
236	Music History	3 hours
237	Choral Technique	1 hour
238	Ensemble	3 hours
Any Senior English Course		3 hours
One course from Divisions A, B or C		2 to 3 hours
		18 to 19½ hours

THIRD YEAR

Music 337	Choral Technique	1 hour
341	Applied Major	1 hour
345	Counterpoint	3 hours
348	Ensemble	3 hours
353	Church Music	1 hour
354O	Organ Literature	1 hour
One music elective		2 hours
Two courses from Divisions A, B or C		4 to 6 hours
		16 to 18 hours

FOURTH YEAR

Music 437	Choral Music Methods and Materials	2 hours
451P	Applied Major (1 hour individual lesson) (1 hour class lesson)	2 hours
453	Organ Pedagogy	1 hour
458	Ensemble	3 hours
463	Church Music	2 hours
One music elective		2 hours
One course from Divisions A, B or C		2 to 3 hours
		14 to 15 hours

HONORS IN PERFORMANCE WITH A MAJOR IN ORCHESTRAL INSTRUMENT

SECOND YEAR

Music 231	Applied Major	1 hour
231A	Piano Minor	½ hour
235	Theory	5 hours
236	Music History	3 hours
237	Choral Technique	1 hour
238	Ensemble	3 hours
Any Senior English Course		3 hours
One course from Divisions A, B or C		2 to 3 hours
		18 to 19½ hours

THIRD YEAR

Music 337	Choral Technique	1 hour
341	Applied Major	1 hour
345	Counterpoint	3 hours
348	Ensemble	3 hours
351	Chamber Music	1 hour
One music elective		2 hours
Two courses from Divisions A, B or C		4 to 6 hours
		15 to 17 hours

FOURTH YEAR

Music 437	Choral Music Methods and Materials	2 hours
451P	Applied Major (1 hour individual lesson) (1 hour class lesson)	2 hours
453	Pedagogy	1 hour
458	Ensemble	3 hours
461	Chamber Music	2 hours
One music elective		2 hours
One course from Divisions A, B or C		2 to 3 hours
		14 to 15 hours

HONORS IN THEORY AND COMPOSITION

SECOND YEAR

Music 231	Applied Major	1 hour
231A	(except for piano majors)	½ hour
235	Theory	5 hours
236	Music History	3 hours
237	Choral Technique	1 hour
238	Ensemble	3 hours
239	Composition	2 hours
Any Senior English Course		3 hours
One course from Divisions A, B or C		2 to 3 hours
		20 to 21½ hours

THIRD YEAR

Music 337	Choral Technique	1 hour
341	Applied Major	1 hour
342	Conducting	1 hour
345	Counterpoint	3 hours
348	Ensemble	3 hours
349	Composition	3 hours
Physics 33		3 hours
One course from Divisions A, B or C		2 to 3 hours
		17 to 18 hours

FOURTH YEAR

Music 437	Choral Music Methods and Materials	2 hours
451	Applied Major	1 hour
455	Orchestration	2 hours
458	Ensemble	3 hours
459	Composition	3 hours
One music elective from the Music History area		2 hours
One course from Divisions A, B or C		2 to 3 hours
		15 to 16 hours

HONORS IN MUSIC HISTORY

SECOND YEAR

Music 231	Applied Major	1 hour
231A	(Except for piano majors)	½ hour
235	Theory	5 hours
236	Music History	3 hours
237	Choral Technique	1 hour
238	Ensemble	3 hours
252	Music History Seminar	2 hours
One course from Divisions A, B or C		2 to 3 hours
One language course other than English		2 to 3 hours
		19 to 21½ hours

THIRD YEAR

Music 337	Choral Technique	1 hour
341	Applied Major	1 hour
345	Counterpoint	3 hours
348	Ensemble	3 hours
Two Music History electives		4 hours
Two courses from Divisions A, B or C (one of which should be general political and economic history)		4 to 6 hours
		16 to 18 hours

FOURTH YEAR

Music 437	Choral Music Methods and Materials	2 hours
451	Applied Major	1 hour
452	Music History Seminar	2 hours
Two Music electives		4 hours
One other music elective		2 hours
Two courses from Divisions A, B or C		4 to 6 hours
		15 to 17 hours

BACHELOR OF ARTS WITH HONORS MUSIC

REQUIREMENTS FOR ADMISSION:

Completion of the common first year with an average of at least 60%. All students must reach the minimum of the Associate level in performance in their practical music subject before graduation. On application, this program will be evaluated by the Registrars of the Ontario Colleges of Education for admission to the Type A or Type B programs for secondary school teaching.

SECOND YEAR

Music 231	Applied Major	1 hour
231A	(Except for piano majors)	½ hour
235	Theory	5 hours
236	Music History	3 hours
237	Choral Technique	1 hour
238	Ensemble	2 hours
Three courses from Divisions A, B or C		6 to 9 hours
		18 to 21½ hours

THIRD YEAR

Music 337	Choral Technique	1 hour
341	Applied Major	1 hour
345	Counterpoint	3 hours
348	Ensemble	3 hours
Two music electives from Theory or Music History areas		4 hours
Two courses from Divisions A, B or C		4 to 6 hours
		16 to 18 hours

FOURTH YEAR

Music 437	Choral Music Methods and Materials	2 hours
451	Applied Major	1 hour
458	Ensemble	2 hours
Two music electives		4 hours
Two courses from Divisions A, B or C		4 to 6 hours
		13 to 15 hours

BACHELOR OF ARTS WITH MUSIC OPTIONS

REQUIREMENTS FOR ADMISSION:

Completion of the common first year with an average of at least 50%.

SECOND YEAR

Music	**31**	Applied Major	1 hour
	31A	(Except for piano majors)	½ hour
	35	Theory	5 hours
	36	Music History	3 hours
	37	Choral Technique	1 hour
	38	Ensemble	2 hours
Three courses from Divisions A, B or C			6 to 9 hours
			18 to 21½ hours

THIRD YEAR

Music	**41**	Applied Major	1 hour
	45	Counterpoint	3 hours
	47	Choral Music Methods and Materials	2 hours
One music elective			2 hours
Three courses from Divisions A, B or C			6 to 9 hours
			14 to 17 hours

DESCRIPTION OF COURSES

THEORY AND COMPOSITION

25. Theoretical Studies: Analysis, sight-singing, dictation and written harmony based on triads, dominant seventh chords and their inversions. Rhythmic reading and dictation, modulation, Keyboard harmony. Five hours

35, 235. Theoretical Studies: Continuation of Music 25. Analysis, sight-singing, dictation and writing using diatonic seventh chords, chromatic harmony and extended modulation. Application of harmonic theory to eighteenth century counterpoint. Advanced rhythmic reading and dictation. Keyboard harmony.

Prerequisite: Music 25 Five hours

45, 345. Counterpoint: First term—The contrapuntal style of the sixteenth century, including analysis of works of Palestrina and Lassus. Writing in two, three and four parts. Second term—Contrapuntal techniques of the twentieth century.

Prerequisite: Music 35 or 235 Three hours

455. Orchestration: Instruments of the orchestra—tone-colors, transpositions. Practical scoring for individual choirs, chamber orchestra and full orchestra, choir, and symphonic band.

Prerequisite: Music 345 Two hours

239. Composition: An introductory course in composition including analysis of widely divergent works in the literature. Composition of works for voices and instruments individually geared to each student's needs and style. The course hours are comprised of seminars and private lessons. Two hours

349, 459. Composition: Works in the larger forms for solo instruments and chamber ensembles. Continuation of analysis with an emphasis on twentieth century literature. Third and fourth year students will be expected to have several works completed during the year. Three hours

HISTORY AND LITERATURE OF MUSIC

26. Music History: A study of the history and literature of music up to 1750. The first half of a two year survey. Texts: Grout, A History of Western Music (W. W. Norton 1960) Starr & Devine, eds., Music Scores Omnibus, vol. 1 (Prentice-Hall, 1964). Three Hours

36, 236. Music History II: A continuation of the survey to the present time. Texts: Grout, A History of Western Music, Starr & Devine, Music Scores Omnibus, Vol. II.
Prerequisite: Music 26 Three hours

306. History of Ancient, Medieval and Renaissance Music: A seminar on music to circa 1600.
Prerequisite: Music 36, 236 or equivalent Two hours

316. History of Music in the Baroque Era: A seminar on music from approximately 1600 to 1750.
Prerequisite: Music 36 or 236 Two hours

326. History of the Symphony: A seminar on music composed for orchestra from the pre-Classic through the Romantic era.
Prerequisite: Music 36 or 236 Two hours

336. History of Chamber Music. A seminar on music composed for chamber ensembles from the sixteenth century to the present time.
Prerequisite: Music 36 or 236 Two hours

346. History of Music in the Romantic Era: A seminar on music of the nineteenth century.
Prerequisite: Music 36 or 236 Two hours

346(A). History of the Art Song and Oratorio: A seminar devoted to the study of the literature of song and oratorio.
Prerequisite: Music 36 or 236 Two hours

354(P). Piano Literature: A study of the literature for solo piano. For piano majors in the third year.
Prerequisite: Music 36 or 236 One hour

354(O). Organ Literature: A study of the literature for organ. For organ majors in the third year.
Prerequisite: Music 36 or 236 One hour

356. History of Opera. A seminar on the development of opera from the time of the Florentine Camerata to the present day.
Prerequisite: Music 36 or 236 Two hours

366. Selected Composer Study: A seminar on the life and works of a single composer, to be selected and named in advance by the instructor.
Prerequisite: Music 36 or 236 Two hours

376. Contemporary Music. A seminar in music of the twentieth century.
Prerequisite: Music 36 or 236 Two hours

APPLIED MUSIC AND PEDAGOGY

21, 31, 231, 41, 341, 451. Individual lessons in the student's major applied music area. One hour
At the end of each academic year, the student must successfully pass an examination in his or her major applied music area conducted by a jury of the faculty. Before graduation each student must have reached the required examination level in his major applied subject. Honors in Performance candidates must be well above this level and, in addition, must present a public recital. All other majors are encouraged to perform on student recital programs.

21A, 31A, 231A. Piano Minor: Individual lessons for those students whose major is not piano. One half hour
Required of all non-piano majors for two years. A minimum of Grade VI level must be achieved by this time.

353, 463. Church Music: Materials, methods and techniques of service playing. For organ majors in the third and fourth years.
Music 353 One hour
Music 463 Two hours

453. Pedagogy of the major instrument or voice: Required of all students registered in the Honors in Performance course in the fourth year. One hour

ENSEMBLES

28, 38, 48, 238, 348, 458. Band, Orchestra, Chorus, Collegium Musicum and Chamber Ensembles: Performance of major works for the respective media. The faculty will assign students to those performing ensembles which are deemed necessary to the musical development of the individual. Three hours

351, 461. Chamber Music: Duos, trios, quartets, etc., with and without piano.
Music 351 One hour
Music 461 Two hours

252, 352, 452. Music History Seminar: A study of Medieval, Renaissance and Baroque music (vocal and instrumental). Participation in Collegium Musicum is required. Two hours

MUSIC EDUCATION

24. Instrumental Music: A general history of the development of the wind and string instruments. The instrumentation of the orchestra and band. Transposing instruments. Elementary score reading and conducting. One hour

117, 217, 317, 417. Woodwind and Brass Class: Class instruction in the woodwind and brass instruments. The student is expected to acquire playing proficiency in one instrument of each family and a general playing knowledge of the others. One hour

232, 332, 432. Music Education Ensemble: Performance of band and orchestral literature suitable for school performing ensembles. One hour

27, 37, 237, 337. Choral Technique: Basic elements of voice production and choral singing. Elementary choral conducting. Study of rehearsal techniques through performance of selected repertoire. One hour

29, 229. The Child Voice: Music materials and procedures which may be employed in the development of the child and adolescent voice. One hour

39, 339. Communication in Music: An exploratory course in rhythmic movement, instrumental activities, and listening techniques which are related to the development of the child. Attention will be given to special areas of creativity. Two hours

49, 449. Comparative Studies in Music Education: A comparative study of the materials and procedures in music education. The work of Kodaly, Orff, and Suzuki will be selected for more intensive work. Two hours

47, 437. Choral Methods and Materials: A survey of choral repertoire suitable for use in high schools. Advanced choral conducting. The administration of a choral music program in the schools.

Prerequisite: Music 337. Two hours

247, 347, 447. String Class: Class instruction in performance on the string instruments. One hour

447A. String Repertoire: A survey of string literature for school orchestras and ensembles. One hour

342. Conducting: Basic conducting techniques. One hour

442. Conducting: Advanced instrumental conducting techniques. One hour

450. Music Education Seminar: School music administration. Classroom teaching techniques. School music libraries. Methods and materials of school wind, string and percussion classes. Band and orchestra performing materials. Psychology of the musical mind. Tests and measurements of musical ability. Two hours

467. Percussion Class: Instruction in the fundamental playing techniques of percussion instruments. One half hour.

MUSIC COURSES FOR ARTS AND SCIENCE STUDENTS

The following music courses are offered on the main campus as electives for Arts and Science students.

10. This course is divided into three parts. To obtain credit two of the three parts must be taken. If a student chooses performance, he must pay for the individual lessons.

10H. History of Music I: The art of music and how to listen to it; instruments and musical forms; emphasis on music of the late Baroque and Classic periods (1700-1830); Bach, Handel, Haydn, Mozart, Beethoven.
No prerequisite: One hour (half course)—4

10T. Theory: Musical rudiments, ear training, elementary form and analysis.
Prerequisite: The ability to read musical notation
One hour (half course)—21

10P. Performance: Individual lessons arranged by the Faculty of Music. Credit for this course will be determined by the student's progress during the year and by a final performance examination.
No prerequisite One hour (half course)

20. This course is divided into three parts. To obtain credit two of the three parts must be taken. If a student chooses performance he must pay for the individual lessons.

20H. History of Music II: Emphasis on music of the Romantic era and the twentieth century; Opera, Nationalism in music, Impressionism, Contemporary trends.
Prerequisite: Music 10H or consent of instructor
One hour (half course)—18

20T. Theory: Elementary harmony, part writing, form and analysis.
Prerequisite: Music 10T or equivalent One hour (half course)—6

20P. Performance: Individual lessons arranged by the Faculty of Music. Credit for this course will be determined by the student's progress during the year and by a final performance examination.
Prerequisite: A minimum of the Grade VI level in some instrument or voice
One hour (half course)

20S. Summer School only.

Part A. Music History, Theory and Literature.

Part B. Choral Music Education or **Instrumental Music Education.**

A. Introduction to music history, theory and literature with special emphasis on the larger forms, i.e., symphony, sonata, concerto, quartet, opera, and the large choral forms.

B. Choral Music Education: Psychology and philosophy of music education; teaching materials, literature for classroom and choir; choral techniques and choral style. Organization and training of school choirs.

or

Instrumental Music Education: A course for beginners on a brass or woodwind instrument. The course has three objectives:

1. To master the fundamentals of performance on one of the instruments.
2. To learn teaching techniques and materials of instrumental music.
3. To study basic conducting of instrumental groups.

Instruments and music will be supplied by the Faculty of Music. No prerequisite is required, though minimal musical literacy is expected. Ten hours

Texts: Joseph Machlis, The Enjoyment of Music, (Norton)
Hill-Searight, A Study Outline and Work-Book in the Elements of Music (Wm. C. Brown)

20Y. A listener's course designed to acquaint students with the landmarks of the orchestral, choral and chamber repertoire through guided listening to recordings and live performance.

No prerequisite Two hours—18

30. This course is divided into three parts. To obtain credit two of the three parts must be taken. If a student chooses performance he must pay for the individual lessons.

30H. History of Music III: Emphasis on music of the Renaissance and Baroque eras (1400-1700).

Prerequisite: Music 20H or equivalent. One hour (half course)—24

30T. Theory: Advanced harmony, part writing, form and analysis, free counterpoint.

Prerequisite: Music 20T *or equivalent* One hour (half course)—34

30P. Performance: Individual lessons arranged by the Faculty of Music. Credit for this course will be determined by the students's progress during the year and by a final performance examination.

Prerequisite: A minimum of the Grade VIII level in some instrument or voice
One hour (half course)

30S. Summer School only.

Part A: Music history, theory and literature.

Part B: Choral Music Education II *or* **Instrumental Music Education II.**

A. An analysis of music literature stressing the development of the musical practice that is background to the familiar nineteenth century style. The history and theory related to this musical practice will also be emphasized.

B. Choral Music Education II: Advanced development of choral techniques; sight singing; study of choral literature; teaching materials.

or

Instrumental Music Education II: A Continuation of Music 20S, Part B, Instrumental Music Education.

Texts: Joseph Machlis, The Enjoyment of Music, (Norton)

Prerequisite: Music 20S or Music 20, or equivalent.

30Y. A continuation of Music 20Y. Will include a detailed study of at least three large scale compositions from a listener's viewpoint, with attention to the life, social background and other works of the composer.

Prerequisite: Music 20Y or equivalent Two hours—18

40S. Summer School only.

The course will explore twentieth century music in breadth with correlated reading. Parallels and contrasts between the music, its creation, and other aspects of contemporary life and thought will be drawn. The evolution of musical art forms will be traced.

Texts: Joseph Machlis, An Introduction to Contemporary Music, (Norton)

Dean:
Andrew E. Scott, B.Sc., Ph.D. St. Andrews, Professor of Chemistry

Assistant Dean:
Walter C. Howell, B.Sc., M.Sc., Ph.D., Associate Professor of Chemistry

The Faculty of Science's faculty, courses and programs will be found on the following pages, organized under departments arranged alphabetically. Reference should be made to the first section of this Calendar and to the booklet "General Information" for further information.

FACULTY OF SCIENCE DEPARTMENTS

Anatomy (p. 92)
Applied Mathematics (p. 94)
Astronomy (p. 97)
Bacteriology and Immunology (p. 99)
Biochemistry (p. 102)
Biophysics (p. 105)
Botany (p. 107)
Chemistry (p. 112)
Computer Science (p. 117)
Geology (p. 120)
Geophysics (p. 124)
Mathematics (p. 126)
Pharmacology (p. 133)
Physics (p. 134)
Physiology (p. 140)
Zoology (p. 143)

Contemporary Science A—The Faculty of Science is offering again in 1969-70 this course in general science for non-science students. It fulfils the science requirement in the General Program B.A., has no prerequisites and will not be accepted as a prerequisite for other science courses. Much of today's most productive research is interdisciplinary in nature and the treatment will reflect this approach by using guest lecturers to treat certain contemporary issues in science. The selection of subjects will be influenced by current developments and it will be mainly from the physical sciences. Enrolment may be limited.
3 lecture/demonstration/laboratory hours—4

Contemporary Science B—This course will be offered by the Faculty of Science for the first time during 1969-70. The description and applications of the course will be similar to those of Contemporary Science A, except that it will be in the Life Sciences Area. Enrolment may be limited.
3 lecture/demonstration/laboratory hours—4

Science 200—History of Scientific Thought. An introductory course in the development and evolution of scientific ideas. 3 lecture/discussion hours—18

ANATOMY

Professors:

Robert Crawforth Buck, M.Sc., M.D.; Ph.D. London, Chairman of the Department

Murray Llewellyn Barr, B.A., M.Sc., M.D.; LL.D. Queen's, Toronto, Alberta and Dalhousie; Dr. med. h. c. Basel; F.R.S.C., F.R.C.P.(C), F.A.C.P.

Associate Professors:

Martin James Hollenberg, B.Sc. (Med.), M.D. Manitoba; M.Sc., Ph.D. Wayne
Kazumasa Hoshino, M.D., D.Med.Sc. Tokyo
Cyril Levene, M.B., B.Ch., B.A.O., M.D. Belfast
Donald Gilbert Montemurro, B.A., M.Sc., Ph.D.
Andrew Wilson, M.B., Ch.B., M.D. Glasgow

Associate Professor of Human Genetics:

Hubert Constantine Soltan, B.A., Ph.D. Toronto

Assistant Professors:

Gabriel Altmann, B.Sc. Dalhousie; M.Sc., Ph.D. McGill
Eric Werener Karl Fritz Donisch, M.D. Bonn; M.Sc.
Elias Bichara Gamal, M.B., B.Ch. Cairo, Ph.D.
David Graham Gwyn, M.B., B.Sc. London; Ph.D. Birmingham
Frederick Raymond Sergovich, B.A. McMaster; Ph.D.
Evelyn Louise Shaver, B.Sc., M.Sc., Ph.D.
Roderick Pataudi Singh, B.A., M.Sc., Ph.D.

Honorary Lecturers:

Carl Franz Robinow, M.D. Hamburg; F.R.S.C. (Professor of Bacteriology and Immunology)

David Burton Walden, B.A. Wesleyan; M.Sc., Ph.D. Cornell (Associate Professor of Botany)

Requirements for Admission: The admission requirements are determined by the prerequisites of the program selected for the Second Year (see page 20).

Second Year

One of:

(a) **Second Year of Program in Honors Biology**
For prerequisite and courses see page 111.

(b) ***Second year of Program in Honors Chemistry***
For prerequisite and courses see page 116.

(c) **Second Year of other Honors Programs**
With permission of the Department of Anatomy, a student may petition the Vice-President (Academic) for recognition of the Second Year of such other Honors Programs as permit inclusion of a course in Organic Chemistry.

Third Year

Principal Courses	Subsidiary Courses
Anatomy 300 Two of: Bacteriology 300; Biochemistry 300; Biophysics 300; Physiology 300 One of: Botany 255; Physiology and Pharmacology 301; Zoology 255, 270, 352	Two options

Mathematics 20, 24 or 27 or Applied Mathematics 20 is required as a subsidiary course of students who have not previously taken a university course in Mathematics.

Fourth Year

Principal Courses	Subsidiary Courses
Anatomy 440, 441, 460, 461, 462, 463, 464, 480	Two options selected with the advice of the Department of Anatomy. One of Mathematics 255, Botany 300, Psychology 255 or Zoology 465 is required if a course in statistics has not previously been taken.

COURSES

254. Functional Human Anatomy: For students in the Physical and Health Education Program. 1 lecture, 2 laboratory hours—29

HONORS COURSES

300. Histology: Survey of mammalian cytology, microscopic anatomy and neuroanatomy for Honors students. 2 lectures, 3 laboratory hours— 1

440. History of Scientific Ideas. 2 hours (half course)—3

441. Seminar: Presentation of assigned topics and discussion of current literature. 1 hour all year (half course)

460. Gross Anatomy: A survey of human anatomy, given only to Honors Anatomy Students. 2 lectures—7

461. Cell Structure: Cytology and histology with emphasis on recent developments, especially in electron microscopy.
Prerequisite: Anatomy 300 or equivalent 2 lectures (half course)—13

462. Cytogenetics: An examination of chromosome morphology and behaviour, including chromosomal abnormalities in man as causes of diseases.
2 lectures (half course)

463. Embryology: The principles of mammalian development.
2 lectures (half course)

464. Neuroanatomy: A course in the anatomy of the mammalian central nervous system, especially the brain of man. 2 lectures (half course)

480. Laboratory: The major laboratory course in various aspects of anatomy for students in the fourth year of the program. A minimum of 10 hours

APPLIED MATHEMATICS

Professor and Head of the Department:

John Henry Blackwell, E.D; B.Sc. Melbourne; M.Sc., Ph.D.

Professors:

Stanley Charles Rees Dennis, B.Sc., A.R.C.S., Ph.D. London
Joachim Benedict Ehrman, B.A. Pennsylvania; M.A., Ph.D. Princeton
James Davis Talman, B.A., M.Sc.; Ph.D. Princeton

Associate Professors:

Trevor M. Luke, B.Sc. Queen's; M.Sc., Ph.D. McGill
Morton A.H. Nerenberg, B.Sc., Ph.D. McGill
Ismail A. Sakmar, M.Sc. Istanbul; Ph.D. California, Berkeley

Assistant Professors:

A. Stanton Deakin, B.Sc. Carleton; M.A., Ph.D. Toronto
Eric Lewis, B.Sc., Ph.D. Bristol
Peter W. Manuel, B.Sc., M.Sc., Ph.D.
Peter W. Norey, B.Sc., Ph.D. London
Paul J. Sullivan, B.A.Sc., M.A.Sc. Waterloo; Ph.D. Cantab (Lecturer in the Faculty of Engineering Science) on leave 1969-70

GENERAL PROGRAMS

APPLIED MATHEMATICS MAJOR **B.Sc. Degree**

Second Year

Applied Mathematics 200
Applied Mathematics 202
Physics 250, 256
One option

Third Year

Applied Mathematics 300, 340
Three options

It is strongly recommended that Computer Science 200 or 34 and Physics 357 be included among the options selected.

HONORS PROGRAMS

Requirements for Admission: First year General Program with Applied Mathematics 20 (or Mathematics 24 or Mathematics 27) and Physics 20 as principal courses. For grades required for admission and progression see page 20.

Second Year*

Principal Courses
Applied Mathematics 200
Mathematics 250 or Applied Mathematics 202
Mathematics 256
Physics 250, 254, 255, 259

Subsidiary Course
One option selected in consultation with the Department of Applied Mathematics.

Third Year*

Principal Courses
Applied Mathematics 300, 350, 351b, 360a
Two of: Mathematics 350, 356, Physics 353, 357

Subsidiary Course
One option selected in consultation with the Department of Applied Mathematics.

Note: Students entering third year Applied Mathematics from second year Physics must take Mathematics 256 instead of one of their principal course options in third year. It may be possible for students to enter third year Applied Mathematics from second year Computer Science if they have the required prerequisites. They can obtain these requirements from the Department.

Fourth Year*

(1) Continuum Mechanics Option

Principal Courses
Applied Mathematics 400, 403b, 420, 452
Two of: Applied Mathematics 453, 454, 460, Physcis 453

(2) Theoretical Physics Option

Applied Mathematics 400, 403b, 420, 454
Two of: Applied Mathematics 452, Physcis 461 and 462, 453

*Students should consult the Department before choosing their principal course options.

COURSES

20. Introduction to Calculus and its Applications: An extensive treatment of the calculus of functions of one variable is given with emphasis on applications in the Sciences and in Engineering. Two of the four hours are devoted to a problems period during which time students receive individual attention.

Prerequisite: Grade 13 Mathematics A — 4 hours—30
(2 lecture hours plus a 2 hour tutorial)

200. Advanced Calculus and Vector Analysis: Vectors, three dimensional analytic geometry, functions of several variables, partial derivatives, extrema including the use of Lagrange multipliers, Taylor's formula, Jacobians, multiple integrals, integral theorems, vector fields, an introduction to ordinary differential equations.

Prerequisite: Applied Mathematics 20, Mathematics 24, or Mathematics 27.
3 hours—30

202. Matrices and their Applications: This course is to develop both technical proficiency in handling matrices and determinants, and an understanding of the relations of matrices to linear vector spaces. Applications to linear equations, geometry, eigenvalue problems and vibrations of mechanical and electrical systems will be emphasized. 3 hours—4

270. Engineering Mathematics II: For Second Year Engineering Science and for certain of the Natural Sciences. Partial differentiation, multiple integrals, infinite series including power series, an introduction to complex variables, elementary ordinary differential equations.

Prerequisite: Applied Mathematics 20, Mathematics 24, or Mathematics 27.
3 hours—20

300. Methods of Applied Mathematics I: Theory of ordinary differential equations, special functions, orthogonal function expansions, properties and solutions of some partial differential equations of mathematical physics, Sturm-Liouville problems, (3 hours a week). Functions of a complex variable, stressing their applications to Mathematical Physics, (1 hour a week). 4 hours— 1

340. Numerical Analysis and Statistics: An introduction to Numerical Analysis and Statistics. The first term is the same as Applied Mathematics 360a, and the second term is the second term of Applied Mathematics 470.
3 hours—14

350. Advanced Classical Dynamics: A logically connected development of classical mechanics including a thorough treatment of Lagrangian and Hamiltonian methods.

Prerequisite: Physics 250 3 hours—12

351b. Introductory Fluid Dynamics: An introduction to Fluid Dynamics, with principal emphasis on ideal fluid theory. 3 hours for one term— 7

360. Numerical Analysis: Accuracy of approximate calculations, interpolation, summation of series, numerical differentiation and integration, solution of numerical algebraic and transcendental equations, numerical solution of ordinary differential equations, least squares and harmonic analysis, numerical solution of simultaneous linear equations. Students are encouraged to use the digital computer. 3 hours—14

360a. Numerical Analysis: An introduction to Numerical Analysis and its applications, being the first term of Applied Mathematics 360.
3 hours for one term—14

370. Engineering Mathematics III: This is a general course in Applied Mathematics for Third Year Engineering students, covering the following topics. First term: finite differences, difference tables, interpolation, numerical differentiation and integration, numerical solutions of differential equations, direct

and iterative methods for solving linear algebraic equations. Second Term: linear algebra, elementary probability theory, Fourier series. 3 hours—26

380. Applied Mathematics for Chemists: Linear algebra, ordinary differential equations including Bessel and Legendre functions, vector calculus, Fourier series, partial differential equations, and elementary probability theory. 3 hours— 1

400. Methods of Applied Mathematics II: This course is concerned with techniques of problem solution in Applied Mathematics, especially with boundary values problems of partial differential equations. Topics discussed vary from year to year but usually include the following: Green's functions, integral equations, integral transforms, special topics in complex variable theory, approximation methods. 3 hours—19

403b. Applied Statistics: A course in Statistics for application similar to the second term of Applied Mathematics 470. 3 hours for one term— 6

420. Advanced Electromagnetic Theory: Simple radiating systems, special theory of relativity, relativistic particle kinematics, collisions between charged particles, energy loss and scattering, radiation by accelerating charges, bremsstrahlung, multipole fields. A general treatment of tensors may be included. 3 hours—24

452. Fluid Dynamics: An advanced course in Fluid Dynamics divided approximately equally between viscous fluid flow and gas dynamics. 3 hours—28

453. Solid Mechanics: A first course in the theory of the mechanics of the solid continuum, including elasticity and plasticity. 3 hours—22

454. Quantum Mechanics: Wave mechanics, axioms of quantum mechanics, harmonic oscillator, angular momentum, hydrogen atom, perturbation theory, elementary atomic and molecular structure, elementary scattering theory.
Prerequisite: Applied Mathematics 350 3 hours— 3

460. Advanced Numerical Analysis: A sequel to Applied Mathematics 360a, with particular attention given to the techniques required for numerical solution of ordinary and partial differential equations. 3 hours— 9

470. Engineering Mathematics IV: A sequel to Applied Mathematics 370 including the following topics. First term: Vector calculus, ordinary linear differential equations with variable coefficients, orthogonal function expansions, introduction to partial differential equations. Second term: Random variables and probability distributions, sample theory, statistical estimations, confidence intervals, curve fitting, experimental design. 3 hours—24

ASTRONOMY

Professor:

William H. Wehlau, A.B., Ph.D. California; Head of the Department, Director of the Observatories

Associate Professor:
David F. Gray, B.Sc. Wisconsin; M.Sc., Ph.D. Michigan

Assistant Professors:
John M. Marlborough, B.Sc., M.A. Toronto; Ph.D. Chicago
Romas Mitalas, B.A., M.A. Toronto; Ph.D. Cornell
James M. Moorhead, B.Sc., California Institute of Technology; M.A. U.C.L.A.

Lecturer:
Amelia W. Wehlau, A.B., Ph.D. California (part-time)

Honorary Lecturer:
Peter W. Manuel, B.Sc., M.Sc., Ph.D. (Assistant Professor of Applied Mathematics)

Requirements for Admission: First Year General Program (Natural Sciences) with Astronomy 20, Applied Mathematics 20 or Mathematics 24 or 27 and Physics 20, as principal courses. For grades required for admission and progression see page 20.

Students entering or continuing in the Honors Astronomy Program are required to consult with the Department for approval of their programmes.

Second Year

Principal Courses	**Subsidiary Course**
Astronomy 220	German 5 or Russian 1*
Applied Mathematics 202 or Mathematics 250	
Applied Mathematics 200 or Mathematics 278	
Physics 250, 254, 255, 259	

Third Year

Principal Courses	**Subsidiary Course**
Astronomy 320	German 35 or Russian 35*
Applied Mathematics 300	
Applied Mathematics 350 or Physics 350	
Physics 353, 357	
One additional Applied Mathematics or Physical Course at the 300 or 400 level	

Fourth Year

Principal Courses	**Subsidiary Course**
Astronomy 420	One course from Division A or B
Applied Mathematics 420 or Physics 455 and another half course	
Applied Mathematics 454 or Physics 451	

*In special circumstances alternative courses may be chosen by permission of the department.

Two additional courses at the 300 or 400 level, from Applied Mathematics, Geophysics, Mathematics or Physics

LIST OF UNDERGRADUATE COURSES

20. Astronomy I: An introduction to astronomy for students who are taking Applied Mathematics 20 or Mathematics 24 or 27 and Physics 20 or 22 concurrently, or who have completed these courses previously. The various fields of astronomy will be covered with an emphasis on the quantitative aspects. Selected topics of current interest will be treated in some detail.
3 hours—13

21. General Astronomy: Astronomy as a science including its historical development. Topics to be covered include Newton's laws of inertia, force and gravitation and Kepler's laws of motion; the solar system: planets, earth, sun, moon, comets, meteors; light, spectra, and astronomical equipment including radio and optical telescopes; stars: their nature, distances, motions, size, composition and evolution; star systems — open and globular star clusters, the milky way, stellar populations, and galaxies; the interstellar material: its density, composition and structure including types of nebulae; the universe, cosmology; selected topics of current interest. Quantitative development of the topics will be given as required. Occasional evening observations with the 6 inch refractor.
3 hours—13

HONORS COURSES

220. Astronomy II: Fundamental astronomy; computing; elementary orbit theory; binary stars.
Prerequisite: Astronomy 20 or permission of the instructor. 2 hours— 1

320. Astrophysics I: Radio Astronomy and Interstellar Material — Maxwell's equations, wave motion, emission and absorption of radiation; Fourier transforms, antennas, interferometers and radiation coherence; gas and dust in interstellar space studied by optical and radio methods, diffuse and reflection nebulae, interstellar clouds and magnetic fields. 3 hours— 6

420. Astrophysics II: Atomic and stellar spectra, gaseous state of matter and radiation; introduction to the internal structure of stars, to stellar evolution and to stellar atmospheres; stellar motions, galactic structure and stellar populations. 3 hours—11

BACTERIOLOGY AND IMMUNOLOGY

Professors:

Robert George Everitt Murray, B.A., M.A. Cantab.; M.D., C.M. McGill; F.R.S.C., Head of the Department

Philip Chester Fitz-James, B.S.A. British Columbia; M.S.A. Toronto; M.D., Ph.D.
Carl Franz Robinow, M.D. Hamburg; F.R.S.C.

Associate Professors:
Kaney Ebisuzaki, B.Sc., Ph.D. Wisconsin
John Robinson, B.S.A. British Columbia; M.Sc., Ph.D. McGill
James Edward Zajic, M.S. Wisconsin; Ph.D., J.D. Oklahoma

Clinical Associate Professors:
Alexander Bakerspigel, B.A., M.A. McMaster; Ph.D.
Leslie Arthur Hatch, M.B.B.S., Dip. Bact., M.C. Path, London

Assistant Professors:
Edward Lionel Medzon, B.Sc., M.Sc., Manitoba; Ph.D. McGill
Jacob Rozanis, M.Sc. Hebrew University, Israel; Ph.D. McGill
Nicholas Roderick Sinclair, B.Sc., M.D., Ph.D. Dalhousie
Gill Henric Strejan, M.Sc. Romania; Ph.D. Hebrew University, Israel
Peter Osborne Boyce Wilkins, B.M., New York; M.S. Hawaii; Ph.D. Pennsylvania

Clinical Assistant Professor:
Earl Wilson Robert Campsall, B.A. Queen's; M.D., C.M. McGill

Honorary Lecturers:
William Barnett Chodirker, B.Sc. (Med.) Manitoba; M.D. Manitoba
Christopher Lynton Hannay, B.S.A. Toronto; D.I.C., Ph.D. London
James Charteris Paterson, O.B.E., M.D., B.Sc. (Med.) Toronto
Eugene B. Roslycky, B.Sc., M.Sc. Manitoba; Ph.D. Wisconsin
John Howard Toogood, M.D. Toronto; Dipl. Int. Med. McGill; F.R.C.P.(C)

HONORS COURSES

Prerequisites for the Fourth Year course: Successful completion of previous year's program or permission of the Head of the Department.

300. Microbiology: A comparative study of the morphology, biology and relationships of algae, bacteria, fungi, protozoa and viruses. Given in collaboration with the Department of Botany. 2 lectures, 3 laboratory hours—16

440. History of Scientific Ideas: A history of scientific ideas given in collaboration with other Health Science Departments. 2 lectures (half course)—1

441. Seminar: The presentation of scientific reports and the writing of an essay on an assigned topic. 2 lectures (half course)—

460. Advanced Microbiology: An advanced treatment of the biology and physiology of microbes with particular emphasis on the bacteria and their viruses. 2 lectures—22

461a. Microbial Anatomy: A survey of cytological methods and applications to the understanding of the structure of procaryotic organisms and fungi. 2 lectures (half course)—9

462b. Virology: A survey of the structure and function of microbial, animal and plant viruses. 2 lectures (half course)—13

465. Microbial Biochemistry: Topics involving the biochemical activities and processes of microbes. (Given in collaboration with the Department of Biochemistry).

Prerequisites: Biochemistry 300, 406 or 456. 1 lecture (half course)—5

467a. Microbial Genetics: Aspects of genetics applying to microorganisms. (Given in collaboration with the Department of Botany)

2 lectures, 2 laboratory hours—26

470a. (Formerly 463a) Immunology: A course concerned with immunological theory and interpretation of basic and medically applied immune phenomena. (Given in collaboration with the Department of Medicine).

2 lectures (half course)—17

472b. (Formerly 464b) Immunochemistry: An advanced course dealing with the chemical structure of antigen and antibodies, with the molecular aspects of antigen-antibody reaction **in vitro** and **in vivo** and with modern techniques of immunochemical purification. Given in conjunction with a laboratory where students will become familiar with immunochemical techniques.

Prerequisite: Immunology 470a or its equivalent.

2 lectures (half course)—32

480. Laboratory and Tutorial: To give training in the techniques employed in modern microbiology with emphasis upon individual effort and resourcefulness. The tutorial will provide an opportunity for staff-student discussion and supplementation of both laboratory and lecture topics. Designed to accompany the lectures of Bacteriology 460, 461a, 462b, 465 and 470a.

Minimum of 10 hours

HONORS PROGRAMS

Requirements for admission:

The admission requirements are determined by the prerequisites of the program selected for the Second Year.

Students who plan to continue into graduate studies are advised to select courses which will satisfy the foreign language credit required by many graduate schools.

Second Year

Either

(a) Second year of program in Honors Biology
For prerequisites and courses see page 106.

Note: Mathematics 20, 24 or 27 or Applied Mathematics 20 is required for students who have not previously taken a university course in Mathematics.

or

(b) Second Year of other Honors Programs
With permission of the Department of Bacteriology and Immunology, a student who has completed First Year General Program (Arts or Social

Sciences), may petition the Vice-President (Arts and Science) for recognition of the Second Year of such other Honors Programs as permit inclusion of a course in Organic Chemistry.

Third Year

Principal Courses	**Subsidiary Courses**
Bacteriology 300	Two options
Biochemistry 300	
One course from each of the following groups	
(a) Anatomy 300, Biophysics 300 or Physiology 300	
(b) Botany 342, 353, Physiology and Pharmacology 301, Chemistry 353, 354 or Zoology 370	

Mathematics 20, 24 or 27 or Applied Mathematics 20 is required for students who have not previously taken a university course in Mathematics.

Fourth Year

Principal Courses	**Subsidiary Courses**
Bacteriology 440, 441, 460, 461a, 462b, 467a, 470a and 480	One of Botany 300, Psychology 255, Zoology 465 or Mathematics 255 if a suitable course in Statistics has not been taken previously.
One of: 465, 472b, or an additional course at the honors level approved by the department	

BIOCHEMISTRY

Professor and Chairman:

Harold Brown Stewart, M.D. Toronto; Ph.D. ibid; Ph.D. Cantab.

Professors:

Kenneth Kitchener Carroll, B.Sc., New Brunswick, M.Sc., ibid, M.A., Toronto, Ph.D. Western Ontario

Philip Chester Fitz-James, B.S.A. British Columbia, M.A., ibid, Ph.D., Toronto, F.R.S.C.

Roger James Rossiter, B.Sc., (U. of Western Australia), B.A. Oxon, M.A., ibid, D. Phil., ibid, B.M., ibid, B. Ch., ibid, D.M., ibid, F.R.I.C. (Eng.), F.R.S.C.

David Burrard Smith, B.A., British Columbia, M.A., ibid, Ph.D. Toronto

Kenneth Percy Strickland, B.Sc., Western Ontario, M.Sc., ibid, Ph.D., ibid

Charles Cross Bigelow, B.A.Sc., Toronto, M.Sc., McMaster, Ph.D., ibid

Associate Professors:

Fred Clark Heagy, M.D., Western Ontario, M.Sc., ibid, Ph.D., ibid

William Lovell Magee, B.Sc., Western Ontario, M.Sc., ibid, Ph.D., ibid

William Colin Campbell McMurray, B.Sc., Western Ontario, B.Sc., ibid, Ph.D., ibid

Ian Gardner Walker, B.A., Saskatchewan, M.A., Toronto, Ph.D., ibid

Donald D'Arcy Webling, B.Sc., Adelaide, M.B., ibid, B.S., ibid, Ph.D., ibid, D.T.M. and H, Sydney

Assistant Professors:

Judith Kelsie Ball, B.Sc., Mount Allison, M.Sc., Dalhousie, Ph.D., ibid
Valentine Donisch, M.D., Bonn, Ph.D. Western Ontario
John Richard Trevithick, B.Sc., Queen's, Ph.D., Wisconsin

Lecturers:

Paul David Gatfield, M.D., Queen's
Bruce Arthur Gordon, M.D.C.M., Queen's, M.Sc., ibid, Ph.D., ibid
David Samuel Milton Haines, B.A., Toronto, M.D., ibid, Ph.D., ibid

Honorary Lecturers:

William Chefurka, B.Sc., Manitoba, M.Sc., Montana, Ph.D. Harvard
Richard Morley Krupka, M.A., Saskatchewan, Ph.D. McGill

Requirements for Admission: The admission requirements are determined by the prerequisites of the program selected for the Second Year.

Students who plan to continue into graduate studies are advised to select options which will satisfy the foreign language credit required by many graduate schools.

Second Year

One of:

(a) Second Year of Program in Honors Biology
For prerequisites and courses see page 106. Note that one of Applied Mathematics 20, Mathematics 20, 24 or 27 will be required.

(b) Second Year of Program in Honors Chemistry
For prerequisites and courses see page 111.

(c) Second Year of other Honors Programs
With permission of the Department of Biochemistry, a student may petition the Vice-President (Arts and Science) for recognition of the Second Year of such other Honors Programs as permit inclusion of a course in Organic Chemistry.

Third Year

Principal Courses	Subsidiary Courses
Biochemistry 300	Two options
Two of: Anatomy 300, Bacteriology 300, Biophysics 300, Physiology 300	
One of: Botany 255, Chemistry 351, 353, 354, 374, Physiology and Pharmacology 301, Zoology 255	

Mathematics 20, 24 or 27 or Applied Mathematics 20 is required for students who have not previously taken a university course in Mathematics.

Fourth Year

Principal Courses	Subsidiary Courses
Biochemistry 440, 441, 460, 461b, 468a and 480	One option: to be selected from Botany 300; Mathematics 255; Psychology 255 or Zoology 465 if Statistics not previously taken.
Two of: Biochemistry 462a, 463b, 465, 467 or 469a,	One additional option with the permission of the Department of Biochemistry.
or	
A full course at the Honors level approved by the Department	

COURSES

46. General Biochemistry: A survey for General Program students.
Prerequisites: Chemistry 33, 203 or 313. 2 lectures, 3 laboratory hours—9

HONORS COURSES

300. General Biochemistry: A survey for Honors students.
Prerequisite: Chemistry 203, 253 or 313; Chemistry 204, 254 or 214
3 lectures, 2 laboratory hours—28

406. General Biochemistry: A survey for students in Honors Biology.
Prerequisite: Chemistry 33, 203 or 313. 2 lectures, 3 laboratory hours—9

440. History of Scientific Ideas: 26 lectures on the History and Development of Scientific Methods. 2 lectures (half course)

441. Seminar: The presentation of scientific papers and the writing of essays on assigned topics. 1 hour (half course)

456. General Biochemistry: A survey for students in Honors Chemistry. (Given in conjunction with the Department of Chemistry)
2 lectures (half course)—1

460. Advanced Biochemistry: An advanced treatment of enzymology and intermediary metabolism.
Prerequisites: Biochemistry 300, 406 or 456. 2 lectures—14

461b. Nucleic Acids, Protein Synthesis and Molecular Genetics: A discussion of the role of the nucleic acids in protein synthesis.
Prerequisites: Biochemistry 300, 406 or 456. 2 lectures (half course)—9

462a. Neurochemistry: A survey of the composition and metabolic processes of nervous tissue.
Prerequisites: Biochemistry 300, 406 or 456. 2 lectures (half course)—17

463b. Current Topics: A discussion of contemporary topics in the field of biochemistry.
Prerequisite: Biochemistry 300, 406 or 456 2 lectures (half course)—20

465. Microbial Biochemistry: (Given in collaboration with the Department of Bacteriology). A discussion of chemical processes peculiar to micro-organisms.
Prerequisites: Biochemistry 300, 406 or 456. 1 lecture (half course)—5

467. Plant Biochemistry: (Given in collaboration with the Department of Botany). A discussion of the chemical composition and metabolism of plant tissues.
Prerequisites: Biochemistry 300, 406 or 456. 1 lecture (half course)—9

468a. Physical Biochemistry: A discussion of the physicochemical properties of macromolecules of biological interest.
Prerequisites: Biochemistry 300 or 456. 2 lectures (half course)—36

469a. Biochemical Regulation: A lecture course with demonstrations or seminars dealing with the factors involved in the control of biochemical processes. 2 lectures (half course)—*28*

480. Laboratory and Tutorial: Designed to give training in techniques and methods at the advanced level; emphasis is laid upon individuality of work and resourcefulness. Tutorial provides opportunity for staff-student discussion and supplementation of both laboratory and lecture topics. 10 hours

BIOPHYSICS

Professor:

Alan Chadburn Burton, M.B.E., B.Sc. London; M.A., Ph.D. Toronto; LL.D. Alberta; F.R.S.C., F.R.S.A.; Chairman of Department

Associate Professors:

Alan Clifford Groom, B.Sc., Ph.D. London; F. Inst. P.
William Rodger Inch, B.Sc., Queen's; Ph.D.
Margot Ruth Roach, B.Sc. New Brunswick; M.D., C.M. McGill; Ph.D., F.R.C.P. (C)
Charles Patrick Stirling Taylor, B.A. British Columbia; B.A., M.A. Oxon, Ph.D. Pennsylvania

Assistant Professors:

Peter Bennett Canham, B.A.Sc. Toronto, M.Sc. Waterloo; Ph.D.
Ronald Ian Duncan, B.S., M.S., Ph.D. Oklahoma
Marvin Harold Sherebrin, B.Sc. Manitoba; M.Sc., Ph.D., P. Eng.
Robert Melvin Sutherland, B.Sc. Acadia; Ph.D. Rochester

Honorary Lecturers:

David Milroy Miller, B.Sc. Alberta; Ph.D. McGill
Donald Richard Miller, B.A., M.A., Ph.D. Toronto

HONORS PROGRAM

Requirements for Admission: The admission requirements are determined by the prerequisites of the program selected for the Second Year, except that Mathematics 24 or 27 or Applied Mathematics 20 and Physics 20 should have been included in the First Year.

All course selections must be made with the approval of the Chairman of the Department of Biophysics. During undergraduate training, the students should take at least one Physical Chemistry course, as much Mathematics or Applied Mathematics and as much Physics as possible.

Concerning the selection of an option in the Second and Third Years, students who plan to continue into graduate studies are advised to select courses which will satisfy the foreign language credit required by many graduate schools.

Second Year

One of:

(a) Second Year of Program in Honors Physics.
For prerequisites and courses see page 133.

(b) Second Year of Program in Honors Biology.
For prerequisites and courses see page 106.

(c) Second Year of Program in Honors Chemistry.
For prerequisites and courses see below 111.

(d) Second Year of other Honors Program. With permission of the Department of Biophysics, a student may petition the Vice-President, Academic for recognition of the Second Year of such other Honors Programs as permit inclusion of a course in Organic Chemistry.

Third Year

Principal Courses
Biophysics 300
Two of: Anatomy 300; Bacteriology 300; Biochemistry 300; Physiology 300; Physiology and Pharmacology 301.
Two Natural Science, Mathematics or Applied Mathematics Courses on the 200 or higher level.

Subsidiary Course
One option

Fourth Year

Principal Courses
Biophysics 440, 441, 460, 461a, 462b, 463a, 464b, 480

Subsidiary Courses
Mathematics 255 (unless approved course in statistics already taken).
One Natural Science, Mathematics, Applied Mathematics or Health Science course on the 200 or higher level.

HONORS COURSES

300. General Biophysics: A survey of the Physics of living things.
2 lectures, 3 laboratory hours—8

440. History: History of scientific ideas—given in collaboration with other departments. 2 lectures (half course)—2

441. Research Topics and Seminar: The presentation by students of scientific reports on laboratory projects and selected topics from the scientific literature. 1 lecture (half course)

460. Cellular Biophysics: The Physics of cell shape, size, surface properties, membrane diffusion and transport. Elasticity and viscosity of cells and body fluids: contraction of the muscle cell. 2 lectures—10

461a. Bioelectrical Phenomena: Bioelectric potentials, excitability and conduction, mechanism of biological transducers, and cybernetics.
2 lectures (half course)—15

462b. Environmental Biophysics and Radiobiology: Effects of environmental agents, natural or artificial, on living things; e.g. pressure, temperature, gaseous environment, gravity, electric and magnetic fields, and radiation, (microwave, infra-red, visible, ultra-violet, and ionizing radiation). The principles of Radiobiology. 2 lectures (half course)—6

463a. Biophysical Analysis: The application of physical and mathematical analysis to the physiological behaviour of living things, with a variety of examples. 2 lectures (half course)—30

464b. Bio-thermodynamics: Study of the transformations of energy in living things, applications of the laws of thermodynamics, energy exchanges with the environment, irreversible thermodynamics and the steady state.
2 lectures (half course)—20

480. Laboratory: This is the major laboratory course in experimental Biophysics for the 4th year students. Students are expected to spend as much time as possible in laboratory work. Minimum 10 hours weekly

BOTANY

Professors:

Clarence James Hickman, B.Sc., Ph.D. Birmingham, Head of the Department
Frankland Shaw Cook, B.A., Ph.D. Toronto
Bruce Gordon Cumming, B.Sc. Reading; Ph.D. McGill
Wilbert Ezekiel McKeen, B.Sc., M.Sc.; Ph.D. Toronto
Duncan Archibald McLarty, B.A.; Ph.D. Columbia
David George Wilson, B.A. Toronto and Queen's; M.A. Queen's; Ph.D. Wisconsin

Associate Professors:

Paul Brethen Cavers, B.S.A. Toronto; Ph.D. Wales
Richard I. Greyson, B.A. British Columbia; M.Sc., Ph.D. Oregon
Laszlo Orloci, B.S.F. Sopron; M.Sc., Ph.D. British Columbia
Robert B. van Huystee, B.A., M.A. Saskatchewan; Ph.D. Minnesota
David Burton Walden, B.A. Wesleyan; M.Sc., Ph.D. Cornell
Angela Myra Wellman, B.Sc., Ph.D. Bristol

Assistant Professors:

Alan Walter Day, B.Sc., Ph.D. Reading
Mary Dianne Fahselt, B.A. Saskatchewan; Ph.D. Washington
Robert Christopher Jancey, B.Sc., M.Sc. Southampton; Ph.D. Sydney
James Bird Phipps, B.Sc. Birmingham

Instructor:

Patricia Forbes Weese, B.Sc. Acadia, B.Ed. Alberta

Instructor (Curator)
John K. Johannesen, Diploma, Royal Agricultural College, Copenhagen

Honorary Lecturers (part-time):
William Harold Minshall, B.S.A. Toronto; M.Sc., Ph.D. McGill
Lloyd Thomas Richardson, B.A. McMaster; M.A., Ph.D. Toronto
Michael Anthony Venis, B.Sc. Reading, D.Phil. Oxon
Edward William Beswick Ward, B.Sc. Wales; M.Sc., Ph.D. Alberta

GENERAL B.A. DEGREE (Botany Major)

For a General Program B.A. with a major in Botany a student must pass sixteen courses which must include:

(a) One appropriate course from Division C (Biology 21)

(b) Two courses at the 20 level from:
English
Mathematics or Applied Mathematics
A language other than English

Select, before he enters the Second Year, a major subject consisting of four senior courses (number 30 or higher) in Botany.

Take in the Second Year:
Two courses in Botany
Three courses from at least two Divisions with no more than one from Division D.

Take in the Third Year:
Two courses in Botany
Three courses from at least two Divisions.
One Division D course may be included unless two Division D courses have been completed in Years I and II.

No more than six courses in Botany may be counted towards a degree.

No more than two courses from Division D may be counted towards a degree.

Out of the 10 courses required in the last two years of the program, at least seven must be senior courses.

For regulations regarding admission, progression and graduation see page 20.

Students are encouraged to include courses in general chemistry, biochemistry and mathematics in their options.

BIOLOGY (Botany Option)

Requirements for Admission: First Year General Program (Natural Sciences) including the following as principal courses: either Biology 22 OR both Botany 20 and Zoology 20, (Only biology 22 will be offered in 1969-70); Chemistry 20; Physics 20 or 22.

One of the following two programs must be taken:

OR

1.	2.
Biology 22	Botany 20
Chemistry 20	Zoology 20
Physics 20 or 22	Chemistry 20
One course from Division A	Physics 20 or 22
One course from Division B	One course from Division A
One of:	One course from Division B
Mathematics 20, 24, 27 or Applied Mathematics 20.	
Geology 20	
Course from Division A, B or D	

For grades required for admission and progression see page 20.

CAUTION: Program 2 will not be offered in 1969-70. All students entering Second Year should examine the prerequisites for courses which they expect to take in Second Year and subsequent years.

Second Year

Principal Courses	**Subsidiary Courses**
Botany 250	Chemistry 203
Botany or Zoology 255	Two of: Chemistry 204, Mathematics 20, 24, 27 or Applied Mathematics 20; Geology 20; Physics 204; a Division A or B course
Zoology 270	

CAUTION: All students entering Second Year should examine the prerequisites for courses which they expect to take in subsequent years.

All students entering Third and Fourth Years are required to participate in the Field Courses conducted by the Department.

All Third and Fourth Year students must consult the Head of the Department of Botany before registering in any of the courses prescribed for Third and Fourth Years.

Third Year

Principal Courses	**Subsidiary Courses**
Botany 300, 342, 351, 353, 357	Biochemistry 406, or an Honors Course other than Botany from Division C
	One option*

Fourth Year

Principal Courses	**Subsidiary Courses**
Botany 499	One course other than Botany from Division C
Four of: Botany 442, 443, 452, 453 454, 455, 457, 459, 460, 461, 471	One option*

*Students who plan to continue into Graduate Studies are advised to select courses which will satisfy the foreign language credit required by many graduate schools.

20. Introductory Botany: For students of First Year General Program (Natural Sciences); the general principles of Botany. (Not offered in 1969-70).
2 lectures, 3 laboratory hours—16

21. Biology: The fundamental principles of biology with stress on the cell as a unit, the origin and preservation of the individual and the race, the mode of inheritance, and the application of biology to social and economic problems. This course is given both in the Department of Botany and in the Department of Zoology. 2 lectures, 2 demonstration/tutorial hours—7

22. Biology: For students of First Year General Program (Natural Sciences) the fundamental principles of biology stressing the features common to all living organisms. This course is given both in the Department of Botany and in the Department of Zoology. 2 lectures, 3 laboratory hours—8

GENERAL PROGRAM COURSES

Students in the General BA program with a Botany major are encouraged to participate in the field courses (363 and 463). First and second year students are advised to consult the Head of the Department in the spring since the Field Courses are conducted prior to fall registration.

Students not registered in Honors Biology but who wish to take Honors level Botany courses must first obtain permission from the Head of the Department.

33. Plant Ecology: Methods of studying vegetation; environmental factors (physical and biological) that influence plant growth and distribution; development and distribution of plant communities.
Prerequisite: Botany 20, Biology 21, or Biology 22.
1 lecture, 3 laboratory hours—6

35. Genetics: Principles of heredity discussed at various levels of cellular organization, from the chromosome within the cell nucleus to populations of multicellular organisms, using plants and animals as illustrative material.
Prerequisite: Botany 20, Biology 21, or Biology 22. 2 lectures—13

36. Microbiology: Morphology, biology, classification and economic importance of micro-organisms.
Prerequisite: Botany 20, Biology 21, or Biology 22
1 lecture, 3 laboratory hours—3

37. Taxonomy and Phylogeny: Taxonomy and evolution with special references to flowering plants.
Prerequisite: Botany 20, Biology 21, or Biology 22
1 lecture, 3 laboratory hours—28

42. Plant Physiology: Aspects of the physiology of growth and development including growth regulation, reproduction and dormancy.
Prerequisite: Botany 20, Biology 21, or Biology 22
1 lecture, 3 laboratory hours—19

HONORS PROGRAM COURSES

Prerequisites for Second (250, 255), Third (300-363) and Fourth (442-499) year programs: successful completion of previous year's Biology program or permission of the Head of the Department.

Students not registered in Honors Biology but who wish to take Honors level courses must first obtain permission from the Head of the Department.

All students in second year who intend to enter the third year of the Botany option must consult the Head of the Department before the end of the second year in order to arrange for participation in the Field Course (363) which is conducted prior to registration in the fall.

250. Vascular Plants: Comparative morphology and anatomy of vascular plants with emphasis on the experimental approach to the study of growth and morphogenesis. 2 lectures, 3 laboratory hours—10

255. Genetics: Principles of heredity discussed at various levels of cellular organization, from the chromosome within the cell nucleus to populations of multicellular organisms, using plants and animals as illustrative material. 2 lectures, 3 laboratory hours—17

300. Biometrics: Study of statistical methods and their application to biological data. 1 lecture, 1 laboratory hour—31

342. Cell Biology: Structure and function of cells, with emphasis on cell types, organelles, and the biochemical and physiological processes occurring within them. 2 lectures, 3 laboratory hours—11

351. Microbiology: A comparative study of the morphology, biology and relationships of algae, bacteria, fungi and viruses. Given in collaboration with the Department of Bacteriology and Immunology. 2 lectures, 3 laboratory hours—16

353. Ecology and Developmental Physiology: Ecological and physiological considerations of plant survival, growth and development. 2 lectures, 3 laboratory hours—20

357. Plant Taxonomy: Theory of taxonomy. Numerical taxonomy with emphasis on Q-techniques. Study of selected genus. History of taxonomic practice and theory. 1 lecture, 3 laboratory hours—28

363. Field Course: A course of study of plants in their natural environment for students entering Third Year. Students should be prepared to meet part of the expenses of travel and subsistence.

442. Plant Biochemistry: Selected topics in plant biochemistry, including photosynthesis and nitrogen metabolism. Given in collaboration with the Department of Biochemistry. 1 lecture, 1 laboratory hour—9

443. Quantitative Plant Ecology: Sampling and description of natural communities. Analysis of distribution patterns. Ordination and classification procedures. 1 lecture, 1 laboratory hour—16

452. Plant Physiology: Selected topics of current interest in plant physiology. 1 lecture, 1 laboratory hour—30

453. Experimental Plant Ecology: Plant responses to environment under experimental conditions, plant competition, evolution and plant ecology.
1 lecture, 1 laboratory hour—6

454. Cytogenetics: The study of chromosomes and the genetic consequences of meiosis. 1 lecture, 1 laboratory hour—1

455. Microbial Genetics: Aspects of genetics applying to micro-organisms. Given in collaboration with the Department of Bacteriology and Immunology.
1 lecture, 1 laboratory hour—26

457. Evolution of Plants: Micro-evolution—gene flow, differentiation of populations; isolation of populations—with particular reference to cultivated plants. Micro-evolution—problems of homology; reliability of the fossil record; semilogical techniques of deriving phylogenies. Geographical-chronological evidences. Biochemical and physiological evolution.
1 lecture, 1 laboratory hour—36

459. Radiobiology: Nature and effects of nuclear radiations on living cells and organisms. Radioecology, Methodology. 1 lecture, 1 laboratory hour—34

460. Algae and Limnology: Morphology and biology of fresh-water algae with particular reference to their significance in natural waters.
1 lecture, 1 laboratory hour—21

461. Principles of Plant Pathology: Nature of plant diseases and of plant pathogens; relationships between host and pathogen; epidemiology of plant diseases; plant disease control. 1 lecture, 1 laboratory hour—10

463. Field Course: A course of study of plants in their natural environment for students entering Fourth Year. Students should be prepared to meet part of the expenses for travel and subsistence.

466. Bacteriology and Virology: Selected topics in bacteriology and virology with emphasis on current developments. 1 lecture, 1 laboratory hour—19

471. Mycology: Selected topics in mycology with emphasis on current developments. 1 lecture, 1 laboratory hour—14

499. Laboratory: A laboratory investigation in a selected field with presentation of a seminar and thesis. 9 laboratory hours

CHEMISTRY

Professor and Head of the Department:. .
Howard C. Clark, B.Sc., M.Sc., Ph.D. Auckland; Ph.D. Cantab

Professors:
Alan R. Allnatt, B.Sc., Ph.D. London
John C. D. Brand, B.Sc., M.Sc., Ph.D., D.Sc. London
Patrick W. M. Jacobs, B.Sc., M.Sc. Natal; Ph.D., D.Sc. London
James F. King, B.Sc., Ph.D. New Brunswick
Paul de Mayo, B.Sc., M.Sc., Ph.D. London
Andrew E. Scott, B.Sc., Ph.D. St. Andrews; Dean of the Faculty of Science

John B. Stothers, B.Sc., M.Sc.; Ph.D. McMaster
Edgar W. Warnhoff, A.B. Washington U.; Ph.D. Wisconsin

Associate Professors:

Howard W. Baldwin, B.A., M.A. Saskatchewan; Ph.D. Chicago; Assistant Dean, Faculty of Graduate Studies
Dino R. Bidinosti, B.Sc., M.Sc. Manitoba; Ph.D. McMaster
Donald M. Graham, B.Sc., M.Sc.; Ph.D. Brooklyn Poly. Inst.
Walter C. Howell, B.Sc., M.Sc., Ph.D.; Assistant Dean, Faculty of Science
R. Garth Kidd, B.Sc., M.Sc. Manitoba; Ph.D. London
John W. Lorimer, B.A., M.A., Ph.D. Toronto
William J. Meath, B.Sc. Carleton; Ph.D. Wisconsin
A. John Sukava, B.Sc., M.Sc. Manitoba; Ph.D. McGill
Christopher J. Willis, M.A., Ph.D. Cantab

Assistant Professors:

N. Colin Baird, B.Sc., Ph.D. McGill
Raymond K-C Chan, B.A., Ph.D. Toronto
Calliope Prevedorou-Demas, B.Sc. Alexandria; Ph.D. London
Peter Guthrie, B.Sc.; Ph.D. Harvard
Roland A. Haines, B.Sc., M.Sc. Dalhousie; Ph.D. Pittsburgh
Duncan H. Hunter, B.Sc. Alberta; Ph.D. U.C.L.A.
Nicholas C. Payne, B.Sc. London; Ph.D. Sheffield
Patricia Reynolds-Warnhoff, A.B. Trinity College, Washington, D.C.; M.Sc. M.I.T.; Ph.D. Southern California

Honorary Appointments:

Professors:

James W. Burns, B.A.Sc. New Brunswick; M.Sc. Queen's; LL.D.
Elvins Y. Spencer, M.Sc. Alberta; Ph.D. Toronto
J. Keith Watson, B.A., M.A. McMaster; M.A., Ph.D. Toronto; University Registrar

Lecturers:

Charles C. Bigelow, B.A.Sc. Toronto; M.Sc., Ph.D. McMaster
Kenneth K. Carroll, B.Sc. New Brunswick; M.Sc. Toronto; Ph.D.
William L. Magee, B.Sc., M.Sc., Ph.D.
David M. Miller, B.Sc., M.Sc. Alberta; Ph.D. McGill
J. Russell Robinson, B.S.A., M.S.A. Toronto; Ph.D.
Albert Stoessl, B.Sc., Ph.D. London
Kenneth P. Strickland, B.Sc., M. Sc., Ph.D.
G. Denis Thorn, B.Sc. Alberta; M.A. Queen's; Ph.D. McGill

PROGRAMS

The Department of Chemistry provides both an Honors Program, leading to an Honors B.Sc. degree after four years of study, and a General Program leading to a B.Sc. degree after three years of study. In either case the concentration in chemistry begins in the Second Year on successful completion of a First Year in a General Program.

The student should consult the general section of this Calendar for details of academic regulations, grades required for admission and progression, and the requirements for graduation which pertain to these programs of study in the Faculty of Science.

The Departmental requirements are outlined below.

B.Sc. HONORS

Requirements for Admission: First Year General Program (Natural Sciences), including Chemistry 20, Physics 20, and one of Applied Mathematics 20, Mathematics 24 or Mathematics 27, with all courses of the program as principal courses. Engineering Science I will be accepted as an equivalent First Year program.

For grades required for admission and progression see page 21. Admission is granted automatically to those completing first year with a grade average of 70% with no course grade below 60%. Students who fail to qualify for automatic admission but who complete the first year with a grade average of 60% or greater **should apply** to the Department for consideration.

Students who fail to obtain the standing necessary for continuance in Honors, or decide not to continue in Honors, may transfer to the General program, but must meet all requirements of that program.

Students who plan to continue into graduate studies are advised to select options which will satisfy the foreign language credit required by many graduate schools.

Second Year

Principal Courses
Chemistry 251, 253, 254
Applied Mathematics 270
Physics 250, 256

Third Year

Principal Courses	**Subsidiary Course**
Chemistry 351, 352, 353, 354, 374 Applied Mathematics 380 (under certain circumstances another course may be elected in consultation with the Chemistry Department).	One option

Fourth Year

Principal Courses	**Subidiary Course**
Chemistry 409, 459, 474 Three of: Chemistry 451, 453, 454; Physics 350, 356; Biochemistry 456.	One option

GENERAL B.Sc.

Requirements for Admission: A First Year General Program which includes Chemistry 20, Physics 20, and one of Applied Mathematics 20, Mathematics 24

or Mathematics 27. In some instances admission may be granted to a student lacking either Physics or Mathematics; however, in such instances the missing prerequisite must be included in the Second Year of study.

Admission to this program will be granted **only after consultation** with the Department **prior** to registration.

Courses offered by the Department usually follow a sequential form and often require some background in Mathematics and Physics. For these reasons, many senior courses have definite prerequisites and corequisites. Students are advised to study these carefully. To fulfill, in part, the requirements for a B.Sc. in this Program, a student must complete a minimum of **four** senior courses in Chemistry but may include up to a maximum of six senior courses. In any event, the program must include Chemistry 251, 253 and 254 and Physics 256. In addition, the inclusion of Applied Mathematics 270, or its equivalent, is strongly recommended.

A typical selection of courses is outlined below:

Second Year

At least two of: Chemistry 251, 253, 254
Applied Mathematics 270 or Mathematics 34
Options: a number elected to attain a total of five courses

Third Year

One of: Chemistry 251, 253, 254 (if not elected in second year)
At least one of: Chemistry 351, 353, 354, 374
Physics 256 (if not previously elected)
Options: a number elected to attain a total of five courses.

COURSES

20. General Chemistry: Primarily for students in First Year General Program (Natural Sciences) or First Year Engineering Science.
2 lectures, 3 laboratory hours—25

21. General Chemistry: A terminal course for students not intending to specialize in Science. 2 lectures, 1½ tutorial and lab. demonstration hours—25

25. General Chemistry: For students in Home Economics and Nursing Programs only.
Prerequisite: Grade 13 Chemistry 2 lectures, 3 laboratory hours—27

33. Organic Chemistry: For students in Home Economics and Nuring Programs only.
Prerequisite: Chemistry 25 Half course—2 lectures, 3 laboratory hours—1st term only—25

HONORS COURSES

203. Organic Chemistry: Intended primarily for students in Honors Biology and students interested in programs in the Health Sciences.
Prerequisite: Chemistry 20 2 lectures, 1½ laboratory hours—23

204. Physical Chemistry: For students in Honors Biology. (Familiarity with calculus is desirable for this course.)
Prerequisite: Chemistry 20 2 lectures, 1½ laboratory hours—2

211. Principles of Inorganic Chemistry: The application of current structural ideas and valence theory to inorganic systems. The laboratory work will involve the preparation and characterization of inorganic compounds. For students in Chemical Engineering Science.
Prerequisite: Chemistry 20 2 lectures, 3 laboratory hours—6

214. Elementary Physical Chemistry: An introduction to the laws of thermodynamics and their applications to chemical systems. For students in Engineering Science, Geology and Geophysics.
Prerequisite: Chemistry 20 and a full course in Calculus.
3 lecture hours—12

251. Principles of Inorganic and Analytical Chemistry: For students in Chemistry Programs.
Prerequisite: Chemistry 20 3 lectures, 4 laboratory hours—13

253. Elementary Organic Chemistry: Systematic discussion of the principal functional groups; elementary principles of chemical bonding, resonance, stereoisomerism, and reaction mechanisms; correlation of molecular structure and chemical reactivity. For students in Chemistry Programs.
Prerequisite: Chemistry 20 2 lectures, 3 laboratory hours—2

254. Elementary Physical Chemistry: An introduction into kinetic theory and thermodynamics. For students in Chemistry Programs.
Prerequisite: Chemistry 20 and a full course in Calculus 3 lecture hours—8

313. Elementary Organic Chemistry: For Chemical Engineering Students. Content similar to Chemistry 203. 2 lectures, 1½ laboratory hours—23

314. Intermediate Physical Chemistry: For Chemical Engineering students. Content similar to Chemistry 354. 3 lectures, 1½ laboratory hours— 7

351. Intermediate Inorganic Chemistry: Chemistry of the transition metals and their complexes; elementary ligand field and molecular orbital theory. For students in Chemistry Programs.
Prerequisite: Chemistry 251 2 lectures, 3 laboratory hours—4

352. Chemical Spectroscopy: Fundamental features of molecular spectroscopic methods in cluding ultraviolet, visible and infrared spectroscopy, magnetic resonance and mass spectroscopy.
Half course—2 lecture hours—first term only—26

353. Intermediate Organic Chemistry: For students in Chemistry Programs.
Prerequisite: Chemistry 253 or 203 3 lectures, 4 laboratory hours—34

354. Intermediate Physical Chemistry: Chemical thermodynamics, phase equilibria and electrochemistry. For students in Chemistry Programs.
Prerequisite: Chemistry 254 and Applied Mathematics 270 or equivalent
Prerequisite or corequisite: Physics 256 3 lectures, 3 laboratory hours— 7

374. Quantum Chemistry I: An introduction to the theory of atomic and molecular structure.
Prerequisite: Applied Mathematics 270, or equivalent 2 lecture hours—20

409. Laboratory: Designed to accompany the lecture work of the Fourth Year Honors Chemistry. 6 laboratory hours

451. Advanced Inorganic Chemistry: Selected topics. 2 lecture hours— 3

453. Advanced Organic Chemistry: Selected topics. 2 lecture hours—16

454. *Advanced Physical Chemistry:* *Statistical thermodynamics.* 2 lecture hours—19

459. Research and Seminar: 6 laboratory hours

474. Quantum Chemistry II: A continuation of Chemistry 374 2 lecture hours—31

COMPUTER SCIENCE

Professor:

John Francis Hart, B.A., M.A., Ph.D. Toronto; Head of the Department

Honorary Lecturers:

G. Lake, B.Sc. Queen's; Director of the Computing Centre

A. G. Slemon, B.A. Manitoba, M.A. Western, Ph.D. Toronto; (Professor of Psychology and Sociology, Althouse College)

Associate Professor:

G. Beckhoff, M.Sc. Southern Methodist, Dallas; Ph.D. Laval

J. K. Carroll, B.S. Lehigh, M.A. Hofstra, Ph.D. New York

Assistant Professors:

C. Dunham, M.A., U.B.C; Ph.D.

I. Gargantini, B.A. Milan, Ph.D. Milan

Z. W. Pylyshyn, Ph.D. Saskatchewan (Joint Appointment with Psychology)

Lecturers:

B. Arnett, B.Sc. California

M. Bennett, B.Sc. Queen's; M.A.

K. Dewdney, B.S., M.A., Waterloo

R. Newkirk, B.Sc.

P. Suttie, B.A.Sc. Toronto

Instructors:

A. G. Wilford, B.A. Queen's; M.A. Toronto

A. Szilard, B.A., M.A.

K. Langland, B.A. Saskatchewan

PROGRAMS

General B.Sc.

Requirements for Admission: First Year (Arts, Social Sciences or Natural Sciences) (see page 19) with Computer Science 20 and one of Mathematics 20, 24, 27, Applied Mathematics 20.

Second Year

Principal Courses	**Subsidiary Courses**
Computer Science 31, 34	One other course from Division C*
	Two other courses

Third Year

Principal Courses	**Subsidiary Courses**
Two of Computer Science 41, 42, 43 (304 or 313 may be taken by consent of the department)	Two other courses from Division C*
	One other course

*Two senior Mathematics courses are required (approval may be given for a course such as Statistics taught in a department other than Mathematics)

General B.A.

Requirements for Admission: First Year (Arts or Social Sciences see page 19)with Computer Science and Mathematics requirements as for General B.Sc.

Principal Courses	**Subsidiary Courses**
Computer Science 31, 34	Two senior Mathematics courses
Two of Computer Science 41, 42, 43	

HONORS

Requirement for Admission: First Year General Program (Arts, Social Sciences or Natural Sciences) with Mathematics 20, 24, 27 or Applied Mathematics 20 as a principal course. Computer Science 20 is required.

Second Year

Principal Courses	**Subsidiary Courses**
Computer Science 200, 206	Two options from the Natural Sciences or Social Sciences
Applied Mathematics 202 or Mathematics 250 and one of Mathematics 256, Applied Mathematics 200	One option

Third Year

Principal Courses	**Subsidiary Courses**
Computer Science 304, 306, 313	One option from Natural Sciences or Social Sciences
Two Mathematics or Applied Mathematics courses at the 300 level	

Fourth Year

Principal Courses	**Subsidiary Courses**
Computer Science 404, 405	Two courses at the 300 or 400 level from Natural Sciences or Social Sciences
Mathematics 453	One option

COURSES

20. Computer Science: This course provides an over-all view of the entire field of Computer Science. Students will have an opportunity to learn to program and to solve problems on the computer. In addition, they will study the more theoretical aspects of the subject relating to the nature of machines and information, general systems, cybernetics and automata.

Computer Science belongs to Division C, the Natural Sciences. Topics in this subject are of interest in Humanities as well as in science for they are valuable as a basis for interdisciplinary studies. 3 lectures, 1 laboratory hour—6

31. Elements of Information Processing: An introductory course on the use of a digital computer in data processing applications; emphasis on programming fundamentals, information retrieval, general systems theory, and computer hardware, including the evaluation of computer systems.

2 lectures, 2 laboratory hours—6

34. Digital Computer Programming: An intensive course in computer programming for students in the General Programme or for Honors students in the Social Sciences or Humanities. Emphasis on a compiler language and its applications to computer-oriented statistics, numerical analysis, simulation, and non-mathematical problems.

Prerequisite: A first year course in Mathematics.

2 lectures, 2 laboratory hours—26

34A. Designed for other Majors who want a terminal course.

34B. Computer Science Majors.

41. Advanced Information Processing: Students are required to complete one major Electronic Data Processing project during the year. Lecture topics include: the study of the COBOL language, sorting, file maintenance and information retrieval, simulation, real time systems, time sharing.

Prerequisite: C.S. 31 or COBOL language 2 lectures, 2 laboratory hours—34

42. Scientific Applications of Digital Computers: The structure and basis of algorithms for solving scientific problems on the computer. Topics in numerical methods, applied statistics and operations research, e.g. solution of sets of linear equations and differential equations, regression analysis and test of hypotheses, simulation, linear and dynamic programming.

Prerequisite: ALGOL or FORTRAN programming, one of Mathematics 30, 34, 35 2 lectures, 2 laboratory hours—10

43. Computer Logic and Programming: Theory of Boolean Algebra and switching circuits, basic logical elements of digital computer, logical design of computer components, software systems — compilers, interpreters, monitor systems, design of languages.

Prerequisite: A course in programming 2 lectures, 2 laboratory hours—20

HONORS COURSES

200. Digital Computer Programming: A thorough introduction to computer programming techniques, with emphasis on FORTRAN, machine language, numerical methods and statistics.

Prerequisite: A course in Mathematics 3 lectures, 2 laboratory hours—26

206. Seminar: A study of General Systems concepts and their relationship to Information Science. 1 hour

304. Advanced Operating Systems: This is a system programming course providing background and experience in connection with large scale computer utilities. A detailed exposition of modern computer hardware and software is accompanied by laboratory exercises in the design of a specific system function.
Prerequisite: An introductory course in Computer Science covering basic machine language programming tools 2 lectures, 2 laboratory hours—19

306. Seminar — General Systems: Applications from the technical standpoint. Introduction to the analysis of linear systems with emphasis on feedback systems, applications to biological systems. 1 hour

313. Computer Logic and Design: Theory of Boolean algebra, and switching circuits, basic logical elements of the digital computer, logical design of computer components, theory of automata.
Prerequisite: A course in computer programming and a senior course in Mathematics. 2 lectures, 2 laboratory hours—7

403. Introduction to Computing Algorithms: Algorithmic aspects of traditional problems in numerical analysis (linear algebra, iterative methods, polynomial interpolation, numerical integration and differentiation, numerical solution of ordinary differential equations, difference methods for partial differential equations, error analysis). 2 lectures, 2 laboratory hours—5

404. Theory of General Systems: A study of the mathematical theories related to General Systems and their applications in Computer Science.
3 hours—23

405. Simulation Laboratory: Construction of mathematical models of various natural and social systems and their computer solutions. Monte Carlo methods, simulation languages. 2 lectures, 2 laboratory hours—2

413. Non-Numeric Computing: One semester of programming techniques for non-numeric computation, including translation of algebraic languages, and artificial intelligence programs; one semester on Theory of Computability, i.e. Turing machine and recursive function theory, mathematical machine theory and formal language theory.
Prerequisite: Mathematics 350 (taken previously or concurrently), and Computer Science 200 2 lectures, 2 laboratory hours—17

GEOLOGY

Professor and Head of the Department:
C. G. Winder, Ph.D., Cornell

Professors:
A. Dreimanis, Mag. rer. nat., Riga
G. H. Reavely, M.A.; D.I.C. London
G. G. Suffel, Ph.D., Stanford
R. W. Hutchinson, Ph.D. Wisconsin

Associate Professors:
W. R. Church, Ph.D., Wales
A. D. Edgar, Ph.D. Manchester
R. N. Farvolden, Ph.D., Illinois
A. C. Lenz, Ph.D., Princeton
J. Starkey, Ph.D., Liverpool
P. G. Sutterlin, Ph.D., Northwestern
G. M. Young, Ph.D., Glasgow

Assistant Professors:
M. E. L. Fleet, Ph.D., Manchester
N. D. MacRae, Ph.D., McMaster

Honorary Lecturers:
R. M. Quigley, Ph.D., Massachusetts Institute of Technology, Associate Professor of Engineering Science
H. C. Palmer, Ph.D., Princeton, Associate Professor of Geophysics

GENERAL PROGRAM

Students may complete a Three Year General Program for a B.A. degree with a Geology major by completing four or more honors courses. Normally Geology 20 or Geology 21 with a B minimum are prerequisite for second year courses. The 400 category courses are primarily for honors students. Before starting the program, the student should discuss his objectives with the Head of the Department.

HONORS PROGRAM

Requirements for admission: First Year General Program (Natural Sciences). The Honors geology student should select Geology 20, Chemistry 20, Applied Mathematics 20 or Mathematics 24 or 27, and either Physics 20 or Biology 22. The following are considered alternates to corresponding courses listed above —Mathematics 20, Physics 22, Botany 20 or Zoology 20. Any three Natural Sciences courses will be considered the principal courses. The Honors geology student should have completed at least one elementary university course in each of Chemistry, Physics, Mathematics and Biology before entering the Third Year.

Before registering in the Second, Third and Fourth Year, the Honors student must consult with the Head of the Department or his deputy. Generally the courses of one year are requisite for courses in the next year. Students should have completed at least one summer of field experience before entering the Fourth Year. For grades required for admission and progression see page (20).

Second Year

Principal Courses	**Subsidiary Courses**
Geology 200, 210, 219, 275	Two of: Chemistry 214; Applied Mathematics 270; Zoology 370.

One of: Physics 20; Biology 22 or Physics 256*

* Students who are still contemplating Geophysics (II) should elect Physics 256, Chemistry 214, and Applied Mathematics 270.

Immediately after final examinations, the Department conducts a field camp (Geology 200, 300) ten day's duration in which Second and Third Year students are required to attend. The cost of each session will not exceed $60.

Third Year

Principal Courses	**Subsidiary Courses**
Geology 300, 320, 340, 350, 360, 367	One of: Option of the second year, Chemistry 354, Computer Science 34, Geography 431, Zoology 270. OR An elementary or intermediate course in Scientific German, Russian or French OR A Humanities or Social Sciences course.

Fourth Year

Principal Courses	**Subsidiary Courses**
Geology 400 Three of: Geology 415, 420, 425, 430, 450, 463, 475; Geophysics 365; Engineering Science 426.	One of: an advance science course, including Geology. OR Intermediate course in a scientific language. OR A Humanities or Social Sciences course.

A student may substitute a science course in a closely related field for one selected geology provided permission is given by the Head of the Department.

COURSES

20. Introductory Geology: Minerals and rocks; geological processes and their results; structure of the earth; fossils; interpreting the earth's history; economic mineral deposits. 2 lectures, 3 laboratory hours—34

21. Geological Science: A survey of the Earth Sciences; the relation of Geology to the other sciences. 2 lectures, 2 laboratory hours—34

60. Earth History: Principles of rock nomenclature and correlation, Geologic time, Mountain building, Principle of uniformitarianism, The Evolution of Life, History of the earth's surface from Precambrian to the present, with emphasis on the Paleozoic and Mesozoic, Recent theories of continent and ocean basin development.

Prerequisite: Geology 20 or 21 Extension only.

HONORS COURSES

200. Mapping Procedures: Involving aerial photo interpretation, pace and compass techniques. Emphasis on lithological examinations.
Prerequisite: Two honors courses including Geology 219
Offered at field camp: (Half course)

215. Introductory Mineralogy and Crystallography: Symmetry; Stereographic projection; derivation of the crystal classes; systematic morphological crystallography; practical determination of point group symmetry; chemical bonding and packing models; structural chemistry and paragenesis of the rock forming minerals and their identification in hand specimen and thin section.
2 lectures, 3 laboratory hours—5

219. Optical Mineralogy and Petrography: Light transmission in minerals; mineral identification using the polarizing microscope; lithology and spatial distribution of rock bodies; map interpretation.
2 lectures, 3 laboratory hours—13

275. Invertebrate Paleontology: Classification, morphology and ecology; evolution; index fossils and their geologic and geographic ranges, some plants and vertebrates. 2 lectures, 3 laboratory hours—27

300. Field Investigation: The chief emphasis will be on structural geology and igneous, metamorphic and sedimentary geology. Geology of the Huronian and rocks of the Sudbury basin. Geophysical, economic and Pleistocene field studies are included.
Prerequisite: Geology 20 and at least 4 honors courses
Offered at field camp (half course)

320. Petrography: Megascopic and microscopic description and classification of igneous, sedimentary and metamorphic rocks.
Prerequisite: Geology 210 and 219 2 lectures, 3 laboratory hours—15

340. Structural Geology: Primary and induced structures in igneous, sedimentary and metamorphic rocks; the physical properties of rocks and the effects of stress application; the interpretative topography; earth's structure and mountain building. Laboratory work will include the interpretation of geologic structures from maps.
Prerequisite: Geology 210 and 219 2 lectures, 3 laboratory hours—31

350. Mineral Deposits: Principal types of metallic ore deposits including their origin. Laboratory study of ore and gangue minerals, ore suites, using the ore microscope.
Prerequisite: Geology 210 and 219 2 lectures, 3 laboratory hours—4

360. Stratigraphy and Historical Geology: Principles of correlation, classification, paleogeography and geologic time. History of the Canadian Shield.
Prerequisite: Geology 210 and 275 5 hours per week—11

367. Glacial and Pleistocene Geology: Glaciers and their work; glacial and extraglacial deposits, their structure and landscape forms; Pleistocene stratigraphy, especially of eastern North America; economic aspect of Pleistocene deposits. Laboratory exercises and field trips.
Prerequisite: Geology 20 or 21 and permission 5 hours—20

391. Geology for Engineers: Introduction to minerals, rocks, weathering, transportation, deposition and glacial geology. Engineering properties of geologic minerals; application of principles of weathering to the deterioration of construction materials; ground water seepage conditions and their influence on slope stability; glacial soils and their importance in engineering practice. Case histories of engineering projects markedly influenced by site geology.
5 hours, one term: (Half course)

400. Senior Thesis: An original study including field observations, laboratory investigations and literature survey. One and one-half courses

415. Advanced Mineralogy and Introductory X-ray Crystallography: Universal Stage, its mineralogy and petrographic uses; advanced mineralogical concepts illustrated by reference to the crystal chemistry and structural crystallography of selected mineral groups; introductory X-ray crystallography, powder methods. 2 lectures, 3 laboratory hours—16

420. Igneous Petrogenesis: Principles of silicate phase equilibria, theories of igneous differentiation with examples from selected localities. Laboratory study of petrographic methods and problems, seminars.
2 lectures, 3 laboratory hours—3

425. Metamorphic Petrogenesis: Principles, classification and the facies concept. Physical-chemical principles involved in their genesis. Laboratory study of petrographic methods and calculations, seminars.
2 lectures, 3 laboratory hours—35

430. Geochemistry: Element abundancies; meteorites; trace element geochemistry; application of thermodynamics to geological problems; sedimentary geochemistry; isotope geochemistry; polymorphism. 3 lectures—24

450. Economic Mineral Deposits: The occurrence and production of ores of the principal metals, with a study of outstanding examples. Laboratory work consists of (a) a series of reports based on original sources and (b) studies of specific ore deposits, with emphasis on microscopic examination. (Not offered 1969-70). 1 lecture, 5 laboratory hours—7

463. Sedimentation and Stratigraphy: Types of sediments and their habitat, conditions within the environment. Stratigraphic concepts of unit nomenclature, correlation and facies. Laboratory exercises in sediment analysis and map interpretation. 2 lectures, 3 laboratory hours—11

475. Invertebrate Macropaleontology: Advanced study of corals (rugose and tabulate), graptolites and Paleozoic brachiopods, with emphasis on stratigraphic occurrence, morphology and classification. Study of principles of taxonomy, evolutionary concepts, use of fossils in zonation and environmental influence. 2 lectures, 3 laboratory hours—32

GEOPHYSICS

Professors:

Alan Edward Beck, B.Sc. London; Ph.D. Australian National University. Head of Department.

Charles Murray Carmichael, B.Sc., M.Sc., Ph.D.

Visiting Professor:
One

Honorary Professor:
Robert James Uffen, B.A.Sc., M.Sc. Toronto; Ph.D.

Associate Professors:
Lalu Mansinha, B.Sc., M.Tech, I.I.T. Kharagpur; Ph.D. British Columbia
Robert Frank Mereu, B.Sc.; M.Sc. Toronto; Ph.D.
Henry Currie Palmer, B.Sc., St. Francis Xavier; Ph.D. Princeton

Assistant Professor:
Helmuth Herman Schloessin, B.Sc., Zurich; Ph.D., Cologne

GEOPHYSICS I (Physical)

Requirements for Admission: First Year General Program (Natural Sciences) with Physics 20 and Mathematics 24 or Applied Mathematics 20 as principal courses, and Geology 20.

Students planning to enter a graduate school are advised to select courses which will satisfy the foreign language credit required by many graduate schools.

Second Year

(Content identical with second year Honors Physics)

Principal Courses
Physics 250, 254, 255, 259, 269

Subsidiary Courses
Mathematics 250 or Applied Mathematics 202
Applied Mathematics 200
One option

Third Year

Principal Courses
Geology 210, 219
Geophysics 365
Physics 350, 356, 357

Subsidiary Courses
Applied Mathematics 300
Geology 200

Fourth Year

Principal Courses
Geology 340
Geophysics 470
Physics 455 and 461
Two full course equivalents from:
Astronomy 320, 420
Geology 320, 350, 430
Applied Mathematics 400
Physics 451, 353, 462, 464, 465

Subsidiary Courses
Geophysics 458
One option

If a student had Physics 355 in his third year he must take Physics 356 in his fourth year.

GEOPHYSICS II (Geological)

Requirements for Admission: First Year General Program (Natural Sciences) with Physics 20 and Geology 20 as principal courses, Mathematics 24 or Applied Mathematics 20 and Chemistry 20.

Students planning to enter a graduate school are advised to select courses which will satisfy the foreign language credit required by many graduate schools.

Second Year

(Satisfies requirements of Second Year Honors Geology with permission of Head of Geology Department)

Principal Courses	**Subsidiary Courses**
Geology 200, 210, 219, 275	Chemistry 214
Physics 256	Applied Mathematics 270

Third Year

Principal Courses	**Subsidiary Courses**
Geology 300, 320, 340, 350	Applied Mathematics 380
Geophysics 365	One option

Fourth Year

Principal Courses	**Subsidiary Courses**
Geophysics 470	Geophysics 458
Physics 356	One option
Two of Geology 360, 367, 415, 420, 425, 430, 450	

HONOR COURSES

21. Physics of the Earth: A survey of: origin and development of the earth and solar system; constitution of the earth; tectonophysics; oceanography; meteorology; application of physical and chemical methods to oil and mineral exploration. 2 lectures, 2 laboratory hours—18

(Open only to students who do not intend to enter an Honors Science Program.)

365. General Geophysics: An introductory course in the various geophysical problems associated with gravity, magnetism, seismology, radio-activity, and the internal constitution of the earth, with applications to geophysical exploration. 2 lectures, 2 laboratory hours—27

458. Geophysics Seminars: This is a course in which the students are required to prepare and present orally papers on specified topics; the papers are also written up in a style normally used for published papers.

470. Thesis: A report on a field or laboratory study conducted by the student. One full course

MATHEMATICS

Professor and Head of the Department:
David Borwein, B.Sc. Witwatersrand; Ph.D., D.Sc. London; F.R.S.E.

Senior Professor:
Randal H. Cole, B.A.; M.A., Ph.D. Wisconsin

Professors:
Mir M. Ali, B.Sc., M.Sc. Dacca; M.S. Michigan; Ph.D. Toronto
Gordon R. Magee, B.A.; M.S., Ph.D. Chicago (part time)
John T. Moore, B.A.; M.A. Wisconsin; Ph.D. Chicago
Derek Naylor, B.Sc., Ph.D. London
Leland F.S. Ritcey, B.A. Mount Allison; M.A. Harvard; Ph.D. Chicago; A.S.A. (Ritcher Memorial Chair of Actuarial Mathematics)

Associate Professors:
Anne E. M. Bode, B.A., M.A. Saskatchewan (Administrative Assistant)
Lai K. Chan, B.Sc., Hong Kong Baptist College; M.A., Ph.D.
Donald O. McKay, B.A., M.A., Ph.D. Buffalo
Bruce L. R. Shawyer, B.Sc., Ph.D. St. Andrews
Thomas H. Wonnacott, B.A.; Ph.D. Princeton

Assistant Professors:
Richard G. Biggs, B.Sc. Stanford; Ph.D. British Columbia
Robert N. Bryan, B.A., M.A., Ph.D. Utah
F. Peter A. Cass, B.Sc., M.Sc. Victoria (Wellington, New Zealand); Ph.D.
Jay L. Delkin, B.A. Reid; M.A. British Columbia
John B. Florence, M.A. St. Andrews; M.Sc. Newcastle-upon-Tyne; Ph.D. Simon Fraser
M. Safiul Haq, M.A., Ph.D. Toronto
Allan G. Heinicke, B.Sc., M.Sc. Manitoba; Ph.D. British Columbia
Clive M. Reis, M.A. Oxford; Ph.D. Michigan State
Irvine J. W. Robinson, B.A., M.A. Queen's
T. M. Viswanathan, B.A. Madras; M.Sc. Assumption; Ph.D. Queen's

Lecturers:
Geoffry Horrocks, M.A. Oxon; F.S.A.; F.C.I.A., A.I.A. (part-time)
John A. Mereu, B.A.; F.S.A., F.C.I.A. (part-time)
Emile Y. State, B.Sc. Toronto; M.A. Illinois

PROGRAMS

Requirements for Admission: First Year General Program with Mathematics 24 or 27 or Applied Mathematics 20 and any two other courses as principal courses. For grades required for admission and progression see page 20. For requirements concerning joint Honors Program in Philosophy and Mathematics see page 55. For Honors Program in Economics, Mathematics Option, see page 155.

Students who plan to continue into graduate studies are advised to take French or a foreign language if they have not already done so in their first year.

Second Year

Principal Courses	**Subsidiary Courses**
Mathematics 250, 256, 278	Two options. A student intending to proceed in the Actuarial Mathematics Program should choose Mathematics 253 as one of these options

Third and Fourth Years

In the Third and Fourth Years, a student may elect one of four programs.

A student who has completed the Second Year of the Computer Science Program may be permitted to enter one of the Programs 1, 2, or 3 provided Mathematics 256 has been taken in the second year. Such a student must take Mathematics 278 before the end of third year.

MATHEMATICS (Program I)

Third Year

Principal Courses	Subsidiary Courses
Mathematics 350, 356	Two options
One other Mathematics course numbered 300 or above.	

Fourth Year

Principal Courses	Subsidiary Courses
Two of Mathematics 450, 456, 460	One option
Two Mathematics courses numbered 300 or above.	

ACTUARIAL MATHEMATICS (Programme 2)

Program 2 will prepare students to write the Preliminary Actuarial Examinations, Parts 1 and 2, prepared by the Educational Testing Service, and also to write Parts 3 and 4 of the Actuarial Examinations. Each year these examinations, which may be written in London, will be held in May and November. Applications to write the examinations must be received by the Society of Actuaries not later than April 1 and October 1 respectively.

Third Year

Principal Courses	Subsidiary Courses
Mathematics 353, 355, 356	Two options. One of these options must be Mathematics 253 if it has not been taken previously.

Fourth Year

Principal Courses	Subsidiary Course
Mathematics 463, Three Mathematics courses numbered 300 or above.	One option

MATHEMATICAL STATISTICS (Program 3)

Third Year

Principal Courses	Subsidiary Course
Mathematics 355, 356	Two options
One Mathematics course numbered 300 or above	

Fourth Year

Principal Courses	**Subsidiary Courses**
Two of Mathematics 445, 453, 455, 456.	One option
Two Mathematics courses numbered 300 or above, one of which must be Mathematics 350 if not taken previously.	

MATHEMATICS, ECONOMICS OPTION (Program 4)

Requirements for Admission: First Year General Program with Mathematics 24 or 27 and Economics 20 as principal courses.

Second Year

Principal Courses
Economics 230, 255
Mathematics 250, 256, 278

Third Year

Principal Courses
Economics 340
Mathematics 355, 356, 378
One of Economics 237, 351

Fourth Year

Principal Courses	**Subsidiary Course**
Economics 360	One option
Mathematics 350, and 445 or 455	
One Mathematics or Economics Course numbered 300 or above.	

SUBJECT REQUIREMENTS FOR THE B.Sc. DEGREE—Mathematics Major

The Department of Mathematics offers the following Programs:

A. Mathematics 30, 32, 34 and at least one of Mathematics 31, 35, 40, 44.
B. Mathematics 250, 256, 278, and at least one of Mathematics 340, 350, 351, 355, 363, 463.

Other programs may be set up in consultation with the Department of Mathematics.

The prerequisite for program A is Mathematics 20 or 24 or 27 or Applied Mathematics 20. For any other program the prerequisite is Mathematics 24 or 27 or Applied Mathematics 20.

GENERAL B.A. DEGREE—Mathematics Major

A student may take a general B.A. program with a Mathematics major if he has previously taken one of Mathematics 20, 24, 27, or Applied Mathematics 20.

20. Introductory Calculus and Algebra: An introduction to calculus; a study of logic, set theory, probability theory, and the algebra of vectors and matrices.
Prerequisite: Grade 13 Mathematics A or Mathematics B. 3 lectures,—30

24. Calculus: Differential and integral calculus with applications.
Prerequisite: Grade 13 Mathematics A and Mathematics B.
3 lectures and 1 tutorial hour—30

27. Introductory Calculus: For students with either Grade 13 Mathematics A or Grade 13 Mathematics B. Students with both Mathematics A and B should take Mathematics 24.
Prerequisite: Grade 13 Mathematics A or Mathematics B.
4 lectures and 1 tutorial hour—30
Note: Applied Mathematics 20 is an acceptable alternative for Mathematics 24 or 27.

30. Algebra: Introduction to modern algebra: rings, domains, fields, groups, polynomials, matrices, determinants.
Prerequisite: Mathematics 20 or 24 or 27. 3 hours—19

31. Synthetic Geometry: Groups of transformations of the Euclidean plane, inversion, and coaxal systems; the projective plane.
Prerequisite: Mathematics 20 or 24 or 27. 3 hours—35

32. Analytic Geometry: Euclidean geometry of two and three-dimensional spaces studied with extensive use of vector and matrix methods.
Prerequisite: Mathematics 20 or 24 or 27. 3 hours—5

34. Calculus: Review of anti-differentiation; uniform continuity, Riemann integral, indeterminate forms, improper integrals, Taylor's formula; functions of several variables, partial differentiation, multiple integration; line and surface integrals; infinite sequences and series; ordinary differential equations.
Prerequisite: Mathematics 20 or 24 or 27. 3 hours—9

35. Statistics: Standard probability distributions; sampling distributions; estimation; test of hypothesis, analysis of variance; regression and correlation.
Prerequisite: Mathematics 20 or 24 or 27. 3 hours—30

40. Elementary Theory of Numbers: Euclidean algorithm, congruences, indices, continued fractions, Gaussian integers, partitions and Diophantine equations.
Prerequisite: Mathematics 20 or 24 or 27. 3 hours—22

44. Complex Variable: Complex numbers, elementary point set topology, Cauchy-Riemann conditions, integration, Cauchy's Theorem and applications, residue calculus and applications, Fourier series.
Prerequisite: Mathematics 20 or 24 or 27. 3 hours—9

230. Algebra: Finite dimensional vector spaces, linear transformations and matrices, linear equations, quadratic forms, eigenvalues and eigenvectors, vector spaces over the complex numbers.
Prerequisite: Mathematics 20 or 24 or 27. 3 hours—19
(Not offered 1969-70)

250. Linear Algebra: Vector and matrix algebra, determinants, linear transformations, linear equations, canonical forms. Applications to bilinear forms, quadratic forms, geometry, systems of linear differential equations.
Prerequisite: Mathematics 24 or 27. 3 hours—14

253. Mathematics of Finance: Compound interest, annuities certain, amoritization, sinking-fund, bonds; the mortality table; life annuities, standard forms of life insurance; commutation functions.
Prerequisite: Mathematics 24 or 27. 3 hours—17

254. Mathematics for the Social Sciences: Advanced calculus and linear algebra. Topics include maximizing functions, differential and difference equations, and the algebra of n dimensional vector spaces as far as eigenvectors and quadratic forms. Cannot be taken for credit by students in Mathematics programs.
Prerequisite: Mathematics 20 or 24 or 27 3 hours—1

255. Statistical Methods: An introductory, practical course intended primarily for honors students in departments other than mathematics. Topics include sampling, confidence intervals, analysis of variance, regression and correlation. Cannot be taken for credit by students in Mathematics programs.
2 hours for one term—12

256. Analysis 1: Elementary point set topology, sequences, limits, continuity, basic properties of the Riemann integral. Series: tests for convergence, rearrangements, uniform convergence, multiplication of series, power series. Differentiation, mean value theorems. The above topics to be discussed with reference to Euclidean n-space where appropriate.
Prerequisite: Mathematics 24 or 27. 3 hours—2

278. Advanced Calculus: Sequences and series; Indeterminate forms; Taylor's formula; Functions of several variables; Partial differentiation; Coordinate transformations; Extrema; Vectors; Integral as a function of a parameter; Improper integral; Multiple integration; Line and surface integrals; Integral theorems; Uniform convergence; Ordinary differential equations.
Prerequisite: Mathematics 24 or 27. 3 hours—30

For each 300 course, the prerequisites are Mathematics 230 or 250 and 256 or 278, or the consent of the instructor. For each 400 course consent of the instructor is required.

340. Number Theory: Divisibility, congruences, quadratic reciprocity, some functions of number theory, Diophantine equations, continued fractions, the distribution of primes, algebraic numbers, partitions. 3 hours—22

350. Algebra 1: Introduction to abstract algebraic systems; elementary theory of groups, rings, fields; establishment of real and complex fields.
3 hours—25

351. Geometry 1: Synthetic Euclidean geometry; synthetic and analytic methods in projective geometry. 3 hours—9

353. Finite Differences: Advancing differences, interpolation, divided differences, central differences, inverse interpolation, summation, approximate integration; applications to life contingencies; theory of graduation. 3 hours—5

355. Statistics 1: Standard distributions; sampling distributions; sampling from finite population; estimation; test of hypothesis; design of experiments; analysis of variance and regression analysis; nonparametric methods; sequential analysis. 3 hours—23

356. Analysis II: Real variables; sequences, improper integrals, series, Fourier series, Fourier integral, Fourier transform, Riemann-Stieltjes integral. Complex variables; integration and differentiation of a function of a complex variable, Taylor and Laurent series, conformal mapping, residues. 4 hours—31

363. Numerical Methods: Accuracy of approximate calculations, interpolation, summations of series, numerical differentiation and integration, solution of numerical algebraic and transcendental equations, numerical solution of difference equations and differential equations, least squares and harmonic analysis, numerical solution of simultaneous linear equations, use of digital computers in problem solving. 3 hours—14

378. Differential Equations: Ordinary differential equations, solution in series, Green's functions for second order equations. Eigenvalue problems, simple eigenfunction expansions. Partial differential equations, method of characteristics. 3 hours—1

445. Theory of Probability: Probability measure, Lebesque-Stieltjes and Riemann-Stieltjes integrals for n variables; Fourier integrals, matrices and quadratic forms; Beta and Gamma functions; orthogonal polynomials; mathematical expectation; correlation and regression, distribution theory; limit theorems, asymptotic distributions; significance tests. 3 hours—31

450. Algebra II: Elementary factorization theorems; field theory; Galois theory; groups with operators, semi-simple rings, general factorization theorem. 3 hours—8

452. Geometry II: Algebraic Geometry. Affine and projective varieties; divisors; Riemann-Roch Theorem; additional topics to be selected. 3 hours—35

453. Methods of Operations Research: Optimization (Linear, Quadratic, and Dynamic Programming, Lagrange multiplier, etc.). Applied Probability (Queuing theory, Markov Chains, etc.). Miscellaneous Topics (Theory of Games, graphs, etc.).

Prerequisite: Mathematics 230 or 250, and 256 or 278. 3 hours—17

455. Statistics II: Distributions in R^n ; sampling theory and distributions; theory of estimation; fiducial inference; testing of hypothesis; analysis of variance; design of experiments and balanced designs; multiple correlation and regression; multivariate analysis; time series. 3 hours—21

456. Analysis III: Basic point set topology, advanced real variable theory, introduction to measure and integration theory. 3 hours—11

460. Introductory Topology: Metric spaces, topological spaces, connectedness, compactness, separation axioms, Tietze extension theorem; simplicial complexes, classifications of compact 2 manifolds. 3 hours—18

463. Life Contingencies: General Life annuities and insurances, net and gross premiums, reserves, non-forfeiture values, combination benefits, joint annuities, last survivor annuities, generalized multiple life annuities, contingent assurances, reversionary annuities, population tables, multiple decrement tables. 3 hours—25

464. Ordinary Differential Equations: Existence theorems; general linear equation, matrix systems, adjoint systems, Green's function, expansion problems; stability theory. 3 hours—33

465. Multivariate Statistical Analysis: Matrix theory; Normal distributions; Correlations. 3 hours—13

468. Differential Geometry and Tensor Calculus: Theory of curves, Serret-Frenet formulae; curvilinear co-ordinates, first and second fundamental forms, geodesics, Codazzi equations, Gauss-Botten theorem. Introduction to differential geometry in the large. Introduction to n-dimensional Riemannian geometry, tensor analysis and general relativity. 3 hours—27

470. Foundations of Mathematics: Formal systems; first-order theories, the completeness theorem, one of the standard axiomatic set theories. Development of mathematics from set theory emphasizing the number systems of mathematics. Discussion of various philosophies of mathematics. 3 hours—24

478. Linear Operators: Continuous operators in normed spaces, linear functionals, contraction mappings, Hilbert space, adjoint operators, completely continuous operators, fixed point theorems, applications to integral equations and boundary value problems. 3 hours—19

488. Complex Analysis: Harmonic, entire and meromorphic functions, infinite products, the Gamma function, normal families, conformal mapping and Riemann mapping theorem. Elliptic functions, Picard Theorem, analytic continuation and Riemann surface of a function. 3 hours—24

PHARMACOLOGY

Professors:

Charles Willis Gowdey, B.A., M.Sc.; D.Phil. Oxon.;
Head of the Department
John Mulvin Parker, M.D. Manitoba; D.P.H., Ph.D. Toronto

Associate Professors:

Ernest Howard Colhoun, B.S.A. Toronto; Ph.D. Cantab.
John Thomas Hamilton, B.Sc., Ph.D. Edinburgh
Richard Blain Philp, D.V.M. Guelph; Ph.D.

Assistant Professor:

Maurice Hirst, B.Sc., Ph.D. Liverpool

HONORS COURSES

Prerequisites for Fourth Year courses: Successful completion of previous year's program or permission of the Head of the Department.

301. General Physiology and Pharmacology: (Given in collaboration with the Department of Physiology.) A survey of the principles of general physiology and pharmacology. 2 lectures—31

440. History of Scientific Ideas: 2 hours (half course)—3

441. Seminar: The preparation of essays and the presentation of scientific reports or papers on assigned topics in pharmacology. 2 hours (half course)

460. Advanced General Physiology and Pharmacology: (Given in collaboration with the Department of Physiology.) The physiology and pharmacology of the cell, excitable tissue, transport of water and solutes, energy exchange.
2 lectures—8

461. Chemical Pharmacology: Pharmacological screening, pharmacodynamics, structure-activity relationships, metabolism and toxicology of selected drug classes. 2 lectures—13

480. Laboratory and Tutorial: A course of training in the techniques employed in modern pharmacological investigations. Opportunity for original projects will be provided. The tutorial will supplement both lecture and laboratory work. Minimum of 10 hours.

PHYSICS

Professors:

Eric Brannen, B.A., M.A. Toronto; Ph.D. McGill;
Senior Professor
A.M.I.A.W. Durnford, B.A., M.A.; Ph.D. Toronto
Harry Ian Symons Ferguson, B.Sc., M.Sc., Ph.D.
Peter Allan Forsyth, B.A., M.A., Saskatchewan; Ph.D. McGill; F.R.S.C.
Peter Arthur Fraser, B.Sc.; M.S. Wisconsin; Ph.D.
Donald Ross Hay, B.Sc., M.Sc.; Ph.D. McGill; Senior Professor
Gordon Frederick Lyon, B.A., M.A., Ph.D. Saskatchewan
J. William McGowan, B.Sc. St. F.-X.; M.Sc. Carnegie Tech.; D.Sc. Laval;
Chairman of the Department
Eric Lloyd Vogan, B.Sc., M.Sc.; Ph.D. McGill

Associate Professors:

Y. F. Bow, B.S. National Chakiang; M.S., Ph.D. Michigan State
Heinrich Roman Froelich, B.Sc. Berlin; M.Sc., Ph.D.
James Arthur Fulford, B.Sc., Ph.D.
Donald Ross Moorcroft, B.A.Sc., M.Sc., Toronto; Ph.D. Saskatchewan
Rama Murty, B.Sc. Andhra; M.Sc., Dip Lib. Bombay; Ph.D.; A. Inst. P.
Graham Stewart Rose, B.Sc., Ph.D. Birmingham
B. Y. Tong, B.Sc. Hong Kong; M.L.S., M.A., Ph.D. California (San Diego)
Thomas William Wallace Stewart, B.Sc., M.Sc.; Ph.D. London

Assistant Professors:

D. F. Gallaher, B.A.Sc. Br. Columbia; M.A. Toronto; M.Sc. Br. Columbia;
Ph.D. Washington
William Ross Jarmain, B.A.; M.A. Wisconsin
P. K. John, B.Sc. Kerala; M.Sc. Madras; Ph.D. Ohio State
James Jones, B.Sc., Ph.D. Sheffield

Robert Peter Lowe, B.Sc., Ph.D.
P. W. Whippey, B.Sc., Ph.D. Reading

Lecturer:
Derek Lane-Smith, B.Sc., M.Sc. Manchester

Sessional Lecturer:
John Campbell Forrester MacDonald, B.A., M.A. British Columbia; Ph.D. Toronto

SUBJECT REQUIREMENTS FOR THE B.Sc. DEGREE

Physics Major
Physics 250 and 256 and Applied Math 270 in the second year.
Physics 356 and 367 in the third year.
Other programs may be set up in consultation with the Physics Department.

HONORS PROGRAMS

PHYSICS

Requirements for Admission: First Year General Program with Physics 20 and Applied Mathematics 20 or Mathematics 24 or 27 as principal courses. For grades required for admission and progression see page 20.

Concerning the selection of subsidiary course options in the Second, Third and Fourth Years, only one may be chosen from Division C. Students who plan to continue into graduate studies are advised to select courses which will satisfy the foreign language credit required by many graduate schools.

Students who are primarily interested in the application of Mathematics to the Physical Sciences are referred to the Honors Applied Mathematics (Program 4) with Physics options. Admission to the Third Year of this Program is open to students who have completed the Second Year of Physics.

Second Year

Principal Courses	**Subsidiary Courses**
Applied Mathematics 200	One option
Mathematics 250 or Applied Mathematics 202	
Physics 250, 254, 255, 259, 269	

Third Year

Principal Courses	**Subsidiary Courses**
Applied Mathematics 300	One option
Physics 350, 353, 356, 357, 359	

Fourth Year

Principal Courses	**Subsidiary Courses**
(1969-70 only)	One option
Physics 451, 453, 458, 459, 461, 462	
One full-course senior option or two half course senior options as approved by the Department	

Principal Courses	Subsidiary Courses
(To be introduced in 1970-71)	One option
Physics 451, 455, 458, 459	
Five half-course senior options or $2\frac{1}{2}$ full course senior options, as approved by the Physics Department; at least $1\frac{1}{2}$ of these shall be physics courses	

PHYSICS: MAJOR-MINOR

Requirements for Admission: First Year General Program with Physics 20 and Applied Mathematics 20 or Mathematics 24 or 27 as principal courses.

The Department will accept students for Major-Minor Honors Programs who elect their Minors in Biology, Chemistry, Geography, Applied Mathematics, Mathematics and some other subjects. All such programs require the approval of the chairman of the Department.

The number of honors courses in the Minor will normally be five. Students electing a Minor other than Mathematics will be required to include Applied Mathematics 270 or equivalent in the Second Year.

Normally the Program will be as follows:

Second Year

Principal Courses	Subsidiary Courses
Physics 250, 256	Two options
Two courses from the Minor	

Third Year

Principal Courses	Subsidiary Courses
Physics 350, 356, 357	One option
Two courses from the Minor	

Fourth Year

Principal Courses	Subsidiary Courses
(1969-70 only)	One option
Physics 350, 367, 453	
One course from the Minor	
(To be introduced in 1970-71)	
Physics 353, 359	Two options
Two half-course or one full-course physics option	
One course from the Minor	

COURSES

20, 22. Introductory Physics: A discussion of the basic concepts of classical mechanics, kinetic theory of matter, thermodynamics, electricity and magnetism and modern physics at the elementary level. For students who are intending to specialize in the natural sciences. Those students who have taken or are taking Mathematics 24 or 27 or Applied Mathematics 20 will take Physics 20.

2 lectures, 3 laboratory hours—22

21. Introductory Modern Physics: A treatment at the elementary level of the experimental facts of modern physics and the interpretation of these facts in terms of atoms and molecules, electrons and other particles, and quantized energy. The necessary concepts from classical physics are reviewed and conservation laws are stressed. For students who do not intend to proceed to any honors course in physics. 3 lecture-laboratory hours—31

33. The Physics of Music and Sound: An introduction to acoustics with applications to the production and transmission of musical sounds; including wave motion; sound waves and their characteristics; vibratory sources of sound; harmony and scales; hearing; electronic recording, reproduction and synthesis of sound; acoustics of buildings and building materials. Open to students in the Faculty of Music and those students with some formal musical training who are not pursuing a major in physics. 3 lecture-laboratory hours—7

38. Selected Readings in Physics: A discussion course in which detailed study is made of writings selected from among the original works describing major achievements in physics and from among those commenting on the achievements. Enrolment may be limited.

Prerequisite: Physics 20, 21 or 22. 2 discussion hours per week

HONORS COURSES

203. Fundamentals of Meteorology: Meteorological elements and instruments for their measurement, including temperature, pressure, wind, relative humidity, cloud forms and precipitation. A physically oriented treatment of air masses and fronts, cyclones and anticyclones, with applications of thermodynamics to adiabatic changes in dry and moist air; stability, instability, convection and turbulence. Special topics such as luminous atmospheric phenomena and severe types of storms.

Prerequisite: Physics 20 and Applied Mathematics 20 or Mathematics 24 or 27. 2 lectures—18

204. Intermediate Physics for Biologists: Material in electricity and magnetism, atomic and nuclear physics, directed where possible towards an understanding of current usefulness to man. This leads into a detailed study of radiation physics, with emphasis on biological applications.

Prerequisite: Physics 20 or 22.

2 lectures, 3 laboratory hours alternate weeks—27

250. Classical Mechanics: Vector algebra including triple products, a kinematic description of motion and the logical development of classical mechanics of single particles and systems starting with a critical analysis of Newton's Laws.

Prerequisite: Physics 20 and Applied Mathematics 20 or Mathematics 24 or 27. 2 lectures—12

254. Optics: A detailed discussion at the intermediate level of geometrical optics, physical optics and quantum optics. Laboratory experience with the phenomena discussed is provided by Physics 259, which, if not taken previously, must be taken concurrently.

Prerequisite: Physics 20 and Applied Mathematics 20 or Mathematics 24 or 27. 2 lectures—36

255. Electricity and Magnetism: A detailed discussion at the intermediate level of the laws and principles of electricity and magnetism. Laboratory experience with the phenomena discussed is provided by Physics 259, which, if not taken previously, must be taken concurrently.

Prerequisite: Physics 20 and Applied Mathematics 20 or Mathematics 24 or 27. 2 lectures—8

256. Light; Electricity and Magnetism: An intermediate course in geometrical and physical optics; electrostatics, magnetism; and electromagnetism.

Prerequisite: Physics 20 and Applied Mathematics 20 or Mathematics 24 or 27. 3 lectures, 3 laboratory hours—31

259. Laboratory: To accompany second year honors physics courses.

Prerequisite: Physics 20. 3 laboratory hours

259E. Laboratory: Selected experiments from Physics 259 for engineering students.

Prerequisite: Physics 20. 3 laboratory hours

269. Laboratory and Tutorial: Designed to augment the experiments of Physics 259, with particular emphasis upon experimental design, treatment of data and analysis of experimental results.

Co-requisite: Physics 259. 3 laboratory/tutorial hours

350. Classical Mechanics: The Lagrangian formulation of classical mechanics is developed and applied to various problems including relativistic motion and normal mode analysis. Hamilton's equations are derived and applied to phase space analysis. The course lays the classical groundwork for quantum mechanics and statistical mechanics.

Prerequisite: Physics 250 and Applied Mathematics 200 or 270. 2 lectures—12

353. Statistical and Thermal Physics: Introduction to the basic concepts of statistical mechanics, the interpretation of temperature and entropy in equilibrium systems and derivation of the laws of thermodynamics.

Prerequisite or corequisite: Physics 350 and Physics 357. 2 lectures—36

356. Applied Electronics: A study of the operation and applications of electronic and solid state devices and circuits.

Prerequisite: Physics 255 or 256. 2 lectures, 2 laboratory hours—13

357. Atomic Physics: The physics of atoms, molecules, electrons and energy quanta, with emphasis on the experimental facts that led to the quantum theories.

Prerequisite: Physics 250, 254 and 255 or equivalent. 2 lectures—19

359. Laboratory and Tutorial: Designed to familiarize the student with the more detailed phenomena and effects of classical physics together with some of the basic concepts of modern physics.

Prerequisite: Physics 259 or 256. 6 laboratory/tutorial hours

367. Advanced General Physics: Topics in (a) electromagnetic theory, (b) atomic and molecular physics, (c) the physics of solids and (d) nuclear and particle physics. Quantum mechanical ideas are introduced in (b), (c) and (d).

Prerequisite: Applied Mathematics 270, Physics 250 and 256 (or equivalent), or permission of Chairman of Department.

3 lectures and 3 laboratory hours—33

417. Communication Circuits: A study of high-frequency transmission line theory; Maxwell's equations and their application to antenna and wave-guide systems; radio systems modulation and detection and introduction to radio noise theory. For engineering students. 3 lectures—25

451. Quantum Mechanics: A first course in quantum mechanics.
Prerequisite: Physics 350, 357 and Applied Mathematics 300. 2 lectures—35

453. Thermodynamics and Statistical Mechanics: Introductory course beginning with the basic concepts of probability, then applying these ideas to systems of particles in equilibrium, the general statements of microscopic thermodynamics, followed by a treatment of macroscopic thermodynamics.
Prerequisite: Physics 350 and 357 or equivalent. (Not offered after 1969-70) 2 lectures—29

455. Electromagnetic Theory: The theory of static and dynamic electric and magnetic fields leading to Maxwell's equations and the solutions describing propagation of plane electromagnetic waves.
Prerequisites: Physics 255 or 256 and Applied Mathematics 300. (Not offered until 1970-71) 3 lectures first-term only (half course)—25

458. Seminar: The presentation of a scientific paper before students and members of the faculty, and the writing of an essay upon an assigned topic.
1 hour (half course)

459. Laboratory and Tutorial: Designed to give training in the techniques and methods of measurement in modern physics: emphasis is laid upon individuality of work and resourcefulness. The tutorial supplements the fourth year lecture work.
Prerequisite: Physics 359. 9 laboratory/tutorial hours

461. Solid State Physics: An introductory course covering the thermal, electric and magnetic properties of crystalline matter.
Prerequisite: Physics 350 and 357. 2 lectures for 1 term (half course)—7

462. Nuclear Physics: An introduction to nuclear and particle physics.
Prerequisite: Physics 350 and 357. 2 lectures for 1 term half course—7

463. Atmospheric Physics: Basic concepts of physics applied to atmospheric phenomena.
Prerequisite or corequisite: Physics 353.
2 lectures for 1 term (half course)—3

464. Atomic and Molecular Physics: Interactions of atoms and molecules with photons, charged particles and each other.
Prerequisite: Physics 254 and 357 2 lectures for 1 term (half course)—3

465. Plasma Physics: An introduction to the properties of highly-ionized gases and a discussion of the diagnostic techniques used to investigate them.
Prerequisite: Physics 455 or 355. 2 lectures for 1 term (half course)—24

466. Radio Physics: A discussion of selected topics in circuit analysis, transmission line theory and the propagation of radio waves.
Prerequisite: Physics 455 or 355. 2 lectures for 1 term (half course)—24

479. Laboratory: Designed to accompany the lecture work of Physics 417.
6 hours per week

PHYSIOLOGY

Professors:

James Alexander Franklin Stevenson, B.S., M.S., M.D., C.M. McGill; F.R.S.C., Head of the Department
Gordon James Mogenson, B.A., M.A. Saskatchewan; Ph.D. McGill
George Waldemar Stavraky, M.D. Odessa; M.Sc., M.D., C.M. McGill; F.R.S.C.

Associate Professors:

David Thomas Armstrong, B.S.A. Ont. Agricultural College, M.S., Ph.D. Cornell
Donald Clarence Bondy, M.D. Western, F.R.C.P. (C)
Franco Romano Calaresu, M.D. Milan, Ph.D. Alberta
Jerry Burdette Critz, B.S. in Ed., M.A., Ph.D. Missouri
Peter Glynn Dellow, B.D.S., M.B., B.S. Adelaide, F.A.C.D.S.
Jerome Joseph Seguin, B.S., M.Sc., Ph.D. (Western)
Cornelius Hendrik Vanderwolf, B.Sc., Alberta, M.Sc., Ph.D. McGill

Assistant Professors:

John Patterson Girvin, M.D. Western, Ph.D. McGill, F.R.C.S. (C)
Paul George Richard Harding, M.D., M.Sc. Western, F.R.C.S. (C)
George Greenough Hinton, B.Sc., M.D., C.M. McGill, D.C.H., F.R.C.P. (C)
Paul Frederick Mercer, D.V.M. Toronto, Ph.D. Cornell
Bruce Paul Squires, B.A., M.D., Ph.D. Western

Honorary Appointments:

Lecturers:
Jackson Sandford Hart, B.A., M.A., Ph.D. Toronto, F.R.S.C.
George William Manning, M.A., M.D., Ph.D. Toronto, F.R.C.P.(C)
Francis John Rounthwaite, B.Sc., M.D., C.M. McGill, F.R.C.S.(C)

HONORS PROGRAMS

The admission requirements are determined by the prerequisites of the program selected for the Second Year (see page 21). In choosing options in these programs, a university course in Mathematics, required for the Honors Program in Physiology, and a university course in Physical Chemistry, required for Biochemistry 300, should be considered.

Students who plan to continue into graduate studies are advised to select courses which will satisfy the foreign language credit required by many graduate schools.

Second Year

One of:

(a) **Second Year of Programs in Honors Biology**
For prerequisites and courses see page 106.

(b) **Second Year of Program in Honors Chemistry**
For prerequisites and courses see page 111.

(c) **Second Year of Program in Honors Physics**
For prerequisites and courses see page 133.

(d) **Second Year of other Honors Programs**

With permission of the Department of Physiology, a student who has completed the First Year of General Program (Natural Sciences) may petition the Vice-President (Arts and Science) for recognition of the Second Year of other Honors Programs. If these do not include Organic Chemistry, the student must take Organic Chemistry in the Third Year.

Third Year

Principal Courses
Physiology 300
Physiology and Pharmacology 301
Two of: Anatomy 300, Bacteriology 300, Biochemistry 300 or 406, Biophysics 300, Botany 255, Zoology 352.
Chemistry 203, 313 or 33 may be required for students who have not previously taken Organic Chemistry.
Applied Mathematics 20 or Mathematics 20, 24 or 27 is required of students who have not previously taken a university course in Mathematics.

Subsidiary Courses
Two options

Fourth Year

Students may choose either the Physiology option, or the Physiology and Pharmacology option in this last year of the program.

PHYSIOLOGY OPTION

Principal Courses
History of Scientific Ideas 440
Physiology and Pharmacology 460
Physiology 441, 461, 462, 463, 464, 480

Subsidiary Courses
One option from:
Botany 300; Psychology 255; Zoology 465 (only if statistics not previously taken)
One additional option with permission of the departments of Physiology and Pharmacology

PHYSIOLOGY AND PHARMACOLOGY OPTION

Principal Courses
History of Scientific Ideas 440
Physiology and Pharmacology 460
Pharmacology 441, 461, 480
Two of Physiology 461, 462, 463, 464

Subsidiary Courses
One option from:
Botany 300; Psychology 255; Zoology 465 (only if statistics not previously taken)
One additional option.

PHYSIOLOGY AND PSYCHOLOGY (see also page 180)

Requirements for Admission: First Year General Program (Natural Sciences) with Psychology 20, Biology 22, or Zoology 20, Chemistry 20, Physics 20 as principal courses. Applied Mathematics 20, or Mathematics 24 or 27 is recommended as one option. For grades required for admission and progression, see page 20.

Second Year

Principal Courses	Subsidiary Courses
Psychology 235, 255	One option
Chemistry 203 (or 313)	
Zoology 255 or 270	
One of: Physics 204, 256, Applied Mathematics 20 or Mathematics 20, 24 or 27 (if not taken previously), Mathematics 250, Applied Mathematics 200.	

Third Year

Principal Courses	Subsidiary Courses
Psychology 338, 343	One option
Physiology 300, 301	
One of: Anatomy 300, Biochemistry 300	

Fourth Year

Principal Courses	Subsidiary Courses
Physiology 463, 464, 480	One option
Physiology 460, or 461 and 462	
Two of: Psychology 234, 236, 337, 349, 445, 446	

Students in this program will undertake a major project in behavioral physiology or sensory processes as part of their experimental work in Physiology 480.

COURSES

30. Human Physiology: The principles of mammalian and human physiology with emphasis on control and regulatory systems for students in Honors Computer Science and others. Enrolment limited.

2 lectures; 3 laboratory hours—4

HONORS COURSES

Prerequisites for Fourth Year Courses. Successful completion of previous year's program or permission of the Head of the Department.

300. Mammalian Physiology: A survey for Honors Students.
2 lectures; 3 laboratory hours—36

301. General Physiology and Pharmacology: (Given in collaboration with the Department of Pharmacology. A survey of the principles of general physiology and pharmacology. 2 lectures—31

342. Human Physiology: A survey for students in Honors Physical and Health Education. 2 lectures; 3 laboratory hours—4

440. History of Scientific Ideas: A survey of the history of science. Given in collaboration with other Departments. 2 hours (half course)—3

441. Seminar: The presentation of scientific papers and reports and the writing of essays on assigned topics. 2 hours (half course)

442. Physiology of Exercise: For students in Honors Physical and Health Education and others with adequate preparation.
Prerequisite: Physiology 342 or equivalent.
1 lecture; 3 laboratory hours (half course)—1—5

460. Advanced General Physiology and Pharmacology: The physiology and pharmacology of the cell, excitable tissue, transport of water and solutes, energy exchange. Given in collaboration with the Department of Pharmacology.
2 lectures—8

461. Systematic Mammalian Physiology: Special physiology of the blood and other fluids, the cardiovascular, respiratory and gastrointestinal systems.
2 lectures (half course)—13

462. Metabolic Physiology: Nutrition and the function of the endocrine system in the metabolism of the body. 2 lectures (half course)—17

463. Neurophysiology: The central and peripheral nervous systems and the special senses. 2 lectures (half course)—21

464. Physiological Controls and Regulations: The role of various systems and control mechanisms in the maintenance of homeostasis and the regulation of behavior. 2 lectures (half course)—35

465. Behavioral Physiology: Observation and measurement of external behavior and the role of the integrative systems in the control of external behavior.
2 lectures (half course)—28

480. Laboratory and Tutorial: Designed to provide training in the techniques and methods in modern physiology; emphasis is laid upon individuality of work and resourcefulness. The tutorial supplements the lectures and laboratory of the fourth year. Minimum of 10 hours

ZOOLOGY

Professors:
Robert Harvey Stinson, B.A. McMaster; Ph.D. Toronto, Acting Chairman

Helen Irene Battle, B.A., M.A.; Ph.D. Toronto (part-time)
William Wallace Judd, B.A., McMaster; M.A.; Ph.D. Toronto
David Maxwell Scott, B.Sc., Ph.D. McGill

Associate Professors:
Thomas Kenneth Richard Bourns, B.A., M.A. British Columbia; Ph.D. Rutgers
Robert Wilfrid Dunbar, B.A., M.A., Ph.D. Toronto
John Allen George, B.S.A. Saskatchewan; M.S.A. Toronto; Ph.D.
Miles Hugh Alston Keenleyside, B.A., M.A., British Columbia; Ph.D. Groningen
Charles Donald MacInnes, B.Sc. Bishop's; M.S., Ph.D. Cornell
Donald Burley McMillan, B.Sc., M.Sc.; Ph.D. Toronto
Rajendra K. Misra, M.Sc., Ph.D. Nagpur; Ph.D. Edinburgh
John Purko, B.A., M.Sc., Ph.D.
John Earle Steele, B.Sc. Dalhousie; M.Sc.; Ph.D. Saskatchewan

Assistant Professors:
William Norton Holsworth, B.Sc., M.Sc., Ph.D. Western Australia
David Malcolm Ogilvie, M.Sc. New Brunswick; Ph.D.
Rene Romain Roth, M.Sc. Cluj.
Richard Ray Shivers, A.B., M.A., Ph.D. Kansas

Honorary Lecturers (part-time):
Edwin Joshua Bond, B.S.A. Toronto; M.Sc.; Ph.D. London
Brian Ellman Brown, B.Sc., M.Sc., Ph.D. Illinois
William Chefurka, B.Sc. Manitoba; M.A. Montana State; Ph.D. Harvard
Ernest Howard Colhoun, B.S.A. Toronto; Ph.D. Cantab.; F.R.E.S.
Hector Alexander Urquhart Monro, B.Sc. (Agr.), M.Sc., Ph.D. McGill
Charles Ronald Harris, B.A., M.A. British Columbia; Ph.D. Wisconsin

Instructor:
Marjorie Eleanor Moulton, B.Sc., M.Sc.

GENERAL B.A. PROGRAM (Zoology Major)

For a General Program B.A. with a major in Zoology a student must pass sixteen courses which must include:

(a) One appropriate course from Division C (Biology 21)
(b) Two courses at the 20 level from:
English, Mathematics or Applied Mathematics
(c) A language other than English

Select, before he enters the Second Year, a major subject consisting of four senior courses (number 30 or higher) in Zoology. Zoology 43 and Zoology 45 must be elected by all students selecting zoology as their major subject.

Take in the Second Year:
Two courses in Zoology
Three courses from at least two Divisions.

Take in the Third Year:
Two courses in Zoology
Three courses from at least two Divisions.

No more than six courses in Zoology may be counted towards a degree.

No more than two courses from Division D may be counted towards a degree.

Out of the 10 courses required in the last two years of the program, at least seven must be senior courses.

For regulations regarding admission, progression and graduation see page 20.

HONORS PROGRAMS

HONORS BIOLOGY (Zoology Option)

Requirements for Admission: First Year General Program (Natural Sciences) including the following as principal courses: either Biology 22 or both Botany 20 and Zoology 20 (only Biology will be offered in 1968-69); Chemistry 20; Physics 20 or 22.

One of the following two programs must be taken in first year.

1.	or	2.
Biology 22		Botany 20
Chemistry 20		Zoology 20
Physics 20 or 22		Chemistry 20
One course from Division A		Physics 20 or 22
One course from Division B		One course from Division A
One of:		One course from Division B
Mathematics 20, 24, 27 or Applied Mathematics 20		
Geology 20		
Course from Division A, B or D		

For grades required for admission and progression see page20.

Caution: Program 2 will not be offered in 1969-70. All students entering Second Year should examine the prerequisites for courses which they expect to take in Second Year and subsequent years.

Second Year

Principal Courses	Subsidiary Courses
Botany 250	Chemistry 203
Botany or Zoology 255	Two of: Chemistry 204; Mathematics 20, 24, 27 or Applied Mathematics 20; Geology 20; Physics 204; a Division A or B Course.
Zoology 270	

Caution: All students entering Second Year should examine the prerequisites for courses which they expect to take in subsequent years.

All students entering Third and Fourth Years are required to participate in the Field Courses conducted by their respective Departments.

All Third and Fourth Year students must consult the Head of the Department of Zoology before registering in any of the courses prescribed for Third and Fourth Years.

Third Year

Principal Courses	**Subsidiary Course**
Zoology 352, 354, 370, 454 Biochemistry 406 or Biochemistry 300 One of: Zoology 453, 456, 460, 465, 470, 471, 473; Botany 342, 351, 353, 357; Geology 20, 275, 367; Mathematics 35; or any other course approved by the Department Head.	One option*

Fourth Year

Either

Principal Courses	**Subsidiary Course**
Zoology 437 Five of: Zoology 453, 456, 460, 465, 470, 471, 473, 480	One option*

or

Principal Courses	**Subsidiary Course**
Zoology 437 Four of the above Zoology courses One of Botany 342, 351, 353, 357, 452, 453, 454, 455, 457, 459, 466, 471; Geology 20, 275, 367; Mathematics 35; Chemistry 211; Physiology 300; Zoology 544, 552; or any other course approved by the Department Head.	One option*

* Students who plan to continue into Graduate Studies are advised to select courses which will satisfy the foreign language credit required by many graduate schools.

HONORS ZOOLOGY

Requirements for Admission: First Year General Program (Natural Sciences) including either Biology 22 or both Botany 20 and Zoology 20, and Chemistry 20. For grades required for admission and progression see page 20. All the Natural Science courses that the student has taken will be counted as principal courses.

Second, Third and Fourth Years

A minimum of 15 courses must be taken, namely 5 in each of the Second, Third and Fourth Years. Of these, at least 8 must be Zoology courses, which must include Zoology 270 and 370 to be taken in the Second Year; of the remainder, 2 courses must be selected from each of Sections II and III listed below, the other 2 being optional Zoology courses. The student must obtain the approval of the Departmental Advisory Committee for his program for each year.

Section I Zoology 270, 370, 460, 471

Section II Zoology 255, 354

Zoology 352, 454; for each of these courses the prerequisites are Organic Chemistry and Biochemistry, either Chemistry 203

and Biochemistry 300, or Chemistry 33 and Biochemistry 406. The biochemistry course may be taken concurrently with either of these two Zoology courses.

Section III Zoology 470, 473
Zoology 453 (prerequisite Zoology 465)

Section IV Zoology 437, 465, 480
Zoology 456 (prerequisite Zoology 354)

The only optional Zoology courses that may be taken in the Second Year are Zoology 255 and 465; Zoology 480 may be taken only in the Fourth Year. A student who lacks the necessary prerequisites for a particular Honors course may with the approval of the Advisory Committee substitute the corresponding general course in the same subject.

The remaining 7 courses additional to the 8 required Zoology courses are entirely optional but subject to the approval of the Advisory Committee. Students are reminded that for the High School Assistant's Certificate courses in Botany, Chemistry, Physics or Mathematics are required. Each of the Zoology courses offered is a full course, counting for 3 credits. For the computation of grades, the principal courses are those courses which are in natural science.

COURSES

20. Introductory Zoology: The principles of animal biology as illustrated by a study of the structure and physiology of particular forms. To qualify for the Honors Courses in Biology a student must obtain at least 60% in this course. Not offered in 1969/70. 2 lectures, 3 laboratory hours—7

21. Biology: The fundamental principles of biology with stress on the cell as a unit, the origin and preservation of the individual and the race, the mode of inheritance, and the applications of biology to social and economic problems. This course is given both in the Department of Botany and in the Department of Zoology. 2 lectures, 2 laboratory hours—7

22. Biology: For students of General Program I: the fundamental principles of biology stressing the features common to all living organisms. This course is given both in the Department of Botany and in the Department of Zoology. 2 lectures, 3 laboratory hours—8

30. Mammalian Zoology: The biology of mammals, with emphasis upon structure and function, and their adaptive significance.
Prerequisite: Zoology 20 or Biology 21 or Biology 22.
2 lectures and 3 laboratory hours—7

34. Comparative Vertebrate Histology: An introduction to the microscopic structure and development of tissues and organs.
Prerequisite: Zoology 30 or 270. 2 lectures, 3 laboratory hours—21

37. History of Biology: The history of discoveries in biology and the development of biological thought. May not be offered in 1969/70.
Prerequisite: One Zoology or Biology course. 2 lectures—3

41b. Entomology: The biology and economic importance of the insects, and in addition the spiders, mites, crustacea and other arthropods.
Prerequisite: One Zoology or Biology course.
2 lectures, 3 laboratory hours (full course, second term)—14

43. Animal Ecology: Formation and distribution of animal populations; population dynamics, ecosystems. The laboratories will include field investigations and techniques of wildlife management.
2 lectures and 3 laboratory hours—29

44. Embryology: A study of fundamental embryological processes as illustrated by selected invertebrate and vertebrate types.
Prerequisite: Zoology 30 or equivalent.
2 lectures and 3 laboratory hours—15

45. Principles of Genetics: The principles of Mendelian genetics and the chromosome theory.
Prerequisite: One Zoology or Biology Course
2 lectures,—17

47. Parasitology: A study of parasitism as a way of life, representative animal parasites, host-parasite relationships, and parasitological techniques.
Prerequisite: One Zoology or Biology Course
2 lectures, 3 laboratory hours—36

HONORS COURSES

255. Principles of Genetics: The principles of Mendelian genetics and the chromosome theory, illustrated by lectures and the practical performance of simple breeding experiments. 2 lectures, 3 laboratory hours—17

270. Comparative Vertebrate Zoology: The biology, origin, and evolution of the classes of vertebrates; an introduction to some principles of evolution.
Restricted to students in Honors Biology and Honors Zoology.
2 lectures, 3 laboratory hours—33

352. Comparative Physiology: A study of chemical and physical principles of cell function, homeostatic mechanisms and the integration of organ systems in selected invertebrate and vertebrate types. 2 lectures, 3 laboratory hours—12

354. Comparative Vertebrate Histology: An introduction to the microscopic structure and development of vertebrate tissues and organs.
2 lectures, 3 laboratory hours—21

370. Invertebrate Zoology and Entomology: The anatomy and biology of representative invertebrate animals (first term) and of insects (second term).
2 lectures, 3 laboratory hours—14

410. Entomology: The biology of insects. Classification, physiology, ecology, insect-control, collecting techniques will be among the topics studied. Not offered in 1969-70. 2 lectures, 3 laboratory hours—8

437. History of Biology: The history of discoveries in biology and the development of biological thought. May not be offered 1969/70. 2 lectures—3

453. Animal Ecology: Distribution of animal populations, population dynamics, predator-prey interactions, ecosystems. The laboratories will include analysis of wildlife and laboratory populations.
2 lectures, 4 laboratory hours—31

454. Embryology: Principles of development as illustrated by selected invertebrate and vertebrate types. 2 lectures, 3 laboratory hours—15

456. Histological Techniques: A practical course in the techniques of microscopy including sectioning and staining, photomicrography, preparation of illustrations, and introductory electron microscopy. 3 laboratory hours

460. Insect Taxonomy: The principles and historical development of insect taxonomy, and the classification of specimens by means of keys and monographs. 3 laboratory hours—7

463. Biological Field Studies: Study of living organisms in their field environment. The student should be prepared to meet part of his expenses for travel and subsistence. Prescribed but non-credit

465. Biometry: Methods of measurement and sampling, and the application of statistical methods to zoological data. 2 lectures, 3 laboratory hours—11

470. Evolution: Concepts of species; infra- and interspecific variation including polymorphism; adaptation; selection and gene flow: significance of central and peripheral populations; theories of speciation; major evolutionary changes. A lecture and seminar course available only to students in Honors Zoology. 3 lectures—24

471. Parasitology: A study of parasitism as a way of life, representative animal parasites, host-parasite relationships, and parasitological techniques. 2 lectures, 3 laboratory hours—36

473. Comparative Ethology: An introduction to the study of animal behavior. 2 lectures, 3 laboratory hours—25

480. Tutorial: A course in reading and practical work within a particular field of Zoology under the direction of a staff member.

Prerequisite: Average of 70% in third year. A student will be admitted only with permission of an instructor. Full course.

Certain graduate courses are available to undergraduates with the permission of the instructor concerned and of the student's advisory committee.

E.S. *21 Engineering Mechanics 1

Analysis of force systems and equilibrium conditions with applications to engineering problems involving structures and machines. Dynamics of a particle and of rigid bodies, including kinematics and force energy and momentum methods of solution. 2 lectures, 3 laboratory hours—8

*E.S. denotes an Engineering Science course

FACULTY OF SOCIAL SCIENCE

Dean: Grant L. Reuber, B.A.; M.A., Ph.D. Harvard.

The Faculty of Social Science's faculty, courses and programs will be found on the following pages, organized under departments arranged alphabetically. Reference should be made to the first section of this Calendar and to the booklet "General Information" for further information.

FACULTY OF SOCIAL SCIENCE DEPARTMENTS

Economics (p. 153)
Geography (p. 158)
History (p. 163)
Journalism (p. 170)
Physical and Health Education (p. 173)
Political Science (p. 175)
Psychology (p. 178)
Secretarial Science (p. 183)
Sociology (p. 185)

The Faculty of Social Science offers the following programs leading to a Bachelor of Arts (B.A.) degree:-

Three-year (General) Programs with concentration in a major subject from the following fields:- Economics, Geography, History, Political Science, Psychology, Sociology.

Three-year (General) Program in Secretarial Science.

Three-year (General) Program in Home Economics.

Four-year (Honors) Programs in Economics, Economics with History options, Economics with Mathematics options, Geography, History, History and German, History and Philosophy, History and Russian, Journalism, Journalism with Public Relations options, Physical and Health Education, Political Science, Psychology, Psychology and Physiology.

and

One-year, Post B.A., Program leading to a Diploma in Journalism.

ECONOMICS

Professors:

Ronald George Bodkin, B.A. Swarthmore; M.A., Ph.D. Pennsylvania
Kevin Hubert Burley, B.A., Ph.D. London
Grant L. Reuber, B.A., M.A., Ph.D. Harvard (part-time)

Associate Professors:

Thomas Joseph Courchene, B.A. Saskatchewan; Ph.D. Princeton
K. Rao Kadiyala, B.Sc. Andhra; M. Stat. I.S.I.; Ph.D. Minnesota
James Rae Melvin, B.Sc. Manitoba; M.A. Alberta; Ph.D. Minnesota

Assistant Professors:

David Winston Conklin, B.A. Toronto; Ph.D. M.I.T.

Joel Fried, B.A., Stanford, Ph.D. Northwestern
Horst Herberg, Dip. Math., Dr. rer. pol. Hamburg
Edward Saraydar, B.A. Syracuse; A.M., Ph.D. Rochester
John Ernest Tanner, A.B. California; Ph.D. Brown

Lecturers:

R. Y. Michel Andrieu, M.A. Washington
Robert Wayne Baguley, B.A.; A.M. Harvard
K. B. Bhatia, B.Com., M. Com., Delhi
David F. Burgess, B.A. Queen's; M.A.
Ake G. Blomqvist, Civ.-ekonom, Stockholm
C. Scott Clark, B.A. Queen's
S. Friedberg, B.A. City College of New York
F. Dermot Gately, B.S. Holy Cross College; M.A. Princeton
H. Thomas Johnson, A.B. Harvard; M.B.A. Rutgers; M.A. Wisconsin
E. J. O. Ketchum, B.A. Toronto; M.Sc. London; M.A. Princeton
Peter G. Kirkham, B.A.Sc. British Columbia; M.B.A., M.A.
L. A. Kochin, B.A. Temple
J. D. May, B.Com. Queens
Louis Parai, B.A. Alberta; M.A. Toronto
Charles Gordon Plourde, B.A., M.A. Queen's
Maria Schmundt, Diplom-Volkswirt, Frankfurt
P. Noel Roy, B.A. McGill
Y. Toda, B.A., M.A. Tokyo
Peter G. Tomlinson, B.A. Carleton
Lawrence S. Zudak, A.B. Indiana; M.S. Purdue

PROGRAMS

ECONOMICS

Requirements for Admission: First Year General Program (Arts, Social Science or Natural Science) with Economics 20 as a principal course. Students may be allowed to enter the Honors Program without Economics 20 if they have an average of 75% in all courses taken in First Year. Mathematics 20, 24 or 27 will normally be required, and should be taken as early as possible: however, students may not obtain credit for more than one of these courses. Students who wish to take only one Mathematics course should select Mathematics 20; those who wish more than one should initially select Mathematics 24 or 27 and follow it with Mathematics 254.

Honors students will not receive credit for Mathematics 35. All options must be approved by the Department.

Second Year

Principal Courses	**Subsidiary Course**
Economics 200, 230, 237, 255	One option other than Economics
A Mathematics Course or Business 250	

Third Year

Principal Courses	**Subsidiary Courses**
Economics 340, 351, 360	Three options, including at least two honors courses in Economics or other subjects.

Fourth Year

Principal Courses	**Subsidiary Courses**
Economics 480 Two Honors Economics Courses	Two options, including at least one honors course in Economics or other subjects.

ECONOMICS WITH HISTORY OPTIONS

Requirements for Admission: First Year General Program (Arts or Social Science) with Economics 20 and History 20 as principal courses. It is recommended that Mathematics 20, 24 or 27 be taken as early as possible.

Second Year

Principal Courses	**Subsidiary Course**
Economics 230, 237, 255 Two options in Honors History	One option

Third Year

Principal Courses	**Subsidiary Course**
Economics 340, 351, 437 Two options in Honors History	One option

Fourth Year

Principal Courses	**Subsidiary Course**
Economics 447 Two Honors Economics courses One Honors History course	One option

ECONOMICS WITH MATHEMATICS OPTIONS

Requirements for Admission: First Year General Program (Arts, Social Science or Science) with Economics 20 and Mathematics 24 or 27 as principal courses.

Second Year

Principal Courses	**Subsidiary Course**
Economics 230, 237, 255 Mathematics 250 and 256 or 278	One option

Third Year

Principal Courses	**Subsidiary Course**
Economics 340, 351 Mathematics 355, 363 One Honors Economics course	One option

Fourth Year

Principal Courses	**Subsidiary Course**
Economics 360, 480	One option
Mathematics 453	
One Honors Economics course	

COURSES

GENERAL COURSES: It is strongly recommended that all students enrolled in the general program with a major in Economics take Economics 30 in their second year. Students who have taken a General Degree with a major in Economics can fulfill the requirements for a Master of Arts degree in Economics in two years.

20. Introduction to Economics: The nature of economics, economic organization, national income, money and banking, economic fluctuations, public finance and fiscal policy, price determination, international trade, and Canadian economic problems. One section of this course is taught in French.
3 lectures and
1 optional tutorial hour—15

30. Price and Income Analysis: A study of the allocation of resources under various market conditions; the measurement and determination of national income, employment and prices.
Prerequisite: Economics 20. 3 hours—34

31. International Trade and Finance: A discussion of the principles of international economics and their application to contemporary problems in the international economy.
Prerequisite: Economics 20. 3 hours— 6

32. Soviet Economics: Historical and doctrinal background; the structure and operation of the Soviet economy including central planning techniques; contemporary problems. Attention will concentrate on the U.S.S.R.
Prerequisite: Economics 20. 3 hours—20

33. Money and Banking: Monetary theory, banking theory and practice, monetary policy and domestic stabilization, international monetary problems.
Prerequisite: Economics 20. 3 hours—15

35. Descriptive Statistics: Classification of statistical units; collection, processing, derivation, presentation, evaluation and analysis of statistical data; national accounting and forecasting.
Prerequisite: Economics 20. 3 hours—10

36. Labour Economics: A study of the labour market, wage determination and the relationship between wages, employment and prices.
Prerequisite: Economics 20. 3 hours— 4

37. Economic History of North America: An examination of the sources of North American economic development.
Prerequisite: Economics 20. 3 hours— 9

38. Economic Development: A review of the principles of economic development and their application to contemporary problems.
Prerequisite: Economics 20. 3 hours—28

39. Resource Allocation and Growth Policies in Canada: The principles of resource allocation and economic growth applied to the problem of devising public policies to stimulate the growth of the Canadian economy.
Prerequisite: Economics 20. 3 hours—24

43. Public Finance: A survey of the role of government, the economic effects of taxes and public expenditures, fiscal policy for stability and growth and intergovernmental relationships.
Prerequisite: Economics 20. 3 hours—31

47. The International Economy in Historical Perspective: A study of the emergence of the international economy in the later nineteenth century, its contraction during the inter-war years, and the attempts at revival since 1945.
Prerequisite: Economics 20. 3 hours— 5

HONORS COURSES: *Honors Courses are restricted* to students who have the prescribed prerequisites and are enrolled in Honors Economics, Mathematics, History, or any other Honors Course and to students enrolled in Pre-business and Engineering Science.

200. Seminar in Economic Policy
Prerequisite: Economics 20. 2 hours

230. Economic Theory
Prerequisite: *Economics 20 with at least 70% or permission of the instructor.* 3 hours—17

237. The Economic Development of the Modern World in recent times.
Prerequisite: Economics 20. 3 hours— 5

255. Statistics
Prerequisite: Economics 20 or permission of the instructor 3 hours—25

340. National Income and Business Cycles
Prerequisite: Economics 230. 3 hours— 9

351. International Economics
Prerequisite: Economics 230. 3 hours—36

360. Resource Allocation and Economic Welfare
Prerequisite: Economics 230. 3 hours— 3

433. Monetary Theory and Policy
Prerequisite: Economics 340. 2 hours—36

434. Industrial Organization
Prerequisite: Economics 230. 2 hours—24

437. North American Economic History
Prerequisite: Permission of the Instructor. 2 hours—16

447. The Economic Development of Modern Europe since 1850
Prerequisite: Permission of the Instructor. 2 hours—27

450. History of Economic Thought
Prerequisite: Economics 230 or permission of the Instructor. 2 hours—20

455. Mathematical Economics
Prerequisite: Economics 230 and Mathematics 20, 24, or 27 or permission of the instructor. 3 hours— 1

463. Public Finance
Prerequisite: Economics 230. 2 hours— 8

470. Contemporary Economic Problems and Policy
Prerequisite: Economics 230. 2 hours—30

480. Seminar
Prerequisites: Economics 340, 360. 2 hours—13

495. Econometrics
Prerequisite: Economics 255 or permission of the Instructor.
3 lectures and 1 tutorial hour— 5

GEOGRAPHY

Chairman and Associate Professor:
Victor W. Sim, B.A. McMaster; M.A. Clark; Ph.D. McGill

Senior Professor:
Norman L. Nicholson, B.A., M.Sc.; Ph.D. Ottawa; F.R.G.S.

Professors:
Hans A. Hossé, B.A., M.A. Manitoba; Ph.D. Ottawa
Robert W. Packer, B.A., M.A. Cantab.; F.R.G.S.
Allen K. Philbrick, B.A., M.S., Ph.D. Chicago
Edward G. Pleva, B.A., M.A., Ph.D. Minnesota

Associate Professors:
Elaine M. Bjorklund, B.Sc., Utah; M.A. Washington; Ph.D. Chicago
Robert McDaniel, B.A., M.A.
Harry W. Taylor, B.A. Westchester State; M.A. Indiana; Ph.D. Maryland
Charles F. J. Whebell, B.A., M.Sc.; Ph.D. London
W. Robert Wightman, B.A., M.A.; Ph.D. Dunelm

Assistant Professors:
Richard W. Butler, B.A. Nottingham
J. Chadwick Day, B.Sc., M.Sc.
M. F. Goodchild, B.A. Cantab.
J. M. Havens, B.A. Middlesbury; M.S. Florida State; M.Sc. London
Michael J. Troughton, B.A., M.A., B. Litt. Oxon.

Lecturers:
Paul M. L. Bruer, B.A.; M.A. Illinois (part-time)
Leonard N. Johnson, B.S.A. Toronto; M.A. (part-time)

Map Curator:
S. Sauer, B.A.

Requirements for Admission: First Year General Program (Arts, Social Science or Natural Science) with Geography 20 as a Principal course. A student who wishes to enter Second Year and has not taken Geography 20 will cover a prescribed reading program during the summer before Second Year, pass a written and/or oral examination during the first week of lectures in September, complete the laboratory exercises for Geography 20 during the academic year and write the Geography 20 Spring examination.

Second Year

Principal Courses	**Subsidiary Courses**
Geography 200, 230, 232, 241	Two options

During the first two years the following courses must be completed. Economics 20, Geology 20 or 21.

Students who intend to continue into Graduate studies are advised to take French 20 or foreign language 20 not later than Second Year.

Options must be selected in consultation with a Departmental Adviser.

Third Year

Principal Courses	**Subsidiary Courses**
Geography 339, 343, 345, 346	Three options. One of these options may be a Fourth Year Geography course.

Fourth Year

Principal Courses	**Subsidiary Courses**
Georgraphy 443 (half course), 448 (half course), 450 (one and a half courses) One of: Geography 430, 431, 432, 433, 434, 435, 437, 439, 440, 447. One of: Geography 460, 461, 462, 463, 464, 465, 466, 467, 468.	One option

COURSES

20. Introduction to Geography: A systems introduction to geography; a dynamic approach to the earth as the home of man.

2 lectures and 2 hours practical work— 3

30. Processes of Landscape Development: Examination of the landscape of selected Canadian regions with particular emphasis on the relationship between climate and the geomorphic processes which are presently active. Some attention will be given to the role of man in altering the natural landscape.

Prerequisite: Geography 20 or permission.

2 lectures and 2 hours practical work—10

32. Cultural Geography: Concepts, systematic distribution, regional constructs, world perspective, and problems of cultural geography.

2 lectures and 2 hours practical work—35

33. Introduction to Urban and Regional Development: Spatial aspects of physical, economic and social systems in urban areas and urban-centred regions;

principles of land use planning and development; current planning problems and selected case studies. 2 lectures and 1 hour tutorial—6

39. Elements of Economic Geography: A conceptual interpretation of the factors influencing the spatial distribution of economic activities.
2 lectures and 2 hours practical work—12

40. Political Geography: The human geography basis of the world's territorial divisions: concepts, selected regional examples, and some applications.
Prerequisite: 1 course in geography. 2 lectures and 1 hour tutorial—18

45. Geography of North America: The geographic basis of human occupance in North America with particular attention to regional analysis and practical case studies. The natural wealth of North America and its conservation through wise development and use.
Prerequisite: 1 course in Geography or permission.
2 lectures and 2 hours practical work—31

46. World Regional Geography: A comprehensive systematic survey in world regional geography.
Prerequisite: 1 course in Geography or permission.
2 lectures and 2 hours practical work— 3

47. Geographical Aspects of North American History: An introduction to the main themes of the historical geography of North America.
Prerequisite: 1 course in Geography or permission.
2 lectures and 2 hours practical work—24

HONORS COURSES

200. Quantative Methods in Geography: Methods of analyzing geographical data; an introduction to statistical methods.
Prerequisite: Mathematics 20 or 24 or permission (may be taken concurrently). 2 lectures and 2 hours practical work—25

230. Physical Geography: Studies of the environmental factors, meteorology, climatology, geomorphology, hydrology, vegetation, and soils; their interrelationships; techniques of measurement and classification.
Prerequisite: Geography 20 or equivalent.
2 lectures and 2 hours practical work— 8

232. Cultural Geography: Concepts, systematic distribution, regional constructs, world perspective, and problems of cultural geography.
2 lectures and 2 hours practical work—35

241. Cartographic Representation and Photo Interpretation: Scales and projections, map making, surveying on the ground and from the air, official and professional maps, cartographic specialties. Techniques in the use of air photos in geographic analysis.
Prerequisite: Geography 20 or permission.
1 hour lecture and 4 hours practical work—21

339. Economic Geography: A systems analysis of the spatial organization of natural resources, agriculture, manufacturing, transportation and communication and tertiary activity. 2 lectures and 2 hours practical work—12

343. Field Methods and Practices: Departmental field camps and field trips as arranged; attendance at geographical meetings as required; special studies and practical problems in field techniques.

Mandatory for Third Year Honors.

Sessions and hours by arrangement. (Half course)

345. Geography of North America: A detailed analysis of the regional geography of North America; case studies and type areas; special attention to major geographical regions shared by Canada and the United States.

Prerequisite: 2 courses in Geography or permission

2 lectures and 2 hours practical work—31

346. World Regional Geography: A systematic analysis of the major environments with emphasis on problems of resource use. Regional samples are analysed in detail emphasizing culture and cultural progression. Practical work includes map analysis and seminars on selected problems.

Prerequisite: 2 courses in Geography or permission

2 lectures and 2 hours practical work—3

430. Meteorology and Climatology: The basic meteorological processes; readings in climate classification, regional climate, microclimatology, climatic change, and applied climatology. 2 lectures and 2 hours practical work—4

431. Geomorphology: Examination of recent periodical literature with particular emphasis on geomorphic processes, current research techniques, and the physiographic development of selected Canadian regions.

Prerequisite: Geography 230 or permission

2 lectures and 2 hours practical work—5

432. Advanced Cultural Geography: Seminar lectures and discussions towards the development of a quantative theoretical world cultural geography.

Prerequisite: 3 course in Geography, including Geography 232

2 lectures and 2 hours practical work— 7

433. Urban Geography: Systems of cities; urban land use; social, cultural, and political patterns within the city; urban problems.

Prerequisite: 2 courses in Geography or permission

2 lectures and 2 hours practical work—11

434. Agricultural Geography: A general study of the factors involved in agricultural production and the classification of agricultural systems. Topical and regional studies with particular attention to tropical and underdeveloped areas.

Prerequisite: 2 courses in Geography or permission

2 lectures and 2 hours practical work—9

435. Introduction to Resources Management: Aspects and problems of the use, misuse, and deterioration of mineral, soil, biotic, water, and landscape resources.

Prerequisite: 2 courses in Geography or permission

2 lectures and 2 hours practical work—13

437. Recreation Geography: Examination of leisure resources, comparison of urban and rural recreational land use patterns; the areal and seasonal variations in intensity of use of land; case studies of the impact of recreation upon various areas.

Prerequisite: 2 courses in Geography or permission

2 lectures and 2 hours practical work—16

439. Advanced Economic Geography: The techniques of Regional Science, including the application of input-output analysis, linear programming, the gravity model and graph theory to the analysis of spatial systems.

Prerequisite: Geography 339, or permission.

2 lectures and 2 hours practical work—5

440. Advanced Politicial Geography: Examination in depth of selected aspects of political geography with special reference to applications of current theories and models.

Prerequisite: 3 courses in geography

2 lectures and 2 hours practical work—25

443. Field Methods and Practices: Departmental field camps and field trips as arranged; attendance at geographical meetings as required, special studies and practical problems in field techniques.

Mandatory for Fourth Year Honors.

Sessions and hours by arrangement. (Half course)

447. Historical Geography: Systematic and cross-sectional approaches to certain aspects of the historical geography of North America with special reference to Canada and Ontario.

Prerequisite: 2 courses in Geography or permission.

2 lectures and 2 hours practical work—10

448. Senior Seminar in Geography: Presentation and discussion of papers on various geographical subjects; informal discussion of topics of current geographical interest; occasional lectures and symposia by staff and visiting professors.

Mandatory for Fourth Year Honors. Hours by arrangement. (Half course)

450. Senior Research and Report in Geography: A report on a geographical problem including the results of field work, cartographic representation, and a study of the relevant literature.

Restricted to and mandatory for Fourth Year Honors.

Hours by arrangement. (One and one-half courses)

SENIOR STUDIES IN THE REGIONAL GEOGRAPHY OF SIGNIFICANT WORLD AREAS.

460. Canada: Regional aspects of the natural resources of Canada and their use; the basis of human occupance in Canada; geographical problems in national development.

Prerequisite: 3 courses in Geography or permission

2 lectures and 2 hours practical work—22

461. United States: A study of the geographic factors in the regional development of the United States; a systematic analysis of the overall occupance

and economy with ten detailed type studies of selected areas to illustrate problem solving techniques.

Prerequisite: 3 courses in Geography or permission
2 lectures and 2 hours practical work—30

462. Latin America: Regional study of economic and cultural geography; analysis of economic, cultural, and political development in the Latin American context.

Prerequisite: 3 courses in Geography or permission
2 lectures and 2 hours practical work—32

463. Western Europe: A systematic analysis of the regional geography of Western Europe; type studies.

Prerequisite: 3 courses in Geography or permission (Not given 1969-70)
2 lectures and 2 hours practical work—34

464. U.S.S.R. and Eastern Europe: (Not given 1969-70) —36

465. Middle East (Southwest Asia and North Africa). (Not given 1969-70) —22

466. Africa: (Not given 1969-70) —30

467. Malaysia, Australasia, And the Pacific. (Not given 1969-70) —34

468. South, East, and Southeast Asia (particularly India, China, Japan). (Not given 1969-70) —17

HISTORY

Chairman and Professor:
Walter Balderston, B.A., Ph.D. Cornell

Senior Professors:
Wallace Klippert Ferguson, B.A.; M.A., Ph.D. Cornell; Litt.D.; F.R.S.C.; J. B. Smallman Professor of History
Donald Gordon Grady Kerr, B.A. McGill; Ph.D. London
Richard Cleghorn Overton, A.B., A.M. Williams; A.M., Ph.D. Harvard
Hugh Mason Wade, M.A. McGill; LL.D. New Brunswick; D. ès L. Ottawa

Professors:
Fred Harvey Hitchins, B.A.; M.A., Ph.D. Pennsylvania (part-time)
Jack Robert Lander, B.A., M.A., M. Litt. Cantab.; F.R.Hist.S.
John Gordon Rowe, A.B. Harvard; B.D. Episcopal Theological School, Cambridge, Mass.; M.A., Ph.D. Toronto (part-time)
James John Talman, B.A., M.A.; Ph.D. Toronto; D.Litt. Waterloo; F.R.S.C.; (part time)
Morris Zaslow, B.A., B.Ed. Alberta; M.A., Ph.D. Toronto

Visiting Professor:
Gordon O. Rothney, B.A. Bishop's; M.A., Ph.D. London

Associate Professors:
Frederick August Dreyer, B.A. Toronto; B.A. Oxon.; Ph.D. St. Andrews
Roger Lee Emerson, B.A. Dartmouth; M.A. Brown; Ph.D. Brandeis

John Rowland Gwynne-Timothy, B.A., M.A. Toronto; D.Phil. Oxon.
Kenneth Harry Warren Hilborn, B.A., M.A. Queen's; D.Phil. Oxon.
Albert Mark John Hyatt, B.A. R.M.C.; B.A. Toronto; M.A. Carleton; Ph.D. Duke
John Purves McLaughlin, B.A. Queen's; Ph.D. London
John Charles Martin Ogelsby, A.B. Stanford; M.A., Ph.D. Washington
Charles Arthur Ruud, B.A. Willamette; A.M. Harvard; Ph.D. Berkeley
Ian Kenneth Steele, B.A. Alberta; Ph.D. London
William Herbert Stockdale, B.A., M.A. Alabama; Ph.D. New York

Assistant Professors:

Peter George Cornwall, B.A. Toronto; A.M. Michigan
Donald S. Hoffman, B.A. Syracuse; Ph.D. Delaware
Robert Arthur Hohner, B.A., M.A., Ph.D. Duke
F. Kirk Metzger, B.A., Bowdoin; M.A. Pennsylvania; Ph.D. Rutgers
Peter Francis Neary, B.Sc., M.A. Memorial; Ph.D. London

Lecturers:

Donald Howard Avery, B.A., M.A. Manitoba
George Emery, B.A. Queen's
Thomas Nathan Guinsburg, A.B., M.A. Columbia
Vladimir N. Pavloff, B.A.Sc. British Columbia; B.A. Carleton; M.A. Berkeley

PROGRAMS

HISTORY

Requirements for Admission: First Year General Program (Arts or Social Science) with History 20 as a principal course and one language other than English.

Second Year

Principal Courses

Three courses from the History 200 and 300 Series. 231, 234 and 236 must be completed before entering Fourth Year

Subsidiary Courses

Two or three options selected with the approval of the History Department, one of which should be an Honors course

Before entering the third year a student must have completed a language other than English at the 20 level.

Students intending to pursue graduate studies are advised that a language other than English is generally required for the M.A. and that two languages other than English are generally required for the Ph.D.

Third Year

Principal Courses	Subsidiary Courses
Three courses chosen from the 300 and 400 series, at least one of which must be History 330, 335, 337, 346, 356. Permission of the instructor must be obtained for entry into a 400 course	Two (or three) options selected with the approval of the History Department, one of which must be an Honors course

Fourth Year

Principal Courses	Subsidiary Courses
Three courses from the History 300 and 400 series	Two (or three) options selected with the approval of the History Department, one of which must be an Honors course

HISTORY AND GERMAN

Requirements for Admission: First Year General Program (Arts or Social Sciences) with History 20 and German 20 as principal courses.

Second Year

Principal Courses	Subsidiary Courses
History 231, 236 German 290, 291	Two options

Third Year

Principal Courses	Subsidiary Courses
Two of: History 330, 335, 346, 356 German 333, 390, 391	Two options

Fourth Year

Principal Courses	Subsidiary Courses
Two of: History 330, 356, 436, 456, 460 German 420, 480, 481, 495*	One option

*Comprehensive Examination in the Spring

HISTORY AND PHILOSOPHY

Requirements for Admission: First Year General Program (Arts or Social Science) with History 20 and Philosophy 20 as principal courses.

Second Year

Principal Courses	Subsidiary Courses
History 231, 236 Philosophy 254, 257	One course in English One option (History 20 if not taken previously)

Third Year

Principal Courses	**Subsidiary Courses**
Two of: History 330, 335, 346, 356	Two options
Philosophy 256	
One of: Philosophy 357, 362	

Fourth Year

Principal Courses

Two or three of History 330, 337, 431, 432, 436, 441, 456, 457, 460
One of: Philosophy 456, 458, 466, 467, 477
One of: Philosophy 450, 454, 464, 474
If an additional Philosophy course is required:
One of: 456, 458, 466, 467, 477

HISTORY AND RUSSIAN

Requirements for Admission: First Year General Program (Arts or Social Science) with History 20 and Russian 20 (or either 2 or 10). (Students who begin Russian in the University will take Russian 2 in the First Year and Russian 20 in the Second Year).

Second Year

Principal Courses	**Subsidiary Courses**
History 236	History 37
Russian 280, 281	Two options, or one option and Russian 20

Third Year

Principal Courses	**Subsidiary Courses**
History 335, 337	Two of: Politics 349, 434; Economics 32; Geography 464
Russian, 390, 391	

Fourth Year

Principal Courses	**Subsidiary Courses**
2 History courses at the discretion of the Chairman of the Department	One of: Politics 348, 434; Economics 32; Geography 464
Russian 420, 491, 495*	

*Comprehensive Examination in the Spring

COURSES

History 20 is a prerequisite for all courses in History, unless permission of the Department is obtained, except for those students already admitted to an Honors Program in a related Department.

20. Modern Europe: 1715 to the Present. (Staff) 3 hours—14

30. Mediaeval Europe: From the 4th to the 15th Centuries. (Lander) 3 hours—34

31. Canada: From the beginnings of the French Régime to 1957. (Avery, Emery) 3 hours—29

32. England to 1688: A survey of English History from the Anglo-Saxons. (Balderston) 3 hours—10

33. British Empires: A comparative study of the theory, practice, and legacy of British Imperialism in America, India, and Africa. (Steele) 3 hours—32

34. The United States, Colonial Period to the Present: Emphasis first term upon the emergence of the American nation, the equalitarian impulse, national expansion and sectional conflict; second term, upon the great transformations of the modern era: the growth of industrialism, big government, a pluralistic society, and international predominance. (Guinsburg) 3 hours—36

35. England since 1688: English political, social, economic, and diplomatic development. (Stockdale, Dreyer) 3 hours—18

36. Modern Europe: From the beginning of the 16th century to 1715. (Metzger) 3 hours—13

37. Russia: A general survey of Russian history. (Ruud) 3 hours—6

38. Latin America: The evolution of Latin America from the time of Columbus to the present. (Oglesby) 3 hours—30

39. Modern China and Japan: A survey of the cultural and political condition of China and Japan at the time of the arrival of the Europeans; the impact of the west on the government, economy, society, and thought of these nations, particularly since 1800. (Cornwall) 3 hours—1

40. Selected Topics in the History of Mediaeval Europe. (Not offered 1969-70) 3 hours—12

41. Selected Topics in the History of Canada.
Prerequisite: History 31 or permission of instructor 3 hours—15
A Problems in Canadian Social History. (Emery)
B Party Politics 1867-1957. (Neary)

42. Selected topics in the History of 20th Century International Relations. Particular emphasis is placed on the impact of Nazi and Communist ideologies, the effects of changing technology, and the rise of independent states in Africa and Asia.
Prerequisite: Students must have completed their second year or have the permission of the instructor (Hilborn) 3 hours—20

44. U.S. History, 1841-1901: The Prelude to Modern America. (Overton)
Prerequisite: History 34 or permission of the instructor. 3 hours—26

46A. Selected Topics in European History: Modern Germany, 1848-1945. (Hoffman) 3 hours—19

46B. Selected Topics in European History: Modern France since 1815. (Gwynne-Timothy) 3 hours—8

46C. Selected Topics in European History: The Habsburg Monarchy and the Balkan Peninsula. (Pavloff) 3 hours—2

46D. Selected Topics in European History: Intellectual History. (Stockdale) 3 hours—14

HONORS COURSES

231. Canada: From the beginning of the French Régime to 1957. (Staff) 3 hours—29

234. The United States, Colonial Period to the Present: Emphasis first term upon the emergence of the American nation, the equalitarian impulse, national expansion and sectional conflict; second term, upon the great transformations of the modern era: the growth of industrialism, big government, a pluralistic society, and international predominance. (Hohner) 3 hours—36

236. Europe and England in the 16th and 17th centuries. (Staff) 3 hours—13

330. The High Middle Ages: Charlemagne to the end of the 13th century. (Rowe) 3 hours—21

331. Selected Topics in the History of Canada: The Development of Western Canada and Northern Canada. (Zaslow) 3 hours—25

333. The First British Empire: Seminar on selected areas; Elizabethan expansion to the American Revolution. (Steele) 3 hours—32

334. Foreign Policy of the United States since 1775: A study of the interaction between domestic forces—ideological, political, and economic—and external forces in the development of United States foreign policy. Prerequisite: History 234 or equivalent. (Guinsburg) 3 hours—14

335. England, 1715-1914: A study of English history in the 18th and 19th centuries, stressing as a central theme the development of the modern state. The course will be based mainly on the writings of the following contemporary authors: Locke, Bolingbroke, Burke, Adam Smith, Paine, Bentham, James Mill, Engels, Robert Owen, Newman, and the Fabian Essayists. (Dreyer) 3 hours—18

337. Russian—U.S.S.R.: The 19th and 20th centuries, with special emphasis on intellectual history. (Pavloff) 3 hours—6

338. Latin America: A study of Spanish and Portuguese civilization in the New World. (Ogelsby) 3 hours—30

339. Modern East Asia: The social, economic, and political history of Modern East Asia, with emphasis on the problems of modernization in China and Japan. (Cornwall) 3 hours—1

346. Modern France: From 1715 to the Present. (McLaughlin) 3 hours—24

356. Modern Germany: 1701 to the Present. (Hoffman) 3 hours—9

400. Senior Thesis: With permission of the Department.

410. Urban: A study of the city in History, its evolution, problems, and influence on civilization. 3 hours—27
(Not offered 1969-70)

431. Canada since 1867: Emphasis on selected topics and seminar discussion. (Kerr) 3 hours—7

432. England, 1399-1642: A political, social and constitutional study of England from the 15th century to the mid-17th century.
(Lander) 3 hours—10

433. The Second British Empire and Commonwealth. (Gwynne-Timothy) 3 hours—19

434. The United States, 1848-1901: The Prelude to Modern America: Emphasis on economic, social, and constitutional developments against the general background of the period.
Prerequisite: History 234 or its equivalent. (Overton) 3 hours—17

436. Selected Topics in European Intellectual History: English Rationalists to the Russian Revolution. (Ruud) 3 hours—22

441. French-Canadian Nationalism. (Wade) 3 hours—2

444. The United States in the 20th Century: Attention is focused on domestic developments. Emphasis in the first term is upon the Progressives, Theodore Roosevelt, and Woodrow Wilson. The second term is devoted to the Great Depression, the New Deal, and the Civil Rights Movement.
Prerequisite: History 234 or equivalent. (Hohner) 3 hours—16

451. British North America: A study of the comparative development of the colonies, with particular reference to Ontario, and an examination of their relations with Great Britain, 1759-1864.
(Not offered 1969-70) 3 hours—23

452. English Constitutional: A study of the development of the English constitution from the Anglo-Saxon monarchy to 1688.
(Not offered 1969-70.) 3 hours—35

456. European International Relations since 1871: The course includes the foreign policies of Great Britain and Continental Powers with respect to non-European nations. Lectures and seminars. (Hilborn) 3 hours—11

457. *Warfare:* With emphasis on the relations between warfare and modern political, economic, and social conditions. (Hyatt) 3 hours—31

460. The Transition from Mediaeval to Modern Civilization: The economic, social, political, religious, and cultural developments of the period from 1300 to 1600. (Ferguson) 3 hours—26

461. Canadian-American Relations since 1760.
(Not offered 1969-70.) 3 hours—34

HOME ECONOMICS

For course description see page 195—Brescia College.

JOURNALISM

Head and Professor:
John Leslie Wild, B.A.; M.A. Michigan

Associate Professor:
Earle Beattie, B.A. Manitoba; B.Ed. Toronto; M.A. State U. of Iowa

Assistant Professors:
Frederick Kenneth Bambrick, B.A.

Lecturers (Part-time):
R. G. Atkey, B.A., LL.B.; LL.M. Yale; of Osgoode Hall, Barrister-at-Law.
Thomas Hugh Bremner
William C. Heine, B.A.
James O'Neail, B.A.
Hal Tennant. B.A. British Columbia

PROGRAMS

JOURNALISM

Requirements for Admission: First Year General Program (Arts or Social Science) with Journalism 20 as a principal course and English 20. Transfer students from other Colleges or Programs must include Journalism 20 in Second Year if it has not been completed and delay 250 until Third Year.

Second Year

Principal Courses	**Subsidiary Courses**
Journalism 250, 255, 260	Senior course in English, or French or a foreign language
History 31	Social Science course (Politics 20 if not completed previously)
	One option

Third Year

Principal Courses	**Subsidiary Courses**
Journalism 350, 351, 356, 375	Senior course in English, or French or a foreign language
Politics 362	One option

Fourth Year

Principal Courses	**Subsidiary Courses**
Journalism 451, 455	Senior Social Science course
History 34 or Politics 44	Senior course in English, or French or a foreign language
	One option

JOURNALISM — PUBLIC RELATIONS OPTIONS

Requirements for Admission: First Year General Program (Arts or Social Science) with Journalism 20 as a principal course and English 20.

Second Year

Principal Courses	**Subsidiary Courses**
Journalism 250	Two Social Science courses
Politics 20	Senior course in English, or French or a foreign language
	One option (non Journalism)

Third Year

Principal Courses	**Subsidiary Course**
Journalism 350, 352, 356, 375	One option
An Honors Social Science course	
Business 20	

Fourth Year

Principal Courses	**Subsidiary Courses**
Journalism 452, 455	History 31
An Honors Social Science course (must be in the same subject as the Honors Social Science course of Third Year)	A Humanities course
	One option

DIPLOMA IN JOURNALISM

Requirements for Admission: A degree in a field other than journalism from a recognized university.

Candidates for the Diploma in Journalism will take the prescribed courses and complete special assignments in reporting, writing and editing.

An average of 60% is required for the Diploma.

Principal Courses
Journalism 255, 260, 351, 356, 375, 400, 250, 350, 351, 455

COURSES

Students should be proficient in typewriting by the beginning of the second year.

20. Introduction to Journalism: A survey of news media with emphasis on the daily newspaper; newswriting, reporting; lectures, workshops, field trips, seminars on current events. Students who hold credit for Journalism 21 may not elect Journalism 20 unless they are registered in an Honors Journalism Program. 3 hours—33

21. Survey of Mass Communication: The structure of the media of mass communication; relationship of the media to the social, economic, political and cultural environment; elements of mass communication theory; critical analyses of the media with reference to the main issues in the news. Students who hold credit for Journalism 20 may not elect Journalism 21, nor may Journalism 20 and Journalism 21 be taken concurrently. 3 hours—33

HONORS COURSES

250. News Writing and Reporting: Reporting specialized fields; techniques and problems in reporting public affairs, social, economic, and political news; ethics of reporting; feature writing; pictorial journalism.
Prerequisite: Journalism 20. 4 hours—24

255. History of Journalism: A survey of the development of journalism in the British Isles, the United States and Canada. 2 hours; half course—25

260. Law for Journalists: Basic principles of the common law with special emphasis on access to news, legal guarantee, and limits of freedom of the press; defamation; contempt of court and copyright. 1 hour: half-course—13

350. Interpretative News Writing and Reporting: Depth reporting; interpreting the news; reporting social developments; news analysis; reviewing the arts and critical writing; editorial and column writing.
Prerequisite: Journalism 250. 4 hours—12

351. Newspaper Production: Newsroom organization; copy editing; page makeup; survey of the mechanical phases of newspaper production.
Prerequisite: Journalism 250 3 hours: half course—5

352. Public Relations I: History and functions of public relations; public relations processes with emphasis on communications; relations with the general public, employees, shareholders, customers, the community, the governments; lectures, seminars, case studies, workshops.
Prerequisite: Journalism 250. 4 hours—15

356. Radio News Writing and Reporting: Comparative study of newspaper and radio writing and news treatment; writing and editing of newscasts; radio interviewing.
Prerequisite: Journalism 250. 2 hours: half-course—32

375. Feature and Magazine Article Writing, Magazine Editing: Feature writing for newspapers; article writing for industrial, trade and general circulation magazines, including assignments and a study of freelancing, readership, research, interviewing, organization, rewriting, style. Elements of magazine editing and production.
Prerequisite: Journalism 250 2 hours: half-course—35

400. Newswriting and Reporting: For students registered in the Diploma Programme in Journalism. Writing for mass communication; the forms and style of journalistic prose; reporting methods; news evaluation; interpretative reporting; world news editing and reporting. 12 hours— 5

451. Communication Problems: Nature, function, process and effects of communication, aspects of the mass media (newspaper, magazine, radio, film and TV), historic development, general semantics, public opinion, propaganda. Papers and projects on mass communication. Lectures, seminars.
Prerequisite: Journalism 350 4 hours—5

452. Public Relations II: Public relations in special situations; industry, banking, insurance, utilities, transportation, hospitals, churches, educational in-

stitutions, health and welfare agencies, government, armed forces; research, planning, evaluation, executive decision-making; seminars; case studies.
Prerequisite: Journalism 356 4 hours—1

455. Radio Documentaries, Television News and Documentaries: Research, interviewing, tape-recording, writing, TV-scripting; editing and producing programs with use of University closed circuit television facilities; commentary, history of Canadian broadcasting; lectures; workshops. Use of TV film camera.
Prerequisite: Journalism 356 3 hours—19

PHYSICAL AND HEALTH EDUCATION

Head and Professor:
Willard Joseph L'Heureux, B.A.; M.A. Michigan; LL.D. New Brunswick

Professor:
John Russell Fairs, B.Sc., M.A. Columbia
Michael Yuhasz, B.A., M.S., Ph.D. Illinois

Associate Professors:
Elfrida Berzins (Mrs.), M.M. Riga
Robert Barrie Eynon, B.A., M.S. Illinois

Assistant Professors:
John R. Richardson, B.P.H.E., M.Sc. Alberta
Mary Lou Dresser, B.A., M.A. Stanford
Gerald I. Gonser, B.A., M.A. Michigan
Brian M. Petrie, D.P.E.; M.Sc., M.A. Michigan State
Garth Paton, B.A., M.A. Michigan
Margaret Joy Taylor, B.A., B.P.H.E. Toronto
Ronald C. Watson, B.A., B.P.E., M.Sc. Alberta

Lecturers:
D. L. Hayes, B.P.E. Alberta; M.Sc. Oregon
John Stanley Hill, D.P.E. Jordan Hill College
Helen Vieno Kunkel (Mrs.), B.A.
Elizabeth Lindsay, B.A., M.Sc. Illinois
Garry John Smith, B.A.
Robert J. Vigars, B.Sc., M.Sc. California

Requirements for Admission: First Year General Program (Arts, Natural Science or Social Science) with Physical Education 20 and any two others as principal courses, and Biology.

Second Year

Principal Courses	***Subsidiary Course***
P.H.E. 251	3 options, one of which is from the Humanities, beginning a concentration approved by the Department
Any two of: 253, 258, 340	
Anatomy 254	

Third Year

Principal Courses	**Subsidiary Courses**
P.H.E. 351, 353 and Any one of: 253, 258, 340, 352 not taken previously Physiology 342	2 options, approved by the Department

Fourth Year

Principal Courses	**Subsidiary Courses**
P.H.E. 451, 456 and Any two of: 443, 457, 458 Physiology 442	2 options, approved by the Department

COURSES

20. Survey of Physical Education: Historical and scientific foundations; motor performance; selected health problems; physical fitness and recreation skills. 2 lectures and 2 laboratory hours—2

31. Advanced Theory and Practice of Activities
Prerequisite: P.E. 20 1 lecture and 3 laboratory hours—4

HONORS COURSES

251. Team Games and Individual Activities: The theory and mechanics of activities; the development of personal performance skills.
2 lectures and 4 laboratory hours

253. Scientific Foundations of Health Education: An approach to intelligent planning for healthful living. The study of personal and community health to equip students with a scientific background in health in order to understand and deal with current health areas. 1 lecture and 2 seminars—21

258. Historical - Cultural Foundations of Physical Education: An examination of philosophical, theological, and scientific anthropologies with emphasis on their doctrines of the body and their respective influences on education and physical education: concepts of play in historical perspective; culture and the body. 3 lectures—34

340. Physical Growth and Development: a study of physical growth and maturation processes with particular emphasis on the effects of exercise and sport. 3 lecture hours—17

351. Team Games and Individual Activities: The theory and mechanics of activities in addition to those studied in P.H.E. 251.
1 lecture and 4 laboratory hours

352. Organization and Administration of Physical and Health Education: The function of administration with respect to curriculum planning, budget,

finance, staff, public relations; principles and organization of intramural and inter-school programs; scheduling and management of athletic contests.
1 lecture and 2 seminars—8

353. Kinesiology and Motor Learning: Essential facts of human anatomy and physiology applied to corrective exercise and analysis of motor skills, principles of motor learning. 2 lectures, 2 laboratory hours—31

443. Scientific Training Techniques: The investigation of modern athletic training methods with emphasis on interval training, weight training, isometric exercises and nutrition. One term—2 lectures, 2 laboratories—5

451. Team Games and Individual Activities: The study of team games with particular reference to coaching responsibilities in planning, methodology, skill analysis, personnel management, etc.; care of athletic injuries.
Prerequisite: P.H.E. 251, 351 6 hours (lecture or laboratory as required)

456. Seminar: The interpretation of physical education in its relationship to education; principles underlying programs; presentation of senior thesis.
3 hours—14

457. Physical Fitness Appraisal and Guidance: The scientific basic of physical fitness appraisal; the construction and administration of fitness and sports skill tests; descriptive statistics in the handling of data for evaluation, grading, and classification. 2 lectures, 2 laboratory hours—21

458. Sport and Culture: An analysis of the social and cultural nature of sport in contemporary society. 3 lecture hours—27

POLITICAL SCIENCE

Chairman and Professor:
W. F. Dawson, B.A. Toronto; M.A. Queen's; D.Phil. Oxon.

Professors:
Eric Beecroft, B.A., M.A. Toronto; Ph.D. Yale
H. A. Hosse, B.A., M.A. Manitoba; Ph.D. Ottawa

Associate Professors:
John R. Cartwright, B.A. Queen's; M.A., Ph.D. Toronto
William M. Dobell, B.A. McGill; M.A., B.Litt. Oxon.
Charles C. Dunlop, B.A., M.A. Queen's
Bohuslav B. Kymlicka, B.A. British Columbia; M.A., Ph.D. Columbia
Sidney J. R. Noel, B.A. Memorial; M.A., D.Phil. Oxon.
T. R. Sansom, B.A. New Brunswick; Ph.D. London

Assistant Professors:
Wallace D. B. Gagne, B.A. Calgary
Huynh K. Khanh, B.A. Johns Hopkins; M.A. Lehigh

Lecturers:
Mary J. Hrabik, B.A. Notre Dame; M.A. Fordham
Graham P. Murray, B.Sc. London; M.A. Lehigh

Instructors (Part time):
Elizabeth J. Chambers, B.A. British Columbia; M.A. Saskatchewan
Phyllis G. Leach, B.A. Heidelberg; M.A. Chicago

Requirements for Admission: First Year General Program (Natural Science, or Social Science) including Politics 20.

Students will normally be advised to take a diversified selection of options from the Social Science Program to be selected with the approval of the Department.

Second Year

Principal Courses
Two of: Politics 231, 240, 242, 244
Three options

Third Year

Principal Courses
Two senior Honors Politics courses, including 347 or 237 if not already taken
Three options

Fourth Year

Principal Courses
Politics 480
Two of: Other senior Honors Politics courses
Two options

COURSES

Except as otherwise noted, Politics 20 is prerequisite for all courses in Politics unless permission of the Department is obtained.

20. Introduction to Political Science: A study of the principal concepts, ideas and analytical methods of modern political science, with emphasis on the political systems of Canada, the United States and Britain. 3 hours—32

30. Canadian Government and Politics: A survey of the governmental institutions and political processes of Canada. (no prerequisite) 3 hours—24

31. International Politics: A study of the factors governing international relations: the United Nations; the foreign policies of such countries as the U.S.A., U.S.S.R., U.K., France, China and Canada. (no prerequisite) 3 hours—7

36. Provincial and Local Government: The structure and processes of provincial and local government, including such subjects as provincial-municipal relations, finance, administration and principles of urban and regional planning. 3 hours—13

38. Political Parties and Pressure Groups: An analytical and comparative study of political parties and pressure groups. 3 hours—29

40. The Politics of Developing Areas: A comparative analysis of social change and political process in developing areas, including Commonwealth countries. 3 hours—17

42. The British Political System: A study of the nature and operation of the British political system, with particular attention to the social context within which the institutions of parliamenary government function. 3 hours—22

44. American Government and Politics: A study of the American Constitution; institutions of government and political processes. 3 hours—26

46. Public Administration: The basic principles of public administration in the modern state, including organization, procedures and the relation of administration to policy making. 3 hours—15

47. History of Western Political Thought: A study of the major political thinkers from Plato to Mill and Marx. 3 hours—4

48. Western European Political Systems: A comparative study of political institutions and processes in West European democratic states. 3 hours—1

49. European Communist Systems: An analysis of political governmental processes in the Soviet Union and East European People's Republics. 3 hours—6

HONORS COURSES

231. International Politics: A study of the factors governing international relations; the United Nations; the foreign policies of such countries as the U.S.A., U.S.S.R., U.K., France, China and Canada. 3 hours—7

240. The Politics of Developing Areas: A comparative analysis of social change and political process in developing areas, including Commonwealth countries. 3 hours—17

242. The British Political System: A study of the nature and operation of the British political system, with particular attention to the social context within which the institutions of parliamentary government function. 3 hours—22

244. American Government and Politics: A study of the American Constitution, institutions of government and political processes. 3 hours—26

338. Political Parties and Pressure Groups: An analytical and comparative study of political parties and pressure groups. 3 hours—29

346. Public Administration: The basic principles of public administration in the modern state, including organization, procedures and the relation of administration to policy making. 3 hours—15

347. History of Western Political Thought: A study of the major political thinkers from Plato to Mill and Marx. 3 hours—4

348. West European Political Systems: A comparative study of political institutions and processes in West European democratic states. 3 hours—1

349. European Communist Systems: An analysis of political and governmental processes in the Soviet Union and East European People's Republics. 3 hours—6

350. Advanced Canadian Government: An examination of selected problems in Canadian government and politics, such as federalism, political parties and pressure groups. 3 hours—11

362. Provincial and Local Government: The structure and political processes of provincial and local government, including such subjects as provincial-municipal relations, finance, administration, and principles of urban and regional planning. 3 hours—13

434. Contemporary Political Theory: A study of the chief political doctrines of the present day, such as communism, socialism, fascism, and the theories associated with democracy; an analysis of concepts such as the state, liberty, authority, and theories of political behavior. (prerequisite 237 or permission of the instructor) 3 hours—33

451. International Law and Organization: A study of the principles and operations of international and regional associations such as the United Nations and NATO. An introduction to international law, emphasizing its relevance to the resolution of conflicts between nations. (prerequisite 231 or the permission of the instructor) 3 hours—21

462. Metropolitan and Regional Government: An advanced study of the governmental structure, administration, politics, planning and financing of metropolitan and regional communities. 3 hours—18

480. Methodology: A seminar on problems in the methodology of political science; the scope and nature of the discipline and its relationship to developments in other fields, particularly psychology and sociology. 2 hours—

485. Selected Topic(s) or Author(s): A seminar.

488. The Electoral Process: An advanced study of quantitative methods employed in political analysis; an analytical and comparative study of voting behavior. 3 hours—3

490. Thesis: With permission of the Department. Thesis to be submitted by March 15 of the fourth year.

PSYCHOLOGY

Head and Professor:
Mary Jean Wright, B.A., M.A., Ph.D. Toronto

Senior Professor:
Douglas Northrop Jackson, B.Sc. Cornell; M.S., Ph.D. Purdue

Professors:
Alexander Karl Bartoshuk, B.Sc. Sir George Williams; M.Sc., Ph.D. McGill
Gordon James Mogenson, B.A., M.A. Saskatchewan; Ph.D. McGill
Leola Ellen Neal, B.A., M.A.; Ph.D. Toronto (Dipl. Clin.) (part-time)
Allan Urho Paivio, B.Sc., M.Sc., Ph.D. McGill
Gordon Haslam Turner, B.A., M.A., Ph.D. Toronto
David Carlton Williams, B.A. Manitoba; M.A., Ph.D. Toronto (part-time)

Visiting Professor:
Graham Alexander Foulds, B.A., M.A. Liverpool; Ph.D. London

Associate Professors:
David Arthur Chambers, B.A. British Columbia; M.Sc., Ph.D. McGill
John Peter Denny, B.A. Toronto; Ph.D. Duke
Robert Charles Gardner, B.Sc. Alberta; M.Sc., Ph.D. McGill
Stephen B. Kendall, B.A. Indiana; Ph.D. Emory
Doreen Kimura, B.A., M.A., Ph.D. McGill
Harold Oliver Lobb, B.A., B.Ed., M.Ed. Saskatchewan; Ph.D. Toronto
William John McClelland, B.A., M.A. Toronto; Ph.D. London (part-time)
Morris Modris Schnore, B.A., M.A.; Ph.D. McGill
Richard Gene Stennett, B.A., M.A.; Ph.D. McGill (part time)
Roger Stretch, B.A. Nottingham, Ph.D. Sheffield
Frank William Ralph Taylor, B.A., M.A., Ph.D. Toronto
Cornelius Hendrik Vanderwolf, B.Sc. Alberta; M.Sc., Ph.D. McGill
Frank Ray Wilkinson, B.A. Utah; M.A. Hawaii; Ph.D. Michigan State

Assistant Professors:
Dan Baran, B.A. McGill; M.A. Columbia; Ph.D. Michigan
Larry Wayne Chamberlain, B.Sc.; Ph.D. Keele
Anthony Joseph Conger, A.B. Trenton; M.A., Ph.D. Illinois
Michael Stephen Goodstadt, B.A. Manchester; Ph.D. Stanford
Gloria Alvernaz Mulcahy, B.A. San Jose; M.S. Washington State; Ph.D. Maryland
Harry George Murray, B.A., M.A.; Ph.D. Illinois
David Reardon Pederson, B.A. Minnesota; M.A., Ph.D. Iowa
Luby S. Prytulak, B.A. Toronto; Ph.D. Stanford
Zenon Walter Pylyshyn, B. Eng. McGill; M.Sc., Ph.D. Saskatchewan
Willard Eugene Reitz, B.S. Pennsylvania State; M.A. Illinois; Ph.D. Pennsylvania State
Gary B. Rollman, B.A. Rochester; M.A., Ph.D. Pennsylvania
Thomas Frederick Siess, B.A. Valparaiso; Ph.D. Minnesota
Marvin M. Simner, B.A. Syracuse; M.Sc. North Carolina State; Ph.D. Cincinatti
Frederick Malcolm Van Fleet, B.A., M.A. McMaster; Ph.D. Colorado
Neil Joseph Vidmar, A.B. MacMurray; A.M., Ph.D. Illinois

Honorary Lecturer:
James Alexander Franklin Stevenson, B.A., M.A., M.D., C.M. McGill, Professor and Head of the Department of Physiology

Lecturers:
Henry John Feenstra, B.A., M.A., Ph.D. (part time)
George H. Phills, B.A. King's; M.A. Dalhousie; Ph.D. London (part time)
Dorothy Susan Prytulak, B.A. Toronto; Ph.D. Stanford
Norman Wilberforce Thomas, B.A., M.A., Ph.D. (part time)

PROGRAMS

PSYCHOLOGY

Requirements for Admission: First Year General Program with Psychology 20 and any three others as principal courses. Mathematics 20 or 24 or Applied Mathematics 20, French 20 or a foreign language 20 are recommended. If Psy-

chology 20 is not taken in the First Year, it must be selected as an option in the Second Year.

Second Year

Principal Courses	**Subsidiary Courses**
Psychology 234, 235, 236, 255	One of: Mathematics 20, 24, 35, Applied Mathematics 20, Philosophy 30, 34, Physics 21, Physiology 22, Sociology 20, Biology 22, Zoology 30 One option

Third Year

Principal Courses	**Subsidiary Courses**
Psychology 337, 338, 343, 349	Two options

Fourth Year

Principal Courses	**Subsidiary Courses**
Psychology 445, 446, 450, 459	Two options

PSYCHOLOGY AND PHYSIOLOGY

Requirements for Admission: First Year General Program (Natural Science) with Psychology 20, Biology 22 or Zoology 20, Chemistry 20, Physics 20, as principal courses. Applied Mathematics 20 or Mathematics 24 or 27 is recommended as one option.

Second Year

Principal Courses	**Subsidiary Courses**
Psychology 235, 255 One of: Chemistry 203, 313 Zoology 255 or 270 One of: Physics 204, 256; Applied Mathematics 20, 200; Mathematics 20, 24, 27, 250	One option

Third Year

Principal Courses	**Subsidiary Course**
Psychology 338, 343 Physiology 300, 301 One of: Anatomy 300; Biochemistry 300	One option

Fourth Year

Principal Courses	**Subsidiary Course**
Physiology 463, 464, 480 Physiology 460 or 461 and 462 Two of: Psychology 234, 236, 337, 349, 445, 446	One option

Students in this program will undertake a major project in behavioral physiology or sensory processes as part of their experimental work in Physiology 480.

PSYCHOLOGY AND PHILOSOPHY

Requirements for Admission: First Year General Program (Arts or Social Science) with Psychology 20 and Philosophy 20 as principal courses. If Psychology 20 was not taken in the First Year, it must be selected as an option in the Second Year.

Second Year

Principal Courses	**Subsidiary Course**
Psychology 235, 236, 255	One option
Philosophy 254, 257	

Third Year

Principal Courses	**Subsidiary Course**
Psychology 338, 349	One option
One of: Psychology 337, 343	
Philosophy 256	
One of: Philosophy 351, 357, 362	

Fourth Year

Principal Courses
Psychology 445, 459
One of: Psychology 446, 450
One of: Philosophy 456, 458, 466, 467, 477
Two of: Philosophy 450, 454, 464, 474

COURSES

Psychology 20 is prerequisite to all other courses in Psychology unless written permission of the Chairman of the Department is obtained.

20. Introduction to Psychology: Problems and methods; individual differences and their assessment; learning; memory; thinking; sensation and perception; motivation; emotion; personality. 3 hours—19

31. Theories of Personality: Representative theoretical interpretations of personality development and dynamics. 3 hours—6

35. Motivation and Learning: The causes of behavior and the modification of behavior through experience. A survey of current theory and research in motivation and learning. **(Formerly Psychology 32).** 3 hours—29

36. Child Psychology: An introduction to theory and research in selected areas of child behavior, with particular emphasis on learning, motivation, perception and personality. 3 hours—16

37. Individual Differences: Quantitative methods in the study of human differences. Elementary statistics, the development and use of psychological tests, and the nature and assessment of human abilities. **(Formerly Psychology 41).** 3 hours—5

38. Perceptual Processes: Theories of perception and psycho-physical methods. The sensory and perceptual processes, their stimulus correlates and physiological bases. **(Formerly Psychology 33).** 3 hours—25

39. Exceptional Children: Problems and methods in work with the gifted, mentally deficient, physically handicapped, brain damaged, and emotionally disturbed child. 2 hours—22

43. Biological Basis of Behavior: First term—basic anatomy and physiology of the nervous system; the role of the neural sciences in the explanation of behavior. Second term—choice of various topics including, (1) comparative psychology, learned and unlearned behavior in various animal phyla, (2) neural basis of cognitive abilities, (3) sensory systems. 2 hours—2

44. Advanced topics in Physiological Psychology: First term—neural basis of emotion and motivation, motivational systems as derived from a study of nervous structures such as the hypothalamus and limbic system. Second term—choice of various topics including, (1) neural basis of cognitive abilities, neural mechanisms in perception, spatial orientation, memory and language, (2) sensory systems, (3) physiology of learning, the learning process in the light of experiments involving the central nervous system.

Prerequisite: Psychology 343 or 43 or consent of instructor 3 hours—13

46. Applied Psychology: The application of psychological principles to practical problems, with the major emphasis on problems in education and industry. 2 hours—27

48. Abnormal Psychology: A consideration of abnormal activities in sensation, perception, memory, emotion, thought and behavior; mental deficiency; the causes and symptoms of psychoneuroses; some reference to major mental disorders; psychotherapeutic techniques.

Prerequisite: Psychology 31, or any two Senior Psychology courses 3 hours—6

49. Social Psychology: The activities of living beings in response to their social environment. The conditioning of personality by the family and other groups; types of prejudice; leadership and prestige in social life; the mob; mental epidemics; propaganda; public opinion. 2 hours—33

HONORS COURSES

234. Historical Systems: A study of persistent problems in the history of psychology and an introduction to the traditional systems of psychology: Structuralism, Functionalism, Behaviorism, Gestalt Psychology, and Psychoanalysis. 2 hours—24

235. Experimental Psychology I: Motivation and Learning; Critical examination of methods, findings, and theory. 2 lectures, 2 laboratory hours—12

236. Child Psychology: An introduction to theory and research in selected areas of child behavior, with particular emphasis on learning, motivation, perception, and personality. 2 lectures and 2 seminar hours—16

255. Statistical Methods: Statistical techniques applicable to the treatment of psychological data; elementary research design. 2 lectures, 1 laboratory hour—25

337. Tests and Measurement: Discussion of basic considerations in measurement; description and evaluation of typical measuring instruments and their uses; consideration of persistent problems in the field of measurement.
2 lectures, 1 laboratory hour—23

338. Experimental Psychology II: Sensation and Perception; Critical examination of methods, findings, and theory. 2 lectures, 2 laboratory hours—11

343. Physiological and Comparative Psychology: Neural and endocrine foundations of behavior; learned and unlearned behavior in selected invertebrate and vertebrate organisms. 2 lectures, 2 laboratory hours—17

349. Social Psychology: Theory and measurement of human social behavior with emphasis on empirical studies of individuals in response to their environment. Topics include: culture and personality; ethnic prejudice; psycholinguistics; propaganda; group structure; mass behavior. 2 hours—33

445. Cognitive Processes: Theory and empirical findings concerning thinking processes such as concept formation, problem solving, and creativity.
2 hours—5

446. Applied Psychology: Consideration of practical problems for which psychological principles and techniques have relevance. Emphasis will be placed upon the interpersonal relations and the problems of small work groups.
2 seminar, 2 laboratory hours—27

450. Personality Theory: Representative theoretical interpretations of personality development and dynamics. 2 hours—16

459. Research Problems: A seminar course in which students will select topics for special investigation. 3 hours

460. Experimental Psychology: Laboratory and seminars dealing with methods, findings, and theory in sensation, perception, and learning as well as the development of research problems for individual investigation. Qualifying students only. 2 lectures, 2 laboratory hours

461. Contemporary Theory: A critical examination of the theories of representative contemporary psychologists. Qualifying students only. 2 hours—1

SECRETARIAL SCIENCE

Professor and Head
Mary Hamilton Gillespie, B.A.; M.A. Columbia

Associate Professors:
Elaine Woodrow Chapman, (Mrs. C.B.), B.A.
Roma Lucille Waller (Mrs.), B.A.; M.A. Columbia

Assistant Professors:
Patricia F. Davis, B.A.
Betty Seldon (Mrs. T. B.), B.A.

Requirements for Admission: Grade 13 standing (with an average of 60%) in English, a modern language (French preferred), and three other credits.

The Department of Education of Ontario accepts a degree in this program as the academic qualification for High School Assistant's Certificate, Type B, for teaching in the Elementary or Secondary schools of Ontario.

Enrollment is limited and students are admitted on the quality of their Secondary School certificate.

Students must obtain credit for all of the First Year before beginning any Second Year work.

First Year

Business 20
English 20
Natural Science 21
One of: French 20 or 21; German 20; Spanish 20
Secretarial Science 28, 29

Second Year

Economics 20
A Senior English
Philosophy 30 or Politics 20 or Psychology 20
One of: French 31; German 30; Spanish 31
Secretarial Science 30, 37, 38, 39

Third Year

A Senior English
History 31
One of: French 43; German 40; Spanish 30
Secretarial Science 47, 48, 49

COURSES

The difficulty of adjusting timetables makes it impossible for those who are unable to pass the final tests of each year to take General Arts subjects of a succeeding year in conjunction with their Shorthand and Typewriting. Therefore, students who fail to pass in one or more of their subjects are faced with the possibility of having to lose an entire year.

28-29. Shorthand and Typewriting: Pitman's Shorthand: theory, speed up to 60 words a minute, and typed transcription of notes. Touch system of typewriting; care of machine; letter styles; copying from manuscript and printed matter; centering; accuracy; and timed tests. 12 hours

30. Accounting and Bookkeeping: Prescribed for Secretarial Science students. Provides practical and basic applications of accounting relating to the sole proprietorship form of business organization, as well as to the partnership and corporates types of organization. 3 hours

37. Office Practice: The foundation of the work in Office Practice is laid in the second year. Lectures are given on office methods, and actual duties are undertaken in the Secretarial Science Office.

Prerequisite: Secretarial Science 28-29 3 hours

38-39. Shorthand and Typewriting: Shorthand speed up to 100 words a minute; typed transcription of notes; typewriting from manuscript; tabulation;

carbon copies; telegrams; financial statements; methods of duplicating; accuracy and timed tests.

Prerequisite: Secretarial Science 28-29 12 hours

47. Office Practice: The responsible duties of the various members of an office staff and the operation of modern office equipment are undertaken by the third year students. Units of work are assigned in rotation. Lectures are given on secretarial duties, office organization, the administration of services, the problems of office personnel.

Prerequisite: Secretarial Science 37, 38, 39 12 hours

48-49. Shorthand and Typewriting: Shorthand speed up to 130 words a minute; typed transcription of notes; typewriting speed up to 60 words a minute; typing from advanced copy (technical matter, foreign languages) and from dictation.

Prerequisite: Secretarial Science 38, 39 10 hours

SOCIOLOGY

Chairman and Associate Professor:

E. T. Pryor, B.A. Saint Thomas Aquinas; M.A. Michigan State; Ph.D. Brown

Associate Professors:

J. D. Allingham, B.A., M.A. McMaster; Ph.D. Australian National
P. M. George, B.A. Earlham; M.A. Boston; Ph.D. North Carolina
J. A. Geschwender, B.S. Buffalo State Teachers' College; M.A., Ph.D. Michigan State
B. D. Singer, B.A. Wayne State; M.A., Ph.D. Pennsylvania

Assistant Professors:

G. E. Ebanks, B.A. London; M.A., Ph.D. Cornell
C. R. Grindstaff, B.A. Wayne State, M.A., Ph.D. Massachusetts
G. K. Jarvis, B.A. Brigham Young; M.A. Michigan
H. Y. Kim, B.A., M.A., Ph.D. Washington
C. E. Nobbe, B.A., M.A., Ph.D. Washington
R. W. Osborn, A.B. Michigan, Ph.D. Brown
J. I. Williams, B.A. Nebraska, Wesleyan; M.A. New Hampshire; Ph.D. Florida State

Lecturers:

C. L. Boydell, B.A. Rutgers; M.A. Massachusetts
W. L. Skidmore, B.S., M.A. Kent State

Sociology 30 and 31 are required of all students selecting Sociology as their major subject. Sociology Majors must have completed Sociology 31 by the end of their second year and Sociology 30 by the end of the third year.

20. Introduction to Sociology. An examination of the major theoretical perspectives in the field of Sociology, methods of empirical investigation of social phenomena, socialization, group structure, principles of social organization, community structure, population and social change. 3 hours—35

30. Sociological Theory: A study of the history of sociological thought leading to an appraisal of contemporary theoretical perspectives in relation to their logical adequacy and heuristic value.
Prerequisite: Sociology 20 3 hours—14

31. Research Methods and Statistics: An introduction to empirical methods in Sociology, including elementary statistical methods, experimental design, and basic techniques for the measurement of sociological variables.
Prerequisite: Sociology 20 3 hours—12

32. Demography and Population Studies: An introduction to the dynamics of population through the study of change in patterns of fertility, mortality and migration. Emphasis is given to the determinants and consequences of current population growth in both developed and underdeveloped areas of the world, and to efforts being made to control this growth. 3 hours—1

34. Community Structure: An introduction to human community study from the ecological viewpoint, with a review of the history of human communities emphasizing the emergence and features of the urban type. The second term focuses on the study of urban growth, urbanization and city systems particularly in Canada.
Prerequisite: Sociology 20 or permission of the Department 3 hours—23

35. Social Stratification: An analysis of social ranking systems of class, status and power. Topics will include: theoretical and methodological problems in ranking, political and sociological perspectives on community and national power structures, and social mobility in industrialized societies. Emphasis will be placed on the comparison of alternative stratification systems.
Prerequisite: Sociology 20 or permission of the Department 3 hours—9

36. Social Organization: A comparative analysis of forms of association and group structure from primary groups to complex bureaucratic structures.
Prerequisite: Sociology 20 or permission of the Department 3 hours—25

38. Social Change: A study of the sources, pattern and consequences of social change. The views of classical and modern theorists will be evaluated in relation to patterns of change exhibited at group, community and cultural levels. Problems encountered in attempts to induce change with respect to economic development, urban planning, population policy, etc. will be surveyed.
Prerequisite: Sociology 20 or permission of the Department. 3 hours—5

39. The Family: Sociological, psychological, and other research perspectives on family structure and functioning.
Prerequisite: Sociology 20 3 hours—8

40. Social Problems: Study of theories of deviant behavior and of social disorganizations, with particular attention to certain specific problems of the contemporary period.
Prerequisite: Sociology 20 3 hours—21

41. Communication and Social Character: Analysis of attitude formation and the role of symbolic systems on social character and collective behavior. Utilizes sociological, communication and general social psychological theory dealing with the function of communications media in society and the effects of patterns of communication upon members of different social groups. Con-

siders research findings on media content, opinion formation and change, propaganda and advertising.

Prerequisite: Sociology 20 or permission of the Department 3 hours—31

42. Sociology of Work: The study of the sociological aspects of economic organization. The sociology of industry, business enterprise, occupations and professions, and the relationship of the economy to other social institutions will be emphasized.

Prerequisite: Sociology 20 or permission of the Department 3 hours—28

43. Minority Groups: The analysis of racial, ethnic, political and religious minority groups in terms of their relationship to each other and to society at large. Stability and change, discrimination, prejudice, and inter-group conflict will be considered within the context of a pluralistic society.

Prerequisite: Sociology 20 3 hours—36

44. Collective Behavior: Basic forms of collective behavior including social crowds, publics, and the mass society will be examined in terms of their structural and social psychological consequences. The focus of the course will be the analysis of the relationship between human problems and collective attempts to resolve them.

Prerequisite: Sociology 20 3 hours—4

45. Applied Sociology: The application of sociological theory and method to selected problems in urban society.

Prerequisite: Sociology 20 or permission of the Department 3 hours—20

46. Medical Sociology and Public Health: The study of the sociological nature of health and illness, medical establishments and professional roles. The definition and measurement of health and community and national solutions to health problems will be considered.

Prerequisite: Sociology 20 or permission of the Department 3 hours—17

47. Group Behavior: Psychoanalytic, cognitive and behavioral theories are evaluated in relation to selected topics including motivation, traits, attitudes, conformity, prejudice, and group behavior.

Prerequisite: Sociology 20 3 hours—13

48. Social Institutions: An analysis of the structure and interrelationships of economic, political and other social institutions.

Prerequisite: Sociology 20 3 hours—34

***Business 20:** Introduction to Business Organization (Division B). 3 hours—5

***Business 250:** A course in Introductory Accounting and Financial Statement Analysis of particular value to students considering Law, Economics or Business.

*Denotes courses given by the School of Business Administration.

AFFILIATED COLLEGES

THE PRELIMINARY YEAR

The Preliminary Year offered at Brescia College is designed for students who have completed Grade 12 (Ontario) or who have the equivalent standing. Minimum standards of admission as set by the College are based on percentage, or rank-in-class and on principal's reports.

Each case of an adult special student seeking admission to the Preliminary Year will be judged on its own merits by the Admission Committee of the College.

The Preliminary Year will consist of the following program:

For admission to First Year General Program (Arts, Music, or Social Science) or to Secretarial Science:

English 10

Another language 10

Any three of: History 14, Geography 20, Mathematics 15, Religious Studies 10, another language 1, 10, 1-10, Music 10 or Home Economics 25.

SPECIAL COURSES

The following courses, equivalent to Grade 13 subjects, are not offered in the College of the University but may be offered by the affiliated colleges as part of the Preliminary Year.

English 10: Literature and Composition.	3 hours—11
French 10: Intermediate French. Prerequisite: Grade 12 French	3 hours—23
History 14: History of the Americas.	3 hours—14
Latin 10. Intermediate Latin. Prerequisite: Grade 12 Latin	3 hours—26
Mathematics 15: Introduction to Analysis.	5 hours— 5
Religious Studies 10	

HURON COLLEGE

Principal:

The Venerable J. Grant Morden, B.A. Toronto; L.Th., B.D., D.D. Wycliffe; S.T.M. Union Theological Seminary; D.Th. General Theological Seminary, New York

Registrar:

J. Catharine Ridley

FACULTY

Business Administration

Lecturer:
H. B. Rooney, B.A., M.B.A.

Classics

Associate Professor:
The Reverend F. H. Allen, M.A., B.D. Oxon.

Economics

Lecturers:
Mark K. Inman, B.A. Acadia; M.A., Ph.D. Harvard; D.Litt. Acadia
H. Thomas Johnson, A.B. Harvard; M.B.A. Rutgers; M.A. Wisconsin
H. B. Rooney, B.A., M.B.A.
D. R. Williamson, B.A. Liverpool; M.A.

English

Professors:
Rodney Poisson, B.A., M.A. British Columbia; Ph.D. Washington
Eleanor Croysdale Jared, B.A., M.A. Toronto; A.M., Ph.D. Radcliffe

Assistant Professors:
Elaine Campbell Bowe, B.A. Mills College; M.A. Indiana, Ph.D., Oregon
Elizabeth Revell, B.A. Toronto; M.A., B.Litt. Oxon.
E. D. McVey, M.A. Queen's

Lecturer:
Sister M. Corona Sharp, B.A., M.A., Ph.D. Notre Dame

French

Assistant Professors:
G. A. Black, M.A. Toronto
Deborah Metford, B.A., M.A. British Columbia; D. de l'U de Paris

Lecturers:
Christa Burghardt, B.A., M.A. Toronto
Valentine Miller, B.A., M.A., B.Litt. Oxon.
C. M. Van der Wel, B.A. London; M.A.

Hebrew

Professor:
The Reverend Geoffrey Howard Parke-Taylor, B.A., M.A. Toronto; L.Th., B.D., D.D. Wycliffe

Lecturer:
The Reverend Harold Kay, B.A. Dalhousie; L.Th. King's, B.D. Trinity; M.A. Temple

History

Professor:
The Reverend J. L. H. Henderson, B.A., B.D., D.D.

Assistant Professors:
Jack Snead Blocker, B.A. Florida; M.S. Wisconsin
G. L. Owens, B.A., M.A. Nebraska
J. N. Thompson, B.A. McMaster; M.A., Ph.D. Princeton

Mathematics

Lecturer:
R. H. Lee, B.A.

Politics

Lecturer:
Helen Dawson, B.A. McGill; M.A. Queen's, B.Litt. Oxon.

Philosophy

Assistant Professors:
R. P. Miller, B.A. Cornell; B.Phil. Oxon.; M.A. Michigan
Jean-Pierre Schacter, B.A. City College of New York; M.A. City University of New York; Ph.D. Syracuse

Lecturer:
The Reverend Donald F. Irvine, B.A., B.Th. (Huron), M.A. University of Waterloo

Psychology

Associate Professor:
F. W. Burd, M.A. Toronto

Assistant Professor:
Moira Sansom, B.A. Mount Allison; B.A. New Brunswick; B.L.S. Toronto

Lecturers:
The Reverend Thomas Harris, B.A. Toronto; L.Th. Wycliffe; M.A. Columbia; B.D. Union Theological Seminary
F. G. Munn, B.A. Waterloo Lutheran; M.A.

Religious Knowledge

Professor:
The Venerable J. Grant Morden, B.A. Toronto; L.Th., B.D., D.D. Wycliffe; S.T.M. Union Theological Seminary; D.Th. General Theological Seminary, New York

Associate Professor:
The Reverend F. H. Allen, M.A., B.D. Oxon.

Lecturers:

The Reverend Donald F. Irvine, B.A., B.Th. (Huron), M.A. University of Waterloo

The Reverend G. E. Rousom, B.A., M.A. Toronto; B.D. Emmanuel

PROGRAMS

The General Program in Arts and Social Science, all Honors Programs which include English, History and Philosophy, and the first two years of Honors Business Administration are offered by Huron College. All laboratory courses in Science are taught in the College of Science.

Through its Department of Religious Knowledge, Huron College offers courses open to all students of the University.

Religious Studies

30. Religious Studies: An introduction to the Living Religions of the World: A study of the history, faith, and practices of the major living religions. 2 hours

38. Religious Studies: Great Biblical Ideas in Relation to Contemporary Thought. 2 hours

44. Religious Studies: 20th Century Theological and Philosophical Problems: A seminar designed to exhibit clearly the rational basis for the radical transformation of theology in the 20th century. The literature of contemporary analysis will be examined as it bears on specific topics, e.g., The existence of God, Order and Design, Meaning and Morality, Religious Experience and Authority. The latter part of the course will be a critical scrutiny of some contemporary responses to the problems posed. 2 hours

45. Religious Studies: An introduction to New Testament Greek. 2 hours

COURSES

These courses are given in Huron College on behalf of the Faculty of Arts of the Constituent University, and Huron College.

1-10. Grammar: Text of Genesis 1-3; 22; Jonah.
Language Laboratory - Israeli Hebrew 5 hours—27

20. Introduction to Hebrew Narrative and Poetry: Text of II Samuel 9-20; I Kings 1-2. Selected Psalms.
Prerequisite: Hebrew 1-10 3 hours—17

30. Hebrew Prophetic Literature: Selections from Amos. Isaiah of Jerusalem, Jeremiah, and Deutero-Isaiah. Introduction to Gunkel's **Formgeschichte** and **Gattungskritik.** (Not offered in 1969-70)
Prerequisite: Hebrew 20 2 hours—21

40. Hebrew Text of the Psalms: Principles and forms of Hebrew poetry. Studies of representative Psalms. Gunkel's **Gattungen** and Mowinckel's cultic **Psalmenstudien.**
Prerequisite: Hebrew 20 2 hours— 4

BRESCIA COLLEGE

OFFICERS OF ADMINISTRATION

Dean:
Sister Dominica, B.A., M.A.

Registrar:
Sister Paula Janisse, B.A., M.A.

Librarian:
Sister Pierina Caverzan, B.A., M.A.L.S. (Rosary College)

Assistant Librarian:
Christine Suokaite, B.A., M.A.L.S. (Rosary College)

FACULTY

Classics

Associate Professor:
Sister Margaret, B.A., M.A. Detroit

Economics

Lecturer:
R. K. Sharma, M.A. Delhi; M.A. (part time)

English

Professor:
Sister Corona Sharp, B.A.; M.A., Ph.D. Notre Dame

Lecturers:
Monte W. Black, B.A. (part time)
Myrtle Brock, B.A., M.A. (part time)
Sister Phyllis Wright, B.A.; B.Ed. Alberta; M.A.
Nancy A. Tausky (Mrs. T. E.), B.A. Hope; M.Phil. Yale
Sister Mary Louise McKenzie, B.A., M.A. (on leave)

French

Professor:
Sister Marie, B.A., M.A.; Ph.D. Toronto

Assistant Professor:
Carol Carter, B.A., M.Ed. Arkansas; M.A. Wisconsin

Instructors:
Muriel Mary Bush (Mrs. W. S.), M.A. Edinburgh (part time)
Annick S. Deakin (Mrs. A. S.), L. es L. Grenoble (part time)

German

Lecturer:
Sister Teresa, B.A.

History

Lecturers:
Beverley Golden, B.A., M.A.
James Ryan, B.A. Ottawa (part time)

Home Economics

Professor:
Sister Dominica, B.A., M.A. Toronto

Associate Professor:
Isabel Hodgkinson (Mrs. G. J.), B.A., M.A. Toronto (part time)

Assistant Professor:
Rhoda Penney, B.Sc., B.Ed. St.F.X., M.S. Cornell

Lecturers:
Lynne. D. DiStefano (Mrs. J. J.), B.A. Russel Sage; A.M. Boston; M.A. Pennsylvania
Nina Mercer (Mrs. P.), B.S. Nebraska; M.S. Cornell (part time)
Lillian L. Rickman (Mrs. F. H.), S.B. Chicago; R.P.Dt.
Mary D. Rouane (Mrs. M.), B.A., M.A. Montana

Mathematics

Lecturer:
May K. Lee (Mrs. W.), B.Sc. Chu Hai; M.A.

Philosophy

Professor:
Sister St. Michael, B.A., M.A. Catholic U. of America; Ph.L., Ph.D. Laval

Assistant Professor:
Rev. Patrick E. Cavanagh, B.A., M.A. Toronto; Ph.D. Notre Dame

Psychology

Professors:
Sister Dolores Kuntz, B.A.; M.A. Detroit; Dip.Psych., Ph.D. Queen's
John Paul, B.A., M.A., Ph.D. Toronto (part time)

Assistant Professor:
Margaret Howe (Mrs. J. L.), B.A. Acadia; M.A. Toronto (part time)

Religious Studies

Lecturer:
Rev. R. B. Hunter, B.A. (Honors); S.T.B.

Spanish

Lecturer:
Zipla C. Howard (Mrs. V. A.), A.B. Indiana

Sociology

Professor:
Sister Arleene Walker, B.A.; M.A. Catholic U. of America

PROGRAM

The General Programs and some of the Honors Programs are available in Brescia College. All laboratory courses in the Natural Sciences are taught entirely in the College of Science.

HOME ECONOMICS

23. Applied Art: Fundamentals of design and colour. 2 hours—13

25. Household Administration: General principles of Home construction and planning, problems of home management and equipment. 2 hours—31

30. Textiles: Indentification and testing of fiber fabrications and finishes; textile industry development; flat pattern techniques; analysis of construction methods. 1 lecture, 3 laboratory hours—13

31. Normal Nutrition: Normal requirements of the body; food nutrients and their functions; deficiencies.
2 lectures both terms, 2 laboratory hours 1 term—21

32. *Food Science*: Experimental approach to the study of factors influencing behavior of foods. 1 lecture, 3 laboratory hours—31

33. Interior Decoration: History of interior decoration with emphasis on furniture styles from ancient times to the present.
Prerequisite: Home Economics 23 1 hour, half course—35

40. Clothing and Designing: Interdisciplinary study of clothing and historic costume; clothing and tailoring methods. Design adaptations of historic costume in the study of flat pattern and draping techniques.
Prerequisite: Home Economics 30 2 lectures, 3 laboratory hours— 7

41. Advanced Nutrition: Nutritional needs during infancy; the adolescent. Diet therapy. Seminars. 3 hours—14

42. Principles of Food Science:
Prerequisite: Home Economics 32 1 lecture, 3 laboratory hours—19

45. Consumer Economics and Communications: Marketing and consumer problems. Demonstration techniques. 1 lecture, 2 laboratory hours—23

48. Institutional Food Production: The application of scientific principles to the preparation, selection and storage of quality food. Floor planning, layout and equipment. Laboratory exercises and field trips.
2 lectures, 3 laboratory hours—29

49. Institution Management: Principles of management; personnel supervision; financial control. Clinical studies. 3 hours—33

PHILOSOPHY

20x. Introduction to Philosophy: This course deals with fundamental problems in Philosophy, especially in Natural Philosophy, Moral Philosophy and Metaphysics, and the solutions offered by great thinkers in these respective fields. 3 hours— 1

35x. Aesthetics: A study of aesthetical theory of classic and modern points of view. 2hours— 3

48x. Contemporary Philosophy: A critical study of selected 20th century philosophers and movements. Emphasis on figures and schools varies from year to year according to students' needs and background. 2 hours—14

49x. Special Topics in Philosophy 2 hours— 8

Psychology 20 is ordinarily prerequisite to all other courses in Psychology.

20x. Introduction to Psychology: Problems and methods; individual differences and their assessment; learning; memory; thinking; sensation and perception; motivation; emotion; personality. 3 hours—19

31x. Theories of Personality: Representative theoretical interpretations of personality development and dynamics. 2 hours— 6

36x. Child Psychology: Ages, stages, and factors involved in the development to a mature personality; introduction to theory, research and problems in selected areas of child behavior, especially learning, maturation, and socialization. 2 hours—16

39x. Exceptional Children: Problems and methods in work with the gifted, mentally deficient, physically handicapped, brain damaged, and emotionally disturbed child. 2 hours—22

46x. Applied Psychology: The application of psychological principles to practical problems, with the major emphasis on problems in education and industry. 2 hours—27

48x. Abnormal Psychology: A consideration of abnormal activities in sensation, perception, memory, emotion, thought and behavior; mental deficiency; the causes and symptoms of psychoneuroses; some reference to major mental disorders; psychotherapeutic techniques.

Prerequisite: Psychology 31 or any two Senior Psychology courses

2 hours— 6

RELIGIOUS STUDIES

10. An Introdcution to Old Testament Theology through the men and messages of the Old Testament. *2 hours*

35. Comparative Religion: Ecumenism—a study of contemporary religions under various aspects. 2 hours

37. Contemporary Theology 2 hours

Prerequisite: Sociology 20 or permission of instructor.

39. The Family: Sociological, psychological, and other research perspectives on family structure and functioning. 3 hours—28

40. Social Problems: Study of theories of deviant behavior and of social disorganization, with particular attention to certain specific problems of the contemporary period. 3 hours— 4

SOCIOLOGY

Requirements for Admission: Grade 13 standing (with an average of 60%) in four subjects comprising seven credits including English, a language other than English or Mathematics, Chemistry and at least one other subject (Biology recommended).

This program, which leads to the B.A. degree in Home Economics, is offered jointly by the University and Brescia College. Students on main campus will register in the Faculty of Social Science. All Home Economics courses are offered at Brescia College.

The Department of Education of Ontario accepts a degree in this program as the academic qualification for High School Assistant's Certificate, Type B, for teaching in the Elementary or Secondary Schools of Ontario.

Students may also take dietetic interneship in institutions approved by The Canadian Dietetic Association for professional training.

First Year

Biology 21
Chemistry 25
English 20
Language or Mathematics at 20 level
Home Economics 23, 25
Psychology 20 or Sociology 20

Second Year

Botany 36
Chemistry 33
Senior English course
Home Economics 30, 31, 32, 33

Third Year

Biochemstry 46
Home Economics 40, 41, 42, 45
Psychology 36 or Sociology 39
(For students interested in teaching and related fields)

OR

Biochemistry 46
Home Economics 41, 42, 45, 48, 49
(For students interested in Food Service Management, Nutrition and Therapeutics)

KING'S COLLEGE

OFFICERS OF ADMINISTRATION

Principal and Dean of Arts:
D. Owen Carrigan, B.A. St. F.X.; M.A. Boston; Ph.D. Maine

Registrar:
J. H. Campbell, B.A. St. F.X.; B.Ed., M.A. U.N.B.

Librarian:
P.D. Mitchell, B.A., B.L.S. McGill

Comptroller:
W. W. Henderson, R.I.A.

FACULTY

D. Owen Carrigan, M.A. Boston; Ph.D. Maine History
Rev. Patrick E. Cavanagh, M.A. Toronto, Ph.D. Notre Dame, Philosophy
Rev. Paul E. Crunican, M.A., Ph.D. Toronto, History
Anne Srabian de Fabry, M.A., Ph.D. Rice, French
Jacques R. Goutor, M.A., Ph.D. Illinois, History
Rev. Robert A. Graveline, Ph.L., S.T.L. Laval, Philosophy
Jaroslav Havelka, M.A. Masaryk, Ph.D. Milan, M.Sc. McGill, Psychology
Rev. Carl E. Keane, M.A. Notre Dame, English
Monica M. Lawlor, M.A., Ph.D. London, Psychology
Dante Lenardon, M.A., Ph.D. Toronto, French

Carolyn K. McNamara, M.A. Toronto, History
Gerald W. Olsen, M.A. Windsor, History
Gary Paterson, M.A., M. Phil., Toronto, English
Rev. William J. Ring, Ph.L. Laval, Philosophy
Rev. Michael Ryan, M.A., Ph.D. Notre Dame, Philosophy
John J. Snyder, M.A., Ph.D. Toronto, Philosophy
Ronald Toop, M.A. Toronto, English
Charles Jeremiah Treacy, M.A., Ph.D. Toronto, Classics

PART TIME FACULTY

Rev. John J. Donahue, S.T.L. Gregorianum, Religious Studies
Rev. Joseph P. Finn, Ph.D. C.U.A., Philosophy
Stuart M. Jackson, B.A. U.W.O., Mathematics
Phyllis Leach, M.A. Chicago, Politics
William Marr, M.A., Economics
V. Rev. Richard T.A. Murphy, O.P., S.T.D. Angelicum, S.S.D. Biblical Commission; S.T.M. Dominican Order, Religious Studies
Roger Spalding, M.A. St. Louis, English

King's College offers the B.A. general degree, the B.A. Honors degree, and the first two years of the Business Administration program.

COURSES

Arts and Social Science courses taught at King's College follow the same prescription as those taught at the University. For course descriptions please see the pertinent sections of this calendar. In addition the following courses are offered at King's College but not at the University.

Philosophy

45x. Political Philosophy: Critical readings from selected original sources of the political thought of ancient, modern, and contemporary thinkers. 3 hours—5

47x. Modern Philosophy: Readings in the works of selected philosophers from the Renaissance to the present day. 3 hours—35

49x. Philosophy of Education: An inquiry into the classical and modern Philosophies of education. 2 hours—32

Psychology

40x. Dynamology: Vegetative powers; sensation and perception; internal senses, feeling and emotion; reflex behavior; intellectual operations; the unconscious; abnormal phenomena; the faculty theory and modern psychological research. 3 hours—25

Religious Studies

21. Salvation History: The story of the Covenant people, from Abraham to the eve of the Christian era, followed by the history of the New Israel from pre- and early-Christian expectations, up to the end of the 1st century A.D. The approach combines history, literary analysis, archaeology, and biblical theology. 3 hours—18

32. Contemporary Moral Problems: A critical examination of contemporary moral attitudes and standards. An attempt to present a Christian approach to some recent moral issues, such as sex, drugs, mass-media, money, politics, war, segregation, etc. 2 hours—26

35. Comparative Christian Religions: A study of the theological issues at stake in the division of Christendom; approaches to Christian unity; Ecumenism. 2 hours—26

40. The Theology of Marriage: A study of marriage considered from the psychological, moral, social, and theological points of view. 2 hours—28

42. Christian Social Theory: The modern and contemporary teachings of the Christian church on social justice, wages, property, work, poverty, social reconstruction, etc. The course will examine the thought of leading theorists and its application to contemporary society. 3 hours—18

	Althouse College of Education	Arts	Music	Social Science	Science	Business Administration
UNDERGRADUATE						
Full-time Students						
Preliminary Year .	—	21	—	—	—	—
First Year	—	629	83	1,461	650	—
Second Year	—	495	54	1,054	496	—
Third Year	—	450	30	850	342	71
Fourth Year	—	70	22	219	113	64
Part-time Students ..	—	1,135	19	924	150	—
Sub-total	—	2,800	208	4,508	1,751	135
GRADUATE						
Full-time Students ..	—	128	1	260	208	356
Part-time Students ..	—	34	—	22	11	1
Sub-total	—	162	1	282	319	351
SUMMER 1968						
Althouse College .	2,031	—	—	—	—	—
Undergraduate ...	—	1,048	19	1,181	182	1
Graduate Full-time	—	48	—	121	220	11
Graduate Part-time	—	10	—	4	1	—
Sub-total	2,031	1,106	19	1,306	403	12
ALTHOUSE COLLEGE REGULAR SESSION						
Full-time Students ..	508					
Part-time Students ..	14					
Sub-total	522					
TOTAL	2,553	4,068	228	6,096	2,473	504

UNIVERSITY TOTAL REGISTRATIONS			
Constituent			
University	16,519	Full-time	10,141
Affiliated Colleges	1,142	Part-time	7,520
	17,661		17,661

Engineering Science	Law	Medicine	Nursing	Dentistry	Library Science	Total 1968-69	Total 1967-68	Increase
—	—	—	—	—	—	21	21	—
162	133	77	40	31	—	3,266	2,701	565
74	63	92	32	10	—	2,370	2,270	100
70	58	84	26	7	—	1,988	1,689	299
51	—	74	60	—	—	673	587	86
2	—	1	46	—	—	2,277*	1,900*	377
359	254	328	204	48	—	10,595	9,168	1,427
75	—	128	10	—	49	1,315	1,129	186
8	—	1	4	—	22	103	133	-(30)
83	—	129	14	—	71	1,418	1,262	156
—	—	—	—	—	—	2,031	1,764	267
10	2	1	36	—	—	2,480	2,188	292
41	—	96	—	—	50	587	440	147
—	—	—	1	—	12	28	14	14
51	2	97	37	—	62	5,126	4,406	720
						522	310	212
493	256	554	255	48	133	17,661	15,146	2,515

Men: 11,130
Women: 6,531
17,661

* The figure of Part-time (Extension) Students read actual students instead of course registrations.

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Information about the academic year 1969-70
may be obtained from the following official publications of
The University of Western Ontario:

General Information

Faculties of
Arts • Music • Science • Social Science

School of Business Administration

Faculty of Dentistry
Faculty of Medicine
Program in Medical Rehabilitation
School of Nursing

Faculty of Engineering Science

Faculty of Graduate Studies

Faculty of Law

School of Library and Information Science

Faculty of Music

Summer School 1969
Extension Program
Continuing Education Classes

French Summer School/ Cours d'anglais

Althouse College of Education
ACE/Technical Courses

These publications are available on request from
the Registrar's Office, or the Office of the Dean of the
Faculty or School concerned.

DEPARTMENT OF INFORMATION SERVICES AND UNIVERSITY PUBLICATIONS