XII—Course Descriptions

General Information

Course Labelling and Levels

Each course is identified by a two–part code. The first part of the code refers to the subject area, the second to the level of the course. Thus, the course PSYC*3570 is a course in the subject area of Psychology (PSYC*XXXX), and is of a level that places it among courses in the 3000 series. The series 1000, 2000, 3000 and 4000 numbers are intended to indicate progressively more demanding content, and correspondingly increasing competence on the part of the students enrolled in the course. Courses in the 1000 series are mainly for first year students, those in the 2000 series are mainly for second year students, and those in the 3000 series are for third year students. Similarly, courses in the 4000 series are mainly intended to be taken by students in the fourth year of honours programs. It is important that students planning their courses have clearly in mind the significance of these numbers so that they may guard against undertaking course work at levels for which they are insufficiently prepared. A two–semester course (e.g. AGR*2351/2) is taken over 2 continuous semesters and counts as 1 course attempt per semester for classification, continuation of study and calculation of fees. Two–semester courses cannot be split.

Course Information

The letters S, F, W indicate the University's intention to offer the course in the Summer (S), Fall (F) or Winter (W) semester during the academic year covered by this Calendar. Although courses normally will be offered in the semester indicated, students preparing their course programs are advised to consult the Undergraduate Course Timetable. The University cannot guarantee that all courses will be offered in the exact semester indicated.

The letter U indicates that an intended offering has not been assigned to the course. Students should consult the Undergraduate Course Timetable posted on WebAdvisor <https://webadvisor.uoguelph.ca/> or contact the departments offering those courses to determine the semester offerings.

The figures in parentheses ( ) following the semester designation are a general guide to the lecture and laboratory contact hours per week, the first digit being the number of lecture hours and the second, the number of laboratory hours. The credit weight for each course appears in brackets [ ]. A credit weight of [0.50] indicates 10–12 student effort hours, including class time, on academic tasks associated with the course.

Detailed course descriptions are maintained at the office of the department offering the course. Some courses, designated "Experiential Learning" courses in the Calendar description, are deliberately designed to accommodate the need to grant academic credit for experiential learning external to regular courses, in such contexts as co–operative education, field observation/job shadowing, internship/externships, practica, service learning, or work study (and other approved experience). Prior approval for admission to these courses must be obtained from the department and instructor concerned.

Some courses are offered in the Guelph–Humber degree program and on the Humber campus only. Those courses will be identified in the course restriction information. See the University of Guelph–Humber web site at for more information about the Guelph–Humber degree programs (http://www.guelphhumber.ca/).

Course Prerequisites

In lists of course prerequisites, "or" conditions are spelled out explicitly, but "and" conditions are indicated with a comma "," . For example: "CSTU*2270, FRHD*2010, NUTR*2010" means "CSTU*2270 and FRHD*2010 and NUTR*2010". A number of courses have stated prerequisites which are prior requirements for entry to the course. Students who do not satisfy course prerequisites, or who in the opinion of the instructor do not possess an equivalent background to that of the stated prerequisites, are not eligible to enroll in the course. When some specific background is desirable but not required, the course description will include a statement of recommended background. It is understood that the instructor may accept equivalent courses from other institutions in place of the stated prerequisites. Students who wish to enroll in courses for which they do not have the stated prerequisite(s) must obtain instructor approval as outlined in Section VIII, Undergraduate Degree Regulations and Procedures, in this Calendar.

Course Equates, Exclusions and Restrictions

Equates – Equate indicates a course identical to the one under which it is listed. The course may have been re–numbered or may be cross–listed under two subject areas. **Students will not be permitted to register in equated courses.**

Exclusions – Exclusion indicates a course with content similar or identical to the course under which it is listed so that both courses cannot be taken for credit. Exclusions are being replaced by equated courses and course restrictions.

Restrictions – Restriction indicates sufficient over–lap in content that the course under which it is listed may not be taken if the student already has credit for the course identified as the restriction. **Students will not be permitted to register in restricted courses.**

XII—Course Descriptions, Agricultural Economics

Department of Agricultural Economics and Business.

AGEC*2220 Financial Accounting F,W(3–3) [0.50]
An introductory course designed to develop an understanding of current accounting principles and their implication for published financial reports of business enterprises. The course approaches the subject from the view of the user of accounting information rather than that of a person who supplies the information.
Prerequisite(s): 1 of ECON*1050, ECON*1100, ECON*1210, ENGG*3240

AGEC*2230 Management Accounting F,W(3–3) [0.50]
This course emphasizes the use of accounting information to facilitate effective management decisions. Topics include cost determination, cost control and analysis, budgeting, profit–volume analysis and capital investment analysis.
Prerequisite(s): AGEC*2220

AGEC*2700 Survey of Natural Resource Economics W(3–1) [0.50]
Natural resources in broad economic perspective. A discussion of factors that shape decisions concerning their use (or misuse), with illustrations of topical interest. This course is not normally offered to 7th or 8th semester students.
Prerequisite(s): ECON*1050 or ECON*1210

AGEC*3030 The Firm and Markets F(3–2) [0.50]
A course in microeconomic theory applied to agricultural economics research. The theory of the firm is used to analyze production and resource use in agriculture. Resource allocation issues, risk responsive decision–making, and firm strategy on vertical and horizontal integration are studied. Consumer theory is used to analyze food purchase decision. How theoretical relationships are quantified and used in the analysis of public policy issues is emphasized.
Prerequisite(s): ECON*2310, ECON*2770, ECON*3740

AGEC*3310 Operations Management F,W(2–1) [0.50]
The decision–making role of the operations manager in transforming inputs into desired outputs is the primary focus of this course. The major issues and problems of designing, scheduling, operating, and controlling the production system will be examined.
Co–requisite(s): AGEC*2230

AGEC*3320 Financial Management F,W(3–0) [0.50]
The viewpoint taken in the course is that of the senior financial officer of a business firm. The focus is on the management of cash, accounts receivable, inventory and short and intermediate term liabilities. Emphasis is placed on the analysis and forecasting of financial statements, and financial modeling for planning and controlling the growth of the business enterprise.
Prerequisite(s): 1 of AGEC*2230, HAFA*3070, HTM*3070

AGEC*3330 Intermediate Accounting F(3–0) [0.50]
A critical evaluation of accounting concepts, principles and practices in relation to both the traditional and current value accounting measurement models. Emphasis will be on the effect of alternative accounting practices and measurement models on income determination and asset valuation.
Prerequisite(s): 10.00 credits including AGEC*2220

AGEC*4000 Agricultural and Food Policy W(3–0) [0.50]
A critical analysis of agricultural income, marketing, adjustment and trade problems and policies in the developed countries, with particular emphasis on Canadian agricultural policies.
Prerequisite(s): 15.00 credits including ECON*2310

AGEC*4210 World Agriculture and Economic Development F(3–0) [0.50]
The role of agriculture in economic development. Analyses of economic policies and programs in developing countries and their effect on economic development.
Prerequisite(s): 10.00 credits

AGEC*4220 Advanced Farm Management W(2–3) [0.50]
A course to follow AGEC*4200 which is oriented toward practical application of theory and analytical principles to the identification, analysis and solution of farm business organization/management problems. Students work on a major farm project as management consultants with a farm owner/operator. The course builds upon students' prior training in accounting, finance, mathematical analysis, computer applications, economics, agriculture and farm management.
Prerequisite(s): 1 of AGEC*3320, AGEC*4200, AGR*2402, ECON*2770, instructor's approval

AGEC*4240 Futures and Options Markets W(3–0) [0.50]
An introduction to the study of the theory and application of futures, options and other derivative instruments for marketing, hedging, investment and speculative purposes. Emphasis is placed on applications of agricultural and financial instruments to real business situations.
Prerequisite(s): 1 of AGEC*3320, AGR*2402, ECON*3560, ECON*3660

AGEC*4250 Business Policy F,W(3–0) [0.50]
Business policy is a synthesis of the principles of business management with emphasis upon the formation of business decisions and policies. The purpose of this course is to enable the student to draw on analytic tools and factual knowledge from all other courses in analyzing comprehensive business problems.
Prerequisite(s): AGEC*3310, AGEC*3320, ECON*3560

AGEC*4290 Land Economics F(3–0) [0.50]
Economic principles and practice in allocating land among agricultural, urban and other uses in regional systems; contemporary trends, problems and policies in land planning, land purchase, valuation, mortgages and credit; assessing and taxing property. (Offered in even–numbered years.)
Prerequisite(s): AGEC*2700 or ECON*2310

AGEC*4310 Resource Economics W(3–0) [0.50]
This course explores the role of property rights and related institutions in the stewardship of natural resources. Readings emphasize original sources in natural resource economics. The course uses a discussion–based class format. Students conduct original research on current natural resource policy issues.
Prerequisite(s): AGEC*2700 or ECON*2310

AGEC*4360 Marketing Research W(3–0) [0.50]
A study of the marketing research function in business with emphasis on its role in providing information to assist managers in making marketing decisions.
Prerequisite(s): 0.50 university credit in statistics

AGEC*4370 Marketing Management F,W(3–2) [0.50]
The course focuses on the decision making role of the marketing manager who is responsible for formulating the strategic marketing plan. The theory of selecting market target(s) for the firm's product and/or services and the development of the marketing mix (product, price, promotion, distribution) with the aid of market research is covered. Note: Students with credit for this course may not proceed to COST*1000.
Prerequisite(s): 10.00 credits, (AGEC*2230 or COST*2600)
Equate(s): COST*4370

AGEC*4410 Sales and Sales Management W(3–0) [0.50]
This course is designed to develop professional selling skills. It includes the development of background knowledge in sales techniques as well as the application of this material to professional selling. Students will learn to plan, execute, and evaluate sales programs.
Prerequisite(s): 10.00 credits

AGEC*4500 Decision Science F(3–0) [0.50]
Quantitative techniques such as classical optimization, mathematical programming, simulation and input–output models are applied to firm, interregional, industry, and international problem situations in agricultural economics, including those dealing with resources and the environment. Time and risk and uncertainty dimensions are addressed.
Prerequisite(s): AGEC*2270 or ECON*2770

AGEC*4550 Independent Studies I S,F,W(3–0) [0.50]
A project based independent study course for majors in Agricultural Economics (of the Bachelor of Arts or Bachelor of Science in Agriculture degree programs), Agribusiness (of the Bachelor of Commerce degree program), and Environmental Economics and Policy (of the Bachelor of Science in Environmental Sciences degree program). Permission of the instructor and Chair of the Department of Agricultural Economics and Business is required.
Prerequisite(s): 10.00 credits including AGR*2401/2 or AGEC*2700

AGEC*4560 Independent Studies II S,F,W(3–0) [0.50]
An opportunity to conduct a second independent study project for majors in Agricultural Economics (of the Bachelor of Arts or Bachelor of Science in Agriculture degree programs), Agribusiness (of the Bachelor of Commerce degree program), and Environmental Economics and Policy (of the Bachelor of Science in Environmental Sciences degree program). Permission of the instructor and Chair of the Department of Agricultural Economics and Business is required.
Prerequisite(s): 10.00 credits including AGR*2401/2 or AGEC*2700

XII—Course Descriptions, Agriculture

Ontario Agricultural College, Dean's Office.

AGR*1100 Introduction to the Agri–Food System F(2–3) [0.50]
A survey of the agri–food system, with reference to current events and development in the various sectors. The course will include exposure to resources of the university and basic skills development in preparation for further study at the university level. It will introduce B.SC. (Agr.), B.COMM. (Ag. Bus.), and B.A. (Ag. Ec.) students to the Experience Agriculture Program, Numeracy Companion, and the O.A.C. Writing Portfolio.
Prerequisite(s): enrolment in the B.SC. (Agr.), B.COMM. (Ag. Bus.), or B.A. (Ag. Ec.) program
Restriction(s): AGR*1150, UNIV*1500

AGR*1250 Agrifood System Trends and Issues W(3–2) [0.50]
The course will improve the awareness and increase the critical appreciation and understanding of students for the breadth and complexity of the agriculture and food system from producer to consumer. Students will understand the ways in which consumers empower the various components of the food system. Students will gain experience in understanding major issues and consumer trends in the food system including those related to environment, food safety, and animal welfare. The role of the Canadian food system in world markets will be presented. Students will be introduced to the basic skills of problem–solving, report preparation, and delivery.

AGR*2301 Resources and Agroecosystems F(3–3) [0.50]
First part of the two–semester course AGR*2301/2. Refer to AGR*2301/2 for the course description.

AGR*2301/2 Resources and Agroecosystems F/W(3–3) [1.00]
The course is an introduction to soil, air and water resources as they relate to one another with some emphasis on temporal and spatial variabilities both within and between landscapes of agroecosystems. The roles of geological, geomorphological, biological, climatic and temporal factors will be included. Responses to these influences will be developed in a framework of soils as a resource in the natural landscape, focusing on soil formation processes, properties, classification and uses. This is a two–semester course offered over consecutive semesters. When you select it you must select AGR*2301 in the Fall semester and AGR*2302 in the Winter semester. A grade will not be assigned to AGR*2301</csRCourseCode until AGR*2302 has been completed.
Prerequisite(s): AGR*1250, CHEM*1040, MATH*1080, 0.50 credit in biology

AGR*2302 Resources and Agroecosystems W(3–3) [0.50]
Second part of the two–semester course AGR*2301/2. Refer to AGR*2301/2 for course description.

AGR*2350 Animal Production Systems and Industry F(3–3) [0.50]
This course is designed to give students an overview of animal production systems and will consist of lectures dealing with major farm livestock species. Laboratories correlate with lectures and involve field trips, video and computer analyses of production alternatives.
Prerequisite(s): BIOL*1030 or BIOL*1040

AGR*2360 Challenges and Opportunities in Animal Production F(2–6) [0.75]
This course consists of lecture presentations on animal science and projects which will expose students to challenges and opportunities in animal production systems. This course is recommended for students with a strong interest in the animal sciences.
Prerequisite(s): AGR*2350

AGR*2401 Economics of the Canadian Food System F(3–2) [0.50]
First part of the two–semester course AGR*2401/2. Refer to AGR*2401/2 for course description.

AGR*2401/2 Economics of the Canadian Food System F/W(3–2) [1.00]
A two–semester course that introduces students to the major aspects of agricultural economics and business. The course is based on the notion of a consumer driven economy for food and non–food products; how this is affected by international trade and domestic agricultural policies; and how in turn these affect resource use and farm/firm management decisions. The four components are: 1) prices, production and marketing; 2) agricultural policy and international trade; 3) resources and the environment. This is a two–semester course offered over consecutive semesters. When you select it you must select AGR*2401 in the Fall semester and AGR*2402 in the Winter semester. A grade will not be assigned to AGR*2401 until AGR*2402 has been completed.
Prerequisite(s): AGR*1250, ECON*1050
Co–requisite(s): ECON*2740 or STAT*2040

AGR*2402 Economics of the Canadian Food System W(3–2) [0.50]
Second part of the two–semester course AGR*2401/2. Refer to AGR*2401/2 for course description.

AGR*2451 Plant Agriculture F(3–3) [0.50]
First part of the two–semester course AGR*2451/2. Refer to AGR*2451/2 for course description.
Prerequisite(s): BIOL*1030

AGR*2451/2 Plant Agriculture F/W(3–3) [1.00]
Basic principles of plant physiology, morphology, genetics and ecology influence plant production systems around the world. Students will expand their understanding of these principles by learning about managed plant ecosystems, plant domestication and use, zones of adaptation, breeding, propagation, production systems and the interactions between those systems and the environment. This is a two–semester course offered over consecutive semesters. When you select it you must select AGR*2451 in the Fall semester and AGR*2452 in the Winter semester. A grade will not be assigned to AGR*2451 until AGR*2452 has been completed.
Prerequisite(s): BIOL*1030

AGR*2452 Plant Agriculture W(3–3) [0.50]
Second part of the two–semester course AGR*2451/2. Refer to AGR*2451/2 for course description.

Prerequisite(s): AGR*2451

AGR*2500 Field Trip in International Agriculture W(3–0) [0.50]

A 2 week field study program to Costa Rica costing approximately $2000 per student in addition to regular tuition fees, immediately prior to the commencement of the winter semester (December 27 to January 10 approx.). Students will visit corporate and individual farms, university and government research stations and become familiar with agricultural production systems. Projects and/or assignments will be completed during the winter semester. Classes are scheduled to meet once a week in the evening during the winter semester. In addition, students will be expected to attend several sessions in the fall semester prior to the field trip. Background information and specific reading assignments will be provided to students in these pre–course briefing sessions. It is important that students identify their interest in taking this course by contacting the OAC Dean's Office in March of the previous year. A deposit of $875 in the form of a cheque made payable to the University of Guelph must be in the OAC Dean's Office by September 15 in order to confirm a reservation for travel arrangements. Scholarship support is available to B.SC.(AGR.) students through the Cavers Memorial Scholarship and the Wolff International Scholarships. Applications are due in Student Financial Services, Office of Registrarial Services by April 1. This course must be recorded as part of your Winter course selection and tuition and compulsory fees will be calculated accordingly.

Prerequisite(s): AGR*1250 or registration in International Development

AGR*3010 Special Studies in Agricultural Science I S,F,W(3–0) [0.50]

A special study option that enables undergraduate students in semesters 5 through 8 to undertake specific projects in agricultural science or course(s) on an approved study abroad or exchange program at an accredited university. The topic of the special study will be determined in consultation with an OAC faculty member and the individual student. Students are responsible for making appropriate arrangements with faculty at the departmental and/or college level prior to registration for the course.

Prerequisite(s): 10.00 credits and participation in an approved study abroad or exchange program

AGR*3330 Introduction to Food Processing F(3–3) [0.50]

This course will introduce the basic principles of food chemistry, food microbiology, unit operations in food processing and food product development. The lectures will be supplemented with demonstration and hands–on tutorial exercises. A World of Work (WOW) module is also included in this course.

Prerequisite(s): AGR*1250, BIOL*1040, CHEM*1050

Restriction(s): registration in the B.SC.(Agr.) program, FOOD*2010, FOOD*2150, NUTR*2150

AGR*3400 Sustainable Rural Communities W(2–1) [0.50]

The structure, function and trends affecting agri–food community settings including historical, ecological and social factors, institutions, agencies and change processes are discussed. The agricultural role of the Provincial Government and the contemporary impact of the agro–industrial complex on Ontario communities will be considered mainly from a comparative perspective. Related topics will include physical infrastructure, political conflicts, labour markets, settlement patterns, housing, gender relations, landscape management, quality of life, sustainability and the promotion of community leadership.

Prerequisite(s): AGR*1250 or 10.00 credits

AGR*3500 Experiential Education F(–) [0.50]

Student initiated experiential learning opportunities can be developed as a credit course in consultation with a supervising faculty member. Details of the activities included in the program will be outlined in a learning contract initiated by the student and agreed by the faculty supervisor in the April prior to the commencement of the work experience. The employer will also provide a description of the project and/or the work experience. The course is designed to meet the needs of B.SC.(Agr.) and Agricultural Business students. Interested students in other programs should consult the OAC Dean's Office.

Prerequisite(s): 5.00 credits

AGR*4000 Seminar in International Agriculture W(3–0) [0.50]

A seminar course dealing with various aspects of international agricultural development programs. Normally taken in the final semester.

Prerequisite(s): AGR*2500 or 1.00 credit in International Agriculture or registration in International Development

AGR*4010 Special Studies in Agricultural Science II S,F,W(3–0) [0.50]

A special study option that enables undergraduate students in semesters 5 through 8 to undertake specific projects in agricultural science or course(s) on an approved study abroad or exchange program at an accredited university. The topic of the special study will be determined in consultation with an OAC faculty member and the individual student. Students are responsible for making appropriate arrangements with faculty at the departmental and/or college level prior to registration for the course.

Prerequisite(s): 10.00 credits and participation in an approved study abroad or exchange program

AGR*4050 Professionalism and Agrology W(3–0) [0.50]

This course is designed for students in the final year of the B.SC.(Agr.) program who wish to understand the responsibilities of professionals in agrology and the responsibilities that professional organizations have in Ontario and Canada. The course is offered in conjunction with the Ontario Institute of Agrologists and will be offered in a series of ten 3–hour evening sessions. The first three sessions will deal with the topics of professionalism, ethics and professional development and utilize materials prepared jointly by the OIA and OAC Access. The remainder of the course will be comprised of discussions of ethical issues and workshops that will help students develop their personal professional development plan, improve their personal resume, and provide a framework for identifying potential professional employment opportunities.

Prerequisite(s): 15.00 credits

AGR*4200 Practicum in Teaching and Extension F,W(2–3) [0.50]
This course will provide instruction and practical experience in teaching at the University level and/or providing information to clients through extension. Students will reinforce their understanding of the agriculture and food system by helping others learn about the system. The course will also provide students with an opportunity to integrate the communication skills that they have developed in previous courses.
Prerequisite(s): AGR*2301/2, (AGR*2350 or AGR*2351/2), AGR*2401/2, AGR*2460, AGR*3330, AGR*3400

AGR*4400 Independent Research F(2–3) [0.50]
This course will provide instruction and practical experience in planning and reporting of independent research. Students will reinforce their depth of understanding of a particular component of the agriculture and food system by developing a research project proposal. The course will also provide students with an opportunity to integrate the communication skills that they have developed in previous courses.
Prerequisite(s): AGR*2301/2, AGR*2401/2, AGR*2452, AGR*3400

AGR*4450 Research Project in Agriculture I S,F,W(0–12) [1.00]
Independent study of a current topic in Agriculture designed to encourage senior undergraduates to conduct research in Agriculture. The course includes participation in meetings organized by the coordinator, work with a faculty advisor to develop a research project, formulate hypotheses, design and carry out preliminary experiments to test the hypotheses. Students will carry out independent library research, begin experimental work, prepare a written report and make a presentation to other students in the course of the research plan and preliminary results. Students must make arrangements with both the faculty supervisor and the course coordinator at least one semester before starting the course. Open to students in semesters 6, 7, and 8 of the B.SC. (Agr.) degree program. This course will normally be followed by AGR*4460 to provide 2 semesters to complete the research project.
Prerequisite(s): completion of semester 5 of the B.SC. (Agr.) program, 70% cumulative average
Restriction(s): AGR*4400, permission of the course coordinator (contingent on the availability and agreement of a faculty advisor)

AGR*4460 Research in Agriculture II S,F,W(0–12) [1.00]
Independent study of a current topic in Agriculture designed to encourage senior undergraduates to conduct research in Agriculture. The focus of this course will be the completion of the research plan developed in AGR*4450 by the student in consultation with a faculty advisor. The course includes participation in meetings organized by the coordinator and meetings with a faculty advisor to review research progress. Students will carry out independent research, prepare a written report of the research findings in a scholarly style and make a presentation to other students in the course of the research results. Open to students in semesters 7 and 8 of the B.SC. (Agr.) degree program.
Prerequisite(s): AGR*4450
Restriction(s): AGR*4500, permission of the course coordinator and faculty advisor

AGR*4500 Agrifood Industry Problem–Solving W(1–6) [0.50]
This course will provide senior level students in agricultural and related sciences with experience in working as a team to propose solutions to agrifood industry problems. The perspective of the best solution will be the agrifood system rather than any individual stakeholder group. Attention will be given to integrating material from different disciplines, further refining skills in problem–solving, and communication. Students and faculty will meet prior to the conclusion of the preceding semester to identify industry projects, student expertise, and to develop a preliminary strategy.
Prerequisite(s): 3.50 credits at the 3000 level or 1.50 credits at the 4000 level in any agricultural science area, environmental science, business or veterinary medicine

XII—Course Descriptions, Anatomy

Department of Biomedical Sciences.

For course listings and descriptions see Biomedical Sciences.

Additional course listings may be found in the course descriptions for Human Kinetics, Veterinary Medicine and Zoology.

XII—Course Descriptions, Animal Science

Department of Animal and Poultry Science.

ANSC*2200 Principles of Aquaculture F(3–0) [0.50]
An introduction to the major principles of fish husbandry and preventive medicine as it relates mainly to the production of finned fish in Canada. (Offered in odd–numbered years.)
Prerequisite(s): 1.50 credits in biology

ANSC*2330 Horse Management Science F(3–2) [0.50]
An introduction to horse management designed to give those with an interest in the various segments of the horse industry a strong scientific basis for production and management decisions. The course includes study of the evolution of our current industry, the biology of growth, performance and management of the equine athlete. The evaluation of conformation as it relates to performance as well as aspects of behaviour, nutrition, reproduction and genetics consistent with the level of the course are included. Laboratories are designed to familiarize the student with current management and handling techniques in addition to augmenting information presented in lectures.
Prerequisite(s): BIOL*1040 or consent of the instructor

ANSC*2340 Structure of Farm Animals W(3–3) [0.50]
An introduction to the carcass structure of cattle, pigs, sheep and poultry. Animal growth and development are considered in relation to meat production. Practical work includes slaughtering of livestock. The course is for students intending to major in Animal Science.

ANSC*3080 Agricultural Animal Physiology F(3–3) [0.50]
This course is an introduction to the physiology of domesticated farm mammals and birds. The course will emphasize homeostatic control of the major body systems. The lectures cover the nervous, cardiovascular, respiratory, urinary, immune, digestive, endocrine and reproductive systems. The lectures and laboratories are closely integrated.
Prerequisite(s): CHEM*2580

ANSC*3120 Introduction to Animal Nutrition F(3–2) [0.50]
The application of principles of nutrition to the development of diets and feeding programs for the various species of animals of agricultural importance. Department of Animal and Poultry Science.
Prerequisite(s): NUTR*3190 or NUTR*3210

ANSC*3150 Principles of Farm Animal Care and Welfare W(3–0) [0.50]
Students will be introduced to the main theoretical concepts of bioethics as related to contemporary animal agriculture. They will be familiarized with the history of the animal welfare movement, including its effect on producers and consumers of animal products. The course will emphasize the techniques of assessment of animal well–being and review legal requirements and voluntarily accepted codes for sound animal care and safe animal handling.
Prerequisite(s): 7.50 credits including AGR*2350 or AGR*2351/2

ANSC*4050 Recombinant DNA in Animal Science F(3–2) [0.50]
The application of recombinant DNA techniques to animal science, including the production from cloned genes of products of value to the livestock industry, the incorporation of marker–assisted selection and of transgenic livestock animals into animal breeding strategies, sexing techniques, and the genetic manipulation of gut and rumen microflora.
Prerequisite(s): MBG*2000

ANSC*4070 Applied Animal Behaviour F(3–2) [0.50]
The course deals with why farm animals behave as they do with reference to causation, function, ontogeny and phylogeny. Basic principles are illustrated by examples taken from all the common agricultural species. Emphasis is placed on the application of behavioural knowledge to improve animal production systems. Designing housing, facilities and management procedures to suit the behaviour of the animals in question is also dealt with.
Prerequisite(s): 1 OF ANSC*3080, BIOM*3080, PSGY*3280 (may be taken as a co–requisite)

ANSC*4080 Environmental Management and Animal Productivity W(3–3) [0.50]
Basic concepts of environmental physiology and their application to animal housing and management will be introduced. The course will review the physics of heat flow, light and air quality as they relate to animal biology and health. Other aspects such as the physical environment that impact on animal health and well–being will be discussed.
Prerequisite(s): 1 of ANSC*3080, BIOM*3080, PSGY*3280

ANSC*4120 Fundamentals of Animal Reproduction W(3–3) [0.50]
The course supplies basic knowledge to aid in the explanation of reproductive phenomena in domestic animals. Special attention will be given to the regulatory mechanisms of male and female fertility.
Prerequisite(s): 1 of ANSC*3080, BIOM*3080, PSGY*3280

ANSC*4130 Reproductive Management and Technology W(3–2) [0.50]
Management of reproductive events at the farm level in the major classes of domestic livestock. An introduction to modern and emerging reproductive technologies as these relate to livestock propagation.
Prerequisite(s): ANSC*4120

ANSC*4160 Beef Cattle Nutrition W(1.5–2) [0.25]
A course designed for students to learn how to solve problems in feeding beef cattle. Relevant aspects of digestion and metabolism of nutrients as well as current issues of feeding beef cattle and diagnosing nutritional deficiencies will be included.
Prerequisite(s): ANSC*3120

ANSC*4170 Dairy Cattle Nutrition W(1.5–2) [0.25]
A course designed to apply principles in dairy cattle nutrition to solving on–farm nutritionally based problems. A case study approach will be used in conjunction with computer modeling and computer ration formulation programs.
Prerequisite(s): ANSC*3120

ANSC*4180 Poultry Nutrition F(1.5–2) [0.25]
A course designed to evaluate nutrient requirements of poultry. Students will learn how to apply feeding programs for meat, laying birds and breeders and how feeding affects poultry meat and egg composition.
Prerequisite(s): ANSC*3120

ANSC*4190 Swine Nutrition F(1.5–2) [0.25]
A course designed to explore details of evaluating feed ingredients and formulating diets for swine. Students will use models to evaluate various aspects of nutrient partitioning for growth and reproduction in pigs.
Prerequisite(s): ANSC*3120

ANSC*4470 Animal Metabolism W(3–0) [0.50]
Current concepts in whole animal metabolism and the quantitative techniques used to measure whole body metabolic kinetics will be presented. Tissue and organ specific biochemical processes will be integrated with whole body control mechanisms.
Prerequisite(s): NUTR*3190

ANSC*4480 Applied Endocrinology W(3–3) [0.50]
This course will examine the endocrine systems of farm animals and their applications to livestock production. Considerable emphasis will be given to projects involving the quantitation of endocrine responses in the cow, the pig and the chicken.
Prerequisite(s): 1 of ANSC*3080, BIOM*3080, PSGY*3280, 0.50 credit at the 3000 level in Physiology

ANSC*4500 Horse Nutrition W(1.5–2) [0.25]
This course is designed to provide students with the most current knowledge of nutrition of horses and other domestic non–ruminant herbivores. Influence of nutrition on musculo–skeletal development and function will be emphasized. (Offered in odd–numbered years.)
Prerequisite(s): NUTR*3190 or NUTR*3210

ANSC*4510 Pet Nutrition F(1.5–2) [0.25]
A course in which students learn about nutrient requirements, feed formulation and nutritional idiosyncrasies for dogs, cats, pocket and exotic pets. (Offered in odd–numbered years.)
Prerequisite(s): NUTR*3190 or NUTR*3210

ANSC*4610 Critical Analysis in Animal Science W(3–0) [0.50]
Each student will select and critically review a topic of emerging importance in animal science. The topic will be presented to the group as a written paper in journal format, as a poster, and as a formal seminar. This course is designed for students in their final year of the Animal Biology Major.
Prerequisite(s): 12.00 credits including 2.00 in animal sciences

XII—Course Descriptions, Anthropology

Department of Sociology and Anthropology.

The Department of Sociology and Anthropology offers three types of courses: sociology courses with the prefix SOC; anthropology courses with the prefix ANTH*; and departmental courses with the prefix SOAN*. The departmental category of courses recognizes the fact that the disciplines of sociology and sociocultural anthropology have developed in tandem and it is possible to identify large areas of overlap and convergence in the work of practitioners both historically and in the present. Departmental courses include most of the core theory and methods courses as well as many elective courses. They contribute equally to the subject matter of sociology as well as the subject matter of sociocultural anthropology for purposes of the undergraduate programs of study in both disciplines. Please see the course listings for Sociology and for Sociology and Anthropology in this section.*

Courses will normally be offered in the semesters designated. Please check with the department for information about additional semester offerings. In addition to regularly scheduled courses, students may elect to do independent study. A student who wishes to do a reading course should first consult the professor with whom he/she wishes to work. Course numbers available for independent study in Anthropology include ANTH*3840, ANTH*4740, *ANTH*4880, ANTH*4890.*

*Sociology credit may also be given for most Anthropology courses, with the exception of ANTH*3840 through ANTH*4910 inclusive. All Anthropology courses may be used for credit in Sociology except for ANTH*3840 through ANTH*4910 inclusive.*

ANTH*1150 Anthropology F,W(3–0) [0.50]

An introductory course dealing with humankind from a broad historical and cross–cultural perspective. Theoretical models, case studies and specific methods will be presented. Course topics may include the origin and transformations of human society, the relationship between biological and cultural traits, human language, variation in family structure and religion, the economic and political aspects of human society.

ANTH*2160 Social Anthropology U(3–0) [0.50]

A course dealing with human society in a comparative framework. The basic methods and concepts of social or cultural anthropology will be examined with special reference to ethnographic studies from a broad range of differed types of societies.

Prerequisite(s): ANTH*1150

ANTH*2650 Prehistory of Canadian Native People F(3–0) [0.50]

An introduction to native studies which uses archaeological, ethno–historical and contemporary materials to examine the culture and social organization of Canadian Indians and Inuit from the early beginnings to European contact.

Prerequisite(s): ANTH*1150

ANTH*2660 Contemporary Native Peoples of Canada W(3–0) [0.50]

An analysis of the impact of Euro–Canadian society on native culture. Particular emphasis will be given to contemporary issues relating to Canadian native peoples (Indians, Inuit and Metis) such as education, treaties and reserves, land claims, government administration and economic development. (Offered in even–numbered years.)

Prerequisite(s): ANTH*1150 or SOC*1100

ANTH*3400 The Anthropology of Gender W(3–0) [0.50]

This course will address theoretical innovation in the discipline of socio–cultural anthropology in the study of gender and feminist issues on the basis of cross–cultural ethnographic case studies. Theoretical problems such as gender inequality, complementarity, the domestic/public divide, ritual and symbolic valuations and the division of labour will be considered in the context of cultural relativity. (Offered in even–numbered years.)

Prerequisite(s): 10.00 credits including 1 of ANTH*2160, SOAN*2120, SOAN*2400

ANTH*3670 Indigenous Peoples: Global Context W(3–0) [0.50]

This course will focus on aboriginality as a political and cultural identity. Historical, political, and cultural similarities between indigenous peoples the world over will be traced and key issues such as assimilation, cultural survival, protection of the commons, and the environment and cultural identity within the nation state will be examined. International organizations of indigenous peoples will be considered as well as other forms of transnational assertions of common identity and resistance. (Offered in odd–numbered years.

Prerequisite(s): 1 of ANTH*2160, ANTH*2650, ANTH*2660, SOAN*2120, SOC*2660

ANTH*3690 Anthropological Theory U(3–0) [0.50]

A review of the major social anthropological theories of the Twentieth Century, including structural functionalism, cultural materialism and French structuralism. This course is intended to present the current state of the discipline, its problems and prospects.

Prerequisite(s): 1 of ANTH*1150, PHIL*2070, SOC*1100, SOC*2280

ANTH*3770 Kinship and Social Organization U(3–0) [0.50]

This course will deal with the theoretical implications of the study of kinship systems for an analysis of human society in general, including a comparative study of the social organization of kinship–based societies.

Prerequisite(s): ANTH*1150

ANTH*3840 Seminar — Topics in Anthropology S,F,W(3–0) [0.50]

This course will be offered as a structured seminar on various topics depending upon the interests of the faculty member teaching the course. Topics will be announced and course outlines will be available at course selection.

Prerequisite(s): 7.50 credits

ANTH*4230 Regional Ethnography U(3–0) [0.50]
A systematic in–depth study of regional ethnography with attention to issues of representation, within the context of a particular historical, political, and economic setting. Focus may be given to a specific geographical area such as part of Latin America, Sub–Saharan Africa, Asia, of Oceania.
Prerequisite(s): 12.50 credits including 1 of ANTH*3400, ANTH*3770, SOAN*3070

ANTH*4300 Senior Seminar W(3–0) [0.50]
Current issues and future trends in the discipline of socio–cultural anthropology will provide the subject matter of this variable content course. This course is meant to provide an opportunity for socio–cultural anthropology majors to consider the latest developments in the sub–discipline. Course topics will be announced and course outlines will be available at course selection time.
Prerequisite(s): 15.00 credits including (ANTH*3690 or SOC*3310), SOAN*3070, SOAN*3120

ANTH*4700 Seminar—Theoretical Issues in Anthropology U(3–0) [0.50]
An examination of selected theoretical issues.
Prerequisite(s): 12.50 credits including (ANTH*3690 or SOC*3310), SOAN*3070, SOAN*3120

ANTH*4740 Seminar in Anthropology S,F,W(3–0) [0.50]
This course will be offered as a structured seminar on various topics depending upon the interests of the faculty member teaching the course. Topics will be announced and course outlines will be available at course selection. This course number may also be used for independent study on a topic of the student's choice. In this case, permission of the instructor who will be supervising the study is required.
Prerequisite(s): 12.50 credits

ANTH*4840 Seminar in Anthropology S,F,W(3–0) [0.50]
This course will be offered as a structured seminar on various topics depending upon the interests of the faculty member teaching the course. Topics will be announced and course outlines will be available at course selection. This course number may also be used for independent study on a topic of the student's choice. In this case, permission of the instructor who will be supervising the study is required.
Prerequisite(s): 12.50 credits

ANTH*4880 Special Projects in Anthropology S,F,W(3–0) [0.50]
The special study option is designed to provide advanced undergraduates with an opportunity independently to explore the frontiers and foundations of a field of knowledge. The subject matter will normally be studied in greater depth of topics related to regular upper–level courses offered in the department which the student has taken or is taking.
Prerequisite(s): permission of the instructor

ANTH*4890 Special Projects in Anthropology S,F,W(3–0) [0.50]
The special study option is designed to provide advanced undergraduates with an opportunity independently to explore the frontiers and foundations of a field of knowledge. The subject matter will normally be studied in greater depth of topics related to regular upper–level courses offered in the department which the student has taken or is taking.
Prerequisite(s): permission of the instructor

ANTH*4900 Honours Anthropology Thesis I S,F,W(3–0) [0.50]
Development and design of an honours thesis proposal conducted under the supervision of a faculty member. Recommended to honours major students.
Prerequisite(s): 15.00 credits including ANTH*3690, (SOAN*3070 or SOAN*3120), and a cumulative average of 70% in all Sociology and Anthropology courses

ANTH*4910 Honours Anthropology Thesis II S,F,W(3–0) [0.50]
Completion and presentation of honours thesis.
Prerequisite(s): ANTH*4900

XII—Course Descriptions, Art History

School of Fine Art and Music.

Students with a special interest in particular courses in Art History should consult the School concerning prerequisites.

ARTH*1510 Art Historical Studies I F(3–0) [0.50]

A consideration of the visual arts in the Western tradition. Emphasis will be placed on historical and critical analysis of key monuments and on the prerequisite technology, as well as on various ways of looking at the visual past and present. Focus will be on the visual arts from prehistory through the Middle Ages.

ARTH*1520 Art Historical Studies II W(3–0) [0.50]

A continuation of ARTH*1510 with particular emphasis on the visual arts from the Renaissance to today.

Prerequisite(s): ARTH*1510

ARTH*2150 Art and Archaeology of Greece F(3–0) [0.50]

A survey of Ancient Greek Art and Archaeology, with stress on form and function plus stylistic trends and aesthetic values. The course will illuminate the cultural, social, and political life in Ancient Greece. (Also listed as CLAS*2150).

Equate(s): CLAS*2150

ARTH*2280 Modern Architecture: Architecture from the Industrial Revolution to Today W(3–0) [0.50]

An investigation of architectural form and content from the mid–18th century in Europe to the present in Canada. Critical consideration will be given to the roles of architecture in the shaping of our visual consciousness and to its central importance in the development of urban and national consciousness.

ARTH*2290 The History of Photography W(3–0) [0.50]

An introduction to the history of photography by means of a broad chronological survey from the discovery of photography through to its application in contemporary visual arts practice. (Offered in even–numbered years.)

Prerequisite(s): ARTH*1520

ARTH*2480 Introduction to Art Theory and Criticism F(3–0) [0.50]

This course provides an overview of some of the most significant methodological approaches and critical practices used by art historians to write about visual culture. Traditional methods of art historical analysis include connoisseurship, iconography, and formalism. With these we will be exploring newer interpretative models and multidisciplinary approaches such as structuralism, semiotics, post–structuralism, and psychoanalytic theory as well as political theories such as feminism and socio–cultural theory.

Prerequisite(s): ARTH*1510, ARTH*1520, SART*1060

ARTH*2490 Canadian Art F(3–0) [0.50]

The visual arts in Canada from its indigenous traditions to the present.

ARTH*2540 Art of the Early Middle Ages F(3–0) [0.50]

Christian art from the Peace of the Church to the end of the Ottonian period. (Offered in odd–numbered years.)

Prerequisite(s): ARTH*1510

ARTH*2550 Early Renaissance Art in Italy F(3–0) [0.50]

Painting, sculpture and architecture in Italy from the late 13th century to the late 15th century, with emphasis on Florence.

ARTH*2560 The Waning Middle Ages F(3–0) [0.50]

The visual arts in the Low Countries, the German territories, and France in the 14th and 15th centuries, with emphasis on the major Netherlandish painters from Robert Campin to Hieronymus Bosch. (Offered in even–numbered years.)

Prerequisite(s): ARTH*1510

ARTH*2580 European Art, 1900–1945 F(3–0) [0.50]

European painting, sculpture and photographic media from the turn of the century to 1945.

ARTH*2600 Neo–Classicism and Romanticism W(3–0) [0.50]

Western art from the middle of the 18th century to the middle of the 19th century. (Offered in even–numbered years.)

Prerequisite(s): ARTH*1520

ARTH*2950 Northern Baroque Art W(3–0) [0.50]

The visual arts in the Spanish Netherlands and the Dutch Republic from the late 16th century to the late 17th century, with emphasis on such major painters as Peter Paul Rubens, Anthony Van Dyck, Jacob Jordaens, Frans Hals, Rembrandt van Rijn, and Johannes Vermeer.

Prerequisite(s): ARTH*1520

ARTH*3010 Contemporary Canadian Art in Context W(3–0) [0.50]

The course will offer detailed study of examples from a spectrum of Canadian visual culture. The developing plurality of art practices, of technological media, of high and low cultural forms will be examined in the context of specifically Canadian social and historical conditions during the modern and post–modern periods. The primary emphasis will be on developments since 1940.

Prerequisite(s): 10.00 credits

ARTH*3030 Visual Arts of the Americas W(3–0) [0.50]

This course focuses on the study of the visual arts of the Americas in the context of cultural, social and political experience. As well as students in Fine Art, this course is recommended for students interested in Latin–American and cultural studies and other interdisciplinary fields. (Offered in odd–numbered years.)

ARTH*3150 Roman Art and Urbanism W(3–0) [0.50]
Introduction to Roman art and urbanism from the Early Republic to the end of the imperial period. The course will survey the developments of Roman art with an emphasis in architecture, sculpture and painting. It will illuminate the development of the urban space in the context of cultural, social and political life. (Also listed as CLAS*3150.)
Equate(s): CLAS*3150
Restriction(s): ARTH*3530, ARTH*4500

ARTH*3460 English Art, 1750 to Present F(3–0) [0.50]
In conjunction with the London Semester, this course will survey the visual arts in England from the mid–18th century to the present. Visits to galleries, museums, libraries, studios, and other cultural institutions will supplement lectures and stress the experience of actual works of art.
Prerequisite(s): admission to London Semester

ARTH*3520 Art Since 1945 W(3–0) [0.50]
An analysis of the visual arts of painting, sculpture, photographic media and non–traditional media from the end of World War II to the present. Selected artists of North America and Western Europe will be considered, as well as the institutions of the art world.
Prerequisite(s): ARTH*2580.

ARTH*3540 Art of the High Middle Ages F(3–0) [0.50]
Romanesque and Gothic art in Western Europe. (Offered in even–numbered years.)
Prerequisite(s): ARTH*1510, ARTH*2540

ARTH*3550 High Renaissance Art W(3–0) [0.50]
Painting, sculpture and architecture in Italy from the late 15th century to the late 16th century, with emphasis on Leonardo, Raphael and Michelangelo.

ARTH*3560 The Reformation Era F(3–0) [0.50]
The visual arts in the German territories, the Low Countries, and France in the 16th century, with emphasis on the painting and graphic arts of Albrecht Duerer and his contemporaries. (Offered in odd–numbered years.)
Prerequisite(s): ARTH*1520

ARTH*3570 Realism to Post–Impressionism W(3–0) [0.50]
Western painting, sculpture and architecture of the second half of the 19th century.
Prerequisite(s): ARTH*1520

ARTH*3640 Southern Baroque Art and Rococo Art F(3–0) [0.50]
Painting, sculpture and architecture in Italy, Spain and France from about 1600 to the mid–18th century, with emphasis on Caravaggio and Bernini, Velasquez and the Tiepolo.

ARTH*3780 Women and Art F(3–0) [0.50]
Introduction to the identification and critique of those traditional perspectives in art that have represented or misrepresented women and women's experience, followed by selected studies of artworks and texts by women throughout history.
Prerequisite(s): 10.00 credits

ARTH*4250 Seminar in Canadian Art W(3–0) [0.50]
Selected topics in Canadian Art. (Offered in odd–numbered years.)
Prerequisite(s): ARTH*2490 or ARTH*3010

ARTH*4520 Seminar on Southern Renaissance, Baroque and Rococo Art W(3–0) [0.50]
Selected topics of the period.
Prerequisite(s): ARTH*1520, (1 of ARTH*2550, ARTH*3550, ARTH*3640)

ARTH*4530 Seminar on Rembrandt and his Contemporaries F(3–0) [0.50]
Selected topics on the painter and his school.
Prerequisite(s): ARTH*1520, ARTH*2950

ARTH*4540 Seminar on 19th–Century Art W(3–0) [0.50]
Selected topics of the period. (Offered in even–numbered years.)
Prerequisite(s): ARTH*1520, ARTH*3570

ARTH*4550 Seminar on 20th–Century Art F(3–0) [0.50]
Selected topics of the period.
Prerequisite(s): ARTH*2580, ARTH*3520

ARTH*4600 Individual Study – Art History S,F,W(3–0) [0.50]
Each student establishes, in consultation with the faculty member chosen, the content of this special study within the area of expertise of that instructor.
Prerequisite(s): This course is available with the approval of the Director for students who have completed their 5th semester and for whom there is no suitable course available.

ARTH*4620 Museum Studies F(3–0) [0.50]
This seminar course will be offered in conjunction with the staff and facilities of the Macdonald Stewart Art Centre and will deal with historical matters relating to the role of the art museum in western life and the critical day–to–day management of a contemporary one. Students will participate, when possible, in the preparation of a current or forthcoming exhibition in the Centre.
Prerequisite(s): 10.00 credits

ARTH*4850 Honours Thesis I S,F,W(0–9) [0.50]
Under the guidance of a faculty member over two semesters (ARTH*4850 in the first semester and ARTH*4860 in the second semester), the honours student will research and complete a major independent project in art history or criticism for final approval by a faculty committee. Recommended for all honours students.
Prerequisite(s): registration in semester 7 or 8 and a cumulative average of 70% in Studio and Art History courses

ARTH*4860 Honours Thesis II S,F,W(0–9) [0.50]
Continuation of ARTH*4850.
Prerequisite(s): ARTH*4850

XII—Course Descriptions, Arts and Sciences

Dean's Office, College of Arts.

Registration in ASCI courses is limited to students in the Bachelor of Arts and Sciences degree program.*

ASCI*1000 Society and Science I: Historical Perspectives F(3–0) [0.50]

This interdisciplinary course examines the interface between science and society at different historical periods. It will focus on selected scientific advances which have had a great impact on society, both at the time of the discovery and subsequently.

Restriction(s): registration in the Bachelor of Arts and Sciences degree program

ASCI*1010 Society and Science II: Current Issues W(3–0) [0.50]

This interdisciplinary course examines scientific and technological activities in modern society, including a number of current controversies. Case studies and debates will be used to examine the multiplicity of impacts and reactions to these activities.

Prerequisite(s): ASCI*1000

Restriction(s): registration in the Bachelor of Arts and Sciences degree program

ASCI*2000 Modes of Inquiry and Communication Across Disciplines F,W(3–0) [0.50]

This course considers the process of inquiry and quest for knowledge in the natural and applied sciences, and the social sciences and humanities as they are constituted as disciplines within the modern university. The course will consider the social forces that shape inquiry, including funding for research, and consider the communication of findings, both inside and outside the academy.

Prerequisite(s): ASCI*1010

Restriction(s): registration in the Bachelor of Arts and Sciences degree program

ASCI*3000 Arts and Sciences Community Project F(0–3) [0.50]

This course integrates the curricular and co–curricular strand of the Arts and Sciences program by asking students working in groups to organize a project which they implement in the community, under the supervision of a faculty member. The project will be generated by interests and concerns raised previously in the curricular and co–curricular offerings of the program.

Restriction(s): registration in the Bachelor of Arts and Sciences degree program

ASCI*4000 Arts and Sciences Honours Seminar F(3–0) [0.50]

This is a senior–level integrating course for the Arts and Sciences program and a forum for the presentation of student group reports and preparation for the ASCI*4010 project. Students will collectively identify an area of investigation relevant to the focus of the program, explore appropriate methodological approaches, examine the topic from a variety of theoretical and disciplinary perspectives and present their group findings.

Prerequisite(s): ASCI*3000

Restriction(s): registration in the Bachelor of Arts and Sciences degree program

ASCI*4010 Arts and Sciences Honours Research Paper W(3–0) [0.50]

Under faculty supervision students in the Arts and Sciences degree program will individually plan, develop, and complete a major paper on a research topic selected in consultation with the faculty supervisor, which follows a general theme chosen by the students and approved in ASCI*4000.

Prerequisite(s): ASCI*4000

Restriction(s): registration in the Bachelor of Arts and Sciences degree program

XII—Course Descriptions, Biology

Department of Botany.
Department of Human Biology and Nutritional Sciences.
Department of Microbiology.
Department of Molecular Biology and Genetics.
Department of Zoology.

BIOL*1020 Introduction to Biology F(3–2) [0.50]
This course will introduce important concepts concerning the organization of life on our planet, from cells to ecosystems. The dynamic and interactive nature of all living systems will be emphasized. This course will be valuable for students without 12U or OAC biology who are interested in environmental issues, medicine, advances in biotechnology and related topics.
Restriction(s): BIOL*1030, BIOL*1040, or equivalent

BIOL*1030 Biology I F, W(3–3) [0.50]
A lecture and laboratory course which introduces the concepts and controversies in contemporary biology and their implications. Using an integrative approach, the course examines some of the basics of biology and two of the common challenges of life, acquisition and processing of nutrients and information flow. How these challenges are faced by animals, microbes and plants and the diversity of structures and processes that have evolved in response to them will be discussed. This is the first course in a two course biology series. When you select it, you are strongly advised to take the second course, BIOL*1040, immediately thereafter. Material from BIOL*1030 will be referred to in BIOL*1040 to emphasize the integrated nature of biology. Students lacking 4U or OAC Biology should consult with their program counselor prior to taking BIOL*1030.
Restriction(s): BOT*1150, MICR*1000, ZOO*1020

BIOL*1040 Biology II S, W(3–3) [0.50]
A continuation of BIOL*1030. A lecture and laboratory course which continues with additional challenges of life faced by animals, microbes and plants and the diversity of structures and processes that have evolved in response to them. To indicate the value of biology to society, some topical issues in biology will be addressed. This is the second course in a two course biology series and should be taken immediately after successfully completing BIOL*1030. Materials introduced in BIOL*1030 will be built on and referred to in BIOL*1040.
Prerequisite(s): BIOL*1030
Restriction(s): BOT*1150, MICR*1000, ZOO*1020

BIOL*1120 Environment and Human Health W(3–0) [0.50]
This course will examine the interaction between environmental conditions and human physiology. There will be a strong emphasis on the effect of environmental factors on human health, aging, and the development of degenerative diseases. This course is designed for non–science students. B.Sc. students cannot take this course for credit. Department of Zoology.
Restriction(s): registration limited to non–B.Sc. program students only

BIOL*2060 Ecology F,W(3–1) [0.50]
This is a basic course that presents a discussion of the ecology of plants, animals, fungi and bacteria as individual organisms, interacting populations, communities and ecosystems. Lectures and discussion groups are used to demonstrate the tremendous difficulty of interpreting ecological data derived from field studies. The value of laboratory–based research in ecology will also be discussed. The course will be important for anyone who wishes to understand what we know and need to know about the way ecological systems work. Departments of Botany and Zoology. (Also offered through distance education format.)
Prerequisite(s): BIOL*1040

BIOL*2210 Introductory Cell Biology S,F,W(3–0) [0.50]
The structure and function of eukaryotic cells with emphasis on multicellular organisms. Role of subcellular structures and organelles in cellular processes of bioenergetics, division, differentiation, motility, secretion, nutrition, and communication. (Also offered through distance education format.)
Prerequisite(s): BIOL*1040

BIOL*2250 Biostatistics and the Life Sciences W(3–2) [0.50]
This course in biostatistical methods will emphasize the design of research projects, data gathering, analysis and the interpretation of results. Statistical concepts underlying practical aspects of biological research will be acquired while working through the process of scientific enquiry. Weekly computer laboratory sessions will focus on practical data visualization and statistical analysis using computer statistical packages. Simple parametric and nonparametric methods are reviewed, followed by more advanced topics that will include some or all of the following: two factor ANOVA and multiple regression, and introductions to discriminant analysis, cluster analysis, principle components analysis, logistic regression, and resampling methods. (Also listed as STAT*2250.) Departments of Mathematics and Statistics and Zoology.
Prerequisite(s): STAT*2040 or STAT*2100
Equate(s): STAT*2250
Restriction(s): STAT*2050

BIOL*3010 Laboratory and Field Work in Ecology F(0–6) [0.50]
This course emphasizes field and laboratory work in ecology. Students will gain experience in experimental designs, sampling, analysis and interpretation of data collected to answer ecological questions. Local field sites will be used to run in–course experiments. Critical thinking about ecological issues relevant to society will be emphasized. Departments of Botany and Zoology.

Prerequisite(s): (BIOL*1040 or BOT*1150), STAT*2040
Co–requisite(s): BIOL*2060 or BIOL*3110

BIOL*3050 Mycology I W(3–3) [0.50]
This course provides an introduction to the fungal lifestyle and to classification and evolution of the major groups of fungi, including microfungi, yeasts and other eukaryotic microbes. The characteristics of fungal cell structure, genetics and metabolism will be presented, and fungal reproduction and sporulation processes discussed with reference to the life cycles of representative forms. The ecological and economic importance of fungi will be demonstrated by considering fungal ecology, symbiotic relationships, mycotoxins and pathogenic fungi and industrial applications of fungi and yeasts. Laboratory work will provide familiarity with procedures for culturing, examining and identifying fungi and yeasts. Department of Botany and Department of Microbiology.
Prerequisite(s): BOT*2100
Restriction(s): BOT*3200, MICR*3100

BIOL*3110 Population Ecology F,W(3–1) [0.50]
An exploration of the structure and dynamics of animal and plant populations. The first part of the course will focus on demographic characteristics of populations and simple models of population growth and natural regulation. The second part of the course will concentrate on a variety of population processes, including predator–prey interactions, spatial dynamics, and disease–host interactions, and consider how these processes affect population dynamics. A quantitative approach emphasizing the use of mathematical models, graphical analysis, and statistics will provide the basic conceptual framework, which will be illustrated by selected case studies. Departments of Botany and Zoology.
Prerequisite(s): (MATH*1080 or MATH*1200), STAT*2040

BIOL*3120 Community Ecology F,W(3–1) [0.50]
A course on the structure and dynamics of communities, dealing with both theoretical and applied aspects of community ecology. Emphasis is on the modern quantitative view of community ecology, and on the development of problem–solving skills. Department of Zoology.
Prerequisite(s): BIOL*3110

BIOL*3130 Conservation Biology W(3–0) [0.50]
An introduction to the biological basis for the management of wild, living resources, including freshwater and marine fish and wild life. Topics will include an overview of processes related to resource population abundance and dynamics, theory and practice of sustained–yield harvesting, and conservation and restoration of endangered species and/or ecosystems. Both theoretical and applied aspects of resource management will be emphasized. Department of Zoology.
Prerequisite(s): BIOL*3110

BIOL*3450 Introduction to Aquatic Environments F,W(3–3) [0.50]
An introduction to the structure and components of aquatic ecosystems, how they are regulated by physical, chemical and biological factors, and the impact of humans on these environments and their biota. Laboratory periods will centre around computer–based exercises and simulation of aquatic systems. Department of Zoology. (Also offered through distance education format.)
Prerequisite(s): CHEM*1050 or CHEM*1310, BIOL*1040, ZOO*2070 is strongly recommended

BIOL*4050 Mycology II F(3–0) [0.50]
This advanced course expands on sujects introduced in BIOL*3050 and examines several selected topics concerning fungi and yeasts. Lecture presentations will emphasize the ecology of the fungi in natural environments, fungi pathogens of animals and plants, use of yeasts and fungi as model systems in biology, and other topics in contemporary mycology. Students will also prepare a review paper on a selected topic for class presentation. Department of Botany and Department of Microbiology.
Prerequisite(s): BIOL*3050

BIOL*4060 Restoration Ecology W(3–1) [0.50]
An overview of the process used to restore naturally occurring ecological systems that have been degraded by human activity. Students will review restoration projects in Canada and abroad, to become more familiar with experimental design, analysis and data management, as it is currently used in restoration ecology. Emphasis will be placed on the scientific method and the role of ecological theory. Political, social, and economic aspects of restoration will also be considered. Department of Botany.
Prerequisite(s): 1 of BIOL*2010, BIOL*2060, (BIOL*3110 and BIOL*3120)

BIOL*4100 Molecular Evolution and Phylogenetics F(2–2) [0.50]
This course is designed to provide students with an appreciation for the uses of molecular data in the study of evolutionary processes. An overview of the principles of molecular data analysis using a phylogenetic approach will be given. In addition, the importance of incorporating evolutionary history into biodiversity research and other applied topics will be emphasized. Laboratory sessions will be devoted to practical training in analytical tools using specialized computer software, and for student presentation of independent research projects. The course will involve practical training in molecular data analysis using a phylogenetic approach and discussion of current topics from the primary literature. Departments of Botany and Zoology.
Prerequisite(s): MBG*3000 or ZOO*3300

BIOL*4110 Ecological Methods F(3–3) [0.75]
An advanced course designed to present theoretical and practical aspects of research methods in ecology. Emphasis will be placed on experimental design, sampling, population estimation, statistical inference, and community characteristics of producers and consumers. Students will participate in research projects of their own design, and will gain experience in preparing research proposals, research papers and posters, and making oral presentations. Departments of Botany and Zoology.

Prerequisite(s): BIOL*3010, BIOL*3120, STAT*2040

BIOL*4120 Evolutionary Ecology W(3–1) [0.50]

An examination of common ecological circumstances faced by plants and animals and the morphological, behavioral and life history characteristics that have evolved in response. Particular emphasis will be placed on evolutionary processes and on adaptive aspects of thermoregulation, foraging strategies, spatial distribution, social and reproductive strategies. The course will emphasize both the theoretical basis and the empirical evidence for ecological adaptation. There is a 1–hour seminar each week for class discussion of selected lecture topics. Departments of Botany and Zoology.

Prerequisite(s): BIOL*3110, MBG*2000, (MBG*3000 or ZOO*3300)

BIOL*4150 Wildlife Conservation and Management W(3–2) [0.50]

This course builds on previous courses in population and community ecology to evaluate the long–term dynamics of threatened populations in the context of human intervention. The course will also provide a ”hands–on” introduction to computer modeling, with application to contemporary issues in population ecology and resource management. Lectures will be drawn from the following topics: growth and regulation of single populations, long–term persistence of ecological communities, harvesting, bio–economics, and habit modification. Department of Zoology.

Prerequisite(s): BIOL*3110 or BOT*2050

Restriction(s): ZOO*4110

BIOL*4200 Biotic Diversity and Ecology of Mangrove Forests F(1–6) [0.75]

This three–week interdisciplinary field course is on the biotic diversity (flora and fauna) and ecology of both natural and managed mangrove forests in Malaysia. The course will be team–taught by faculty members from the University of Guelph (UG) and the University of Malaya (UM), and it is designed for senior undergraduate students. It consists of three compulsory modules (vertebrates, invertebrates and plants) with each module lasting four days (lectures with group discussions, and field exercise will include identification of organisms ad determination of abiotic factors in the environment). In addition, students will be required to conduct independent research projects related to the mangrove forest. UG students will be paired with UM students, and each pair will develop a working hypothesis and protocol for their project prior to UG students leaving for Malaysia. Students will be responsible for costs of food, lodging and transportation to and from Malaysia. Detailed information is available from the Departments of Botany and Zoology and from the course website (http://CBS.uoguelph.ca/mangrove). This course must be recorded as part of your Fall or Winter course selection and tuition and compulsory fees will be calculated accordingly. Department of Zoology and Department of Botany. (Offered in alternate years.)

Prerequisite(s): BIOL*2060 or BIOL*3110

Restriction(s): instructor consent required, registration is limited to 15 undergraduate students

XII—Course Descriptions, Biomedical Sciences

Department of Biomedical Sciences.

Additional course listings may be found in the course descriptions for Toxicology and Veterinary Medicine.

BIOM*2000 Concepts of Physiology F,W(3–0) [0.50]

An introductory course covering the fundamental integrative aspects of human physiology. The basic physiology of the cardiovascular, respiratory, gastrointestinal, nervous, endocrine, renal and reproductive systems will be discussed. This course is not open to students in the B.SC. program specializing in the biological sciences.

Restriction(s): ANSC*3080, BIOM*3050, BIOM*3080, BIOM*3100, HK*3940, PSGY*2210, PSGY*3050, PSGY*3280, ZOO*3190, ZOO*3200, ZOO*3210

BIOM*3000 Mammalian Neuroanatomy W(3–2) [0.50]

The basic organization of the mammalian nervous system. Includes 3 dimensional examination and dissection of the spinal cord, brain stem, cerebellum and cerebral hemispheres and study of serial sections. Emphasis is on the morphological basis of function. (Offered in even–numbered years.)

Prerequisite(s): 1 of BIOL*1040, PSYC*2410, equivalent

BIOM*3010 Laboratory Animal Anatomy F(2–3) [0.50]

The anatomy of common laboratory animals including primates. Emphasis is placed on similarities of the basic mammalian plan. Functional differences are considered. An introduction to avian anatomy is included.

Prerequisite(s): BIOL*1040 or ZOO*1020

BIOM*3030 Biomedical Histology F(3–4) [0.75]

This histology course is designed for students with interests in Bio–Medical Sciences and Toxicology. Basic tissue types and major organ systems, will be examined focusing on structural/functional relationships. Human and common experimental mammals will be emphasized.

Prerequisite(s): BIOL*2210, CHEM*2580

BIOM*3040 Medical Embryology W(2–3) [0.50]

The patterns and principles of fertilization and normal embryonic and fetal development of mammalian organ systems are covered with a focus on the medical implications. The teratology of structural and functional prenatal anomalies in development is mentioned. Designed for students pursuing Biomedical Sciences, Medical Toxicology and students interested in Human or Veterinary Medicine.

Prerequisite(s): BIOL*1040 (an anatomy course is recommended)

Restriction(s): ANAT*3210

BIOM*3090 Principles of Pharmacology and Toxicology W(3–0) [0.50]

This course will introduce students to the basic principles of pharmacology and toxicology. Topics to be covered include receptor mechanisms, kinetics and the actions of drugs and toxins at the cellular, organ and organism level.

Prerequisite(s): CHEM*2580, (BIOM*3100 or HK*3940)

Co–requisite(s): if BIOM*3100 taken, BIOM*3110 and BIOM*3120

BIOM*3100 Mammalian Physiology I F(3–0) [0.50]

The first part of a two–semester sequence. A series of lectures concerning the normal functioning of the body treating in a detailed manner the physiology of the nervous, endocrine, and reproductive systems.

Prerequisite(s): CHEM*2580

Restriction(s): BIOM*3050, PSGY*3050

BIOM*3110 Mammalian Physiology II W(3–0) [0.50]

This second lecture course in mammalian physiology deals with the cardiovascular and digestive systems and with homeostasis as reflected in respiratory and renal function.

Prerequisite(s): 1 of BIOM*3050, BIOM*3100, PSGY*3050, permission of the instructor

BIOM*3120 Laboratory Exercises in Mammalian Physiology W(0–3) [0.25]

A series of laboratory exercises in which the students measure cardiovascular, neuromuscular and respiratory parameters on themselves using a computer based acquisition system. These exercises complement the lectures in BIOM*3100, BIOM*3110, and HK*3940.

Prerequisite(s): BIOM*3100 or HK*3940

Co–requisite(s): BIOM*3110 if BIOM*3110 has not been taken previously or BIOM*3940 previously

BIOM*4010 Teratology F(2–3) [0.50]

The principles and practices of the study and analysis of birth defects in individuals and populations will be examined through lectures, lab projects and seminars. An on–going theme is the medical, social and moral/ethical impact of birth defects and testing for teratogenic safety.

Prerequisite(s): (1 of ANAT*3070, BIOM*3010, HK*3401/2, HK*4951/2, ZOO*2090), (1 of ANAT*3210, ZOO*4440, BIOM*3040), [1 of HK*3940, BIOM*3070, (BIOM*3110, BIOM*3120)]

BIOM*4020 Physiology of Digestion F(3–1) [0.50]

A comparative study of the function and control of the mammalian digestive system with an emphasis on domestic species and on the human. (Offered in even–numbered years.)

Prerequisite(s): 1 of BIOM*3110, HK*3940, ZOO*3210, or permission of instructor

BIOM*4030 Endocrine Physiology W(3–0) [0.50]
The endocrine integration of physiological and biochemical processes in mammalian organs and body systems. The emphasis will be on the biochemical function of hormones and physiological events occurring in response to homeostatic demands such as starvation, stress, thirst, temperature fluctuation, and mineral imbalance.
Prerequisite(s): 1 of BIOM*3110, CHEM*2580, HK*3940, permission of instructor
Restriction(s): PSGY*4020

BIOM*4041 Mammalian Reproductive Biology F(2–2) [0.50]
First part of the two–semester course BIOM*4041/2. Refer to BIOM*4041/2 for course description.
Prerequisite(s): (1 of ANAT*3070, BIOM*3010, HK*2952, HK*3401/2, HK*4951/2, ZOO*2090), (1 of ANAT*3230, BIOM*3030, ZOO*3000), (BIOM*3110, BIOM*3120 or permission of instructor)

BIOM*4041/2 Mammalian Reproductive Biology F/W(2–2) [1.00]
This multidisciplinary course examines medically significant aspects of mammalian reproduction in detail. The pre–clinical medical disciplines will provide the basis for the analysis of key reproductive processes which will be presented in the context of modern techniques of reproductive manipulation and the ethical problems they pose. This is a two–semester course offered over consecutive semesters. When you select it you must select BIOM*4041 in the Fall semester and BIOM*4042 in the Winter semester. A grade will not be assigned to BIOM*4041 until BIOM*4042 has been completed.
Prerequisite(s): (1 of ANAT*3070, BIOM*3010, HK*2952, HK*3401/2, HK*4951/2, ZOO*2090), (1 of ANAT*3230, BIOM*3030, ZOO*3000), (BIOM*3110, BIOM*3120 or permission of instructor)

BIOM*4042 Mammalian Reproductive Biology W(2–2) [0.50]
Second part of the two–semester course BIOM*4041/2. Refer to BIOM*4041/2 for course description.
Prerequisite(s): BIOM*4041

BIOM*4050 Physiology of Aging F(3–0) [0.50]
Aging is accompanied by alterations in the physiological and biochemical functioning of body organ systems. The relationship between aging and the cardiovascular, respiratory, digestion/nutrition and reproductive systems will be discussed as will homeostatic functions associated with bone metabolism and fluid balance.
Prerequisite(s): 1 of BIOM*2000, BIOM*3110, HK*3940, PSGY*2210, permission of instructor

BIOM*4090 Pharmacology F(3–0) [0.50]
A lecture and seminar course which will emphasize the actions, uses and toxicities of drugs on various body systems in humans and animals.
Prerequisite(s): BIOM*3090 or PHRM*3020

BIOM*4500 Research in Biomedical Sciences I S,F,W(0–6) [0.50]
Independent theoretical and/or practical research of a current topic in any of the biomedical sciences (such as anatomy, physiology, pharmacology, toxicology, genetics, biochemistry). Approval of the departmental course coordinator is required before course selection.
Prerequisite(s): 14.00 credits

BIOM*4510 Research in Biomedical Sciences II S,F,W(0–12) [1.00]
Independent research of a current topic in any of the biomedical sciences (such as anatomy, physiology, pharmacology, toxicology, genetics, biochemistry). Approval of the departmental course coordinator is required.
Prerequisite(s): 14.00 credits
Restriction(s): BIOM*4511:2

BIOM*4521 Research in Biomedical Sciences II S,F,W(0–6) [0.50]
First part of the two–semester course BIOM*4521/2. Refer to BIOM*4521/2 for course description.
Prerequisite(s): 14.00 credits
Restriction(s): BIOM*4510

BIOM*4521/2 Research in Biomedical Sciences II S/F,F/W,W/S(0–6) [1.00]
Independent research of a current topic in any of the biomedical sciences (such as anatomy, physiology, pharmacology, toxicology, genetics, biochemistry). Approval of the departmental course coordinator is required. This is a two–semester course offered over consecutive semesters. When you select it you must select BIOM*4521 in the first semester and BIOM*4522 in the second semester. A grade will not be assigned in BIOM*4521 until BIOM*4522 has been completed.
Prerequisite(s): 14.00 credits
Restriction(s): BIOM*4510

BIOM*4522 Research in Biomedical Sciences II F,W,S(0–6) [0.50]
Second part of the two–semester course BIOM*4521/2. Refer to BIOM*4521/2 for course description.
Prerequisite(s): BIOM*4521

XII—Course Descriptions, Botany

Department of Botany.
Additional course listings may be found in the course descriptions for Biology and Plant Biology.
Senior students are encouraged to inquire about graduate courses, particularly in the areas of Vascular Plant Systematics and Morphology, that can be taken for credit.

BOT*1200 Plants and Human Use W(3–0) [0.50]
This course will examine past and present interactions between humans and plants with emphasis on major changes in civilization and cultures as a result of these interactions. The approach will be to consider several case studies of how unique structural and chemical properties of various plant organs have played a role in their use by humans. Not an acceptable course for students in B.SC. Biology Programs. (Also offered through distance education format.)

BOT*2000 Plants, Biology and People F(3–1) [0.50]
The course deals with the biology of plant species of historical and cultural importance. It will focus on plants used as a source of drugs, herbal medicines, industrial raw materials, food products, perfumes and dyes. Examples of plant products that will be looked at include cocaine, chocolate, tea, opium, hemp and ginseng. The relevant morphology, physiology, distribution and ethnobotany of these plant species will be discussed.
Prerequisite(s): BIOL*1040
Restriction(s): BOT*1200

BOT*2030 Plants in the Ontario Landscape F(3–3) [0.50]
In this course you will learn to identify plants and their habitats in the Ontario landscape. In addition, you will apply methods typically used for field studies in plant biology. Through a series of field exercises, this course will foster an appreciation of local natural areas and provide a foundation for further studies and careers in ecology and environmental assessment.
Prerequisite(s): BIOL*1040

BOT*2050 Plant Ecology F(3–3) [0.50]
This course supplies the tools needed to assess plant populations and communities quantitatively. Field work is carried out at semi–natural sites on campus to provide practical experience in data collection. These data are analyzed to address conceptual and practical issues raised in lectures. This course is especially valuable for students interested in plant or wildlife biology and in environmental management.
Prerequisite(s): BIOL*1040 or BOT*1150

BOT*2100 Life Strategies of Plants F,W(3–2) [0.50]
This course introduces the structures and processes used by plants in the greening of our planet, and how and why plants are basic to the functioning of the biosphere. This course includes hands–on experience in examining the cells, tissues and architectures of plants as well as selected processes of plant function.
Prerequisite(s): BIOL*1040
Restriction(s): BOT*1150, BOT*2300, BOT*2400

BOT*3310 Plant Physiology F,W(3–3) [0.50]
The unique function and structure of plants is explored in relation to their growth, survival and adaptation to the environment. Photosynthesis, plant respiration, water and nutrient relations, and the control of growth and development by environmental and hormonal signals are explained through lectures and ”hands–on” laboratories.
Prerequisite(s): BIOL*1040 or BOT*1150
Restriction(s): BOT*2300

BOT*3410 Plant Anatomy F(3–3) [0.50]
The intricate internal structure of plants is explored in this course. The development, pattern and significance of cells, tissues and organs will be emphasized as well as the histological and microscopical methods used to study them. The lab emphasizes interpretation of plant structure as it relates to function.
Prerequisite(s): BIOL*1040 or BOT*1150
Restriction(s): BOT*2400

BOT*3710 Classification and Morphology of Seed Plants W(3–3) [0.50]
The interpretation of floral and vegetative morphology for purposes of classification and identification of flowering plants and conifers; flower and cone structure as related to function; principles of plant classification, fundamentals of nomenclature and economic importance of selected plant families are covered. Labs stress interpretation of plant form and plant identification at the ranks of family to species by use of a key to the flora of North–Eastern North America.
Prerequisite(s): BOT*2100

BOT*4380 Metabolism in the Whole Life of Plants W(3–0) [0.50]
This course follows the developmental changes that take place in plants, and explores the molecular, biochemical and physiological mechanisms that are responsible for development. Emphasis will be placed on the importance of modern experimental methods and critical evaluation of data.
Prerequisite(s): BIOL*1040, CHEM*2580

BOT*4820 Research Opportunities in Botany I S,F,W(1–5) [0.75]
These courses, normally open to students who are in semesters 7 and 8, are specifically designed to encourage senior undergraduates to conduct research in an area of Plant Biology. The courses may be taken individually or in sequence. The two–course sequence is par-

ticularly valuable for students considering graduate work. When the two–course sequence is selected, BOT*4820 will put emphasis on reviewing the primary scientific literature, formulating hypotheses and the design of experiments. This course must be completed before registration in BOT*4830. In all instances, supervisory arrangements must be made at least one semester before starting the course; registration with the course coordinator is contingent on the availability and agreement of a faculty supervisor.

BOT*4830 Research Opportunities in Botany II S,F,W(1–5) [0.75]

See BOT*4820.

XII—Course Descriptions, Chemistry

Department of Chemistry and Biochemistry.

*Credit may be obtained in only 1 of CHEM*1040, CHEM*1100; 1 of CHEM*2400, CHEM*2480; 1 of CHEM*2820, CHEM*2880.*

**A 1 hour tutorial is scheduled in the third hour of the time slot. Laboratory period extends 3 hours.*

Laboratory Deposit: *During the first week of classes, a refundable laboratory deposit of $10.00 will be collected from each student who registers in any of the courses in Chemistry, designated below by the symbol "+". Breakages will be charged against this deposit.*

CHEM*1040 General Chemistry I F,W(3*–3) [0.50]

A course which introduces concepts of chemistry, the central link between the physical and biological sciences. Principles discussed include chemical bonding simple reactions and stoichiometry, chemical equilibria and solution equilibria (acids, bases, and buffers).

Prerequisite(s): 1 of 4U Chemistry, OAC Chemistry (or equivalent), CHEM*1060

Restriction(s): CHEM*1100, CHEM*1300

CHEM*1050 General Chemistry II S,F,W(3*–3) [0.50]

An introductory study of the fundamental principles governing chemical transformations: thermodynamics (energy, enthalpy, and entropy); kinetics (the study of rates of reactions); and redox/electrochemistry.

Prerequisite(s): CHEM*1040 or IPS*1100

Restriction(s): CHEM*1300, CHEM*1310

CHEM*1060 Introductory Chemistry F(3–0) [0.50]

A course stressing fundamental principles of chemistry, designed for students without 4U or OAC Chemistry or equivalent. Topics include: atomic theory, the periodic table, stoichiometry, properties of gases and liquids, acid–base concepts and chemical equilibria. This course is intended only for students who require the equivalent of 4U or OAC Chemistry in order to proceed to CHEM*1040 or CHEM*1300.

CHEM*1100 Chemistry Today F(3–0) [0.50]

A chemistry course for non–scientists. This course will outline the involvement of chemistry in our daily lives and will provide an appreciation of chemistry from atoms to important complex molecules. Topics will include energy sources, air and water pollution, natural and synthetic polymers, household chemicals, foods, drugs and biochemicals.

CHEM*1300 Introductory Environmental Chemistry F(3*–3) [0.50]

This course presents the fundamentals of chemistry in the context of the environment in the modern industrial world. The core content includes general chemical principles such as stoichiometry, equilibrium and reaction energetics, illustrated with cases and examples that relate these principles to contemporary environmental problems.

Prerequisite(s): 1 of 4U Chemistry, OAC Chemistry, CHEM*1060

CHEM*1310 Introductory Environmental Chemistry II W(3*–3) [0.50]

This course extends the foundation of general and physical chemistry for environmental sciences to provide a basis for the understanding of the dynamic behaviour of chemical systems in the external world. The core content includes principles of thermodynamics, photochemistry, electrochemistry and kinetics, illustrated with cases and examples that relate these principles to contemporary environmental problems.

Prerequisite(s): CHEM*1300

CHEM*2060 Structure and Bonding F(3–2) [0.50]

Applications of symmetry, simple crystal structures and principles of bonding. Molecular orbital theory is used to explain the fundamental relationship between electronic and molecular structure. This course provides the elementary quantum background for an understanding of the electronic structures of atoms and molecules.

Prerequisite(s): CHEM*1050, MATH*1210, PHYS*1010

CHEM*2070 Structure and Spectroscopy S,W(3–2) [0.50]

An introduction to spectroscopy and its relationship to molecular structure and dynamics. Rotational, vibrational, electronic and magnetic resonance spectroscopies will be studied. Concepts introduced in CHEM*2060 will be applied to chemical and biochemical problems through spectroscopic techniques. Central to this course is the use of spectroscopy for the determination of molecular structures and the investigation of molecular motions.

Prerequisite(s): CHEM*2060

CHEM*2300 Chemical Reactivity F(3*–3) [0.50]

A general coverage of the reactivity of the elements and some of their compounds, with an emphasis on the compounds of carbon.

Prerequisite(s): CHEM*1050 or CHEM*1310

CHEM*2400 Analytical Chemistry I S,F,W(2–6) [0.75]

Quantitative analysis of important inorganic species in solution by volumetric, gravimetric and spectrophotometric techniques. Spreadsheet applications to solution equilibria and data analysis. This course is intended to build the foundations of good analytical laboratory practice.

Prerequisite(s): CHEM*1050 or IPS*1200

Restriction(s): CHEM*2480

CHEM*2480 Analytical Chemistry I S,F,W(2–3) [0.50]

Same as CHEM*2400 with a 3 hour laboratory component.

Prerequisite(s): 1 of CHEM*1050, CHEM*1310, IPS*1200

CHEM*2580 Introductory Biochemistry S,F,W(3–3) [0.50]
The evolution, chemical structure, and biological roles of the major molecular components of the cell: proteins, nucleic acids, lipids, and carbohydrates, enzymology, intermediary metabolism, with emphasis on catabolic processes.
Prerequisite(s): CHEM*1050 or CHEM*2300

CHEM*2700 Organic Chemistry I S,W(3*–3) [0.50]
An introduction to organic chemistry, stereochemistry, discussion of the major mechanisms and related reactions: nucleophilic substitution and elimination, electrophilic addition, free radical reactions, electrophilic aromatic substitution, nucleophilic addition and nucleophilic acyl substitution.
Prerequisite(s): CHEM*1050
Restriction(s): CHEM*2300

CHEM*2820 Thermodynamics and Kinetics F(3–3) [0.50]
The laws and applications of chemical thermodynamics and chemical kinetics.
Prerequisite(s): CHEM*1050, (MATH*1200 or MATH*2080)

CHEM*2880 Physical Chemistry F(3–2) [0.50]
A survey course for students who are not specializing in chemistry, biochemistry or chemical physics. Topics include basic thermodynamics, chemical equilibrium, macromolecular binding, chemical kinetics, enzyme kinetics, transport processes, colligative properties and spectroscopy. This course describes macroscopic observable properties of matter in terms of molecular concepts.
Prerequisite(s): CHEM*1050, (1 of MATH*1000, MATH*1080, MATH*1200)
Restriction(s): CHEM*2820

CHEM*3360 Environmental Chemistry and Toxicology S,W(3–0) [0.50]
The chemistry of the natural environment; the influence of pollutants upon the environment, including methods of introduction of pollutants to, and removal of pollutants from the environment. (Also listed as TOX*3360.)
Prerequisite(s): CHEM*1050
Equate(s): TOX*3360
Restriction(s): CHEM*1310

CHEM*3430 Analytical Chemistry II: Instrumental Analysis S,W(3–3) [0.50]
Methods for the separation, identification and quantification of substances in the solid, liquid and vapour states. Emphasis will be placed on modern instrumental methods and trace analysis.
Prerequisite(s): CHEM*2400 or CHEM*2480
Co–requisite(s): CHEM*2070
Restriction(s): CHEM*3450, CHEM*3460, TOX*3300

CHEM*3440 Analytical Chemistry III: Analytical Instrumentation F(3–3) [0.50]
Analytical Instrumentation, data acquisition, processing and applications in Chemistry and Biochemistry.
Prerequisite(s): CHEM*3430
Restriction(s): CHEM*3450, CHEM*3460

CHEM*3560 Structure and Function in Biochemistry F,W(3–0) [0.50]
This course develops the understanding of biochemical processes, by examining the enzymatic molecular mechanisms underlying specific cellular and physiological systems. Examples may include oxygen binding/transport and the evolution of globin genes/proteins; regulation of carbohydrate and lipid metabolism; proteins that change shape, including enzymes, membrane proteins, and prion proteins, blood clotting; neurotransmission.
Prerequisite(s): CHEM*2580

CHEM*3570 Analytical Biochemistry S,F(3*–3) [0.50]
The tools and techniques by which biological molecules are isolated, separated, identified, and analyzed. Detailed discussion of experimental methods for macromolecule purification characterization.
Prerequisite(s): (CHEM*2400 or CHEM*2480), CHEM*2580
Restriction(s): MICR*3110

CHEM*3640 Chemistry of the Elements I F(3*–3) [0.50]
A comprehensive introduction to concepts used by inorganic chemists to describe the structure, properties, and reactivity of compounds of the main group elements. The most important concepts covered are: Electronic Structure of Atoms, Symmetry, MO theory, Acids and Basis, Structure of Solids, Trends in the Periodic System.
Prerequisite(s): CHEM*2070

CHEM*3650 Chemistry of the Elements II W(3*–3) [0.50]
The chemistry and structure of transition metal compounds; electronic spectral and structural properties of transition metal complexes; mechanisms of their substitution and redox reactions. Introduction to organometallic chemistry.
Prerequisite(s): CHEM*3640

CHEM*3750 Organic Chemistry II S,F(3*–3) [0.50]
A continuation of the coverage of fundamental aspects of organic chemistry using an assimilation of carbonyl chemistry, unsaturated systems and carbon–carbon bond forming processes to acquaint students with methods of organic synthesis. Topics also include an introduction to spectroscopic methods for the identification of organic compounds.
Prerequisite(s): CHEM*2700

CHEM*3760 Organic Chemistry III W(3–3) [0.50]
An in–depth treatment of various aspects of organic chemistry. This will include such topics as the chemistry of heterocycles, bio–organic chemistry, polar rearrangements, organic photochemistry and a detailed discussion of organic spectroscopy.
Prerequisite(s): CHEM*3750, CHEM*2070

CHEM*3860 Quantum Chemistry F(3–1) [0.50]
Elementary quantum mechanics for the understanding of the electronic structure of atoms and molecules.
Prerequisite(s): CHEM*2070, MATH*2170

CHEM*3870 Symmetry and Spectroscopy W(2–3) [0.50]
Elementary group theory with applications to molecular spectroscopy. (Offered in odd–numbered years.)
Prerequisite(s): CHEM*2070

CHEM*4010 Chemistry and Industry W(3–0) [0.50]
This course examines industrial processes for the production of organic and inorganic chemicals. The environmental impact and the challenges of a large–scale operation will be considered alongside the actual chemical processes involved.
Prerequisite(s): (CHEM*2300 or CHEM*2700), (CHEM*3430 or TOX*3300), (MATH*1210 or MATH*2080)

CHEM*4400 Advanced Topics in Analytical Chemistry W(3–0) [0.50]
Recent developments in instrumental methods of chemical analysis. A typical selection will include topics from the areas of surface analysis and the applications of lasers in chemical analysis.
Prerequisite(s): CHEM*3430 or CHEM*3450

CHEM*4520 Metabolic Processes F(3–0) [0.50]
An in–depth study of the role of bioenergetics, regulation, and chemical mechanisms in carbohydrate, lipid, and nitrogen metabolism.
Prerequisite(s): CHEM*3560 or CHEM*3570

CHEM*4540 Enzymology W(2–4) [0.50]
A laboratory–intensive course. Enzyme active sites and the mechisms of enzyme action; enzyme kinetics and regulation; recombinant proteins and site–directed mutagenesis as tools for understanding enzymes.
Prerequisite(s): CHEM*3560 (may be taken concurrently), CHEM*3570

CHEM*4550 Biochemistry and Structure of Macromolecules F(3–0) [0.50]
Structure, function, and physical conformation of proteins and nucleic acids, biophysical and computational techniques for the study of biological macromolecules.
Prerequisite(s): (CHEM*3570 and 1 of CHEM*2820, CHEM*2880) or (CHEM*3560, PHYS*3240)

CHEM*4570 Applied Biochemistry F(3–0) [0.50]
Biochemical engineering of the pathways for production of amino acids, antibiotics, proteins, enzymes, and antibodies for applications in industry, medicine and scientific research.
Prerequisite(s): CHEM*3560 or CHEM*3570

CHEM*4580 Membrane Biochemistry W(3–0) [0.50]
An examination at the molecular level of structure and functions of cell membranes, cell surfaces and associated structures. Topics may include: membrane lipids; membrane protein structure; membrane transporters; ATP production; cytoskeleton; cell surface carbohydrates; membrane biogenesis; signal transduction.
Prerequisite(s): CHEM*3560 or CHEM*3570

CHEM*4620 Advanced Topics in Inorganic Chemistry F(3–0) [0.50]
A contemporary treatment of subjects of current interest in modern inorganic chemistry. Possible topics include solid state chemistry and organometallic chemistry.
Prerequisite(s): CHEM*3650

CHEM*4630 Bioinorganic Chemistry W(3–0) [0.50]
The role and importance of transition metal systems in biological processes. (Offered in odd–numbered years.)
Prerequisite(s): CHEM*2580, CHEM*3650

CHEM*4720 Organic Reactivity W(3–0) [0.50]
Introduction to physical organic chemistry, including discussion of reactive intermediates, substituent effects, medium effects, the mechanisms of organic reactions and the theoretical description of the bonding in organic molecules. (Offered in even–numbered years.)
Prerequisite(s): CHEM*3760 (may be taken concurrently)

CHEM*4730 Synthetic Organic Chemistry F(3–0) [0.50]
Introduction to synthetic organic chemistry, including discussion of retrosynthetic analysis, natural products and organic reactions. The integration of these topics for the rational design of synthetic schemes will also be discussed.
Prerequisite(s): CHEM*3760

CHEM*4740 Topics in Bio–Organic Chemistry W(3–0) [0.50]
This course covers the principles, methods and techniques of current bio–organic chemistry with emphasis on modern synthetic and analysis methods applied to biological molecules, a molecular based approach to structure recognition, and an introduction to molecular modelling and drug design.
Prerequisite(s): CHEM*2580, CHEM*3750

CHEM*4880 Topics in Advanced Physical Chemistry W(3–0) [0.50]
Selected topics in advanced physical chemistry. (Offered in even–numbered years.)
Prerequisite(s): (CHEM*2820 or PHYS*3240), (CHEM*3860 or PHYS*3230)

CHEM*4900 Chemistry and Biochemistry Research Project I S,F,W(0–9) [0.75]
Research project and seminar in chemistry and biochemistry. This course is designed to provide senior undergraduates with an opportunity to conduct research in an area of chemistry or biochemistry. Students must make arrangements with both a faculty supervisor and the course coordinator prior to registration. Students cannot choose a supervisor with whom they already have research experience in another capacity (e.g. a summer research position). Students should note that most projects are of two semesters' duration, and should plan their studies on the expectation that they will also register in CHEM*4910 in a subsequent semester.
Prerequisite(s): 5.00 credits in chemistry or biochemistry including 1.50 credits from (CHEM*3430 or CHEM*3450), CHEM*3570, CHEM*3640, CHEM*3650, CHEM*3760, CHEM*3870, CHEM*4540

CHEM*4910 Chemistry and Biochemistry Research Project II S,F,W(0–9) [0.75]
Research project and seminar in chemistry or biochemistry. Students must make arrangements with both a faculty supervisor and the course coordinator prior to registration.
Prerequisite(s): CHEM*4900

XII—Course Descriptions, Classical Studies

School of Languages and Literatures.

These courses do not require a knowledge of the Greek or Latin languages.

CLAS*1000 Introduction to Classical Culture F,W(3–0) [0.50]

A wide–ranging look at essential features of Greek and of Roman culture and society. Considerable emphasis will be given to the classical views of the human condition.

CLAS*2000 Classical Mythology W(3–0) [0.50]

An examination of the nature and function of myth in Classical Antiquity. The course shows how the narrative and symbolic structure of myths orders individual and communal experience. The myths that have influenced Western civilization receive special emphasis.

CLAS*2150 Art and Archaeology of Greece F(3–0) [0.50]

A survey of Ancient Greek Art and Archaeology, with stress on form and function plus stylistic trends and aesthetic values. The course will illuminate the cultural, social, and political life in Ancient Greece. (Also listed as ARTH*2150).

CLAS*2350 The Classical Tradition W(3–0) [0.50]

This course examines the transmission of Greco–Roman culture in circumstances radically different from those in which it originated. It highlights the aspects of classical culture most influential in forming the Western tradition. (Offered in odd–numbered years.)

Prerequisite(s): CLAS*1000 or CLAS*2000

CLAS*2360 The Classical Tradition (in Latin) W(6–0) [1.00]

This course, which is offered in conjunction with CLAS*2350, adds to the content of that course the reading and study in Latin of certain primary sources, in particular Cicero, Quintilian, Augustine. (Offered in even–numbered years.)

Prerequisite(s): LAT*2000

CLAS*3000 The Rise and Fall of Athens F(3–0) [0.50]

Greek history in the 5th century; the development of Athenian democracy; the Peloponnesian War and the decline of Athenian dominance. Special attention is paid to the literature and thought of the period. (Offered in odd–numbered years.)

Prerequisite(s): 1 of CLAS*1000, CLAS*2000, HIST*2850

CLAS*3010 The Roman Revolution W(3–0) [0.50]

An examination of the collapse of the Roman Republic and the development of the Imperial government under Augustus. The paradox of the external power and inner instability of Rome. (Offered in even–numbered years.)

Prerequisite(s): 1 of CLAS*1000, CLAS*2000, HIST*2850

CLAS*3020 History of the Hellenistic World F(3–0) [0.50]

The rise and fall of the Hellenistic states from the death of Alexander the Great until the Roman conquest, with political emphasis on the development of the monarchies and cultural emphasis on the Hellenization of the East. (Offered in odd–numbered years.)

Prerequisite(s): 1 of CLAS*1000, CLAS*2000, HIST*2850

CLAS*3030 Epic Heroes and Poems W(3–0) [0.50]

The nature and significance of the epic hero. Epic as code and as critique of tradition. Oral poetry, and critical problems raised by it. The central texts are The Iliad, The Odyssey, and Virgil's Aeneid; other poems are also studied. (Offered in even–numbered years.)

Prerequisite(s): CLAS*1000 or CLAS*2000

CLAS*3040 Greek Tragedy and Comedy W(3–0) [0.50]

The nature of tragedy, and the existential and moral questions raised by the plays of Aischylos, Sophokles, and Euripides. Comedy, fantasy, and society in Aristophanes.(Offered in odd–numbered years.)

Prerequisite(s): CLAS*1000 or CLAS*2000

CLAS*3050 The Rise and Fall of Athens (in Greek) F(6–0) [1.00]

This course, offered in conjunction with CLAS*3000, augments the content of that course with the reading and study in Greek of selected primary sources, such as Herodotus, Thucydides, and Plutarch. (Offered in odd–numbered years.)

Prerequisite(s): GREK*2020

CLAS*3060 The Roman Revolution (in Latin) W(6–0) [1.00]

This course, offered in conjunction with CLAS*3010, augments the content of that course with the reading and study in Latin of selected primary sources, notably Sallust, Cicero, Caesar, and Suetonius.(Offered in odd–numbered years.)

Prerequisite(s): LAT*2000

CLAS*3070 History of the Hellenistic World (in Greek) F(6–0) [1.00]

This course, offered in conjunction with CLAS*3020, augments the content of that course with the reading and study in Greek of selected Greek sources pertaining to the history of the Hellenistic World, primarily Polybius and Plutarch. (Offered in even–numbered years.)

Prerequisite(s): GREK*2020

CLAS*3080 Epic Heroes and Poems (in Greek) W(6–0) [1.00]

This course, offered in conjunction with CLAS*3030, augments the content of that course with the reading in Greek of selected books from the Iliad and/or Odyssey. The course will include close study of the epic dialect and features of its formulaic language.(Offered in even–numbered years.)

Prerequisite(s): GREK*2020

CLAS*3090 Greek Tragedy and Comedy (in Greek) W(6–0) [1.00]
This course, taught together with CLAS*3040, complements the content of that course by the reading and study in Greek of an extant play. Offered in odd–numbered years.)
Prerequisite(s): GREK*2020

CLAS*3100 Religion in Greece and Rome F(3–0) [0.50]
An examination of the varieties of religious experience and of religious activity in Greece and Rome, before the establishment of Christianity. Particular attention is paid both to the relations of religion to state and to the relations of the individual to gods. (Offered in even–numbered years.)
Prerequisite(s): CLAS*1000 or CLAS*2000

CLAS*3120 Religion in Greece and Rome (in Latin) F(6–0) [1.00]
This course, offered in conjunction with CLAS*3100, supplements that course's content by the reading and study of Latin primary sources. (Offered in even–numbered years.)
Prerequisite(s): LAT*2000

CLAS*3150 Roman Art and Urbanism W(3–0) [0.50]
Introduction to Roman art and urbanism from the Early Republic to the end of the imperial period. The course will survey the developments of Roman art with an emphasis on architecture, sculpture and painting. It will illuminate the development of the urban space in the context of cultural, social and political life. (Also listed as ARTH*3150)

CLAS*3200 Sport in Antiquity F(3–0) [0.50]
The history of sport in Greece and Rome from Homer to the Caesars, with emphasis on its relationship to religion, education, literature, and community life. (Offered in odd–numbered years.)
Prerequisite(s): 1 of CLAS*1000, CLAS*2000, CLAS*2300

CLAS*3750 Greek Myth in the Western Tradition F(3–0) [0.50]
This course will study the functions of Greek myths in the non–Greek cultures which adopted them and so transmitted them to the later general culture of the West. The period to be explored extends from Augustan Rome through the European Middle Ages to the Early Renaissance in Italy. (Offered in even–numbered years.)
Prerequisite(s): CLAS*2000

CLAS*4000 Novel and Romance in Antiquity F(3–0) [0.50]
The historical and formal roots of fiction in the classical prose romances. Special attention is paid to the influence of myth, religion, historiography and ethical biography. Among texts studied are Daphnis and Chloe, Satyricon, and Aithiopika. (Offered in odd–numbered years.)
Prerequisite(s): CLAS*3030 or CLAS*3040

CLAS*4010 Novel and Romance in Antiquity (in Latin) F(6–0) [1.00]
This course, which is taught in tandem with CLAS*4000, complements that course's content by the reading and study in Latin of an extant novel. (Offered in odd–numbered years.)
Prerequisite(s): LAT*2000

CLAS*4150 Research Paper in Classics F,W(3–0) [0.50]
This course is intended to complement courses in specified studies in classics. It engages the student in research and in critical writing, and permits the examination, in depth, of a topic of importance to the discipline and of interest to the student.
Prerequisite(s): 1.50 credits in Classical Studies courses at the 3000 level

CLAS*4400 Seminar in Classics W(3–0) [0.50]
A seminar course complementing courses of specific study in classics. It seeks to define the nature of the discipline, its values and its procedures. Attention will be paid to recent methodological and ideological trends in the discipline.
Prerequisite(s): 1.50 credits in Classical Studies at the 3000 level

XII—Course Descriptions, Computing and Information Science

Department of Computing and Information Science.

*Note: Credit may be obtained for 1 of CIS*1000 or CIS*1200. Students with credit for COST*2020 may not register in CIS*1000 or* CIS*1200 *Students who major or minor in Computing and Information Science may not receive credit for the following courses unless taken to satisfy the requirements of another program:* COST*2020*, MATH*1050.*

CIS*1000 Introduction to Computer Applications S,F,W(3–2) [0.50]

A survey of computer systems and software. An introduction to computer programming and data organization. An emphasis on using application packages for personal and business use. The social impact of computing. Not recommended for students with previous computer science background. Cannot be taken for credit by students taking a major or minor in Computing and Information Science.

Restriction(s): CIS*1200, COST*2020

CIS*1200 Introduction to Computing F,W(3–2) [0.50]

An introduction to computer hardware and software, data organization, problem–solving and programming. Exposure to application packages for personal and business use. For students who wish a balance between programming and the use of software packages. Cannot be taken for credit by students taking a major or minor in Computing and Information Science.

Restriction(s): COST*2020, CIS*1000

CIS*1500 Introduction to Programming F,W(3–2) [0.50]

Introductory problem–solving, programming and data organization techniques required for scientific applications using a general purpose programming language. Topics include control structures, data representation and manipulation, and interfacing to applications software. For students who require a good understanding of programming but are not planning on taking additional specialist Computing and Information Science courses. Cannot be taken for credit by students taking a major or minor in Computing and Information Science.

CIS*1510 Introduction to Object–Oriented Programming W(3–2) [0.25]

To introduce the Object–Oriented (OO) approach to programming and algorithm design. The OO concepts will be explained through the Java program language. Standard programming techniques acquired in CIS*1500 are recast in an OO context and applied to more complex problems. Together with CIS*2650, this course will enable students who began with CIS*1500 to join the computing science mainstream in second year.

Prerequisite(s): CIS*1500

Restriction(s): CIS*1650

CIS*1650 Programming I F,W(3–2) [0.50]

Technically intensive introduction to object–oriented programming and problem solving concepts. Control and basic data structures, objects, class libraries, organizational approaches, and basic algorithms are introduced. This course is required for students in a Computing and Information Science major or minor program and for those wishing to take additional computing courses.

Equate(s): CIS*1600

CIS*1900 Discrete Structures in Computer Science W(3–2) [0.50]

Provides a foundation in finite mathematics which is required for further computer science courses. Abstract representation of structures and algorithms. Topics include graph theory, logic, and set theory.

CIS*1XXX Any CIS course at the 1000 level [0.50]

** PLACE HOLD FOR B.A. REQUIREMENTS — DO NOT PRINT IN COURSE DESCRIPTIONS **

CIS*2030 Structure and Application of Microcomputers F,W(3–3) [0.50]

Components of a computer system, including memories, CPU, buses, and input/output subsystems and interface hardware. Instruction sets, addressing modes, assembly/machine language programming. Development of algorithms for data acquisition, display, and process control.

Prerequisite(s): (CIS*2650 or IPS*1120), (1 of CIS*1900, ENGG*3450, MATH*2000)

Equate(s): IPS*2010

CIS*2100 Scientific Computing and Applications Development S,F(3–2) [0.50]

This course is intended to introduce the student to techniques in modern applications development using current technologies and practices. The emphasis of the first part of the course ranges from building and maintaining WEB sites to search engines and multimedia presentations. The second part of the course is concerned with building and maintaining simple databases as needed for the management of scientific data. This is done in conjunction with packages for mathematical and statistical analysis, and presentation techniques. Cannot be taken for credit by students taking a major or minor in Computing and Information Science.

Prerequisite(s): 1 of CIS*1000, CIS*1200, CIS*1500

CIS*2420 Data Structures S,F(3–2) [0.50]

An advanced examination of data structures. Their representation in both a high–level programming language and as abstractions. Analysis of algorithms, comparative performance, and complexity. Structures include trees, graphs, hashtables, sets, object–oriented hierarchies, and templates.

Prerequisite(s): CIS*2650, (CIS*1900 or MATH*2000)

CIS*2450 Software Systems Development and Integration S,W(3–2) [0.50]

Techniques and tools used in the development of large software systems. Methods for organizing and constructing modular systems, manipulating files, an introduction to interface design, and use of databases. Software tools for managing projects, database connectivity, configuration management, and system application programmer interfaces.

Prerequisite(s): CIS*2650, (CIS*1900 or MATH*2000)
Restriction(s): CIS*2400

CIS*2650 Programming II S,W(3–1) [0.50]
A sequel to CIS*1650. Structured Programming using a general purpose procedural language. Topics include string processing, record manipulation in memory and on disk, static and dynamic data structures, recursion, and pointers. Fundamental algorithms are introduced for sorting, searching, text processing and other important tasks.
Prerequisite(s): CIS*1600 or CIS*1650
Equate(s): CIS*1700

CIS*3110 Operating Systems W(3–1) [0.50]
Operating Systems in theory and practice. Components in a system: scheduling and resource allocation; process management, multi–programming, multi–tasking; I/O control and file systems; mechanisms for client–server computing. Examples from contemporary operating systems.
Prerequisite(s): CIS*2420

CIS*3120 Digital Systems S,W(3–1) [0.50]
Boolean algebra, minimization of Boolean expressions. Design of combinational and sequential logic circuits. Memory design. Control, ALU, bus design. Microprogramming and CPU design.
Prerequisite(s): CIS*2030 or IPS*2010 are recommended

CIS*3200 Software Engineering S,W(3–2) [0.50]
Examination of the software engineering process and the production of reliable systems. Techniques for the design and development of complex software. Topics include object oriented analysis, design and modeling, software architectures, software reviews, software quality, software engineering, ethics, maintenance and formal specifications.
Prerequisite(s): CIS*3430

CIS*3210 Computer Networks F(3–1) [0.50]
This course covers the high–level (protocol) oriented aspects of computer networks, specifically: application, session, transport and network layers. It includes the internet, socket–level programming, multimedia and quality of service issues. The hardware aspects (switches, LANs, modems, transmission paths) are covered at only a functional level.
Prerequisite(s): CIS*3110
Restriction(s): CIS*4200

CIS*3430 System Analysis and Design in Applications F,W(3–2) [0.50]
An introduction to the issues and techniques encountered in the design and construction of software systems. The theory and models of software evolution. Topics include requirements and specifications, prototyping, design principles, object–oriented analysis and design, standards, integration, risk analysis, testing and debugging.
Prerequisite(s): CIS*2420, (CIS*2400 or CIS*2450)

CIS*3460 System Simulation F(3–2) [0.50]
Simulation model classification. Continuous and discrete languages. Process and transaction oriented systems. GPSS: entities, processing logic, chains, queue disciplines. Random number generators. Design and optimization of simulation applications and validation techniques.
Prerequisite(s): CIS*2420, (MATH*1010 or MATH*1210), (1 of STAT*2040, STAT*2060, STAT*2120)

CIS*3490 The Analysis and Design of Computer Algorithms S,W(3–1) [0.50]
The design and analysis of efficient computer algorithms: standard methodologies, asymptotic behaviour, optimality, lower bounds, implementation considerations, graph algorithms, matrix computations (e.g. Strassen's method), NP–completeness.
Prerequisite(s): CIS*2420, recommended MATH*2150

CIS*3530 Data Base Systems and Concepts F,W(3–1) [0.50]
Review of data organization and data management principles with the perspective of analyzing applications suitable for implementation using a DBMS. Analysis of several data base models, query specification methods, and query processing techniques. Overview of several related issues including concurrency control, security, integrity and recovery. Students are expected to demonstrate concepts through project assignments.
Prerequisite(s): CIS*2420, (CIS*2400 or CIS*2450)

CIS*3650 Compilers F(3–1) [0.50]
Detailed study of the compilation process. Design and implementation of a compiler considering techniques for parsing building and manipulating intermediate representations of a program and code generation. Interpreters.
Prerequisite(s): CIS*3110, (CIS*2030 or IPS*2010)

CIS*4000 Applications of Computing Seminar S,F,W(0–6) [0.50]
This capstone course of the B.Comp. program provides students an opportunity to combine their area of application with their studies in computing via a course project and seminar series. Application areas discussed in any particular semester will depend on areas of application selected by students. Students are required to present their work in a seminar and also to participate in the critical analysis and review of the work of other students taking this course.
Prerequisite(s): registration in semester 7 or higher of the B.Comp. Program and completion of a minimum of 2.50 credits in an area of application

CIS*4050 Advanced Computer Architectures F(3–1) [0.50]
Central processor architectures, control and microprogramming, memory systems, special architectures, underlying support for special architectures, architectures suitable for very large scale integration. Offered in even–numbered years and may be offered in odd–numbered years.
Prerequisite(s): CIS*3110, CIS*3120, (CIS*2030 or IPS*2010)

CIS*4210 Telecommunications W(3–1) [0.50]
This course covers the low–level and the hardware–oriented aspects of computer communications, specifically the physical, link, and network layers. It includes basic telecommunication technology, local area networks, lowlevel protocols, switching technologies, wireless and mobile networking, data and stream compression, and error coding.
Prerequisite(s): CIS*3210
Restriction(s): CIS*4200

CIS*4300 Human Computer Interaction F(2–2) [0.50]
Methods for user interface software design, including interface representations and testing. Evaluation and design of sample application systems. Impacts of computer–based information systems on individuals and organizations. Implementation and testing tools. Planning of learning stages and design of assistance subsystems. Offered in odd–numbered years and may be offered in even–numbered years.
Prerequisite(s): CIS*3110, CIS*3430, [2 of CIS*3200, CIS*3490, CIS*3530, (CIS*3600 or CIS*3650)]

CIS*4400 Distributed Information Systems F(3–2) [0.50]
This course addresses the basic concepts and methodologies used to build distributed systems applications. The course deals with building information infrastructures involving a base network layer, middleware and application layer. The emphasis is on the enabling methodologies for building complex distributed information systems.
Prerequisite(s): CIS*3430, CIS*3530, (CIS*3210 or CIS*4200)
Restriction(s): CIS*4440

CIS*4410 Trends in Distributed Systems W(3–1) [0.50]
A course that examines the technical issues surrounding modern and future distributed commercial enterprises. Special attention is given to new communication modes, high volume, data–intensive systems, distributed transactions and security mechanisms.
Co–requisite(s): (CIS*3210 or CIS*4200), CIS*3530

CIS*4430 Information Organization and Retrieval W(3–1) [0.50]
Advanced techniques for information management. Analysis of advanced indexing structures. Information retrieval, feedback strategies, text searchings, automatic indexing. Database query optimization and system support. Web based retrieval. Offered in even–numbered years and may be offered in odd–numbered years.
Prerequisite(s): CIS*3110, CIS*3430, CIS*3530, [1 of CIS*3200,CIS*3490, (CIS*3600 or CIS*3650)]

CIS*4450 Special Topics in Information Science U(3–1) [0.50]
A variety of advanced topics mainly from areas within general information processing. Subject areas discussed in any particular semester will depend on the interests of the students and the instructor. Students should check with the Department of Computing and Information Science to determine what topic will be offered during specific semesters and which prerequisites, if any, are appropriate.

CIS*4500 Special Topics in Computing Science U(3–1) [0.50]
A variety of advanced topics within Computing Science. Subject areas discussed in any particular semester will depend upon the interests of both the students and the instructor. Students should check with the Department of Computing and Information Science to determine what topic will be offered during specific semesters and which prerequisites, if any, are appropriate.

CIS*4600 Elements of Theory of Computation F(3–0) [0.50]
An introduction to finite automata, formal languages and sequential machines. Models of computation, including Turing machines and the hierarchy of machines/languages. Decidability and computability.
Prerequisite(s): CIS*3110, CIS*3430, [2 of CIS*3200, CIS*3490, CIS*3530, (CIS*3600 or CIS*3650)]

CIS*4750 Artificial Intelligence F(3–1) [0.50]
Examination of techniques used in the field of artificial intelligence including: heuristic search, A* algorithms, game searches, logic based knowledge representation. Other topics may include frames, scripts, semantic nets, models of uncertain reasoning, expert systems and natural language understanding. These ideas will be explored through the development of a substantial project.
Prerequisite(s): CIS*3110, CIS*3430, [2 of CIS*3200, CIS*3490, CIS*3530, (CIS*3600 or CIS*3650)]

CIS*4760 Computer Vision and Pattern Recognition W(3–0) [0.50]
Image enhancement, image smoothing, thresholding, segmentation, region growing, decision–theoretical methods, information theory, neural networks, syntactic/structural methods, applications. Computer graphic experience desirable. Offered in odd–numbered years and may be offered in even–numbered years.
Prerequisite(s): CIS*3110, CIS*3430, [2 of CIS*3200, CIS*3490, CIS*3530, (CIS*3600 or CIS*3650)], (1 of STAT*2040, STAT*2060, STAT*2100, STAT*2120)

CIS*4800 Computer Graphics W(3–1) [0.50]
Introduction to computer graphics. Topics include graphics programming concepts, geometrical transformations, viewing 3–D projections, raster graphics, sculptured surfaces, visible surface determination, image processing and other special topics. Practical issues will be covered by assignment using currently available graphics equipment.
Prerequisite(s): CIS*3110, CIS*3430, [2 of CIS*3200, CIS*3490, CIS*3530, (CIS*3600 or CIS*3650)]

CIS*4900 Computer Science Project S,F,W(0–6) [0.50]
Planning, developing and writing a research proposal under individual faculty supervision. The course, in continuation with CIS*4910 provides senior undergraduates an opportunity to pursue an independent course of study. The topic selected will be determined by agreement between the student and the faculty member with expertise in the area.
Prerequisite(s): 2 C.I.S. courses at the 4000 level

CIS*4910 Computer Science Thesis S,F,W(0–6) [0.50]
This course is a continuation of CIS*4900. The student will conduct and write an undergraduate thesis under the individual supervision of a faculty member. In addition the student is required to present his/her work in a seminar and also participate in the critical analysis and review of the work of other students taking this course.
Prerequisite(s): CIS*4900

XII—Course Descriptions, Consumer Studies

Department of Consumer Studies.

For courses without semester designations, please check with the department. Advance schedules are available in the department.

COST*1000 Introduction to Marketing Management S,F,W(3–0) [0.50]

An examination of the process of analyzing, planning, implementing, coordinating, and controlling programs involved in the conception, pricing, promotion, and distribution of products, services, and ideas designed to create and maintain beneficial exchanges with target markets for the purpose of achieving public and private organizational objectives. (Also offered through distance education format.) (Spring offering through distance education format only.)

COST*1400 Introduction to Design W(3–0) [0.50]

Designed to increase visual awareness and recognition of natural and planned design elements in the environment. Investigation of the roles of designers and an understanding of design as an applied process that responds to human needs.

COST*1800 Housing and Community Planning F(3–0) [0.50]

A general survey of the developing residential environment in the modern community. The social, psychological, economic, physical and political dimensions of housing and urban development are included.

COST*2020 Information Management S,F,W(2–2) [0.50]

Introduces the concepts and principles of information acquisition, manipulation and management as relevant to organizational decision–making. Provides experience in the applications of information technology as practiced in organizations. Students with credit for this course may not proceed to CIS*1000.

Prerequisite(s): 5.00 credits

Restriction(s): CIS*1000, CIS*1200

COST*2100 Personal Financial Management W(3–0) [0.50]

An introductory course designed to meet the professional needs of those in teaching, counseling and community service, as well as personal goals in financial management. (Also offered through distance education format.)

Prerequisite(s): 5.00 credits

COST*2300 Technology and the Consumer F,W(3–0) [0.50]

A review of major high technology events and their utilization in product development processes; the positive and negative impact of these technologies on consumers and their life styles will be emphasized.

Prerequisite(s): 5.00 credits or permission of the instructor

COST*2600 Fundamentals of Consumer Behaviour F,W(3–0) [0.50]

In the long run organizations survive and achieve their goals by satisfying the needs and wants of consumers as well as or better than their competitors. This course examines consumer behaviours, the economic, social, cultural and psychological factors related to consumer behaviours, the evolution and change in behaviours and relationships, and the ways in which consumers respond to stimuli employed in the marketing of products, services and ideas.

Prerequisite(s): (1 of COST*1000, HAFA*1000, HTM*1000), (1 of PSYC*1100, PSYC*1200, SOC*1100)

COST*2810 Social Aspects of Housing F(3–0) [0.50]

An overview of the impact of the residential environment upon lifestyles at various stages in the life cycle. Topics include the effect of neighbourhood and dwelling design upon children, seniors and the economically and physically handicapped. Consideration will be given to the development of behaviorally based design guidelines.

Prerequisite(s): 5.00 credits

COST*2820 Housing Finance W(3–0) [0.50]

Examines the financing of both residential and commercial real estate but with an emphasis on borrowing by individual homeowners. A mathematical approach is used to examine the impact of various lender and borrower decisions about loan terms (amoritization periods, pre–payment options, etc.). The evolution of the Canadian housing finance system is contrasted with that in the United States. Various mortgage product innovations for seniors and other segments of the borrowing public are investigated.

Prerequisite(s): 5.00 credits

COST*3010 Quality Management W(3–0) [0.50]

Lectures will include general concepts and expectations of quality assurance from consumer, government, managerial and technological points of view and discuss the relationship of national and international groups concerned with quality assurance. Seminars apply concepts to selected products and services.

Prerequisite(s): 10.00 credits including 0.50 credit in statistics

COST*3020 Distribution Systems & Retail Management F,W(3–0) [0.50]

An examination of the management of distribution systems for consumer products and services. Topics include operational and management aspects of retailing, wholesaling, importing/exporting, transportation, and inventory management.

Prerequisite(s): 10.00 credits including 1 of AGEC*4370, COST*1000, HAFA*3080, HTM*3080

COST*3030 Research Methods F,W(2–2) [0.50]

Examines the concepts, principles and practices for consumer, market and product development research processes. Topics include research problem definition, research objectives, research design, measurement, sampling methods, execution and research management, analysis and interpretation, and report writing.

Prerequisite(s): (STAT*2060 or STAT*2090)

Restriction(s): registration in the B.COMM. Marketing Management Major, regular or co–op, Housing and Real Estate Management Major, regular and co–op, or the B.A. Marketing Management Minor

COST*3040 Business and Consumer Law F,W(3–0) [0.50]

Course introduces students to statutory and common law concerning business and consumer transactions. An overview of the laws of contracts and torts forms the basis of business and producer/consumer relationships. Discussion topics include sale of goods and consumer protection legislation; debtor–creditor relations; competition law; intellectual property rights and manufacturers' product liability.

Prerequisite(s): 5.00 credits

COST*3100 Economic Behaviour of Households W(3–0) [0.50]

A micro analysis of the patterns of resource use pursued by the household as conditions inside and outside the household change. Students are expected to possess or develop facility with the calculus of multivariable functions, constrained optimization, and multiple regression analysis.

Prerequisite(s): ECON*2310

COST*3600 Consumer Information Processes F,W(3–0) [0.50]

Course provides an in–depth treatment of information processing research and theories as they relate to consumer judgement and choice. Components of theory addressed include: attention and perception, motivation, processing capacity, encoding and memory storage, retrieval and decision processes. Applications to marketplace policy and strategy are discussed.

Prerequisite(s): COST*2600, COST*3030

COST*3610 Consumer Economics F(3–0) [0.50]

The course examines applications of macro and micro economic theory to the consumption process. Students are expected to possess or develop facility with calculus and multiple regression analysis.

Prerequisite(s): ECON*2310, ECON*2410, STAT*2060

COST*3620 Advertising Management F,W(3–0) [0.50]

Concepts of communication and management as practiced by private and public sector organizations. Communication management principles are applied to the design and evaluation of communication programs.

Prerequisite(s): 10.00 credits including COST*1000 and COST*2600

Restriction(s): registration in the B.Comm. Program

COST*3870 Topics in Housing U(3–0) [0.50]

Lecture–discussion or seminar on a selected topic or area of specialization related to housing to be conducted by faculty with special interests or expertise in the area. Students should confirm with the department prior to course selection what topic(s), if any, will be offered during specific semesters.

Prerequisite(s): will be indicated by the department when the course is offered

COST*3880 Topics in Housing U(3–0) [0.50]

Lecture–discussion or seminar on a selected topic or area of specialization related to housing to be conducted by faculty with special interests or expertise in the area. Students should confirm with the department prior to course selection what topic(s), if any, will be offered during specific semesters.

Prerequisite(s): will be indicated by the department when the course is offered

COST*3890 Property Management W(3–0) [0.50]

Financial theory is used to examine the diversification benefits of including real estate with financial assets in an investment portfolio. Diversification strategies within a real estate portfolio are also covered. The marketing and leasing of real estate space culminates in a leasing negotiation exercise between pairs of students. Differing property management issues faced by managers of residential, office, retail, industrial and mixed use properties are covered.

Prerequisite(s): COST*1800, COST*2820

COST*4020 Research in Consumer Studies U(3–0) [0.50]

An independent investigation of a pertinent topic in consumer studies. Registration requires departmental approval.

Prerequisite(s): COST*3030

COST*4040 Management in Product Development F(3–0) [0.50]

Major course components include: new product strategy formulation, the role of technical and market research, the analysis of opportunities, management of development processes, product launches, government and regulatory controls.

Prerequisite(s): registration in the B.Comm. program (Marketing Management major) and 12.50 credits including COST*2600

COST*4050 Consumer, Business and Government Relations F,W(3–0) [0.50]

Examination of changing economic, political, financial, and social power as determinants of relationships among and the roles played by consumers, businesses, and governments in the evolution of capitalistic democracies; the impact of power and the absence of power on employment, real incomes, income distribution, consumer attitudes, education systems, and the capacity of governments to govern.

Prerequisite(s): 12.50 credits including COST*2600, ECON*1100, ECON*1200

COST*4370 Marketing Strategy F,W(3–0) [0.50]

This course focuses on the decision–making role of the marketing manager who is responsible for formulating the strategic marketing plan. The theory of selecting market target(s) for the firm's product and/or services and the development of the marketing mix (product, price, promotion, distribution) with the aid of market research and computerized information systems is covered.

Prerequisite(s): 10.00 credits

Equate(s): AGEC*4370
Restriction(s): registration in the B.Comm. program (Marketing Management major)

COST*4600 International Marketing F,W(3–0) [0.50]
The study of marketing in global context with specific emphasis on the strategic implications of marketing in different country cultures. Included are the global marketing environment and the competitive challenges and opportunities confronting today's international marketers, the cultural environment of global marketing, the assessment of global market opportunities and the development of global marketing strategies.
Prerequisite(s): COST*1000, COST*2600, COST*3030

COST*4810 Housing Services Systems W(3–0) [0.50]
This course deals with the development, redevelopment and renewal of housing services within the context of organization decision–making systems. Students will design a program and implementation strategy to address a housing issue. The interrelations among the social aspects of housing, public policy, construction industry capabilities and financing mechanisms are considered. Both public and private delivery systems will be examined.
Prerequisite(s): COST*4850, COST*4860

COST*4820 Real Estate Appraisal F(3–0) [0.50]
This course deals with the basic principles involved in valuing real estate. The market comparison, cost and income approaches of appraisal are covered. The major emphasis in the course is on using discounted cash flow projections to value income–producing real estate. The term project involves the use of a spreadsheet program to estimate property value for a property chosen by the student. While valuation of single family homes is covered, the main emphasis is on investment real estate.
Prerequisite(s): (CIS*1000 or COST*2020), (COST*2820 or ECON*3560)

COST*4840 Housing and Real Estate Law F(3–0) [0.50]
Lays out the legal principles which guide the expanding and changing body of law dealing with housing and real estate development and forms of occupancy; statutory and regulatory matters are explored.
Prerequisite(s): 10.00 credits including COST*1800, COST*2820

COST*4850 Housing Policies F(3–0) [0.50]
Examines both substantive and jurisdictional policy and program development at the federal, provincial and local levels. The policy making process will be reviewed as well as policy and program evaluation techniques. The emphasis is on Canada although comparisons with other countries will be discussed.
Prerequisite(s): 10.00 credits including COST*1800, COST*2820

COST*4860 Housing Industry Structure and Process W(3–0) [0.50]
The development and construction sectors of the housing industry will be examined from both the structural and process perspectives in order to develop an understanding of how the industry adapts and how organizations operate. The course will focus on Canadian residential housing industry organizations and related agencies.
Prerequisite(s): 10.00 credits including COST*1800, COST*2820

COST*4910 Topics in Consumer Studies U(3–0) [0.50]
Lecture–discussion or seminar on a selected topic in consumer studies to be conducted by faculty with expertise in the area. Students should check with the department to determine what topic, if any, will be offered during a semester.
Prerequisite(s): will be indicated by the department when the course is offered.
Restriction(s): instructor consent required

COST*4920 Topics in Consumer Studies U(3–0) [0.50]
Same description as COST*4910.

COST*4950 Consumer Studies Practicum U(1–3) [0.50]
The practicum provides supervised experience in applying the concepts and principles of consumer studies to contemporary issues in areas such as consumer finance, consumer policy, housing, product standards and quality assurance.
Prerequisite(s): 15.00 credits
Restriction(s): permission of the instructor and department chair

XII—Course Descriptions, Co–operative Education

Co–operative Education Services.

*COOP*XXXX courses are limited to students registered in a co–operative education program.*

COOP*1000 Co–op Work Term I F,W,S(3–0) [0.00]

This is a semester long experience in a work setting. Co–op work semesters differ depending on the program and major. Location of the semester is varied. Refer to program of study for the semester in which this is scheduled. Must pass work report evaluation and work performance evaluation to continue.

Prerequisite(s): COOP*1100

COOP*1100 Introduction to Co–operative Education F,W(3–0) [0.00]

This course will introduce students to the theory and practice of co–operative education at the University of Guelph. Students will learn to take full advantage of the co–op option. They will acquire practice in the skills required to succeed in the competitive process of locating suitable work terms. Specifically, the course will cover: characteristics and expectations of the ”new” world of work, interview skills, resume and cover letter writing, as well as general skills required to be successful in the co–op. Students also obtain practice in the co–op employment process.

Prerequisite(s): enrolment in a co–operative education program

COOP*2000 Co–op Work Term II F,W,S(3–0) [0.00]

This is a semester long experience in a work setting. Co–op work semesters differ depending on the program and major. Location of the semester is varied. Refer to program of study for the semester in which this is scheduled. Must pass work report evaluation and work performance evaluation to continue.

Prerequisite(s): satisfactory or better evaluation in COOP*1000

COOP*3000 Co–op Work Term III F,W,S(3–0) [0.00]

This is a semester long experience in a work setting. Co–op work semesters differ depending on the program and major. Location of the semester is varied. Refer to program of study for the semester in which this is scheduled. Must pass work report evaluation and work performance evaluation to continue.

Prerequisite(s): satisfactory or better evaluation in COOP*2000

COOP*4000 Co–op Work Term IV F,W,S(3–0) [0.00]

This is a semester long experience in a work setting. Co–op work semesters differ depending on the program and major. Location of the semester is varied. Refer to program of study for the semester in which this is scheduled. Must pass work report evaluation and work performance evaluation to continue.

Prerequisite(s): satisfactory or better evaluation in COOP*3000

XII—Course Descriptions, Crop Science

Department of Plant Agriculture, Crop Science Divison.

CROP*2110 Crop Ecology F(3–0) [0.50]
Fundamental ecological principles are applied to managed agricultural ecosystems. Crop selection and management are viewed as influencing interactions among species and the environment. Adaptation and distribution of temperate zone crops are related to both environmental constraints and human intervention.
Prerequisite(s): BIOL*1040

CROP*2280 Crops in Land Reclamation F(2–2) [0.50]
The use of vegetation to reclaim land disturbed by human intervention, including mining and extraction, construction of right–of–ways, waste disposal, and logging, are introduced. Fundamentals of soil, plant, and associated microbial relations are reviewed, with emphasis on plant adaptation to soil constraints. Presentations by guest speakers and visits to nearby sites are used to identify the off as well as on–site environmental implications of land disturbance.

CROP*3300 Grain Crops W(3–0) [0.50]
Management strategies and world production of the major temperate grain crops are studied relative to their botanical and physiological characteristics and to available environmental resources. The utilization of grain crops for human food, livestock feed, and various industrial products are examined. (Offered in odd–numbered years.)
Prerequisite(s): AGR*2451/2 or CROP*2110

CROP*3310 Protein and Oilseed Crops F(3–0) [0.50]
Management strategies and world production of the major temperate protein and oilseed crops are studied relative to their botanical and physiological characteristics and to available environmental resources. The utilization of protein and oilseed crops for human food, livestock feed and various industrial products are examined. (Offered in odd–numbered years.)
Prerequisite(s): AGR*2451/2 or CROP*2110

CROP*3340 Managed Grasslands W(3–2) [0.50]
Managed grasslands provide grazing, conserved feed, and a wider range of services to the environment and society at large. Agro–ecological, genetic, and managerial considerations will be integrated toward addressing questions of ruminant production and environmental management in the Great Lakes basin. Species will be distinguished morphologically and physiologically, focusing on adaptation to climatic, edaphic, and managerial constraints. Topics in sward utilization will range from fresh grazing to feed conservation as hay, haylage, and silage.
Prerequisite(s): AGR*2451/2 or CROP*2110

CROP*3400 Organic Agriculture W(3–2) [0.50]
The design and operation of organic agriculture will be introduced, focusing on systems oriented toward field crops, horticultural crops, and livestock. Emphasis will be placed on system design a) to capture positive synergies among enterprises in space and time, b) to minimize niches for pest proliferation, c) to internalize costs of production, d) to maintain soil, plant, and animal health, and e) to respect and enhance natural resource endowments. Complementing the basic principles and practices discussed in class, students will learn site–specific applications from farmer–practitioners both in class and on the farm. Student teams will be responsible for visiting several farms during the term, interviewing farm families, and preparing case reports. Students will be encouraged to view the course as an opportunity to explore internship opportunities within the organic industry.
Prerequisite(s): one of AGR*2350, AGR*2301/2, AGR*2401, AGR*2451/2, BIOL*2060, CROP*2110

CROP*4220 Cropping Systems W(3–2) [0.50]
Design of cropping systems for specific livestock, poultry and cash crop enterprises; integration of all factors affecting crop yields, quality and economy of production such as choice and interchangeability of crops, crop sequence, tillage, pest control, seasonal work programming, harvesting, drying and storage.
Prerequisite(s): (2 of CROP*3300, CROP*3310, CROP*3320, CROP*3330), (SOIL*3080 or SOIL*4090)

CROP*4240 Weed Science F(3–3) [0.50]
Weeds will be studied in relation to agricultural practices. Principles of chemical, mechanical and biological control will be outlined. Laboratories will include weed identification, weed control methods, and demonstrations of the effects of various herbicides.
Prerequisite(s): AGR*2451/2

CROP*4260 Crop Science Field Trip F(0–4) [0.50]
A field study designed to increase the student's knowledge of agricultural production and agri–business. Students will tour a selected area of North America prior to the fall semester, visiting cash crop and livestock farms, supporting industries (e.g. processing, manufacturing) and markets (e.g. elevators, stockyards). A fee of approximately $750.00 per student will be assessed.
Prerequisite(s): 12.50 credits including AGR*2451/2

CROP*4340 Seminar: Selected Topics in Crop Science F(2–0) [0.50]
This course is designed to permit students to study topics of current interest in the production of crops for feed and food purposes. Students will present seminars and prepare video presentations on the selected topics.
Prerequisite(s): 0.50 credit at the 3000 level in Crop Science

CROP*4350 Crop Science Research Project I S,F,W(2–0) [0.50]
Students will select a problem in crop science, conduct an extensive search and review of the literature and outline an experiment to conduct on the problem. The outline will be presented as a seminar.
Prerequisite(s): 12.50 credits

Restriction(s): registration in the B.SC. or B.SC.(Agr.) program

CROP*4360 Crop Science Research Project II S,F,W(2–0) [0.50]

Students will conduct an experiment with the objective of providing information about some problem in crop science. The problem may be a field, growth room or a laboratory experiment which may have been outlined in CROP*4350. Research findings will be written up in scientific style and a brief seminar of results presented.

Prerequisite(s): CROP*4350 or by permission

XII—Course Descriptions, Drama

School of Literatures and Performance Studies in English.

NOTES: Admission to the following courses is not guaranteed, and is by audition, submission of a portfolio and/or interview only:

DRMA*2620 [0.50] Special Studies in Theatre Practice
DRMA*3110 [0.50] Acting II
DRMA*3120 [0.50] Acting III
DRMA*3410 [0.50] Special Studies in Production I
DRMA*3420 [0.50] Special Studies in Production II
DRMA*3600 [0.50] Directed Readings and Special Independent Studies
DRMA*3610 [0.50] Directed Readings and Special Independent Studies
DRMA*3620 [0.50] Special Studies Seminar
DRMA*3630 [0.50] Special Studies Seminar
DRMA*4090 [0.50] Directing
DRMA*4210 [0.50] Scenography
DRMA*4250 [0.50] Honours Project in Theatrical Production I
DRMA*4260 [0.50] Honours Project in Theatrical Production II
DRMA*4650 [0.50] Honours Essay

For times and dates of auditions and interviews, students should consult the School. All students applying for entry to these courses must obtain the signature of the Drama Program advisor or the Director, who will admit students only after consultation with the instructor.

The Drama program has a particular interest in the drama and theatre of Canada. Course offerings will reflect this concentration where appropriate.

DRMA*1000 Introduction to Theatre F,W(3–3) [0.50]
This course deals with the nature and function of drama and theatre in society, and with the role and function of different aspects of theatre in production, including playwriting, directing, acting, design and technical theatre. It concerns itself with the social and cultural role played by theatre as an art form, and with how theatre is produced and produces its effects. The course is designed to introduce students to ways of discussing, analyzing and writing about the theatrical event. It will include attendance at selected productions, and a fee will be charged for the cost of travel to them.

DRMA*1050 Script Analysis F,W(3–0) [0.50]
An introduction to the reading and analysis of scripts, and the different ways in which critics, directors, actors, and designers approach them. The course will include exercises in the written analysis of a limited number of scripts.

DRMA*1090 Public Presentation F,W(2–3) [0.50]
This course introduces students to acting techniques which are useful to those making public presentations in any number of contexts, including the classroom and employment situations. The course will not be counted towards a major or minor in Drama.

DRMA*1500 Introduction to Film F(2–3) [0.50]
A study of films from a variety of periods and places, this course aims to introduce the basic components of film language and to promote the understanding of film as an art form. Through the viewing and analysis of selected films key concepts such as photography, editing and movement will be explored, as will matters such as style, authorship, and genre.

DRMA*2080 Acting I F,W(2–3) [0.50]
A studio course for drama students applying classroom theory to acting problems. The course is required of, but not restricted to, students in a drama specialization.

DRMA*2220 Introduction to Technical Theatre and Design F,W(2–3) [0.50]
An introduction for drama students to the theory and practice of theatrical production and design, including sets, costumes, lighting, sound, and technical drawing. Students may be expected to serve on some evenings and weekends in technical capacities on a production.

DRMA*2300 Introduction to Theatre History, Criticism and Theory F(3–0) [0.50]
This course will initiate the student into the academic study of theatre history, criticism and theory. It will focus on a variety of historical, critical and theoretical approaches to the analysis of drama and theatre.

DRMA*2400 Theatre for Young Audiences W(2–2) [0.50]
A study of the theory and practice of theatre for young audiences, including script analysis and practical performance exercises.

DRMA*2500 Contemporary Cinema W(2–3) [0.50]
The course is designed to give the student knowledge and understanding of contemporary cinematic expression.

DRMA*2620 Special Studies in Theatre Practice F,W(2–3) [0.50]
Students will perform in School productions; or students with prior experience may apply to serve in technical capacities on productions. Admission is by application to the School.

DRMA*3080 Acting Studio F,W(2–3) [0.50]
A studio course in acting that will address particular issues and techniques, and may conclude with a small–scale production.
Prerequisite(s): DRMA*2080

DRMA*3110 Acting II F,W(2–3) [0.50]
A continuation of DRMA*2080. Students will perform in a public production. Admission is by audition only.

Prerequisite(s): DRMA*2080

DRMA*3120 Acting III F,W(2–3) [0.50]

A continuation of DRMA*3110 . Students will perform in a public production. Admission is by audition only.

Prerequisite(s): DRMA*3110

DRMA*3180 Concepts and Methods of Theatre History W(3–0) [0.50]

A study of theatre history and historiography, focusing on the relationships between the plays written in selected historical periods and the theatrical and cultural conditions that shaped them. The course will explore various approaches and methods of historical interpretation.

Prerequisite(s): DRMA*2300

Restriction(s): DRMA*3021/2

DRMA*3220 Technical Production I F,W(2–3) [0.50]

A continuation of DRMA*2220, focusing on the theory and application of theatrical crafts, and including work in a technical capacity on a School production.

Prerequisite(s): DRMA*2220

DRMA*3230 Technical Production II F,W(2–3) [0.50]

A continuation of DRMA*3220, focusing on the theory and application of theatrical crafts, and including work in a technical capacity on a School production. Students will normally work in different capacities in DRMA*3220 and DRMA*3230.

Prerequisite(s): DRMA*3220

DRMA*3240 Theatrical Organization F(3–0) [0.50]

A study of various models of theatrical organization such as theatrical funding, board and management structures, production management, technical direction, and stage management, together with their implications for theatrical production and interpretation.

Prerequisite(s): DRMA*1000

DRMA*3320 Applied Criticism of Drama and Theatre F(3–0) [0.50]

This course is designed to engage students in critical practice as applied to theatrical production.

Prerequisite(s): DRMA*1050, (1 of DRMA*1000, DRMA*2080, DRMA*2220, ENGL*2120)

DRMA*3410 Special Studies in Production I F,W(2–3) [0.50]

Students will serve in such capacities as stage managers, assistant stage managers, assistant directors, assistant designers, dramaturges, producers, or publicists on School productions, and will study the functions of these roles in theatrical production. Admission is by application to the School.

Prerequisite(s): DRMA*3220

DRMA*3420 Special Studies in Production II F,W(2–3) [0.50]

A continuation of DRMA*3410. Students will normally work in different capacities in DRMA*3410 and DRMA*3420. Admission is by application to the School.

Prerequisite(s): DRMA*3410

DRMA*3430 Theatrical Design: Sets and Props F(2–3) [0.50]

A study of the history, theory, and practice of theatrical design, with focus on the principles of set and prop design.

Prerequisite(s): DRMA*2220

Restriction(s): DRMA*3211

DRMA*3440 Theatrical Design: Costume and Lighting W(2–3) [0.50]

A study of the history, theory, and practice of theatrical design with focus on the principles of costume and lighting design.

Prerequisite(s): DRMA*2220

Restriction(s): DRMA*3211

DRMA*3530 Canadian Film W(2–3) [0.50]

This course is designed to give the student knowledge and understanding of Canadian film and film makers.

Prerequisite(s): DRMA*1500

DRMA*3550 Theories of Drama and Theatre W(3–0) [0.50]

A study of selected theoretical approaches to the study of drama and theatre.

Prerequisite(s): DRMA*2300

DRMA*3600 Directed Readings and Special Independent Studies U(3–0) [0.50]

Independent study based upon bibliographies established in consultation with the instructor. An essay normally will constitute the written requirement for the course. Tutoring and/or consultation will be arranged, depending on the topic or materials for study. Special studies may also be arranged in the practical aspects of the theatre, with appropriate assignments, not leading to a production. Projects for this course are subject to the approval of the School, and must be submitted to the Director, on forms provided by the School, no later than the last day of classes in the semester prior to enrolment in the course.

Prerequisite(s): 3.00 credits in Drama including DRMA*1050, DRMA*2300

DRMA*3610 Directed Readings and Special Independent Studies U(3–0) [0.50]

Same as DRMA*3600.

Prerequisite(s): DRMA*3600

DRMA*3620 Special Studies Seminar F(3–0) [0.50]

A seminar course that provides for intensive study of a specific aspect of drama and/or theatre.

Prerequisite(s): 3.00 credits in Drama including DRMA*1050, DRMA*2300

DRMA*3630 Special Studies Seminar F(3–0) [0.50]
Same as DRMA*3620.
Prerequisite(s): DRMA*3620

DRMA*3700 Fundamentals of Directing F(2–3) [0.50]
A study of the basic theories of directing, complemented by practical in–class directing exercises.
Prerequisite(s): DRMA*1050, DRMA*2080

DRMA*3850 Canadian Drama and Theatre F(3–0) [0.50]
A study of Canadian plays in their historical, cultural, and theatrical contexts.
Prerequisite(s): DRMA*2300 or any 2000 level literature course
Restriction(s): DRMA*3331/2

DRMA*3950 Drama in London W(2–4) [0.50]
A course designed for students taking the London Semester consisting of a study of theatre events in London, through attending performances, reading texts and meeting for weekly seminars.

DRMA*4090 Directing F,W(3–2) [0.50]
The application of the fundamentals of directing through the direction of a one–act play. Admission is by application to the School.
Prerequisite(s): DRMA*370

DRMA*4210 Scenography W(2–3) [0.50]
An integrated studio course in scenographic concepts and techniques for the theatre. Admission is by application to the School.
Prerequisite(s): DRMA*3430

DRMA*4250 Honours Project in Theatrical Production I F,W(0–6) [0.50]
The completion, under direction, of a project in acting, directing, dramaturgy, design or technical theatre. Students will normally work in different capacities in DRMA*4250 and DRMA*4260. Admission is by application to the School.
Prerequisite(s): 1 of DRMA*3110, DRMA*3220, DRMA*3430, DRMA*3440, DRMA*3700 as appropriate

DRMA*4260 Honours Project in Theatrical Production II F,W(0–6) [0.50]
Same as DRMA*4250.
Prerequisite(s): DRMA*4250

DRMA*4300 Seminar in Theatre History F(3–0) [0.50]
A study in depth of one aspect or period of theatre history or historiography. (Offered in even–numbered years.)
Prerequisite(s): 0.50 credit in theatre history at the 3000 level

DRMA*4310 Seminar in Theory of Drama and Theatre F(3–0) [0.50]
A study in depth of one aspect of dramatic or theatrical theory. (Offered in odd–numbered years.)
Prerequisite(s): DRMA*3550

DRMA*4320 Seminar in Dramatic Literature W(3–0) [0.50]
A study in depth of one aspect of dramatic literature. (Offered in even–numbered years.)
Prerequisite(s): 0.50 credit in dramatic literature at the 3000 level

DRMA*4330 Seminar in Canadian Drama and Theatre W(3–0) [0.50]
A study in depth of one aspect of Canadian drama and theatre. (Offered in odd–numbered years.)
Prerequisite(s): 0.50 credit at the 3000 level in dramatic, Canadian literature or theatre history

DRMA*4340 Playwriting F(3–0) [0.50]
A study of the theory and practice of playwriting. Admission is by application to the instructor .
Prerequisite(s): 0.50 credit in dramatic literature or creative writing at the 3000 level

DRMA*4650 Honours Essay U(3–0) [0.50]
The completion, under direction, of a scholarly essay in the study of drama and/or theatre. Admission is by application to the instructor.
Prerequisite(s): at least 1.00 credit in dramatic literature, theory, or theatre history at the 3000 level or above

XII—Course Descriptions, Economics

Department of Economics.

For courses without semester designations, please check with the department. Advance schedules are available in the department.

ECON*1050 Introductory Microeconomics S,F,W(3–0) [0.50]

An introduction to the Canadian economy: price determination, market structure and resource allocation; the behaviour of consumers and firms; market intervention by government. Some of the economic issues addressed may include agricultural price supports, rent control, the NAFTA, environmental regulation, price discrimination, pay equity, and taxation. (Also offered through distance education format.)

Equate(s): ECON*1200

ECON*1100 Introductory Macroeconomics S,F,W(3–0) [0.50]

The Canadian economy: aggregate performance and policy; an analysis of the determinants of national income, employment and the price level, the role of government monetary and fiscal policies in improving the rate of economic growth. (Also offered through distance education format.)

Prerequisite(s): ECON*1050

ECON*2000 Contemporary Economic Problems in Canada W(3–0) [0.50]

A study of important socio–economic issues in Canada using the basic principles of macro and microeconomics. Discussion and analysis of population, poverty, foreign ownership, regional development, etc.

Prerequisite(s): ECON*1050, ECON*1100

ECON*2100 Economic Growth and Environmental Quality F(3–0) [0.50]

An examination of the implications of economic growth on the quality of the environment, employing the basic principles of economic analysis. (Also offered through distance education format.)

Prerequisite(s): ECON*1050

ECON*2150 Introduction to Business Economics S,F,W(3–0) [0.50]

A course intended for those with an interest in economics as it pertains to business. (Not intended for students in Economics or Commerce programs.) Four modules to be completed: two on microeconomic principles and their application to business problems; one using on–line databases and electronic publications; one from a list of applied topics. (Offered through distance education format only.)

Restriction(s): ECON*1050, ECON*1100 or registration in the Bachelor of Commerce Program

ECON*2200 Industrial Relations F(3–0) [0.50]

This is a survey course of the Canadian industrial relations system. Among the topics covered are: the growth and objectives of unions, the legal framework of collective bargaining, the effects of unions on industry and the economy, industrial conflict and public policies.

Prerequisite(s): ECON*1050

ECON*2310 Intermediate Microeconomics S,F,W(3–1) [0.50]

The analysis of the behaviour of households and firms under alternative assumptions and market conditions. (Also offered through distance education format.)

Prerequisite(s): ECON*1050, (AGR*1101/2 or ECON*1100)

ECON*2410 Intermediate Macroeconomics S,F,W(3–1) [0.50]

The analysis of closed economy models of aggregate spending, output, employment, prices and interest rates under alternative assumptions about the nature of labour, product and financial markets. The analysis of theories of consumption, investment and money demand. (Also offered through distance education format.)

Prerequisite(s): ECON*1050, ECON*1100

ECON*2420 Canadian Economic History U(3–0) [0.50]

This course surveys the development of the Canadian economy from the aboriginal economy to the early fur and fish trades, agricultural settlement, industrialization, the Great Depression, growth of the public sector and fast economic growth after World War Two. Particular attention is paid to international economic relations and to regional differences within Canada.

Prerequisite(s): ECON*1050, (ECON*1100 or HIST*2450)

ECON*2500 Introduction to the Economics of Law, Crime and Enforcement U(3–0) [0.50]

An introduction to the economic analysis of law, participation in illegal labour and product markets and optimal law enforcement. Topics covered may include the economics of property, contract and tort law, the costs of crime and crime control, measurement of deterrence, regulatory enforcement, trade–offs in the likelihood and severity of punishment and tax evasion.

Prerequisite(s): ECON*1050

ECON*2650 Introductory Development Economics F(3–0) [0.50]

This course introduces students to the economic experience of developing countries, the ways in which economists try to understand it, and the implications for policy. The basic tools of economic analysis as taught in the introductory courses are used to analyse topics that may include theories of growth, trade, education, foreign investment, exchange rates, labour markets, the role of government, environmental sustainability and strategies related to agriculture, population, industry and investment.

Prerequisite(s): ECON*1050, ECON*1100

ECON*2720 Business History F(3–0) [0.50]

This course surveys the evolution of economic activity and organization from the industrial revolution to the present. Particular attention is given to the changing relationship between technology and business organization, the shift from proprietorship to corporation

and the rise of multinational enterprise. Other topics may include the relationship between business and government, the role of the entrepreneur in the process of technical change and the evolution of work patterns and standards of living.
Prerequisite(s): ECON*1050, (ECON*1100 or any 1.50 credits in history)

ECON*2740 Economic Statistics F,W(3–1) [0.50]
A course designed to prepare students conceptually and mathematically for ECON*3560, Theory of Finance and ECON*3740, Introduction to Econometrics. Topics include the summation operator, descriptive statistics, frequency distributions, probability and statistical independence, the binomial distribution, algebra of the expectation operator, discrete bivariate distributions, covariance, variance of a linear function of random variables, the normal and t distributions, sampling distributions, point and interval estimation, hypothesis testing and an introduction to ordinary least squares. Additional topics may be included at the instructor's discretion. Examples and assignment questions are drawn from economics and finance.
Prerequisite(s): ECON*1050, ECON*1100, (1 of MATH*1000, MATH*1050, MATH*1080, MATH*1200)

ECON*2770 Introductory Mathematical Economics F,W(3–1) [0.50]
This course applies the elements of calculus and matrix algebra to simple microeconomic and macroeconomic problems.
Prerequisite(s): ECON*1050, ECON*1100, (1 of MATH*1000, MATH*1080, MATH*1200)

ECON*3200 Economics of Industrial Relations U(3–0) [0.50]
An economic analysis of the Canadian industrial relations system. Emphasis is placed on understanding the theoretical implications of unions and collective bargaining practices for wage and employment outcomes. Empirical analysis of the nature and growth of unions and of their effect on industrial conflicts, public policy and the performance of the economy.
Prerequisite(s): ECON*2310

ECON*3300 Economics of Health and the Workplace U(3–0) [0.50]
This course will introduce students to concepts of health economics with particular relevance to workplace issues. Topics to be covered include the determinants of health, the demand for and supply of health care, the market for health care providers, health insurance, public and private, the role of health insurance in the labour market, whether not having to provide comprehensive health insurance to their workers gives Canadian firms an edge over their American competitors, workplace health risks and their effects on working conditions and salaries, workplace wellness programs and their evaluation, and the analysis of the cost effectiveness of health interventions.
Prerequisite(s): ECON*2310, ECON*2740

ECON*3500 Urban Economics U(3–0) [0.50]
This course is designed to apply the basic principles of intermediate economic theory to problems facing urban areas with emphasis on Canada. Topics to be covered will include such things as housing, urban poverty, municipal financing, transportation.
Prerequisite(s): ECON*2310

ECON*3510 Money, Credit and the Financial System U(3–0) [0.50]
Economics of the payments system, banking and other financial institutions and of credit markets. Bank of Canada operations and policy instruments. Monetary theory and policy.
Prerequisite(s): ECON*2310, ECON*2410

ECON*3520 Labour Economics U(3–0) [0.50]
A study of the labour market, wage determination and the relationship between wages, employment, and prices.
Prerequisite(s): ECON*2310

ECON*3530 Industrial Organization U(3–0) [0.50]
This course examines industries in which firms have the potential to exercise market power. Topics include how the competitive environment affects the behaviour of firms, measuring the extent of market power on welfare. The performance of markets under monopolies, dominant firms, cartels and oligopolies is examined and related aspects of Canadian competition policy and regulations are discussed.
Prerequisite(s): ECON*2310, ECON*2770

ECON*3560 Theory of Finance F(3–0) [0.50]
Capital budgeting and long–term finance and investment decisions by firms and individuals. Introduction to capital asset pricing under uncertainty and to concept of efficient markets. Major emphasis is on corporate finance. (Also offered through distance education format.)
Prerequisite(s): ECON*2310, (1 of ECON*2740, PSYC*2010, STAT*2040, STAT*2050, STAT*2060, STAT*2080, STAT*2090, STAT*2100, STAT*2120)

ECON*3580 Economics of Regulation U(3–0) [0.50]
A study of the economic reasons for government intervention in the marketplace. Emphasis will be placed on the role of crown corporations, regulatory agencies, regulation rules and public sector price–setting in the Canadian economy.
Prerequisite(s): ECON*2310

ECON*3600 Macroeconomics in an Open Economy U(3–0) [0.50]
International macroeconomic issues; the balance of payments; models of exchange rate determination; foreign exchange risk and covered interest arbitrage; alternative exchange rate regimes; small versus large economies; monetary and fiscal policy in an open economy.
Prerequisite(s): ECON*2410, ECON*2740, ECON*2770

ECON*3610 Public Economics U(3–0) [0.50]
This course examines the interventionist role of government in the economy. It examines several sources of market failure which are used to justify government intervention. These include public goods, externalities and redistribution. The course also evaluates alternative sources of government revenue from the perspectives of both equity and efficiency. These include the personal and corporate income taxes, sales taxes and wealth taxes.
Prerequisite(s): ECON*2310

ECON*3620 International Trade U(3–0) [0.50]
An introduction to the general equilibrium analysis of international trade, international factor movements and commercial policy. Special emphasis is given to Canada's international trade relationships.
Prerequisite(s): ECON*2310

ECON*3660 Economics of Equity Markets U(3–0) [0.50]
This course studies the economic literature regarding the determination of security prices and the operation of the stock market. (Also offered through distance education format.)
Prerequisite(s): ECON*3560

ECON*3710 Advanced Microeconomics S,F(3–1) [0.50]
An in–depth treatment of consumer and producer theory leading to the general equilibrium model of the economy and the study of welfare economics.
Prerequisite(s): ECON*2310, ECON*2770

ECON*3720 History of the World Economy since 1850 U(3–0) [0.50]
Study of the evolution of the world economy since 1850. Topics may include the costs and benefits of empire to Britain, Anglo–German trade rivalry, the rise to prominence of "settler colonies", economic growth in the Third World, reparations and war debt, agricultural overproduction, origins of the Great Depression, the 1945–1973 boom in world production and trade.
Prerequisite(s): ECON*1050, ECON*1100, (1 of ECON*2310, EURO*2070, HIST*2450, HUMN*2070, ISS*2010)

ECON*3730 Europe and the World Economy to 1914 U(3–0) [0.50]
This course surveys the world economy with a particular focus on the industrial revolution in Europe, demographic change, the rise to prominence of the 'settler colonies', the origins of international inequality and the experience of globalization during the later nineteenth century. Particular attention is given to international trade, capital flows and migration.
Prerequisite(s): ECON*1050, ECON*1100, (1 of ECON*2310, EURO*2070, HIST*2450, HUMN*2070, IDEV*2010)

ECON*3740 Introduction to Econometrics U(3–1) [0.50]
A computer–based course involving the specification and estimation of economic models and the testing of economic hypotheses using appropriate test statistics. Topics include the summation operator, expectation operator, ordinary least squares estimation, dummy variables, seasonality, multicollinearity, heteroskedasticity, autocorrelation, data sources (including uses of the Data Resource Centre). Additional topics may be included at the instructor's discretion. Heavy emphasis will be placed on applications and writing up results. Some use of spreadsheet software (e.g. QuattroPro, Excel) and statistical software (e.g. TSP, SHAZAM) will be required.
Prerequisite(s): ECON*2310, ECON*2410, ECON*2740, ECON*2770

ECON*3770 Mathematical Economics and Game Theory W(3–1) [0.50]
This course extends the application of mathematical techniques to problems in both macroeconomics and microeconomics: comparative statics; the Envelope Theorem; Euler's Theorem; Kuhn–Tucker conditions; integration with continuous compounding; special matrices, vector spaces and quadratic forms. Approximately half the course is devoted to static and dynamic game theory with both complete and incomplete information and uncertain outcomes.
Prerequisite(s): ECON*2310, ECON*2410, ECON*2770

ECON*4500 Topics in Urban Economics U(3–0) [0.50]
This course will investigate selected theoretical and applied topics in urban economics in depth. Among topics which might be treated are location theory, the theory of spatial structure, transportation economics, the economics of housing, the economics of land use regulation, urban public finance.
Prerequisite(s): ECON*3710, ECON*3740

ECON*4640 Applied Econometrics F(3–0) [0.50]
This course discusses the classical linear regression model and its extensions including generalized least squares and the theory and application of F tests. The maximum likelihood principle is introduced, as are alternative approaches to testing, e.g. LM, LR and Wald tests. Additional topics may be included at the instructor's discretion. Matrix algebra is used and proof of the Gauss–Markov theorem is included, but discussion of proofs is in general limited in order to allow substantial applications to data using statistical software such as TSP, SHAZAM, SAS, STATA.
Prerequisite(s): ECON*3740, ECON*3770
Equate(s): ECON*4740

ECON*4710 Advanced Topics in Microeconomics U(3–0) [0.50]
An intensive study of the scope, methodology, and content of contemporary microeconomics; selected topics in partial and general equilibrium analysis.
Prerequisite(s): ECON*3710, ECON*3770

ECON*4720 Topics in Economic History U(3–0) [0.50]
The use of economic theory to analyse the process of historical economic change.

Prerequisite(s): ECON*2310, 12.50 credits

ECON*4750 Topics in Public Economics U(3–0) [0.50]

This course examines selected topics related to the expenditure and taxation functions of government. Topics may include issues in public good theory such as the free rider problem, the problem of eliciting truthful revelation of preferences and the use of taxes as a corrective device for externalities. The course may also address optimal taxation as well as tax evasion. Throughout this course the trade–off between efficiency and equity is emphasized.

Prerequisite(s): ECON*3710, ECON*3770

ECON*4760 Topics in Money and Finance U(3–0) [0.50]

Selected topics in monetary economics such as theories of the demand for and supply of money, the nature and role of private banks and central banks, the transmission processes of monetary policy and in the theories of corporate finance and the pricing of financial assets.

Prerequisite(s): ECON*3600, ECON*3710, ECON*3740

ECON*4780 Topics in Industrial Organization U(3–0) [0.50]

Selected topics in the theoretical and empirical study of the organization and performance of firms and markets. Topics may include: strategic behaviour of firms such as actions to deter entry of rivals, pre–emptive choice of location and product quality, and research and development; the regulation of firms under uncertainty; econometric analysis of the use of market power, and; modern advances in the theory of the firm.

Prerequisite(s): ECON*3710, ECON*3740, ECON*3770

ECON*4790 Topics in Labour Market Theory U(3–0) [0.50]

Selected topics in advanced labour market theory with emphasis on empirical evidence for the Canadian labour market.

Prerequisite(s): ECON*3710, ECON*3740, ECON*3770

ECON*4800 Theory of Strategic Management U(3–0) [0.50]

This course is about the creation and maintenance of long–term vision for the corporation from the perspective of the general manager. It is concerned with both the determination of strategic direction and the management of the strategic process. ECON*4800 may not be counted as a 4000 level economics course for purposes of satisfying the minimum 4000 level economics course requirements in the B.A. Honours Economics or B.A. Management Economics programs.

Prerequisite(s): AGEC*3320, ECON*2740, completion of semester 5

ECON*4810 Advanced Macroeconomic Theory U(3–0) [0.50]

The theory of complex aggregate economic models; their assumptions, construction, and use in the analysis of macroeconomic activity.

Prerequisite(s): ECON*3600, ECON*3740, ECON*3770

ECON*4830 Economic Development U(3–0) [0.50]

A study of the theories, problems and policies of economic growth with special reference to underdeveloped countries.

Prerequisite(s): ECON*2310

ECON*4840 Applied Econometrics II U(3–0) [0.50]

This is a continuation of ECON*4640 and deals with asymptotic theory, maximum likelihood estimation, instrumental variables, simultaneous equation models and selected topics such as models for limited dependent variables, models for panel data, ARCH models, units roots and error correction models. There will be applications to data using statistical software.

Prerequisite(s): ECON*4640

ECON*4860 Seminar in Current Economic Problems U(3–0) [0.50]

Examination in a seminar setting of selected contemporary economic problems.

Prerequisite(s): ECON*3600, ECON*3710, ECON*3740, or permission of instructor

ECON*4870 Mathematical Economics: Dynamics U(3–0) [0.50]

The purpose of this course is to introduce the student to the techniques and application of dynamic analysis. The discussion concentrates on systems of differential equations, optimal control theory, etc.

Prerequisite(s): ECON*3600, ECON*3710, ECON*3770

ECON*4880 Topics in International Economics U(3–0) [0.50]

Selected topics involving the advanced analysis of the causes and effects of trade and financial flows and international factor movements.

Prerequisite(s): ECON*3600, ECON*3710, or permission of instructor

ECON*4890 History of Economic Thought U(3–0) [0.50]

A study of the development of economic theory, the tools of economic analysis, and the evaluation of economics as a science, together with an analysis of the circumstances affecting this development.

Prerequisite(s): ECON*2310, ECON*2410

ECON*4900 Special Study in Economics S,F,W(3–0) [0.50]

The special study option is designed to provide senior undergraduate students with an opportunity to pursue an independent course of study. The subject matter will be related to regular 4000 level courses. Students will be required to submit a major paper/report on the subject matter studied. Formal agreement between the student and instructor of the course is required as well as the approval of the department chair or designate. One only of ECON*4900/ECON*4910 may count as one of the required minimum number of 4000 level economics courses in the B.A. programs.

Prerequisite(s): ECON*3600, ECON*3710, ECON*3740

ECON*4910 Special Study in Economics S,F,W(3–0) [0.50]

Same description as for ECON*4900.

ECON*4930 Environmental Economics U(3–0) [0.50]

An advanced treatment of the interrelationship between economic activities and the state of the natural environment from the economists' point of view.

Prerequisite(s): ECON*2410, ECON*3710

ECON*4940 Model Building and Economic Analysis U(3–0) [0.50]

Progress in economic theory is increasingly made by studying the properties of small artificial economies or competitive general equilibrium models. This course examines the construction of competitive general equilibrium models and outlines the computational techniques required to solve them. These models may be used to study a range of subject areas, including topics in macroeconomics with a particular emphasis on business cycle analysis or the economics of the environment. The subject areas will vary from year to year and are chosen at the instructor's discretion.

Prerequisite(s): ECON*3740

ECON*4950 Applied Economics Research Project W(3–0) [0.50]

Students plan, develop and conduct a research project under individual faculty supervision and structured co–ordination. The supervisor is a faculty member with expertise in the area being investigated. The co–ordinator is a faculty member who leads group sessions on research project objectives, expectations, potential topics, data sources, available software and other relevant issues. Students will also present proposals, progress reports and final products in this group setting.

Prerequisite(s): ECON*3770, ECON*4640

XII—Course Descriptions, Engineering

School of Engineering.

*Students who are not registered in the B.Sc.(Eng.) degree program may take no more than 3.00 Engineering (ENGG*XXXX) credits.*

ENGG*1100 Engineering and Design I F(2–4) [0.75]

Introduction to engineering and design by means of selected problems. Students integrate basic science, mathematics, and complementary studies to develop and communicate engineering solutions to specific needs using graphical, oral, and written means. Application of computer–aided drafting, spreadsheets, and other tools to simple engineering design problems. The practice of professional engineering and the role of ethics in engineering.

ENGG*1210 Engineering Mechanics I W(3–1) [0.50]

Fundamental principles of Newtonian mechanics; statics of particles in 2–D space; equilibrium of rigid bodies in 2–D; distributed forces; friction, linear and angular momentum of rigid bodies; conservation of energy; principles of impulse and momentum; and, plane motion of rigid bodies.

Prerequisite(s): OAC Algebra and Geometry

ENGG*1500 Engineering Analysis W(3–1) [0.50]

Engineering applications of Matrix algebra, vector spaces and computer techniques to solve linear systems. Linear transformations, eigenvalues and eigenvectors, diagonalization and their applications in engineering problems. Complex variable algebra, multi–variables functions, partial derivatives, and maxima and minima.

Co–requisite(s): ENGG*1210, MATH*1210

ENGG*2100 Engineering and Design II F(2–4) [0.75]

Progression in engineering design skills with particular emphasis on computer usage in design, oral communication of solutions and team skills. Computer usage in design will include advanced CAD/CAM/CAE tools, structured programming and database management software. An introduction to safety in engineering practice and design. An introduction to the concept of sustainable development.

Prerequisite(s): ENGG*1100

ENGG*2120 Material Science F(3–2) [0.50]

Study of the mechanical, electrical, magnetic, optical and thermal properties of solids. Atomic order and disorder in solids, single–phase metals, and multiphase materials (their equilibria and micro–structure) are examined as a basis for understanding the causes of material properties. Interwoven throughout the course is an introduction to materials selection and design considerations.

Prerequisite(s): CHEM*1040, PHYS*1130

ENGG*2160 Engineering Mechanics II F(3–1) [0.50]

Fundamental principles of the mechanics of deformable materials; stress and strain; Mohr's circle for transformation of stress and strain; deflection under load; design of beams; shafts; columns and pressure vessels; failure theory and design.

Prerequisite(s): ENGG*1210, ENGG*1500, 0.50 credit in calculus

ENGG*2230 Fluid Mechanics W(3–2) [0.50]

Analysis of steady ideal and viscous fluid flow systems using the Continuity, Bernoulli and Momentum equations. Boundary layer theory is treated in terms of viscous and pressure drag, lift and its importance in heat and mass transfer. Dimensional analysis and dynamic similitude are studied to provide an understanding of flow systems analysis and modeling. Introduction to pipe flow and open channel flow.

Prerequisite(s): ENGG*1210, MATH*1210

ENGG*2400 Engineering Systems Analysis F(3–1) [0.50]

Analytical description and modeling of engineering systems such as mechanical, electrical, thermal, hydraulic biological and environmental systems. Applications of multivariable calculus, linear algebra and differential equations to stimulate and analyse such systems.

Prerequisite(s): ENGG*1210, ENGG*1500, MATH*1210

Co–requisite(s): MATH*2270

ENGG*2410 Digital Systems Design Using Descriptive Languages F(3–2) [0.50]

Review of Boolean algebra, truth tables, Karnaugh maps. Design, synthesis and realization of combinational circuits. Design, synthesis and realization of sequential circuits. VHDL: structural modeling, data flow modeling, synchronous & asynchronous behavior descriptions, algorithmic modeling. Designing with PLDs. Digital design with SM charts. Designing with PGAs and complex programmable logical devices. Hardware testing and design for testability. Hierarchy in large designs. The course will primarily be concerned with the design of multi–input, multi–output digital controllers which provide the central control signals that orchestrate the collection of hardware devices (from SSI to VLSI) found in a digital system. An introduction to FPGA–based, as well as microprocessor–based digital systems design will be given. Design examples will include systems such as UART, microcontroller CPU, ALU and data acquisition system.

Prerequisite(s): CIS*1650, CIS*1900, PHYS*1130

ENGG*2450 Network Theory W(3–1) [0.50]

Electrical quantities; electrical circuit elements and their characteristics; exponentials, sinusoids and phasors applied to electrical circuits; s–plane representation and pole–zero concepts; steady–state a.c. circuits; general network analysis; magnetic quantities and circuits; demonstration of principles as applied in several engineering fields.

Prerequisite(s): ENGG*2400, MATH*2270, PHYS*1130

ENGG*2550 Water Management W(3–0) [0.50]
The influence of fundamental engineering and hydrologic principles on the choices available for management of water on a watershed basis is demonstrated for representative techniques used in management for water supply, irrigation, flood control, drainage and water pollution control. Selected problems are studies to reveal the technical, environmental, legal, jurisdiction, political, economic and social aspects of water management decisions.
Prerequisite(s): (CHEM*1040 or CHEM*1310), GEOG*2000

ENGG*2560 Environmental Engineering Systems W(3–2) [0.50]
Analysis techniques for natural and engineered systems including chemical, physical and biological processes. Mass balance analysis for steady state and unsteady state situations. Analysis under both equilibrium and non–equilibrium conditions. Reactor types including batch, plug–flow, CSTR. Noise pollution, control and prevention.
Prerequisite(s): CHEM*1050, MATH*2270

ENGG*2660 Biological Engineering Systems I W(3–1) [0.50]
Mathematical description and identification of biological systems; through mass and energy balances; reactions in biological systems; biomedical, food, and bio–processing applications.
Prerequisite(s): ENGG*2400, MATH*2270, MICR*1020
Co–requisite(s): CHEM*2580, STAT*2120

ENGG*3100 Engineering and Design III W(3–2) [0.75]
This course combines the knowledge gained in the advanced engineering and basic science courses with the design skills taught in ENGG*1100 and ENGG*2100 in solving open–ended problems. These problems are related to the student's major. Additional design tools are presented, including model simulation, sensitivity analysis, linear programming, knowledge–based systems and computer programming. Complementing these tools are discussions on writing and public speaking techniques, codes, safety issues, environmental assessment and professional management. These topics are taught with the consideration of available resources and cost.
Prerequisite(s): registration in the B.SC.(Eng.) program, ENGG*2100, ENGG*2230, ENGG*2400, ENGG*3260 and, for the specific majors: BIOE, (ENGG*2150 or ENGG*2160), ENGG*2660; ESC, ENGG*3390; ENVE, (ENGG*3180 or ENGG*3360), ENGG*3590, ENGG*3650; WRE, ENGG*3590, ENGG*3650

ENGG*3150 Engineering Biomechanics W(3–2) [0.50]
Basic concepts of biological material structure, properties, adaptation and remodeling; viscoelasticity in biological materials and techniques for modeling viscoelastic material behaviour; 2–dimensional and 3–dimensional joint kinematic analysis techniques; muscle mechanics and optimization techniques; current techniques in laboratory instrumentation and biomedical applications.
Prerequisite(s): ENGG*2150 or ENGG*2160

ENGG*3160 Biological Engineering Systems II F(3–2) [0.50]
Mass transfer in biological systems: concepts; gas–liquid mass transfer; membrane transport processes; and heterogeneous reactions. Applications may include fermenter aeration, tissue perfusion, mass transfer limitations in biofilms, microbial flocs and solid tumours, protein recovery and drug delivery.
Prerequisite(s): ENGG*2230, ENGG*2660

ENGG*3170 Biomaterials F(3–2) [0.50]
Physical properties of natural and synthetic (e.g. stainless steel, polymers) materials used in biological engineering applications. Topics will include microstructure and mechanical properties of typical biomaterials, quantification of advanced material properties and behaviours, fabrication, compatibility, biodegradation and mechanical failure. Typical applications will include processing of biomaterials as well as equipment and implant design.
Prerequisite(s): ENGG*2120

ENGG*3180 Air Quality F(3–2) [0.50]
The study of the transport, transformation and deposition processes associated with air pollutants. The chemical and biological nature, impacts, and sources of air pollutants. The physical aspects of the atmospheric boundary layer. The mathematical treatment of diffusion in a homogeneous field in a boundary layer. Regulatory approaches worldwide and their use of air quality modeling. The use of models for the design of stacks and monitoring networks.
Prerequisite(s): ENGG*2230, ENGG*2560
Co–requisite(s): ENGG*3260
Restriction(s): ENGG*3360

ENGG*3240 Engineering Economics F(3–0) [0.50]
Principles of project evaluation; analysis of capital and operating costs of engineering alternatives, benefit–cost ratio; break–even studies, evaluations recognizing risk, replacement and retirement of assets; tax considerations, influence of sources of funds.
Prerequisite(s): MATH*1210

ENGG*3260 Thermodynamics F(3–2) [0.50]
Macroscopic thermodynamics and its applications to engineering analysis and design. First and second laws and applications to closed and flow systems, both with and without reaction; properties of pure substances and solutions; introduction to phase and reaction equilibrium. Applications include gas–vapour systems (psychrometrics and beyond), power and refrigeration cycles, raoult and henry law solution behavious, flame temperature calculations, semiconductor device fabrication.
Prerequisite(s): ENGG*2230, CHEM*1040, MATH*2270

ENGG*3340 Geographic Information Systems in Environmental Engineering F(3–0) [0.50]
Geographical information system structure and functions. Data structuring and application program development. Data input, display and analysis. Applications in environmental engineering and natural resource development/management. Students will be able to use a GIS software package to build geographical information systems.
Prerequisite(s): (CIS*1500 or CIS*1600), (1 of MATH*1000, MATH*1080, MATH*1200)

ENGG*3380 Embedded Architecture Design F(3–2) [0.50]
In this course, students will design, build and program a CPU for use in embedded architecture applications. Topics include – CPU design: instruction set design, addressing modes, operands; data flow design: internal bus structure, data flow signals, registers, control sequence design: hardwired control, decoding, microprogramming; architecture classes: CISC, RISC, DSP; I/O interfacing: ports, memory–mapping, DMA; real–time design: interrupts, timing, performance.
Prerequisite(s): ENGG*2410

ENGG*3390 Signal Processing F(3–2) [0.50]
This course will establish the fundamental analysis and design techniques for signal processing systems. Topics covered include: definition and properties of linear time–invariant systems; impulse response and convolution; continuous–time Laplace transform, Fourier series, Fourier transform; discrete–time Fourier transform, discrete–time Fourier series, fast Fourier transform, Z transform; complex frequency response; filter analysis and design for both continuous and discrete time systems. Students will be able to design continuous–time filters and both design and implement discrete–time digital filters using computer–based tools.
Prerequisite(s): ENGG*3410

ENGG*3400 Introduction to Mechatronic Systems Design W(3–2) [0.50]
This course covers the design of mechatronic systems, which are synergistic, combinations of components and controls drawn from mechanical engineering, electronics, control engineering, and computer science. The course emphasizes the integration of these areas through the design process employing the two skills of (1) modeling, analysis, control design, and computer simulation of dynamic systems, and (2) experimental validation of models, analysis and the understanding of the key issues of hardware implementation. The two skills are developed though assignments emphasizing analytical analysis with complementary laboratory exercises. The material covered includes mechatronic system design; a review of kinematics, electronics, modeling, simulation, signals and control; control architectures; sensors including vision; and actuators.
Prerequisite(s): ENGG*3410, ENGG*3450

ENGG*3410 Systems and Control Theory W(3–2) [0.50]
Modeling, performance analysis and control with potential application to engineering, physical and biological systems. Topics include modeling in time, Laplace and frequency domains. Performance and stability by methods of Hurwitz, Routh, Bode, and Nyquist. Control by ON/OFF and PID Controllers.
Prerequisite(s): ENGG*2400, MATH*2270
Co–requisite(s): ENGG*2450

ENGG*3430 Heat and Mass Transfer W(3–1) [0.50]
Analysis of steady and transient thermal systems involving heat transfer by conduction, convection and radiation and of mass transfer by molecular diffusion and convection. Other topics include the thermal analysis of heat exchangers and heat transfer systems involving a change of state.
Prerequisite(s): ENGG*2230, ENGG*3260, MATH*2270

ENGG*3450 Electrical Devices F(3–2) [0.50]
Magnetic circuits; principles of transformation; linear transformer models; principles of electromechanical conversion; steady–state performance of rotating machines; conduction in metals and semi–conductors; principles of modern electronic devices; operational amplifiers; linear models of electronic devices.
Prerequisite(s): ENGG*2450

ENGG*3470 Mass Transfer Operations W(3–2) [0.50]
Application of mass transfer principles in the natural and engineered systems. Mass transport in the multi–media fate of contaminants in and between air, water and land. Design and analysis of separation processes for emission and pollutant prevention.
Prerequisite(s): ENGG*2230, ENGG*3260, MATH*2270
Co–requisite(s): ENGG*3430

ENGG*3490 Introduction to Mechatronic Systems Design W(3–2) [0.75]
This course covers the design of mechatronic systems, which are synergistic, combinations of components and controls drawn from mechanical engineering, electronics, control engineering, and computer science. The course emphasizes the integration of these areas through the design process employing the two skills of (1) modeling, analysis, control design, and computer simulation of dynamic systems, and (2) experimental validation of models, analysis and the understanding of the key issues of hardware implementation. The two skills are developed though assignments emphasizing analytical analysis with complementary laboratory exercises. The material covered includes mechatronic system design; a review of kinematics, electronics, modeling, simulation, signals and control; control architectures; sensors including vision; and actuators.
Prerequisite(s): ENGG*3410, ENGG*3450
Restriction(s): ENGG*3400

ENGG*3590 Water Quality F(3–3) [0.50]
This course builds on the student's experience in chemistry, biology, physics and fluid mechanics, and provides an engineering perspective on: (i) standard methods of water quality analysis for physical, chemical and biological characteristics of water; (ii) significance and interpretation of analytical results, (iii) modeling of water quality in natural systems and (iv) introduction to engineered water and wastewater treatment systems.
Prerequisite(s): ENGG*2230, ENGG*2560, (BIOL*1040 or MICR*1020), STAT*2120

ENGG*3640 Microcomputer Interfacing F(3–2) [0.50]
Interfacing microcomputers to external equipment. Topics include peripheral devices, hardware interfaces, device driver software and real time programming. Advanced programming: debugging of embedded systems, data structures and subroutine calls, high–level system programming. Interrupts and resets, real time events, signal generation and timing measurements. Synchronous and asynchronous serial communication. Parallel I/O ports and synchronization techniques. I/O interfacing, microcomputer busses, memory interfacing and direct memory access (DMA). Data acquisition topics include signal conditioning analog to digital conversion and digital signal processing.
Prerequisite(s): ENGG*2410
Co–requisite(s): ENGG*3390
Restriction(s): ENGG*4640

ENGG*3650 Hydrology F(3–1) [0.50]
Quantitative study of natural water circulation systems with emphasis on basic physical principles and interrelationships among major processes; characteristics of mass and energy; inputs to and output from watersheds; factors governing precipitation occurrence, evaporation rates, soil–water storage changes, groundwater recharge and discharge, run–off generation; methods of streamflow analysis; mathematical modeling.
Prerequisite(s): (ENGG*2230 or MET*2030), (MATH*1210 or MATH*2080), (STAT*2120 or STAT*2040), and competency in computing

ENGG*3670 Soil Mechanics F(3–2) [0.50]
Relations of soil physical and chemical properties to strength; soil water systems and interactive forces. Visco–elastic property and pressure–volume relationships of soil systems. Stress–strain characteristics of soil under dynamic loads. Application of engineering problems. Laboratory and field investigation methods.
Prerequisite(s): ENGG*2120, ENGG*2230

ENGG*3830 Bio–Process Engineering F(3–1) [0.50]
Application of engineering principles to the processing of biological products in the biological and food industry. Analysis and design of unit processes such as sedimentation, centrifugation, filtration, milling and mixing involving rheology and non–Newtonian fluid dynamics of biological materials. Analysis of heat and mass balances for drying evaporation, distillation and extraction.
Prerequisite(s): ENGG*2230, ENGG*2660
Co–requisite(s): ENGG*3260

ENGG*4110 Biological Engineering Design IV F,W(2–6) [1.00]
Capstone design project in the Biological Engineering program. Teams of 3–4 students apply engineering analysis and design principles to a problem in a biological system or process. A completely specified solution at the level of preliminary or final design is required, including assessment of socio–economic and environmental impact. Teams produce reports and a poster presentation to a professional standard. Ethics and law case studies relevant to professional engineering practice are discussed.
Prerequisite(s): all 1000 and 2000 level core credits, ENGG*3100, instructor consent
Restriction(s): registration in semester 8 of the B.SC.(Eng.) program

ENGG*4120 Engineering Systems and Computing Design IV F,W(2–6) [1.00]
Capstone design project in the Engineering Systems and Computing program. Teams of 3–4 students apply engineering analysis and design principles to a problem involving control system, computer hardware or computer software technology. A completely specified solution at the level of preliminary or final design is required, including assessment of socio–economic and environmental impact. Teams produce reports and a poster presentation to professional standard. Ethics and law case studies relevant to professional engineering practice are discussed.
Prerequisite(s): all 1000 and 2000 level core credits, ENGG*3100, instructor consent
Restriction(s): registration in semester 8 of the B.SC.(Eng.) program

ENGG*4130 Environmental Engineering Design IV F,W(2–6) [1.00]
Capstone design project in the Environmental Engineering program. Teams of 3–4 students apply engineering analysis and design principles to a problem involving control system, computer hardware or computer software technology. A completely specified solution at the level of preliminary or final design is required, including assessment of socio–economic and environmental impact. Teams produce reports and a poster presentation to professional standard. Ethics and law case studies relevant to professional engineering practice are discussed.
Prerequisite(s): all 1000 and 2000 level core credits, ENGG*3100, instructor consent
Restriction(s): registration in semester 8 of the B.SC.(Eng.) program

ENGG*4150 Water Resources Engineering Design IV F,W(2–6) [1.00]
Capstone design project in the Water Resources Engineering program. Teams of 3–4 students apply engineering analysis and design principles to a problem involving control system, computer hardware or computer software technology. A completely specified solu-

tion at the level of preliminary or final design is required, including assessment of socio–economic and environmental impact. Teams produce reports and a poster presentation to professional standard. Ethics and law case studies relevant to professional engineering practice are discussed.
Prerequisite(s): all 1000 and 2000 level core credits, ENGG*3100, instructor consent
Restriction(s): registration in semester 8 of the B.SC.(Eng.) program

ENGG*4250 Watershed Systems Design F(3–2) [0.75]
Hydrological analysis of watershed systems including stream flow for design of structures and channels, flood warning, flood plain mapping, low–flow characteristics. Hydraulic analysis applied to design of dams, reservoirs, control structures, energy dissipation structures, bridges and culverts. Analysis of steady flow profiles, flood waves, and sediment transport, for design of natural and constructed channels, and protective works for rivers to achieve environmentally sustainable land use in watershed systems.
Prerequisite(s): ENGG*2230, ENGG*3650

ENGG*4260 Water and Wastewater Treatment Design W(3–2) [0.75]
Application of design principles for a variety of water purification systems, including drinking water, municipal wastewater, industrial wastewater and agricultural wastewater. This involves the design of physical, chemical and biological unit operations, and evaluating the optimum combination to satisfy the given design constraints and criteria. The optimum designs integrate engineering science, basic science, economics, and occupational health and safety for the workers and the public.
Prerequisite(s): ENGG*3100, ENGG*3590

ENGG*4280 Digital Process Control Design W(3–2) [0.75]
Design, analysis synthesis and simulation of process control and automation systems. Automation hardware, process compensation techniques and P.I.D. controllers, design and dynamics of final control elements, computer control and the microprocessor.
Prerequisite(s): ENGG*3410

ENGG*4300 Food Processing Engineering Design F(3–2) [0.75]
Formulation of mathematical models to describe food processing operations and the response of foods to such operations. Process evaluation, development and computer–aided design of operations such as thermal processes and food freezing. The influence of water activity and structure on the enzymatic, cellular, organic and structural systems of foods. The properties of powders and particulate foods and mechanical operations with solid foods.
Prerequisite(s): ENGG*3260, FOOD*2150

ENGG*4330 Air Pollution Control F(3–2) [0.75]
Analysis and design of atmospheric pollution control techniques. Techniques considered include both in–process solutions as well as conventional end–of–pipe treatments. Pollutants covered include gaseous, particulate, metals and trace organics.
Prerequisite(s): ENGG*3180, ENGG*3260

ENGG*4340 Solid and Hazardous Waste Management F(3–2) [0.50]
Solid waste generation rates and waste composition. Integrated waste management: collection, recovery, reuse, recycling, energy–from–waste, and landfilling. Biological treatment of the organic waste fraction – direct land application, composting, anaerobic digestion. Environmental impact of waste management and sustainable development. Cross media issues related to solid waste disposal. An introduction to hazardous waste management and treatment methods.
Prerequisite(s): ENGG*2560 or ENGG*2660

ENGG*4360 Soil–Water Conservation Systems Design F(3–2) [0.75]
Properties of soils and land use governing the occurrence and magnitude of overland flow, soil erosion, infiltration, percolation of soil water, and variations in soil water storage. Design of soil and water management systems and structures to control soil erosion and protect water quality for environmentally and economically sustainable land use planning. Design of surface and subsurface drainage system for rural land. Design of sprinkler and trickle irrigation systems.
Prerequisite(s): ENGG*2230, ENGG*3650, ENGG*3670

ENGG*4370 Urban Water Systems Design F(3–2) [0.75]
Estimation of water quantity and quality needed for urban water supply and drainage. Design of water supply, pumping systems, pipe networks and distributed storage reservoirs from analysis of steady and transient, pressurized and free surface flow. Rates of generation of flows and pollutants to sanitary and storm sewers, design of buried pipe and open channel drainage systems with structures for flow and pollution control. Modeling of water systems for sustainable urban development.
Prerequisite(s): ENGG*2230, ENGG*3650

ENGG*4380 Bioreactor Design F(3–2) [0.75]
Modeling and design of batch and continuous bioreactors based on biological growth kinetics and mass balances. Gas–liquid mass transfer for aeration and agitation instrumentation and control.
Prerequisite(s): ENGG*3160

ENGG*4390 Bio–instrumentation Design F(3–2) [0.75]
Theory and selection criteria of devices used in measurements in biological systems; design of complete measurement systems including transducers, signal conditioning and recording components; error analysis. Differences between measurements in biological and physical systems.
Prerequisite(s): ENGG*3450

ENGG*4400 Biomechanical Engineering Design F(3–2) [0.75]
Concept development, design, modeling, manufacture and testing of medical implants and tools. This course will investigate the biomechanical factors influencing design, regulatory issues, current development trends, and the possible future of medical implant technology.
Prerequisite(s): ENGG*2120, ENGG*3170

ENGG*4420 Real–time Systems Design F(3–3) [0.75]
Hard versus soft real–time systems. Real–time issues in computer architecture. Clocks and timing issues. Correctness and predictability. Structuring and describing real–time software. Clock Synchronization. Real–time objects and atomicity. Validation of timing constraints. Formal Real–time systems design and analysis techniques: process–based, event–based, and Petri Nets. Resource management and control. Real–time scheduling and task allocation (Uni–processor and Multi–processor). Design for dependability, reliability and fault tolerance. Real–time programming using ADA. Survey of Real–time operating systems. Scenarios of real–time systems.
Prerequisite(s): CIS*3110

ENGG*4430 Neuro–Fuzzy and Soft Computing Systems W(3–0) [0.50]
Introduction to Fuzzy systems; Fuzzy Sets; Fuzzy Rules and Fuzzy Reasoning; Fuzzy Inference Systems; Fuzzy Control; Introduction to Neural and Automata Networks; Neural Network Paradigms; Supervised Learning Neural Networks, Learning from Reinforcement, Unsupervised Learning and Other Neural Networks; Neurocontrol; System Identification; Controller Training, Robust Neurocontrol; Adaptive Neuro–Fuzzy Inference Systems, Coactive Neuro–Fuzzy Modeling; Reinforcement Learning Control, Gradient–Free Optimization, Feedback Linearization and Sliding Control; Applications: Quality Assurance, Decision Aid Systems, Automatic Character Recognition, Inverse Kinematics Problems, Automobile MPG (Miles Per Gallon) Prediction, System Identification, Channel Equalization, Adaptive Noise Cancellation, Process Control.
Prerequisite(s): ENGG*3410
Co–requisite(s): ENGG*4280

ENGG*4450 Large–Scale Software Architecture Engineering F(3–2) [0.50]
This course introduces the students to the analysis, synthesis and design of large–scale software systems at the architectural level. This is in contrast to the algorithmic and data structure viewpoint of most software systems. Large–scale software systems are complex, execute on many processors, under different operating systems, use a particular or many language(s) of implementation, and typically rely on system layers, network connectivity, messaging and data management and hardware interfacing. The material covered includes architectural styles, case studies, architectural design techniques, formal models, specifications and architectural design tools. The laboratory sessions will expose the students to analyzing and redesigning an existing large–scale software system.
Prerequisite(s): CIS*2420, ENGG*2100

ENGG*4460 Robotic Systems F(3–3) [0.50]
This course covers robot technology fundamentals, mathematical representation of kinematics, planning and execution of robot trajectories, introduction to robot languages, programming of robotic systems, different application domains for robots (e.g. assembly, manufacturing, medical, services, etc.), and robot sensors. The goal of this course is to provide students with a comprehensive background, approaches and skills to apply robotics technology to real world engineering applications and problems. (First offering Fall 2005.)
Prerequisite(s): ENGG*1500, ENGG*3410

ENGG*4660 Medical Image Processing W(3–2) [0.50]
This course covers the fundamentals of medical imaging from both the processing of digital images and the physics of image formation. Image processing topics covered include: fundamentals of resolution and quantization; linear systems as applied to multi–dimensional continuous and discrete systems including the relationship between the point spread functions and modulation transfer function; point operations such as contrast enhancement, histogram equalization, and H and D curves, geometric operations for distortion correction, including interpolation methods; linear filtering in both the spatial and spatial–frequency domains; and image restoration and inverse filtering. The physics of the following imaging modalities with emphasis on the parameters which effect image quality will be covered: x–ray radiology, MRI, ultrasound, and nuclear medicine. (First offering Winter 2006.)
Prerequisite(s): ENGG*3390

XII—Course Descriptions, English

School of Literatures and Performance Studies in English.

1. ENGL*1060 or ENGL*1200 is prerequisite to all other courses in English, with the exception of ENGL*2840, ENGL*2860 and ENGL*2880.
2. ENGL*2060 is prerequisite to ENGL*2120, ENGL*2130, ENGL*3940, ENGL*3960. Students in Semester 3 or above may take ENGL*2060 concurrently with ENGL*2120 or ENGL*2130 with permission from the instructor.
3. ENGL*1060 and ENGL*2060 provide a strong foundation for English studies at the University level, particularly for students intending to major or minor in English. These linked courses expose students not only to a broad range of texts from different countries and historical periods but also to some of the exciting developments in the discipline.
4. Honours major students are required to take the seminar courses ENGL*2120, ENGL*2130, ENGL*3940, ENGL*3960, preferably in their 3rd, 4th, 5th and 6th semesters.
5. Honours major students are required to take **two** 4000–level seminars, preferably in their 7th and 8th semesters. The prerequisites for the 4000–level seminars are ENGL*2060 plus **one** of ENGL*2120, ENGL*2130 plus **one** of ENGL*3940, ENGL*3960.
6. Honours minor students are required to take the seminar course ENGL*2120 and **one** of ENGL*2130, ENGL*3940, ENGL*3960, preferably in their 3rd to 6th semester.
7. Many English lecture courses are offered on alternate years only and many English seminars have variable content. For more information, students should consult the School's home page at http://www.uoguelph.ca/englit/english.html.
8. Many English lecture courses are reading–intensive while seminar courses are writing and presentation–intensive. Honours major students are advised to take **two** lectures and **one** seminar per semester beginning in their 3rd semester.
9. WRITING– AND PRESENTATION–INTENSIVE: Seminars emphasize written and oral work to help students develop the critical reading and writing skills essential to their learning throughout the curriculum.
10. READING–INTENSIVE: Lectures emphasize breadth of reading, contexts, and comparisons, to help students develop the knowledge base essential to their understanding of the field. In order to allow essay–writing to be concentrated in seminars, assignments in lecture courses will not predominantly take the traditional essay form but a range of other formats.

ENGL*1060 Literatures in English I: Reading the Past F(2–2) [0.75]

This course introduces a range of historical and national writings in prose, poetry, and drama. Lectures address, chronologically, works by selected authors from the middle ages to the mid–twentieth century, the periods in which these works were produced, and some of the ways in which they have been read. Workshops focus on the development of writing and analytical skills. Reading– and writing–intensive course.

Restriction(s): ENGL*1410

ENGL*1200 Reading the Contemporary World F,W(2–1) [0.50]

An introduction to the reading of literary texts and persuasive forms of writing, bringing to the foreground the links between language and contemporary social and political issues. Course material will represent a range of national origins and issues involving gender, race, and class, and will illustrate the importance of figurative language, form and genre, and narrative point of view in learning to read critically. The course will also emphasize writing skills (grammar, organization of ideas, forms of written expression) through workshops and several short written assignments. Students planning to major in English must take ENGL*1060 but may also take ENGL*1200.

ENGL*1410 Major English Writers U(3–0) [0.50]

This course offers an introduction to the study of literature through a chronological consideration of works by selected major authors from the Middle Ages to the 20th century, in relation to their social, intellectual and literary backgrounds. Instruction and practice in effective essay writing will be included. (Offered through distance education format only.)

Restriction(s): ENGL*1060, ENGL*2060

ENGL*2060 Literatures in English II: Finding a Critical Voice W(1–2) [0.75]

This course revisits the historical, national, and genre sweep of ENGL*1060 by conducting a range of specific, more in–depth studies of particular works (including some of the texts examined in ENGL*1060) in their historical moments. Seminars help students to develop a range of critical approaches through oral presentations and essay–writing.

Prerequisite(s): ENGL*1060

Restriction(s): ENGL*1410

ENGL*2120 Seminar: Critical Practices F,W(3–0) [0.50]

This course guides students through a range of critical approaches and explores their implications for readings of a limited number of literary texts. The seminar's main areas of concentration are: (1) close reading, centering on the way a particular poem, work of fiction, or play works in its details and overall structure; (2) critical approaches and methodologies; (3) critical writing and discussion. (Choices of approaches and texts will be determined by individual instructors.) Students in semester 3 or above may take ENGL*2060 and ENGL*2120/ENGL*2130 concurrently with permission of the instructor. Writing– and presentation–intensive course.

Prerequisite(s): ENGL*2060

Restriction(s): ENGL*2111/2

ENGL*2130 Seminar: Literature and Social Change F,W(3–0) [0.50]

This course explores the social and cultural work that literary texts perform. Seminars will illuminate such categories as gender, sexuality, nation, race, ethnicity, and class; particular ways in which they are written into a limited number of literary works; and some of

the critical debates surrounding our interpretations of those processes. (Choice of focus and texts to be determined by individual instructors.) Students in semester 3 or above may take ENGL*2060 and ENGL*2120/ENGL*2130 concurrently with permission of the instructor. Writing– and presentation–intensive course.
Prerequisite(s): ENGL*2060
Restriction(s): ENGL*2111/2

ENGL*2200 Postcolonial Literatures F(3–0) [0.50]
This course introduces significant issues, perspectives, and voices within the study of the postcolonial literatures in English. The course may include literature from Africa, Australia, Canada, the Caribbean, India and the Pacific. Reading–intensive course.
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*2550 North American Native Literatures W(3–0) [0.50]
This course explores selected issues, perspectives, and voices within the study of Native literatures and their contexts in North America. One purpose of the course is to raise questions about the meaning of the U.S. – Canadian border for Native writers. Reading–intensive course.
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*2640 Culture, Location, Identity: Minoritized Literatures in Canada and Beyond F(3–0) [0.50]
This course will open up debates around emergent issues, perspectives, and voices in the literatures of minoritized cultures particularly within the North American context. Questions about the meanings of various borders for understanding Canadian negotiations of identity, culture, and location will remain a consistent feature of this variable content course. Reading–intensive course.
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*2740 Children's Literature F,W(3–0) [0.50]
An exploration of the varieties of literature written for children and of the literary and psychological values contained therein. Third semester standing is required for admission.
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*2840 Literature and Aging W(3–0) [0.50]
This course examines the ways in which literary texts represent old age and aging. Students will be alerted to the depth and complexity of insight which imaginative writers bring to the concerns of gerontology. (Offered in odd–numbered years.)

ENGL*2860 Science Fiction F(3–0) [0.50]
A survey of science fiction dealing with the origins of the form and examining the varying modes and topics. Some effort will be made to evaluate the directions in which science fiction is developing and to consider its merit as literature. (Offered in odd–numbered years.)

ENGL*2880 Women in Literature W(3–0) [0.50]
The course will involve the study and discussion of poems, stories, novels and plays by or about women.

ENGL*2920 Creative Writing: Fiction U(3–0) [0.50]
An introduction to creative writing through practical experiment, discussion, and the technical examination of models. Since admission to the course depends on the approval of the instructor, students must submit examples of their work to the instructor prior to registration. This course will be offered annually in either Fall or Winter. Check with the School.
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*2940 Creative Writing: Poetry U(3–0) [0.50]
As for ENGL*2920. (Note especially that students must submit examples of their work to the instructor prior to registration.) This course will be offered annually in either Fall or Winter. Check with the School.

ENGL*3020 Shakespearean Contexts F(3–0) [0.50]
A study of a selection of Shakespeare's plays and poems in conjunction with a wide range of other texts. These may include, at the instructor's choice, 'source' narratives, subsequent adaptations, and plays and poems by predecessors or contemporaries, as well as other writings that shed light upon discursive contexts, performance practices, authorial and playhouse revision, issues of gender and subjectivity, and the reception of these plays by early modern audiences and readers. Reading–intensive course. (Offered in even–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3120 Shakespearean Receptions F(3–0) [0.50]
The course will examine a selection of Shakespeare's plays and poems in the light of contemporary reassessments of his place in the canon. For purposes of comparison, plays by contemporaries of Shakespeare may also be studied along with adaptations of Shakespeare chosen from a number of different historical contexts. Close readings of these texts will be organized around such topics as Shakespearean adaptations, constructions of gender and subjectivity, Shakespeare and canon–formation, Shakespeare and critical theory, the politics of Shakespearean interpretation, Shakespeare in contemporary media culture, and changing performance practices. Reading–intensive course. (Offered in odd–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3170 Elizabethan Literary Culture: Chastity and Power W(3–0) [0.50]
This course examines the literary culture associated with Elizabeth I. Issues, including gender and sexuality, power, and religion, will be explored through a wide range of sixteenth– and early–seventeenth century poems (these will be chosen from such writers as Skelton, Wyatt, Surrey, Mary Stuart, the Sidneys, Spenser, Marlowe, Shakespeare, Raleigh, Aemilia Lanyer, Mary Wroth, Elizabeth I, Jonson, Donne, and Herbert). Reading–intensive course. (Offered in odd–numbered years.)

Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3180 Colonial Encounters: Nation and Discovery W(3–0) [0.50]

This course examines writings concerning, or alluding to, English (and other European) encounters with new worlds and different cultures. These will include accounts of travel, conquest, and colonization written or collected by such writers as Bernal Diaz, Luis de Camoës, Columbus, Hakluyt, Raleigh, Harriot, Drake, and Bradford; essays by writers such as Las Casas, Spenser, and Montaigne; and plays, poems, and prose such as Marlowe's Tamburlaine, Shakespeare's The Tempest, Jonson, Chapman, and Marston's Eastward Ho, parts of Spenser's Faerie Queene, Marvell's "Bermudas", and Behn's Oronooko: or the Royal Slave. Key intertexts to these writings will also be studied, along with relevant aspects of postcolonial theory. Reading–intensive course. (Offered in odd–numbered years.)

Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3190 Poetics and Politics in Early Modern England F(3–0) [0.50]

This course examines the intimate connections between poetics and politics in Elizabethan and Jacobean literature. The texts to be studied may include plays and poems, as well as essays, political, historical, and theological writings, and works of prose fiction. Close readings of these texts will focus on such issues as kingship, transgression, rhetoric, and the relation between political subjection and literary subjectivity. The course will establish connections between early modern notions of power and its manipulation, and contemporary critical and political discourses in which similar issues are at stake. A wide range of materials chosen from such authors as More, Ascham, Castiglione, Montaigne, Ariosto, Sidney, Puttenham, James I., Nash, Fennor, Bacon, Lyly, Marston, Greene, and Lodge will be examined by way of close readings. Reading–intensive course. (Offered in odd–numbered years.)

Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3220 Representing Britain: 18th– & 19th– Century Literature F(3–0) [0.50]

This course explores selected topics in the interrelation of literature and politics from the late seventeenth to the nineteenth century in Britain. Areas of focus may include: the literature of civil war, constitutionalism and revolution; satire and society; writings emerging from suffrage reform and agitation, the colonization of Ireland, the construction of political subjectivity, political paranoia, conspiracy and sedition. Reading–intensive course. (Offered in odd–numbered years.)

Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3230 Literary Culture and the English Civil War W(3–0) [0.50]

This course will examine key literary figures and texts in the period leading up to and including the English Civil War (1623–1660). Literary contributions to the political and religious struggles of the period will be studied in the light of a range of different approaches. Primary readings will be selected from among the works of such writers as Milton, Marvell, Charles I, Hobbes, Coppe, Winstanly, Everard, Katherine Philips, Jonson, Webster, Middleton, and Massinger. Reading–intensive course.(Offered in even–numbered years.)

Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3260 Writing Gender & Family: 18th– and 19th– Century Literature W(3–0) [0.50]

This course will explore texts which engage with such matters as the shifting constructions of the family, changing sexual practices, ideals of femininity and masculinity, and the significance of the separation of spheres in eighteenth– and nineteenth–century writing. Focal points may include: the role of desire in narrative; literary representations of gender and economics, of gender and medicine, and of pivotal figures such as the prostitute, the governess, the rake, or the gentleman. Reading–intensive course. (Offered in odd–numbered years.)

Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3280 Early English Literature U(3–0) [0.50]

This course will focus on the language, literature, and culture of Anglo–Saxon England (7th to 11th centuries). In addition to acquiring the rudiments of Old English and engaging in translation exercises with short passages from Anglo–Saxon texts, students will read a selection of texts in modern English translation; these will include Beowulf, the Battle of Maldon, elegies such as the Seafarer, riddling poems and religious poems. In reading these texts, which may be supplemented with intertexts from other northern European cultures, students will be encouraged to reflect on such issues as the processes by which early English culture affiliated itself to Judaeo–Christian and Hellenic traditions. Reading–intensive course. (Offered in alternate years.)

Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3300 Restoration to Romanticism: Forging the Nation F(3–0) [0.50]

Drawing upon a range of literary texts from a variety of genres, this course will explore the politics of language and style in a series of cultural debates that shaped British national character from the late seventeenth to the late eighteenth centuries. Selected topics may include: literary representations of religious establishment and dissent; the division of power; the question of minority cultures; revolution and reaction; the problem of economic stability. Reading–intensive course. (Offered in even–numbered years.)

Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3320 Romanticism to Victorianism: Culture and Conformity F(3–0) [0.50]

This course explores the key texts in various genres of British cultural debates of the late eighteenth to the late nineteenth century. Focal points may include: literary representations of family and society; science and narrative; Britain's "others"; class and conflict; protest and power; the roots of modernism; European influences. Reading–intensive course. (Offered in odd–numbered years.)

Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3340 British Imperial Culture F(3–0) [0.50]
This multi–genre course introduces students to the literature of British imperialism in the eighteenth and nineteenth centuries. The course will consider the changing relationship between nation, empire, and colony by examining literary representations of such topics as: orientalism; travel writing; the construction of race; the representation of trade; the popular literature of empire; children's literature; the question of the other. Reading–intensive course. (Offered in even–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3360 Scottish Formations F(3–0) [0.50]
This variable content course explores selected issues, ideas and periods of this national literature, including influences on immigrant and world literature. Topics may include: mythologizing the Celt; Scottish writers and English critics; sovereignty and nationhood; "new wave" writing; Scottish influences on the Canadian canon; witches, devils, and folk tales. Reading–intensive course. (Offered in even–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3370 Narrative Modes: 18th– and 19th–Century Literature W(3–0) [0.50]
This course offers comparative study of narrative structures, which includes selections from such genres as poetry, fiction, biography, autobiography and specialized discourses. Focal points may include romance; the gothic; the novel of sensibility; the realist novel; sensation fiction; the discourses of medicine and science. Reading intensive course. (Offered in even–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3380 Studies in the History of Literary Production W(3–0) [0.50]
This course will examine a range of issues arising from the materiality of book production and circulation. Topics may include serialization; mass production and circulation; patronage; reviewing; circulating libraries; licensing; censorship; children's literature; periodicals; gift books; letters; and other aspects of publishing and the public sphere. Reading–intensive course. (Offered in odd–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3420 Contemporary Drama W(3–0) [0.50]
British, American and European drama from the Second World War to the present day. (Offered in odd–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3450 Early Twentieth–Century Drama F(3–0) [0.50]
A study of post–realist developments in modern drama including symbolism, expressionism, surrealism, and epic theatre. (Offered in odd–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3460 Literature in London W(2–3) [0.50]
A study of British literature in its social and historical context. Reading of particular works will be supplemented by visits to sites of literary interest, the use of special library and museum collections, and attendance at public lectures and performances. For London Semester students only.
Prerequisite(s): admission to the London Semester

ENGL*3470 Twentieth–Century British Literature I W(3–0) [0.50]
This multigenre course explores aesthetic and socio–cultural movements (including modernism) in British literature from the turn of the century to mid–century. Reading–intensive course. (Offered in odd–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3480 Twentieth–Century British Literature II F(3–0) [0.50]
This multigenre course explores aesthetic and socio–cultural movements (including postmodernism) in British literature from mid–century to the present. Reading–intensive course. (Offered in odd–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3540 Writing the United States: Forging the Nation F(3–0) [0.50]
This multigenre course explores the relationship between literary production and political power from the emergence of American culture in the seventeenth century to the fragmentation of the United States around the time of the Civil War in the mid–nineteenth century. Areas of focus may include national fantasy; the literature of revolution and federation; narratives of slavery, captivity, and native genocide; immigration and travel literature; the literature of reform, abolition, and the cult of domesticity. Reading–intensive course. (Offered in even–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3550 Modern United States Literatures W(3–0) [0.50]
This multigenre course explores powerful examples of twentieth–century United States literatures, from about the First World War to the present. The selection is wide, including both traditional and experimental forms; female and male writers from various ethnic and racial groups; and a range of cultural issues. Reading–intensive course. (Offered in odd–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3560 Emergent Literary Forms W(3–0) [0.50]
This course will introduce students to a range of medieval writing practices including manuscript culture, oral culture, early drama, literatures in translation, early lyric, and so forth. Its focus will be on the transition from oral to written literatures by way of emergent literary forms in English and other languages. The texts to be studied will be chosen from a corpus that includes the following: Monmouth's History of the Kings of Britain, the Lais of Marie de France, Chretien de Troyes, Layamon's Brut, the Mabinogion, Harald's

Saga, the Chanson de Roland, extracts from saints' lives, miracle stories, play cycles, and others. Reading–intensive course. (Offered in even–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3570 Studies in the Age of Chaucer F(3–0) [0.50]
This course will introduce students to significant aspects of Chaucerian literature while also introducing a range of other writings by Chaucer's precursors and near contemporaries chosen from a range of writers that include the following: the Gawain poet, Malory, Wyclif, Lydgate, Langland, Dunbar, Henryson, Margery Kemp, Julian of Norwich, Christine de Pisan, Dante, Petrarch, and Boccaccio. Reading–intensive course. (Offered in even–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3630 Writing Canada: Forging the Nation W(3–0) [0.50]
This multigenre course focuses on Canadian literature to World War One, examining cultural contestation in the Canadian settler colony among the Canadian, U.S., British, and indigenous peoples. Topics may include the rise of nationalist discourse, race and nation, landscape and the sublime, gothic, sentimental, and historical fiction, children's literature, slavery and resistance narratives, travel and captivity narratives. Reading–intensive course. (Offered in odd–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3660 Canadian Poetry W(3–0) [0.50]
This course is an introductory study of Canadian poetry, in a variety of national and international contexts. Reading–intensive course. (Offered in even–number years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3670 Twentieth–Century Canadian Literature and Criticism F(3–0) [0.50]
This multigenre course examines formations of, and resistances to, ideas of national consciousness and cultural identity in Canadian literature and criticism in English from the beginnings of the twentieth century to the 1960s. Reading–intensive course. (Offered in even–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3680 Twentieth–Century Canadian Literature and Criticism F(3–0) [0.50]
This course examines the role of narrative in Canadian literature and criticism in English, since the 1960s, in relation to a variety of social, cultural, and historical contexts. Reading–intensive course. (Offered in odd–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3690 History of Literary Criticism F(3–0) [0.50]
This course introduces students to the major critics and texts formative in the development of an English critical tradition. The study will begin with Plato and Aristotle, and proceed from the Renaissance through to modernist critical theory. (Offered in odd–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3740 United States Imperial Culture F(3–0) [0.50]
This multigenre course will introduce students to a period of intense cultural struggle in the United States, from Civil to First World War (i.e. from the mid–nineteenth to early–twentieth centuries). Topics for consideration may include the literary representation of race, civil war, and empire; machine and mass culture; emergent literatures and changing constituencies of American citizenship. Reading–intensive course. (Offered in odd–numbered years.)
Prerequisite(s): ENGL*1060, ENGL*1200

ENGL*3750 Studies in Postcolonial Literatures W(3–0) [0.50]
Concentrated study in a major sub–area of postcolonial literature. Specific topics will vary each year, but may involve focus on a particular genre or region such as Africa, Australia, Canada, the Caribbean, India, and the Pacific. (Offered in odd–numbered years)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3760 The Atlantic Diaspora: Colonialism, Resistance, Literatures W(3–0) [0.50]
This course examines literatures in English in the Atlantic colonies (selected from among Canada, the Caribbean, the United States, and Latin America) in the context of movements of peoples and cultures from Africa, Europe, and India across the Atlantic Ocean. Discussion will focus on eighteenth– and nineteenth–century texts addressing such issues as cross–cultural contacts with indigenous peoples, the slave trade and abolition movements, and the kinds of culture developing in these evolving societies. Texts will be selected from among the rich array of poetry, fiction, memoirs, letters, travel accounts, period histories and ethnographies, autobiographies and folkloric records that formed the literary culture of this period. Attention may be paid to diverse forms of oral and written expression, linguistic changes, the Creole continuum, the evolution of national and racial stereotypes, and religious syncretism. Reading–intensive course. (Offered in even–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3820 Study in a Major Author W(3–0) [0.50]
This variable–content course provides an intensive study of works by a single writer. (Offered in even–numbered years.)
Prerequisite(s): ENGL*1060 or ENGL*1200

ENGL*3860 Topics in Literary and Cultural Studies U(3–0) [0.50]
These variable–content courses provide opportunities for topics in cross–period studies, inter– and transdisciplinary studies and cultural studies, among others that are not available in regular offerings. Consult the School for specific offerings in a given semester.

ENGL*3870 Topics in Literary and Cultural Studies U(3–0) [0.50]
These variable–content courses provide opportunities for topics in cross–period studies, inter– and transdisciplinary studies and cultural studies, among others that are not available in regular offerings. Consult the School for specific offerings in a given semester.

ENGL*3880 Topics in Literary and Cultural Studies U(3–0) [0.50]
These variable–content courses provide opportunities for topics in cross–period studies, inter– and transdisciplinary studies and cultural studies, among others that are not available in regular offerings. Consult the School for specific offerings in a given semester.

ENGL*3940 Seminar: Form, Genre, and Literary Value F,W(3–0) [0.50]
This seminar focuses on textual conventions such as form, style, and genre as they inform the interaction between reader and text. The impact of these conventions on the processes of literary production, reception, the production of meaning, and the assessment of literary value will be explored in relation to a limited number of literary works. (Choice of focus and texts to be determined by individual instructors.) Writing– and presentation–intensive course.
Prerequisite(s): ENGL*2060

ENGL*3960 Seminar: Literature in History F,W(3–0) [0.50]
This course explores the processes by which specific texts or genres emerge from particular historical moments and by which we attempt to reconstruct those historically specific connections. Seminars will focus on such topics as the archive surrounding one text, problems of period and canon, or genres and historical change. (Choice of period and texts will be determined by individual instructors.)Writing– and presentation–intensive course.
Prerequisite(s): ENGL*2060

ENGL*4040 Seminar: Medieval and Early Modern Literatures U(3–0) [0.50]
This seminar provides the opportunity for intensive study of British literature from the beginnings to 1660.
Prerequisite(s): ENGL*2060, (ENGL*2120 or ENGL*2130), (ENGL*3940 or ENGL*3960)

ENGL*4050 Seminar: 18th– and 19th–Century Literatures U(3–0) [0.50]
This seminar provides the opportunity for intensive study of British literature from 1660 to 1900.
Prerequisite(s): ENGL*2060, (ENGL*2120 or ENGL*2130), (ENGL*3940 or ENGL*3960)

ENGL*4070 Seminar: United States Literatures U(3–0) [0.50]
This seminar provides the opportunity for intensive study of American literature.
Prerequisite(s): ENGL*2060, (ENGL*2120 or ENGL*2130), (ENGL*3940 or ENGL*3960)

ENGL*4080 Canadian Literatures U(3–0) [0.50]
This seminar provides the opportunity for intensive study of Canadian literature.
Prerequisite(s): ENGL*2060, (ENGL*2120 or ENGL*2130), (ENGL*3940 or ENGL*3960)

ENGL*4100 Special Studies in English U(3–0) [0.50]
A seminar designed to provide students in semesters 7 and 8 with an opportunity to pursue studies in an area or areas of language or literature not available in other courses. The course may be taught by a visiting professor or members of the school.
Prerequisite(s): ENGL*2060, (ENGL*2120 or ENGL*2130), (ENGL*3940 or ENGL*3960)

ENGL*4110 Special Studies in English U(3–0) [0.50]
A seminar designed to provide students in semesters 7 and 8 with an opportunity to pursue studies in an area or areas of language or literature not available in other courses. The course may be taught by a visiting professor or members of the school.
Prerequisite(s): ENGL*2060, (ENGL*2120 or ENGL*2130), (ENGL*3940 or ENGL*3960)

ENGL*4200 Postcolonial Literatures U(3–0) [0.50]
This course provides the opportunity for intensive study of a representative selection of literature in English by writers from Africa, India, the Caribbean, Australia, and the Pacific.
Prerequisite(s): ENGL*2060, (ENGL*2120 or ENGL*2130), (ENGL*3940 or ENGL*3960)

ENGL*4210 Modern and Contemporary Literatures U(3–0) [0.50]
This course provides the opportunity for a study of significant works in fiction, poetry, and drama that demonstrate new approaches in form and content characteristic of 20th–century writings in English.
Prerequisite(s): ENGL*2060, (ENGL*2120 or ENGL*2130), (ENGL*3940 or ENGL*3960)

ENGL*4220 Special Topics in Women's Writings U(3–0) [0.50]
This course provides for intensive study of issues relating to the aesthetic strategies, such as those associated with structure, imagery, and language, devised by women writers to reflect women's experience and perceptions.
Prerequisite(s): ENGL*2060, (ENGL*2120 or ENGL*2130), (ENGL*3940 or ENGL*3960)

ENGL*4680 Seminar: 20th–Century Poetry U(3–0) [0.50]
Studies in English–language modern and contemporary poetry.
Prerequisite(s): ENGL*2060, (ENGL*2120 or ENGL*2130), (ENGL*3940 or ENGL*3960)

ENGL*4690 Contemporary Literary Theory W(3–0) [0.50]
The study of the major branches of contemporary literary theory. Topics covered will include structuralism, reader–oriented theory, feminist theory, new historicist and materialist critique, postcolonialist critique, and deconstruction.
Prerequisite(s): ENGL*2060, (ENGL*2120 or ENGL*2130), (ENGL*3940 or ENGL*3960)

ENGL*4720 Creative Writing: Prose/Poetry U(3–0) [0.50]
A development and extension of the creative writing/reading skills and techniques introduced in ENGL*2920 and ENGL*2940. This course will involve the generation and revision of challenging new work, sophisticated critique of the work of other students, and fo-

cused discussion of the cultural, social, and political issues in which the practice of creative writing is enmeshed. Admission to the course is normally dependent on the successful completion of ENGL*2920 or ENGL*2940 and, following the submission of a portfolio of new work, the approval of the instructor.
Prerequisite(s): ENGL*2920 or ENGL*2940

ENGL*4810 Directed Reading S,F,W(3–0) [0.50]
This course is intended particularly as preparation for ENGL*4910. The student will design a course of readings and assignments with the instructor, whose consent must first be obtained. This option is intended only for students who have performed particularly well within the honours program. Exceptional students may take ENGL*4810 in preparation for a ENGL*4910 creative writing project, on the approval of the instructor.
Prerequisite(s): ENGL*2060, (ENGL*2120 or ENGL*2130), (ENGL*3940 or ENGL*3960)

ENGL*4910 Honours English Essay S,F,W(3–0) [0.50]
A major essay (approx. 25 pages) on some subject of special interest to the student is prepared and written under the direction of a faculty member. Consent of the instructor must be obtained and the subject must be approved by the School prior to the semester in which the course is to be taken. This option is intended only for students who have performed particularly well within the honours program. Exceptional students may use ENGL*4910 for creative writing, on the approval of the instructor.
Prerequisite(s): ENGL*2060, (ENGL*2120 or ENGL*2130), (ENGL*3940 or ENGL*3960)

XII—Course Descriptions, Environmental Biology

Department of Environmental Biology.

Additional course listings may be found in the course descriptions for Microbiology, Plant Biology, Toxicology and Zoology.

ENVB*2010 Food Production and the Environment W(3–0) [0.50]

Systems of food production are described and related to their impact on the environment and food safety. Consumer demands and the effects of food processing and packaging will be discussed. Issues of population pressure and sustainable development will be explored. For non–B.SC.(Agr.) students.

Prerequisite(s): 2.50 credits

Restriction(s): AGR*1250

ENVB*2030 Current Issues in Forest Science F(3–0) [0.50]

Basic principles of forestry and forest management with emphasis on Canada's forests. Relationship of important tree species to their preferred environments. Aspects of tree growth, forest ecology and soils and silviculture. Utilization of forests and trees in the global context.

Prerequisite(s): BIOL*1040

ENVB*2040 Biology of Plant Pests W(3–0) [0.50]

An interdisciplinary course on the nature and importance of diseases, weeds, insects and abiotic stresses on plant productivity and quality. A case history approach will be used to illustrate the biology of plant pests, the principles of pest population management, and related topics.

Prerequisite(s): BIOL*1040

ENVB*2100 Problem–Solving in Environmental Biology F,W(2–2) [0.50]

An exploration of ways of approaching problems dealing with environmental concerns. Training will include critical thinking, information retrieval and organization, and project design. Emphasis on oral and written presentations, both individual and group. Students will be introduced to the various disciplines within the department.

Prerequisite(s): registration in the Environmental Biology major

ENVB*2210 Introductory Apiculture F,W(3–0) [0.50]

This course is designed to acquaint the student with the broad field of beekeeping. It will include honey bee biology and behaviour, management for honey production, products of the hive, pests and enemies and the value of bees as pollinators of agricultural crops.

ENVB*3000 Nature Interpretation F(2–3) [0.50]

An exploration of communication and experiential learning theories and their application to natural history interpretation and environmental education program design. Students will develop and present interpretive materials and a program within the context of the existing nature interpretation program at The Arboretum. (Also offered through distance education format.)

Prerequisite(s): (BIOL*1040 or ZOO*1020), (BIOL*2010 or BIOL*3110)

ENVB*3030 Pesticides and the Environment W(3–2) [0.50]

The role and use of pesticides by various facets of society and the effect of these pesticides on biological activities in the environment. A research proposal is required.

Prerequisite(s): BIOL*1040, (CHEM*1040 or CHEM*2300)

ENVB*3040 Natural Chemicals in the Environment F,W(3–0) [0.50]

The role of naturally occurring chemical substances in the inter–relationships of organisms, population dynamics and the structure of ecosystems, and the role of such chemicals in the biological regulation and control of pests. (Also offered through distance education format.)

Prerequisite(s): 0.50 credit in biology

ENVB*3090 Insects in Relation to Wildlife W(3–3) [0.50]

A survey of the more common insects of importance to wildlife and outdoor recreation.

Prerequisite(s): BIOL*1040

ENVB*3210 Plant Pathology F(2–3) [0.50]

The nature of disease in plants and a study of the basic principles of control. A collection of 30 plant disease specimens is required.

Prerequisite(s): BIOL*1040

ENVB*3300 Applied Ecology and Environment F(2–2) [0.50]

Environmental issues require scientific analysis. The applications of ecology, the science of diversity, abundance, and activities of living things and their interactions with the physical and biotic environment, are presented as the basis for sustainable agricultural practices, ecosystem rehabilitation, and conservation. Use of ecological principles in planning and policy are debated in local, regional, national, and global contexts.

Prerequisite(s): 1 of BIOL*2060, CROP*2110, (BIOL*3110, BIOL*3120)

ENVB*4020 Water Quality and Environmental Management F(3–3) [0.50]

This course will introduce the student to issues pertaining to water quality, how to assess environmental impacts, and strategies for the management of water resources. Examples and case studies will draw from agricultural, industrial and municipal sources. Topics include: historical perspectives, methods to assess water quality, restoration and rehabilitation of impacted aquatic habitats, and risk assessment and management of water resources.

Prerequisite(s): BIOL*3450

ENVB*4040 Behaviour of Insects W(3–0) [0.50]
Investigation of the behaviour of insects within an ecological and evolutionary framework. Topics range from basic behavioral principles to the complex behaviour exhibited by the social insects.
Prerequisite(s): 1 of BIOL*3110, ENVB*3090, ZOO*4380, ZOO*4400

ENVB*4070 Biological Control: Plant Diseases W(3–0) [0.50]
Management of plant pathogens and weeds by biological systems that have a minimal impact on the environment. Topics include naturally–occurring biological control such as suppressive soils and induced plant disease resistance; and inundative biological control such as plant disease biocontrol agents, mycoherbicides, transgenic disease resistance, and their mechanisms of action.
Prerequisite(s): 1 of BOT*3200, ENVB*3210, MICR*3220

ENVB*4100 Applied Entomology W(3–3) [0.50]
A study of the life histories and pest management practices employed against insect pests of various plant and animal hosts. Principles of economic entomology are illustrated using specific insect pests as examples.
Prerequisite(s): 1 of ENVB*3090, 0.50 credit in Crop Production at the 3000 level

ENVB*4220 Biology of Aquatic Insects F(2–3) [0.50]
A study of the adult and immature forms of aquatic insects. Students are required to present a collection of at least 200 insects.
Prerequisite(s): ENVB*3090

ENVB*4240 Biological Activity of Pesticides W(3–0) [0.50]
A study of the fate and mode of action of pesticides, e.g., insecticides, herbicides and fungicides.
Prerequisite(s): 0.50 credit in biochemistry

ENVB*4260 Field Entomology F(1–6) [0.50]
An introduction to insect sampling, observation, and experimentation in field situations. Lectures and discussions on the biology of the insect fauna of the field site. Students conduct two projects (individual or small group): (1) a diversity study involving the observation, collection and identification of selected groups of insects and (2) a behaviour/ecology study utilizing experimental techniques to test hypotheses. Student evaluation based on participation in course activities and written reports. Course fees cover the costs of room, board, equipment, and transportation to the field station. Detailed information is available from the Office of the Chair – Department of Environmental Biology. This course must be recorded as part of your Fall course selection and tuition and compulsory fees will be calculated accordingly.
Prerequisite(s): 1.00 or more credits in biological sciences, ENVB*3090

ENVB*4270 Insect Biosystematics W(2–3) [0.50]
A study of the lesser known groups of native insects and an introduction to taxonomic procedure and the principles of insect systematics. Students are required to assemble their own insect collections prior to registering in this course. The laboratory portion of the course will focus on identification of student insect collections.
Prerequisite(s): ENVB*3090

ENVB*4420 Problems in Environmental Biology S,F,W(0–6) [0.50]
Students will select a research problem in an area of special interest. Direction will be given by a faculty member concerned with entomology–apiculture, applied microbiology, weed science and environmental physiology, plant pathology, etc., as represented within the department. For 7th and 8th semester students considering graduate studies.
Prerequisite(s): 1.50 credits at the 3000 level in the agricultural and biological sciences and the permission of the course supervisor

ENVB*4550 Ecotoxicological Risk Characterization W(3–0) [0.50]
A biologically based, advanced course that will give students working knowledge of current processes and techniques for ecotoxicological risk characterization. The course material will cover the topics of problem definition, dose response characterization, exposure characterization, risk assessment, and risk management decision making. (Also listed as TOX*4550.)
Prerequisite(s): ENVB*3030, TOX*2000
Equate(s): TOX*4550

ENVB*4780 Forest Ecology F(2–3) [0.50]
Principles of forest ecology with emphasis on the ecological principles needed for sound forest management. Biotic and abiotic components of forest ecosystems will be discussed in the context of energy flow, nutrient cycling, forest succession and appropriate silvicultural systems.
Prerequisite(s): ENVB*2030, (1 of BOT*2050, BIOL*2060, BIOL*3110)

ENVB*4800 Topics in Applied Biology F(2–2) [0.50]
An integrated overview of those areas of applied biology that are of special interest to environmentalists. The material will be directed toward students majoring in Environmental Biology and Environmental Protection. Lectures and discussions will be presented by faculty and other professionals from research, business, education and technical fields. Students will conduct seminars on selected topics.
Prerequisite(s): 1.50 credits at the 3000 level in the agricultural or biological sciences

XII—Course Descriptions, Environmental Design and Rural Development

School of Landscape Architecture.

No courses have been approved under the subject area of Environmental Design and Rural Development.

XII—Course Descriptions, Environmental Sciences

Faculty of Environmental Sciences.

The program in Environmental Sciences is interdisciplinary, involving courses from several different departments. See the B.Sc.(Env.) program information in Section X—Undergraduate Degree Programs.

ENVS*1010 Introduction to Environmental Sciences F(3–2) [0.50]

The development of environmental science as an integrative, interdisciplinary approach to understanding and resolving environmental problems. An environmental science problem–solving framework is applied to a series of case studies reflecting the diversity of contemporary environmental issues.

Prerequisite(s): registration in the B.Sc. (Env.) program

ENVS*2010 Decision–making and Communication Skills W(1–3) [0.50]

This course will cover basic concepts in creative thinking, research design, and project planning through discussion and application of a problem–solving methodology. A strong emphasis on oral and written presentations is included.

Prerequisite(s): ENVS*1010 and registration in semester 4

ENVS*3100 Internship/Externship in Environmental Sciences S,F,W(0–6) [0.50]

This is a student initiated experiential learning opportunity to be undertaken either on or off campus, and developed in consultation with the Associate Dean's Office (Faculty of Environmental Sciences). Details of the proposed activites will be outlined in a learning contract inititated by the student and agreed by the Associate Dean and an appointed project advisor prior to the commencement of the work experience. The supervisor will also provide a description of the project and/or the work experience. The course is designed to meet the needs of B.Sc. (Env.) students. (This is not available to students in the B.Sc. (Env.) Co–op program.)

Prerequisite(s): 12.50 credits including ENVS*2010

ENVS*3320 Principles of Landscape Ecology F(3–2) [0.50]

An integrated approach to understanding the functioning of landscapes. The emerging theories, concepts and methodologies of landscape science and their application to landscape and environmental management. (Offered in even–numbered years.)

Prerequisite(s): 1 of BIOL*2010, BIOL*2060, BIOL*3110, GEOG*2110

ENVS*3360 Waste Management and Utilization F(3–2) [0.50]

Students will study sources, characteristics, fate, impact and control of liquid, gaseous and solid wastes. This includes cross–media issues in waste management. Introduction to unit operations and processes for handling and treatment of solid waste, hazardous waste, wastewater and waste gas. Applications will include municipal, industrial and agricultural wastes.

Prerequisite(s): CHEM*2300, (MATH*2080 or MET*2030), (BIOL*1040 or MICR*1000)

ENVS*4011 Colloquium/Project in Environmental Sciences F(0–1) [0.25]

First part of the two–semester course ENVS*4011/2. Refer to ENVS*4011/2 for course description.

Prerequisite(s): ENVS*2010 and registration in semester 7 or 8 of the B.SC.(Env.) degree program

ENVS*4011/2 Colloquium/Project in Environmental Sciences F/W(0–1/0–3) [0.50]

The course permits the student the opportunity to integrate both the skills and knowledge acquired in earlier courses through application to current environmental problems and issues. Group research problems and exposure to critical environmental policy issues will form the core elements of the course. Students must be registered and attend preliminary organizational meetings scheduled in the Fall semester. This is a two–semester course offered over consecutive semesters. When you select it you must select ENVS*4011 in the Fall semester and ENVS*4012 in the Winter semester. A grade will not be assigned to ENVS*4011 until ENVS*4012 is completed.

Prerequisite(s): ENVS*2010 and registration in semester 7 or 8 of the B.SC.(Env.) degree program

ENVS*4012 Colloquium/Project in Environmental Sciences W(0–3) [0.25]

Second part of the two–semester course ENVS*4011/2. Refer to ENVS*4011/2 for course description.

Prerequisite(s): ENVS*40110

ENVS*4220 Environmental Impact Assessment W(3–0) [0.50]

This course examines environmental impact assessment (EIA) from philosophical, methodological and institutional perspectives. The evolution of EIA in Canada will be the focus. Case studies illustrating major issues and applications will be presented at a variety of geographical scales. The preparation and presentation of a research project is an integral component.

Prerequisite(s): 15.00 credits including (1 of BIOL*2010, BIOL*2060, BIOL*3110), (POLS*3370 or ZOO*4050, where ZOO*4050 may be taken concurrently)

ENVS*4500 International Environmental Field Course F(0–6) [0.50]

An interdisciplinary field course to be held overseas. The course will include a common curriculum for all students, dealing with the historical, geographical, cultural and biological aspects of the location. Students will also undertake a project which would normally relate to their own specific interest. Formal instruction on the common core element of the course will be given either by Guelph faculty and/or by faculty from the host country. Each student will submit both a paper developed from the general core of the course and also a project report.

Prerequisite(s): 12.50 credits and approval of the Faculty of Environmental Sciences

XII—Course Descriptions, European Studies

School of Languages and Literatures.

EURO*1020 European Culture from 1900–1960 F(3–0) [0.50]

The course will explore how the industrial revolution, imperialism and 19th–century philosophy contributed to the emergence of 20th–century Arts and Letters. Various media will be employed. Texts studied are in English translation, and in a number of cases only excerpts from the texts to be discussed will be required reading.

EURO*1050 The Emergence of a United Europe F(3–0) [0.50]

This interdisciplinary course will provide students with an understanding of the events and processes resulting in economic integration in Europe after 1945. Economic, historical and political aspects will be emphasized.

EURO*2000 Europe and France's Revolution F(3–0) [0.50]

This course will study the sources and nature of the protest leading to revolution in France and to dissension in other European countries. Its major aim is to explore the effect on the European mind and arts of the first half of the 19th–century in a variety of media. The course will conclude with an examination of results, particularly in matters of aesthetics.

EURO*2070 European Integration, 1957–1992 W(3–0) [0.50]

This interdisciplinary course aims to provide an in–depth analysis of the development of European integration from the establishment of the EEC to 1992. Major emphasis will be placed on the historical development of the European communities, their economic framework and political institutions. Other attempts at economic integration such as EFTA and Comecon will be considered in less detail.

Prerequisite(s): 1 of EURO*1050, HUMN*1050, permission from one of the instructor or Coordinator of European Studies

EURO*4600 Honours Seminar in European Studies W(3–0) [0.50]

A seminar course designed to explore one or more topics of European culture, history and/or business, depending on the expertise of the instructor. Students should consult the Coordinator of European Studies for specific offerings.

Prerequisite(s): EURO*1020, EURO*1050, EURO*2000, EURO*2070 and/or approval of the Coordinator for European Studies

EURO*4740 Research Project in European Studies F,W(3–0) [0.50]

An independent study course that requires a research project on an aspect of European Studies. The topic must be approved by the Coordinator of the European Studies Program. Research is undertaken with the guidance of a faculty advisor, and seminar presentations will be included.

Prerequisite(s): EURO*1020, EURO*1050, EURO*2000, EURO*2070, approval of the Coordinator for the European Studies Program

XII—Course Descriptions, External Courses

*All courses labeled XCST*XXXX are Conestoga College Courses. The corresponding Conestoga Course numbers are provided. Detailed course profiles can be accessed through the Conestoga College home page at http://www.conestogac.on.ca/. All XCST*XXXX courses are limited to students in the Career Development Practitioner program.*

*All courses labeled XSEN*XXXX are Seneca College Courses. The corresponding Seneca Course numbers are provided. Detailed course profiles can be accessed through the Seneca College home page at http://www.senecac.on.ca/. All XSEN*XXXX courses are limited to students in the B.Sc.(Tech.) program.*

*All courses labeled XSHR*XXXX are Sheridan College Courses. The course descriptions appear in the Sheridan College academic calendar and can be accessed through the Sheridan College home page at http://www.sheridanc.on.ca/. All XSHR*XXXX courses are limited to students in the Sports Injury Management program.*

XCST*2000 Career Counselling and Development F,W(–) [0.50]

This course provides an overview of the theory and practice of career counselling and development. Emphasis will be placed on an analysis of career development theories, occupational structures, career information, approaches to vocational assessment, the practice of career counselling, and future trends in the evolution of the field. (Offered through distance education format only.)

External Course Code(s): Conestoga #90370800

XSEN*2010 Effective Business and Technical Writing W(3–0) [0.50]

This subject introduces the study of technical writing, including specified formats such as memoranda, letters, proposals, and informal reports. The course applies and develops the skills of technical writing in a series of writing assignments placing emphasis on brevity, clarity, conciseness, unity and coherence – all essential to good technical communication. Basic research skill and effective oral communications are also covered.

External Course Code(s): Seneca #SES–391

XSEN*2020 Management Studies: Business and Human Relations F(3–0) [0.50]

This subject concentrates on the human factor within the typical business situation. Its main purpose is to help students develop effective human relations, frameworks and practical human relations, problem–solving skills for the work environment. Selected topics will include: building a positive self–concept; interpersonal communication and listening skills; developing healthy emotions; resolving interpersonal conflict; and building positive relationships for a healthy work environment.

External Course Code(s): Seneca #BUS–203

XSEN*3020 Pharmaceutical Analysis W(2–4) [0.50]

The aim of this course is to simulate the pharmaceutical quality control laboratory providing students with an inside knowledge of the industry. To accomplish this students are introduced to the pharmaceutical terms, definitions and forms (e.g. Certificate of Analysis), drug legislations, and regulatory agencies (FDA, TPP). Strong emphasis is placed on the navigation and interpretation of pharmacopeial compendia (USP, BP, EP). Other aspects of the course include ICH stability requirements, stability protocols and stability reports. Practical aspects include physical, wet chemical and instrumental analyses of drug substances, in–process materials and finish products using official pharmacopeial methodologies. Calculations (e.g. % Purity, % Impurity and % Label Claim) relating to the analyses described above are dealt with and students are required to use SOPs during all pharmaceutical laboratory sessions to ensure compliance with GMP, GLP, FDA and TPP regulations.

Prerequisite(s): XSEN*3020 CHEM*2400, CHEM*2580

External Course Code(s): Seneca #PHA–333

XSEN*3030 Pharmacology and Applied Toxicology W(3–3) [0.50]

This subject is an introduction to the general aspects of pharmacology and toxicology. The lecture topics will cover the pharmacological activity of drugs on the autonomic nervous system, central nervous system and the cardiovascular system. The laboratory practicals will focus on testing, drug screening, and clinical trial methodology.

Prerequisite(s): XSEN*3030 CHEM*2400, CHEM*2580

External Course Code(s): Seneca #PHT–533

XSEN*3040 Occupational Health and Chemistry W(2–3) [0.50]

A general coverage of general aspects of industrial hygiene. Specific topics include Canadian legislation with respect to Occupational Safety, modes of evaluation of chemical exposure, occupational toxicology, and instrumentation associated with the evaluation of the occupational environment.

Prerequisite(s): XSEN*3040 CHEM*2700

External Course Code(s): Seneca #OCC–433

XSEN*3060 Pharmaceutical Analysis – Advanced W(2–3) [0.50]

This course reinforces the concept of how the pharmaceutical laboratory works by focusing on method validation requirements within the pharmaceutical industry. It introduces students to the regulatory (ICH, FDA) requirements and guidelines for systems validation, including TPP–acceptable methods and GMP regulations. Validation methods that are taught include Related Substances, Assay, Dissolution and Cleaning. Critical validation parameters (e.g., linearity, specificity, limit of quantitation, etc.) are focused on as well as validation protocols including establishing specifications and dealing with exceptions or out–of–specification (OOS) results. Process validation characteristics (i.e., Design Qualification (DQ), Installation Qualification (IQ), Operation Qualification (OQ), Performance Qualification(PQ) or System Suitability) are also emphasized as well as ”Best Practices” such as Process Capabilities and Annual Product Review.

Prerequisite(s): XSEN*3060 XSEN*3020

External Course Code(s): Seneca #PHA–533

XSEN*3100 Communication Systems and Circuits W(3–0) [0.50]

Passive circuit analysis, waveform spectra, audio signals, noise, RF and broadband amplifiers, oscillators, receivers, amplitude modulation, single–sideband modulation, angle modulation, pulse modulation, transmission lines and cables, waveguides, radio–wave propagation, antennae, telephone system, digital communications, facsimiles and television signals. Special emphasis will be given on the use of these media for computer communications.

External Course Code(s): Seneca #CMS–455

XSEN*3110 Computer Information Systems II W(3–0) [0.50]

This course is the study of the introduction of basic network concepts using the architecture of Microsoft NT as the main Network Operating System. Focusing on Windows NT Workstation v3.5, the integration and configuration of networking topologies within office environments will be demonstrated.

External Course Code(s): Seneca #CPS–455

XSEN*3120 Microprocessors I W(3–0) [0.50]

This is an introductory microprocessor course dealing with fundamental hardware and software concepts. The subject material includes: number systems, computer concepts, register structure, arithmetic and logic operations, machine language programming, instruction set, stack and interrupts. A substantial amount of time is devoted to practical lab work. The processor used is the MC68HC11.

External Course Code(s): Seneca #MCO–455

XSEN*3130 Advanced C Programming W(3–0) [0.50]

The Advanced C programming will build on the introductory C course. The Borland DOS–based AC@ interactive development environment will be used. Important advanced programming concepts such as structures, pointers, and unions will be stressed. In addition, graphical programming concepts will be introduced.

External Course Code(s): Seneca #PGM 455

XSEN*3140 Operating Systems W(3–0) [0.50]

Operating Systems explores the design concepts, operational facilities and job control language of operating systems. The UNIX (registered trade mark of ATT) operating system and its associated programs is the principal system studied.

External Course Code(s): Seneca #PGM 455

XSEN*4010 Pharmaceutical Calculations W(3–0) [0.50]

This subject deals with computations relevant to pharmaceutical topics. Included are the representation of scientific and technical data, chemical kinetics and drug stability, osmo–lality and tonicity, pH and solubility, viscosity, phase rule and numerous pharmaceutical calculations (e.g. manufacturing formulas, dosage formulations, radiochemistry, concentration, alligation, HLB, etc.).

Prerequisite(s): XSEN*4010 CHEM*2400, CHEM*3570

External Course Code(s): Seneca #PHC–533

XSEN*4020 Pharmaceutical Organic Chemistry W(1–3) [0.50]

In this subject the determination of the structure of organic compounds using spectroscopic methods such as N.M.R. and mass spectroscopy are discussed. Correlation of structure and reactivity (in particular, drug activity) of organic compounds is also explored. A multi–step synthesis of an anesthetic (lidocaine) and mass–spectrometric analysis of an unknown organic compound (or mixture) are examples of lab–projects covered in this subject.

Prerequisite(s): XSEN*4020 CHEM*3750

External Course Code(s): Seneca #PAC–633

XSEN*4030 Pharmaceutical Product Formulations W(2–3) [0.50]

This subject deals with the theoretical and practical aspects of pharmaceutical product formulation with an emphasis on semi–solid and liquid formulations. The students prepare and test ointments, creams, lotions, and syrups in the laboratory. Formulation as it relates to overall product stability and efficacy is also covered in both theoretical and practical terms.

Prerequisite(s): XSEN*4030 CHEM*3750

External Course Code(s): Seneca #PPF–633

XSEN*4040 Pharmaceutical Manufacturing W(2–3) [0.50]

An introduction to the important principles and methods related to the production of pharmaceuticals. Topics include methods of manufacture of important dosage forms, regulations governing various dosage forms, good manufacturing practice as defined by regulatory bodies and an overview of the manufacturing plant during the various stages of production with emphasis on GMP.

Prerequisite(s): XSEN*4040 CHEM*3570, CHEM*3750

External Course Code(s): Seneca #PYM–633

XSEN*4050 Biopharmaceuticals W(3–0) [0.50]

This subject introduces the student to the rapidly developing field of biotechnology and biopharmaceuticals. Techniques used in the development of biopharmaceuticals will be emphasized as well as large–scale production of biologicals manufactured by genetic engineering processes.

External Course Code(s): Seneca #BPH–633

XSEN*4100 Object Oriented Programming Using C S(3–0) [0.50]

Students will learn Object–Oriented Programming Using the C++ programming language in a Borland interactive programming environment.

External Course Code(s): Seneca #CPM–555

XSEN*4110 Control Processes S(3–0) [0.50]

The Data Acquisition and Control application of the computer to the control of physical processes is covered in this subject. Topics include, sensors and transducers, signal conditioning, A/D conversion, control computers, D/A conversion control activators, an introduction to robotics and artificial intelligence.

Prerequisite(s): XSEN*4110 XSEN*3130

External Course Code(s): Seneca #CST–555

XSEN*4120 Data Communications I S(3–0) [0.50]

This course has been designed to provide an in–depth understanding of the underlying principles of the rapidly expanding and changing discipline of Data Communications. The following topics in this subject are discussed: Terminology, components, network design and configurations, transmission media including fibre optical design methods, protocols, topologies, architectures, private and public network strategies and LAN vendors.

External Course Code(s): Seneca #DCM–555

XSEN*4130 Digital Communications S(3–0) [0.50]

Fundamental principles of Digital Telecommunications. Introduction to signal sampling including analog to digital conversion as well as digital modulation and multiplexing techniques.

External Course Code(s): Seneca #DCS–653

XSEN*4140 Technical Writing S(3–0) [0.50]

Technical report writing is linked to the completion of a senior design project.

External Course Code(s): Seneca #TRW–653

XSHR*1710 Sheridan—Emergency Conditions U(–) [0.25]

Offered by Sheridan College.

XSHR*1720 Sheridan—Lower Quadrant Composite U(–) [0.25]

Offered by Sheridan College.

XSHR*1730 Sheridan—Field Practice I (100 hours) U(–) [0.50]

Offered by Sheridan College.

XSHR*1740 Sheridan—Protective Equipment U(–) [0.25]

Offered by Sheridan College.

XSHR*2710 Sheridan—Field Practice II (200 hours) U(–) [0.50]

Offered by Sheridan College.

XSHR*2720 Sheridan—Upper Quadrant Composite U(–) [0.25]

Offered by Sheridan College.

XSHR*2730 Sheridan—Modalities U(–) [0.25]

Offered by Sheridan College.

XSHR*2740 Sheridan—Field Practice III (150 hours) U(–) [0.50]

Offered by Sheridan College.

XSHR*2750 Sheridan—Field Practice IV (250 hours) U(–) [1.00]

Offered by Sheridan College.

XSHR*2760 Sheridan—Clinical Assessment Rehab. I U(–) [0.25]

Offered by Sheridan College.

XSHR*2770 Sheridan—Functional Anatomy of Spine/Head U(–) [0.25]

Offered by Sheridan College.

XSHR*2780 Sheridan—Sports Injury Clinic I U(–) [0.25]

Offered by Sheridan College.

XSHR*2790 Sheridan—Mechanics of Lower Quadrant U(–) [0.25]

Offered by Sheridan College.

XSHR*2800 Sheridan—Human Adaptation to Exercise U(–) [0.50]

Offered by Sheridan College.

XSHR*2810 Sheridan—Clinical Assessment Rehab. II U(–) [0.50]

Offered by Sheridan College.

XSHR*2820 Sheridan—Mechanics of Upper Quadrant U(–) [0.50]

Offered by Sheridan College.

XSHR*2830 Sheridan—Clinical Assessment Rehab. III U(–) [0.50]

Offered by Sheridan College.

XSHR*2840 Sheridan—Clinical Administration U(–) [0.50]

Offered by Sheridan College.

XSHR*2850 Sheridan—Manual Therapy U(–) [0.25]

Offered by Sheridan College.

XSHR*2860 Sheridan—Field Practice V (200 hours) U(–) [0.75]

Offered by Sheridan College.

XSHR*2870 Sheridan—Field Practice VI U(–) [0.75]
Offered by Sheridan College.
XSHR*2880 Sheridan—Clincial Placement U(–) [1.50]
Offered by Sheridan College.
XSHR*2890 Sheridan—Sports Injury Clinic II U(–) [0.25]
Offered by Sheridan College.

XII—Course Descriptions, Family Relations and Human Development

Department of Family Relations and Applied Nutrition.

These courses support three majors offered by the Department of Family Relations and Applied Nutrition: Child Studies, Family and Social Relations, and Gerontology.

FRHD*1010 Human Development F(3–0) [0.50]

An introduction to the study of the development of the individual throughout the life cycle. Emphasis will be placed on the interrelationships between physiological, sociological and psychological aspects of normal human development. (Also offered through distance education format.)

FRHD*1020 Couple and Family Relationships W(3–0) [0.50]

A survey of family dynamics throughout the life course, emphasizing themes of power, intimacy and family diversity. Topics may include; gender socialization, sexuality, mate selection, communication, abuse, couple interaction, parent–child relations, divorce, remarriage. (Also offered through distance education format.)

Equate(s): FRHD*2010

FRHD*2040 Principles of Program Design for Children W(2–2) [0.50]

This course will examine the elements involved in planning and implementing quality play–based programs for young children. Some of the issues include: the role of the teacher, meeting developmental needs, the materials and the organization of the environment, and instructional strategies. The course will involve a workshop component.

Prerequisite(s): FRHD*2260, FRHD*2270

Equate(s): CSTU*2040

FRHD*2060 Adult Development and Aging W(3–0) [0.50]

An overview of major theoretical approaches, research issues and methodologies, and significant research findings which relate to adult development and aging.

Prerequisite(s): 1 of FRHD*1010, PSYC*1200, SOC*1100

Equate(s): PSYC*2060

FRHD*2100 Development of Human Sexuality F(3–0) [0.50]

A social scientific analysis of human sexuality. Emphasis will be placed on the development of sexuality within an interpersonal context. (Also offered through distance education format.)

Prerequisite(s): 5.00 credits including at least 1 of FRHD*1010, PSYC*1100, PSYC*1200, SOC*1100

FRHD*2110 Exceptional Children and Youth W(3–0) [0.50]

An overview of childhood exceptionalities including intellectual differences, communication disorders, sensory impairments, developmental and behaviour disorders, and health problems. Issues faced by the exceptional child as well as the parents and siblings are discussed. (Also offered through distance education format.)

Prerequisite(s): FRHD*1020, (FRHD*2270 or PSYC*2450)

Equate(s): CSTU*2110

FRHD*2260 Infant Development W(3–0) [0.50]

An examination of developmental principles and milestones characterizing infant development from conception to 24 months. Emphasis will be placed on understanding the nature of the reciprocal family–infant interactions during this period, and on the societal context influencing those interactions. (Also offered through distance education format.)

Prerequisite(s): PSYC*1200, SOC*1100

Equate(s): CSTU*2260

FRHD*2270 Development in Early and Middle Childhood F(3–0) [0.50]

Examination of development in the early and middle childhood years, with emphasis on family and societal contexts.

Prerequisite(s): FRHD*1010 or (PSYC*1200, SOC*1100)

Equate(s): CSTU*2270

FRHD*2280 Adolescent Development W(3–0) [0.50]

An examination of psychosocial development in adolescence, emphasizing physiological, social and emotional changes. (Also offered through distance education format.)

Prerequisite(s): 1 of FRHD*2260, FRHD*2270, PSYC*2450

Equate(s): FRHD*3080

FRHD*2300 Principles of Program Design for Youth W(3–0) [0.50]

The course is designed to expose students to the issues and program development strategies that lay the foundation for quality experiences for youth. Students will examine the developmental needs of adolescents, models for programming and the role of the youth worker in a variety of contexts.

Prerequisite(s): FRHD*2270

Co–requisite(s): FRHD*2280

FRHD*3040 Parenting: Research and Applications W(3–0) [0.50]

A study of research concerning parent–child relationships, primarily in North American society.

Prerequisite(s): FRHD*1020, (FRHD*2270 or PSYC*2450)

FRHD*3060 Principles of Social Gerontology F(3–0) [0.50]
A study of social and health aspects of individual and population aging, including theories and implications for understanding and working with the elderly.
Prerequisite(s): 10.00 credits including 1 of FRHD*1020, SOAN*3100, SOC*3100

FRHD*3070 Research Methods – Family Studies F(2–2) [0.50]
A critical examination of research methods in family studies.
Prerequisite(s): 10.00 credits

FRHD*3090 Child and Family Poverty W(3–0) [0.50]
An examination of the research dealing with children for whom environmental conditions constitute a serious impediment to later development; a consideration of appropriate policies and practices.
Prerequisite(s): FRHD*2110, NUTR*1010
Equate(s): CSTU*3100

FRHD*3120 Families in Canadian Context W(3–0) [0.50]
Canadian families are studied from a structural perspective and are placed in social and historical context. Topics include structural variations in family form, work roles within and outside the family, the structural significance of marriage and parenthood, and social policies affecting families.
Prerequisite(s): FRHD*1020

FRHD*3150 Strategies for Behaviour Change F(3–0) [0.50]
This course will review the nature and use of behaviour change strategies commonly used in interventions with children, youth, and their families.
Prerequisite(s): FRHD*2110

FRHD*3180 Observation and Assessment F(2–2) [0.50]
Direct observation as a strategy for collecting information on children's behaviour in applied and research settings. Emphasis on theory, recording and interpreting observational data and communicating findings in written reports.
Prerequisite(s): FRHD*2040, FRHD*2110
Equate(s): FRHD*4300
Restriction(s): registration in semester 5 or above in the Child Studies or Child Studies Co–op Majors

FRHD*3190 Administration of Programs for Children and Youth W(3–0) [0.50]
A study of the roles and responsibilities of administrators in programs for children and youth with emphasis on the development of appropriate policies and procedures; management of human and financial resources; and internal and external communication within the context of multidisciplinary settings. Attention will be given to quality assurance, professional ethics, and continuing professional development. (Offered through distance education format only.)
Prerequisite(s): 10.00 credits including one of FRHD*2260, FRHD*2270, PSYC*2450
Equate(s): CSTU*4270, FRHD*4270

FRHD*3200 Practicum—Child, Youth and Family I F,W(3–8) [1.00]
Seminar and supervised experience with children. The practicum will be designed to demonstrate the application of theory studied earlier in the program. It will also provide opportunities for working directly with young people while examining such topics as the role of the teacher, teacher–child interaction, and program implementation. Students wishing to enroll in this course must consult with the instructor during course selection.
Prerequisite(s): FRHD*1020, FRHD*2040, NUTR*1010
Equate(s): CSTU*3170, FRHD*3170

FRHD*3400 Communication and Counselling Skills S,F,W(3–0) [0.50]
Examination and analysis of the theories and methods of communication as applied within the processes of family counseling and consultation.
Prerequisite(s): 10.00 credits including FRHD*1020

FRHD*4020 Family Theory F(3–0) [0.50]
An analysis of theoretical approaches and concepts in the study of the family.
Prerequisite(s): 12.50 credits including FRHD*2010

FRHD*4061 Family and Community: Field Placement F(2–8) [1.00]
First part of the two–semester course FRHD*4061/2. Refer to FRHD*4061/2 for course description.
Prerequisite(s): FRHD*3400

FRHD*4061/2 Family and Community: Field Placement F/W(2–8) [2.00]
Seminar and supervised field placement in health and social service agencies. The practicum and seminar will further develop and expand students' helping roles in agencies and the integration and application of theoretical knowledge from previous course work with practice. Students wishing to enrol in this course must consult with the instructor during the course selection period. This is a two–semester course offered over consecutive semesters. When you select it you must select FRHD*4061 in the Fall semester and FRHD*4062 in the Winter semester. A grade will not be assigned to FRHD*4061 until FRHD*4062 is completed.
Prerequisite(s): FRHD*3400

FRHD*4062 Family and Community: Field Placement W(2–8) [1.00]
Second part of the two–semester course FRHD*4061/2. Refer to FRHD*4061/2 for course description.

Prerequisite(s): FRHD*4061

FRHD*4070 Topics in Family Relations and Human Development U(3–0) [0.50]
Lecture–discussion or seminar on a selected topic in family studies. To be conducted by regular or visiting faculty with expertise in the area. Students should check with the Department of Family Relations and Applied Nutrition to determine what topic will be offered during specific semesters and which prerequisites, if any, are appropriate.

FRHD*4080 Topics in Family Relations and Human Development U(3–0) [0.50]
Lecture–discussion or seminar on a selected topic in family studies. To be conducted by regular or visiting faculty with expertise in the area. Students should check with the Department of Family Relations and Applied Nutrition to determine what topic will be offered during specific semesters and which prerequisites, if any, are appropriate.

FRHD*4090 Topics in Family Relations and Human Development U(3–0) [0.50]
Lecture–discussion or seminar on a selected topic in family studies. To be conducted by regular or visiting faculty with expertise in the area. Students should check with the Department of Family Relations and Applied Nutrition to determine what topic will be offered during specific semesters and which prerequisites, if any, are appropriate.

FRHD*4100 Dynamics of Group and Family Functioning F(2–2) [0.50]
An exploration of group processes through participation and laboratory groups. Group theory and current techniques used in group and family counseling will also be reviewed in lectures.
Prerequisite(s): FRHD*3040 or FRHD*3400

FRHD*4160 Family Relations in Gerontology F(3–0) [0.50]
A critical examination of selected issues affecting the well–being of the elderly in Canada. Topics will include such issues as the nature and types of community support systems for the aged, and institutionalization and its alternatives.
Prerequisite(s): FRHD*3060

FRHD*4170 Practicum—Child, Youth and Family II F,W(4–16) [1.00]
Seminar and experience with children in an appropriate field setting to be assigned by the department. Emphasis will be upon developing, implementing and evaluating program plans for children in educational and community settings. Students will acquire communication and interactive skills with children and adults. Students wishing to enrol in the course must consult with the course instructor during the course selection period.
Prerequisite(s): FRHD*3170 or FRHD*3200
Equate(s): CSTU*4151:2

FRHD*4180 Assessment and Intervention F(2–2) [0.50]
Principles and theories of assessment and evaluation as related to the child, the family, and to child oriented intervention, education and social service programs.
Prerequisite(s): FRHD*2110, FRHD*3070, FRHD*3180
Restriction(s): registration in semester 7 or above in the Child Studies or Child Studies Co–op Majors

FRHD*4200 Issues in Human Sexuality W(3–0) [0.50]
An advanced analysis of sexual development. Specific attention will be given to sexual problems, and the concepts, methods and issues associated with sex education and counseling.
Prerequisite(s): FRHD*2010, FRHD*2100 and 1.00 credit at the 3000 level in Family and Social Relations, Psychology or Sociology

FRHD*4210 Senior Seminar in Early Education and Care F(3–0) [0.50]
The study of the historical and philosophical basis of programs for young children evaluated from a developmental perspective. Emphasis will be on current approaches and programs and contemporary issues in early childhood programming.
Prerequisite(s): FRHD*3170 or FRHD*3200
Equate(s): CSTU*4210

FRHD*4250 Aging and Health F(3–0) [0.50]
This course offers upper level undergraduates a forum to explore issues related to aging and health across the adult life span. More specifically, the conceptual groundwork necessary for understanding the roles of the life span developmental perspective, individual development, physiological changes in human aging, contextual influences and interactions, and several models/theories of aging and health will be examined. A primary objective of the course is the integration of models and theory to facilitate understanding of aging and health topics. Topics include but are not limited to: age changes and disease processes (both acute and chronic); mental health and illnesses; medication use; disease prevention and health promotion; influence of health on family relationships, caregiving, and placement decisions; systemic and societal influences on health; and ethical issues and controversies surrounding the end–of–life care and decision making, advanced directives, assisted suicide, and death and dying.
Prerequisite(s): 10.00 credits including FRHD*2060

FRHD*4260 Social Policy and Gerontology W(3–0) [0.50]
An examination of aging and adult development in relation to social policy with special reference to families.
Prerequisite(s): FRHD*3060

FRHD*4310 Professional Issues F(3–0) [0.50]
This course examines ethical and professional issues in working with children, youth, adults of all ages, and their families. A variety of institutional settings are considered (e.g., school systems, treatment agencies, youth residential programs, senior care facilities). The complexities of professional practice with diverse populations are explored in depth. Legal aspects relevant to work in this area are also addressed.

Prerequisite(s): FRHD*3400

FRHD*4320 Social Policies for Children, Youth and Families W(3–0) [0.50]

This course focuses on current social policies, programs, and services that affect children's development and family well–being. Issues include policies that affect income security, parental effectiveness, social service provision, and community resources.

Prerequisite(s): FRHD*3040

FRHD*4400 Youth, Risk and Resilience W(3–0) [0.50]

This course examines biological, and social–contextual aspects of developmental issues evident in childhood and adolescence. The theoretical perspective of developmental psychpathology will be used to examine literatures relating to risk, resilience, developmental trajectories, classification, assessment, and intervention. Students will have a chance to critically examine many mental health issues commonly found in childhood and adolescence.

Prerequisite(s): FRHD*2110, FRHD*2280

Restriction(s): PSYC*3460

FRHD*4810 Thesis I U(3–0) [0.50]

Planning, developing and writing a research proposal under individual faculty supervision. Topic to be decided by the student in consultation with the supervisory faculty member before she/he may course select or register for the course.

Prerequisite(s): FRHD*3070, consent of the instructor is required

Equate(s): CSTU*4810

FRHD*4910 Thesis II U(6–0) [1.00]

The student will conduct and write an undergraduate thesis under the direction of a faculty member.

Prerequisite(s): FRHD*4810

Equate(s): FRHD*4911:2

XII—Course Descriptions, Food Science

Department of Food Science.

FOOD*2010 Principles of Food Science S,W(3–0) [0.50]
Principles involved in the processing, handling and storage of foods. Relationship of science and technology to food processing. (Offered through distance education format only.)
Equate(s): FOOD*2150, NUTR*2150
Restriction(s): AGR*3330

FOOD*2100 Communication in Food Science I W(3–0) [0.50]
Students will acquire basic skills in technical and business communication and be prepared to complete a variety of communication assignments in subsequent semesters. Students will learn and apply the principles of effective written and oral communication. Communication achievements made during the undergraduate program will be presented in a communication portfolio in a subsequent course, FOOD*4100.
Restriction(s): enrolment in the Food Science or Food Science Co–op Majors of the B.SC. Program

FOOD*2150 Introduction to Nutritional and Food Sciences F(3–0) [0.50]
This interdisciplinary course provides an introduction to the Food and Nutritional Sciences from both historical and modern perspectives. Major themes are the nutritional and functional properties of food, nutrient assimilation, food preservation and safety, and the interactions between food processing, diets and health. The course is co–operatively taught with the Department of Nutritional Sciences. (Also listed as NUTR*2150.)
Prerequisite(s): BIOL*1030, (CHEM*1040 or CHEM*1300)
Equate(s): FOOD*2010, NUTR*2150
Restriction(s): AGR*3300, NUTR*2120

FOOD*2400 Introduction to Food Chemistry S,W(3–0) [0.50]
An introduction to the chemistry and biochemistry of the major components of foods: lipids, proteins, carbohydrates and water/ice. In addition, an overview of some of the reactions and changes in food components which occur during processing, handling and storage will be presented. This course may not be taken for credit by students in the Food Science Major. (Offered through distance education format only.)
Prerequisite(s): CHEM*1040
Restriction(s): FOOD*3100

FOOD*2410 Introduction to Food Processing F,W(3–0) [0.50]
An introduction to food processes and the relationships between chemistry, microbiology, and engineering as they apply to food processing are discussed. The following topics are included: high and low temperature processes; moisture control and intermediate moisture foods; concentration and dehydration processes; and novel food processing techniques. This course may not be taken for credit by students in the Food Science Major. (Offered through distance education format only.)
Prerequisite(s): CHEM*1040, (1 of BIOL*1040, MICR*1000, MICR*1010, MICR*1020)
Restriction(s): FOOD*3160, FOOD*3170

FOOD*2420 Introduction to Food Microbiology S,F(3–0) [0.50]
An introduction to the major groups of microorganisms important in foods including sources of contamination during production, processing and storage of foods, microbial spoilage of food, food–borne illness, and food fermentations. Evaluation of food processing conditions used to control the presence and/or growth of microorganisms in foods. This course may not be taken for credit by students in the Food Science Major. (Offered through distance education format only.)
Prerequisite(s): 1 of BIOL*1040, MICR*1000, MICR*1010, MICR*1020
Restriction(s): FOOD*3230

FOOD*2620 Food Engineering Principles W(3–2) [0.50]
Introduction to engineering principles and operations in food processing including heat transfer, thermal processing, refrigeration, fluid flow, separating, mixing, size reduction and moisture modifications. Material and energy balances. Instrumentation and process control concepts.
Prerequisite(s): 0.50 credit in physical chemistry or biochemistry or 0.50 credit in organic chemistry beyond the 1000 level
Restriction(s): ENGG*2620

FOOD*3010 Food Chemistry F(3–2) [0.50]
A lecture course covering the fundamental principles of the chemistry of foods. The course will discuss selected topics related to the chemistry (physical, organic and analytical) and physics of food materials such as lipids, proteins, carbohydrates and water. Other topics covered include enzymes and pigments.
Prerequisite(s): CHEM*2580

FOOD*3020 Food Chemistry Laboratory W(0–6) [0.50]
An involved laboratory course on various aspects of food chemistry. Emphasis will be placed on the development of strong analytical skills. Laboratory exercises are based on topics covered in FOOD*3010.
Prerequisite(s): FOOD*3010

FOOD*3160 Food Processing I F(3–3) [0.75]
Processing techniques used in the food industry; pasteurization, sterilization, chilling and freezing as methods of food preservation.

Prerequisite(s): FOOD*2150, MICR*2030

FOOD*3170 Food Processing II W(3–3) [0.50]

Principles of food processing with special reference to concentrated, dehydrated and intermediate moisture foods.

Prerequisite(s): FOOD*2150, MICR*2030

FOOD*3230 Food Microbiology F(3–3) [0.75]

Important groups of microorganisms associated with food spoilage, food fermentations, food infections and intoxications. Intrinsic and extrinsic factors and their relationship to microbial growth. Control of microorganisms by food processing.

Prerequisite(s): MICR*1020 or MICR*2030

FOOD*3260 Industrial Microbiology W(3–3) [0.50]

Fundamental and applied aspects in industrial processes with an emphasis on sanitation in the food and beverage industries. Topics include: water quality, alcohol fermentations, organic acid and enzyme production, vinegar technology, disinfectants and microbiological aspects of quality control.

Prerequisite(s): MICR*1020 or MICR*2030

FOOD*3430 Introduction to Food Analysis F,W(3–0) [0.50]

An introduction to quantitative analysis of foods by chemical, physical and instrumental means. Determination of major and minor constituents of foods. (Offered through distance education format only.)

Prerequisite(s): FOOD*2400

Restriction(s): FOOD*4120

FOOD*3700 Sensory Evaluation of Foods W(2–3) [0.50]

Principles of sensory evaluation of foods and a study of the techniques employed. (Offered in odd–numbered years.)

Prerequisite(s): (FOOD*2150 or HAFA*2700), (1 of STAT*2040, STAT*2060, STAT*2080)

FOOD*4010 Food Plant Sanitation and Quality Control W(3–0) [0.50]

Participants will learn and apply principles of hygiene, cleaning chemistry and mechanisms, and will develop and evaluate sanitation programs for specific food processes. Graduates of this course will be able to implement sampling and statistical quality control plans and quality audits. Food Safety programs including both GMP (good manufacturing practices) and HACCP (hazard analysis and critical control point) will be developed for specific cases. A case study approach will be used. Quality management aspects of quality assurance are not included in this course. (Offered through distance education format only.)

Prerequisite(s): (FOOD*2010 or FOOD*2150),(1 of FOOD*2410, FOOD*3160, FOOD*3170), (FOOD*2420 or FOOD*3230)

FOOD*4070 Food Packaging F(3–0) [0.50]

Functions of packaging in food preservation systems will be examined using a review of current packaging materials, their properties, production methods and applications for specific products. Additional topics include regulatory, environmental and marketplace influences on food packaging choices. (Offered through distance education format only.)

Prerequisite(s): 1 of 10.00 credits in science or engineering, (FOOD*2010, FOOD*2410, FOOD*2420), instructor consent

FOOD*4090 Functional Foods and Nutraceuticals W(3–0) [0.50]

The course examines the relation of functional foods and nutraceuticals (FFN) to food and drugs. The safety and efficacy of individual FFN products, and the regulatory issues that influence the development and commercialization of FFN in global markets are emphasized. The course is co–opertively taught by the Department of Human Biology and Nutritional Sciences and the Department of Food Science. (Also listed as NUTR*4090.)

Prerequisite(s): NUTR*3190 or NUTR*3210

Equate(s): NUTR*4090

FOOD*4100 Communication in Food Science II W(2–0) [0.25]

Each student will present a communication portfolio based on their proposal in FOOD*2100. Additional communication assignments and work shops will build skills in discussion leading, meeting, management, crisis management and both peer and self evaluation.

Prerequisite(s): FOOD*2100, 2.50 credits at the 3000 level in Food Science

FOOD*4110 Meat and Poultry Processing W(2–3) [0.50]

The course focuses on the principles and techniques employed by the meat industry (the fourth largest in Canada). Lectures include a detailed study of muscle structure and its relation to meat quality, the physical properties of meat proteins, lipids and flavour compounds important in meat processing. Practical applications of processing techniques (including product manufacturing) packaging and merchandizing are emphasized in the laboratory. Eggs and egg processing are covered to a lesser extent. (Offered in odd–numbered years.)

Prerequisite(s): ANSC*2340 or FOOD*3160

FOOD*4120 Food Analysis F(3–4) [0.75]

Quantitative analysis of foods by chemical and physical methods. Determination of major and minor constituents of foods.

Prerequisite(s): 0.50 credit in analytical chemistry or FOOD*3100 taken as corequisite

FOOD*4140 Communication in Food Science III S,F,W(0–2) [0.25]

This course gives the student the opportunity to integrate both communication skills and technical knowledge in Food Science acquired in earlier courses through participation in an independent experiential learning project. The topic of the project may be in any area of Food Science, but an emphasis on communication to a non–scientific audience is required. The project may be conducted in teams of up to four students. Students are required to present a concise report in a written paper and in a seminar. Students must make arrangements with both faculty supervisor and course co–ordinator in a prior course selection period.

Prerequisite(s): FOOD*2100, 2.50 credits at the 3000 level in Food Science

FOOD*4220 Topics in Food Science S,F,W(0–2) [0.25]

Independent study of a selected topic in Food Science, involving a review and critical evaluation of the current literature. The course comprises independent library research and students are required to present a concise report in a written paper and in a seminar. Students must make arrangements with both faculty supervisor and the course co–ordinator in a prior course selection period.

Prerequisite(s): 2.50 credits at the 3000 level in Food Science

Restriction(s): permission of the instructor

FOOD*4230 Research in Food Science I S,F,W(0–2) [0.25]

Independent laboratory research of a selected topic in Food Science, under the supervision of an individual faculty. The laboratory research is based on the literature review conducted in FOOD*4220. In addition, a review and critical appraisal of experimental principles will guide the design of laboratory experiments. Students are required to present a concise report in a written paper and in a seminar. Students must make arrangements with both faculty supervisor and the course co–ordinator in a prior course selection period.

Prerequisite(s): FOOD*4220

FOOD*4240 Research in Food Science II S,F,W(0–2) [0.25]

Independent laboratory research of a selected topic in Food Science, under the supervision of an individual faculty. The laboratory research conducted in FOOD*4230 will be continued and expanded. Students are expected to demonstrate increasing independence in designing, conduction and evaluating experiments. Students are required to present a concise report in a written paper and in a seminar. Students must make arrangements with both faculty supervisor and the course co–ordinator in a prior course selection period.

Prerequisite(s): FOOD*4230

FOOD*4340 Cheese and Fermented Dairy Foods W(3–3) [0.50]

The manufacture, chemistry and microbiology of cheese and fermented dairy foods. Quality control and yield efficiency. Laboratories include manufacture of representatives from all cheese families and a variety of other fermented milk products. (Offered in even–numbered years.)

Prerequisite(s): CHEM*2580 or MICR*2030

FOOD*4350 Processing Plant Technology F(3–2) [0.50]

This course will examine the operation of the modern food and dairy processing plant. Selected topics will include metals and corrosion, steam production, refrigeration, waste management, and plant automation. The case study approach will be used to illustrate operational and automation decisions and the factors which influence these decisions.

Prerequisite(s): FOOD*2150

FOOD*4400 Dairy Processing W(3–3) [0.50]

Production, processing and marketing of fluid milk and frozen dairy products and butter. Public health aspects of pasteurization, composition and formulation of mixes, and discussion of the various unit operations involved in processing of fluid products, frozen dessert products and butter. Purchase and marketing of dairy products will also be discussed. (Offered in odd–numbered years.)

Prerequisite(s): CHEM*2580, FOOD*2150

FOOD*4520 Cereal Technology W(2–3) [0.50]

The technology and chemistry of the principal cereals; kernel structure and its chemistry with respect to the technological characteristics and nutritive value. Processing of wheat, corn, sorghum, rice, oats and barley; utilization of products and by–products. Bread–making process, dough rheology and technology; breakfast cereals and protein–enriched cereal products. (Offered in even–numbered years.)

Prerequisite(s): CHEM*2580

FOOD*4700 Food Product Development W(2–3) [0.50]

The course examines the research and development processes related to food products. Technological developments affecting food product development will be examined. Experience in planning, conducting, and communicating results as a team working on developing a food product.

Prerequisite(s): FOOD*3100

XII—Course Descriptions, French Studies

School of Languages and Literatures.

*The School reserves the right to determine the appropriate level to be taken by students enrolling in language courses. With the exception of FREN*1000, literary texts are, at all levels, studied in French. Students registering in these courses will be expected to have the appropriate language proficiency.*

FREN*1000 Understanding the French Speaking World F(3–0) [0.50]
A course taught in English which introduces students to French culture as it manifests itself in France, Quebec, the rest of North America, Africa, and the West Indies. Historical, linguistic and socio–political issues will be examined within the broader context of culture.

FREN*1090 Basic French: Reading S,F,W(3–0) [0.50]
A basic course in French grammar and reading for students who have up to Ontario Grade 9 French (or equivalent) but not above. FREN*1090 cannot be counted toward a specialization in French. Francophones and French immersion students will not be admitted to this course. (Offered through distance education only.)

FREN*1100 Basic French: Listening S,F,W(3–0) [0.50]
A basic course in French grammar with emphasis on listening skills for students who have up to Grade 10 French (or equivalent) but not above. FREN*1100 cannot be counted toward a specialization in French. Francophones and French immersion students will not be admitted to this course. (Offered through distance education format only.)

FREN*1110 Elementary French F,W(3–1) [0.50]
A review course in French grammar, oral and written skills for students with some knowledge of French (Ontario Grade 11 or equivalent). Students with OAC French (or equivalent) will not be allowed to register in this course. FREN*1110 cannot be counted toward a specialization in French. Francophones and French immersion students will not be admitted to this course.

FREN*1200 Intermediate French I S,F,W(3–1) [0.50]
Practice in written and oral French. Francophones and French immersion students will not normally be admitted to this course.
Prerequisite(s): 1 of FREN*1110, OAC French, permission of the School

FREN*2020 France: Literature and Society F,W(3–1) [0.50]
An historical introduction to French life and thought as seen through literature and art. Lectures and small seminars are integrated into a multi–media presentation including videotapes, slides and audio tapes.
Prerequisite(s): FREN*1200 or FREN*2030

FREN*2030 Intermediate French II S,F,W(3–1) [0.50]
Further practice in written and oral French. Grammar, vocabulary acquisition, translation, laboratory exercises. Discussion groups.

FREN*2060 Quebec: Literature and Society F,W(3–1) [0.50]
An historical introduction to Quebec life and thought from New France to the present as seen through literature and art. Lectures and small seminars are integrated into a multi–media presentation including videotapes, slides and audio tapes.
Prerequisite(s): FREN*1200 or FREN*2030

FREN*2500 French Translation I W(3–0) [0.50]
An introduction to the art and techniques of French–English translation.
Prerequisite(s): FREN*2030

FREN*2520 French Composition I F(3–0) [0.50]
Essay writing and textual analysis.
Prerequisite(s): FREN*2030

FREN*2540 Spoken French: Theory and Practice S,W(3–1) [0.50]
A course focussing on the differences between written and spoken French and designed to help students function efficiently in an oral French context (comprehension and expression). Francophones will normally not be admitted to this course. (Offered in odd–numbered years.)
Prerequisite(s): FREN*2030

FREN*3000 Romanticism and Realism in France F(3–0) [0.50]
A seminar on the 19th–century novel emphasizing themes and ideas which have contributed to contemporary literature and thought.
Prerequisite(s): FREN*2020, FREN*2030

FREN*3010 Twentieth–Century French Novel W(3–0) [0.50]
A changing world as perceived by 20th–century writers in France. From Gide to post–modernism, the impact of renewed scientific perspectives on literature, and the questioning of modes of representation, signs and society. (Offered in even–numbered years.)
Prerequisite(s): FREN*2020, FREN*2030

FREN*3020 Twentieth–Century French Theatre F(3–0) [0.50]
Twentieth–century drama: Sartre, Beckett, Ionesco and more recent dramatists. (Offered in odd–numbered years.)
Prerequisite(s): FREN*2020, FREN*2030

FREN*3070 Enlightenment and Crisis F(3–0) [0.50]
Prose literature in the 18th century; the questioning of traditional values. The road to revolution.
Prerequisite(s): FREN*2020, FREN*2030

FREN*3150 French Children's Literature F(3–0) [0.50]
A study of children's literature in the francophone world from the 17th century to the present.
Prerequisite(s): FREN*2020, FREN*2030

FREN*3200 Quebec Novel F(3–0) [0.50]
A survey of representative Quebec novels from World War II to the Quiet Revolution. A seminar and lecture course.
Prerequisite(s): FREN*2030, FREN*2060

FREN*3210 Quebec Theatre W(3–0) [0.50]
A survey of recent trends in Quebec drama and readings from representative works by Quebecois playwrights. A seminar and lecture course. (Offered in odd–numbered years.)
Prerequisite(s): FREN*2030, FREN*2060

FREN*3220 Recent Quebec Writing W(3–0) [0.50]
An analysis of representative contemporary Quebec novels, short stories and poems from aesthetic, thematic and ideological points of view. (Offered in even–numbered years.)
Prerequisite(s): FREN*2030, FREN*2060

FREN*3230 The Structure of French F(3–0) [0.50]
Elements of the sound system, grammar and vocabulary of contemporary French.
Prerequisite(s): FREN*2030

FREN*3240 French Classicism W(3–0) [0.50]
Human destiny in 17th–century drama.
Prerequisite(s): FREN*2020, FREN*2030

FREN*3290 Post–colonial Francophone Fiction W(3–0) [0.50]
An introduction to 20th century Francophone writers from Maghreb, Black Africa, and the Caribbean through the study of selected works. (Offered in even–numbered years.)
Prerequisite(s): FREN*2020, FREN*2030

FREN*3300 Perspectives of French and Quebecois Literature S,F,W(3–0) [0.50]
Treatment of a certain theme or area of interest such as: regionalism, feminism, France and Quebec in the world, politics and polemics, popular literature in France, and Quebec humour. Content will vary from semester to semester.
Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3310 Perspectives of French and Quebecois Literature S,F,W(3–0) [0.50]
Treatment of a certain theme or area of interest such as: regionalism, feminism, France and Quebec in the world, politics and polemics, popular literature in France, and Quebec humour. Content will vary from semester to semester.
Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3320 Perspectives of French and Quebecois Literature S,F,W(3–0) [0.50]
Treatment of a certain theme or area of interest such as: regionalism, feminism, France and Quebec in the world, politics and polemics, popular literature in France, and Quebec humour. Content will vary from semester to semester.
Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3330 Perspectives of French and Quebecois Literature S,F,W(3–0) [0.50]
Treatment of a certain theme or area of interest such as: regionalism, feminism, France and Quebec in the world, politics and polemics, popular literature in France, and Quebec humour. Content will vary from semester to semester.
Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3340 Perspectives of French and Quebecois Literature S,F,W(3–0) [0.50]
Treatment of a certain theme or area of interest such as: regionalism, feminism, France and Quebec in the world, politics and polemics, popular literature in France, and Quebec humour. Content will vary from semester to semester.
Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3350 Perspectives of French and Quebecois Literature S,F,W(3–0) [0.50]
Treatment of a certain theme or area of interest such as: regionalism, feminism, France and Quebec in the world, politics and polemics, popular literature in France, and Quebec humour. Content will vary from semester to semester.
Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3360 Perspectives of French and Quebecois Literature S,F,W(3–0) [0.50]
Treatment of a certain theme or area of interest such as: regionalism, feminism, France and Quebec in the world, politics and polemics, popular literature in France, and Quebec humour. Content will vary from semester to semester.
Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3370 Perspectives of French and Quebecois Literature S,F,W(3–0) [0.50]
Treatment of a certain theme or area of interest such as: regionalism, feminism, France and Quebec in the world, politics and polemics, popular literature in France, and Quebec humour. Content will vary from semester to semester.
Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3380 Perspectives of French and Quebecois Literature S,F,W(3–0) [0.50]
Treatment of a certain theme or area of interest such as: regionalism, feminism, France and Quebec in the world, politics and polemics, popular literature in France, and Quebec humour. Content will vary from semester to semester.
Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3390 Perspectives of French and Quebecois Literature S,F,W(3–0) [0.50]
Treatment of a certain theme or area of interest such as: regionalism, feminism, France and Quebec in the world, politics and polemics, popular literature in France, and Quebec humour. Content will vary from semester to semester.

Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3500 French Translation II F(3–0) [0.50]

Contrastive grammar (French and English). Analysis of various styles and their application to written translation. Small discussion groups.

Prerequisite(s): FREN*2030, FREN*2500

FREN*3520 French Composition II W(3–0) [0.50]

A course similar to FREN*2520 with special emphasis on stylistics.

Prerequisite(s): FREN*2030, FREN*2520

FREN*3530 Business French F(3–0) [0.50]

This course is a detailed study of the French language as it is currently used in administration and business, both in France and Quebec. It will cover areas such as advertising, administrative reports, employment, communication and levels of language.

Prerequisite(s): FREN*2030

FREN*3560 Contemporary French Women's Writings W(3–0) [0.50]

A study of the main trends in women's writings and feminist criticism in contemporary France. (Offered in odd–numbered years.)

Prerequisite(s): FREN*2020, FREN*2030

FREN*3610 Studies in French Literature and Culture in Nice F,W(3–0) [0.50]

Thematic courses relating to the literature, arts, and society of metropolitan France and of the Francophone world. Options may include other languages, literatures, and other disciplines in the arts and social sciences. For Nice students only.

Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3620 Studies in French Literature and Culture in Nice F,W(3–0) [0.50]

Thematic courses relating to the literature, arts, and society of metropolitan France and of the Francophone world. Options may include other languages, literatures, and other disciplines in the arts and social sciences. For Nice students only.

Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3630 Studies in French Literature and Culture in Nice F,W(3–0) [0.50]

Thematic courses relating to the literature, arts, and society of metropolitan France and of the Francophone world. Options may include other languages, literatures, and other disciplines in the arts and social sciences. For Nice students only.

Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3640 Studies in French Literature and Culture in Nice F,W(3–0) [0.50]

Thematic courses relating to the literature, arts, and society of metropolitan France and of the Francophone world. Options may include other languages, literatures, and other disciplines in the arts and social sciences. For Nice students only.

Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3650 Studies in French Literature and Culture in Nice F,W(3–0) [0.50]

Thematic courses relating to the literature, arts, and society of metropolitan France and of the Francophone world. Options may include other languages, literatures, and other disciplines in the arts and social sciences. For Nice students only.

Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3660 Studies in French Literature and Culture in Nice F,W(3–0) [0.50]

Thematic courses relating to the literature, arts, and society of metropolitan France and of the Francophone world. Options may include other languages, literatures, and other disciplines in the arts and social sciences. For Nice students only.

Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3670 Studies in French Literature and Culture in Nice F,W(3–0) [0.50]

Thematic courses relating to the literature, arts, and society of metropolitan France and of the Francophone world. Options may include other languages, literatures, and other disciplines in the arts and social sciences. For Nice students only.

Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3680 Studies in French Literature and Culture in Nice F,W(3–0) [0.50]

Thematic courses relating to the literature, arts, and society of metropolitan France and of the Francophone world. Options may include other languages, literatures, and other disciplines in the arts and social sciences. For Nice students only.

Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*3690 Studies in French Literature and Culture in Nice F,W(3–0) [0.50]

Thematic courses relating to the literature, arts, and society of metropolitan France and of the Francophone world. Options may include other languages, literatures, and other disciplines in the arts and social sciences. For Nice students only.

Prerequisite(s): 1 of FREN*2020, FREN*2030, FREN*2060

FREN*4050 Early Modern French Culture F(3–0) [0.50]

A study of the literature and culture of Medieval and Renaissance France (1200–1600), from the chivalric and religious writings to humanist thought and early French feminism. (Offered in odd–numbered years.)

Prerequisite(s): FREN*2020, FREN*2030, FREN*3520

FREN*4300 Symbolist and Surrealist Poetry W(3–0) [0.50]

The French Symbolists of the 19th century. The 20th century Surrealist poets' vision of the world. (Offered in even–numbered years.)

Prerequisite(s): FREN*2020, FREN*2030, FREN*3520

FREN*4500 The French Language in Canada W(3–0) [0.50]
A descriptive, historical and socio–linguistic study of the varieties of French spoken in Canada, with particular emphasis on Quebec. (Offered in odd–numbered years.)
Prerequisite(s): FREN*2030, FREN*3230

FREN*4520 French Translation III F(3–0) [0.50]
A contrastive analysis of French and English stylistic resources, with application to English–French translation. (Offered in odd–numbered years.)
Prerequisite(s): FREN*2030, FREN*2500, FREN*3500

FREN*4600 Honours Seminar in French and Quebecois Studies S,F,W(3–0) [0.50]
Seminar on literary genres, movements and themes.
Prerequisite(s): FREN*2020, FREN*2030, FREN*2060, FREN*3520

FREN*4610 Honours Seminar in French and Quebecois Studies S,F,W(3–0) [0.50]
Seminar on literary genres, movements and themes.
Prerequisite(s): FREN*2020, FREN*2030, FREN*2060, FREN*3520

FREN*4620 Honours Seminar in French and Quebecois Studies S,F,W(3–0) [0.50]
Seminar on literary genres, movements and themes.
Prerequisite(s): FREN*2020, FREN*2030, FREN*2060, FREN*3520

FREN*4630 Honours Seminar in French and Quebecois Studies S,F,W(3–0) [0.50]
Seminar on literary genres, movements and themes.
Prerequisite(s): FREN*2020, FREN*2030, FREN*2060, FREN*3520

FREN*4640 Honours Seminar in French and Quebecois Studies S,F,W(3–0) [0.50]
Seminar on literary genres, movements and themes.
Prerequisite(s): FREN*2020, FREN*2030, FREN*2060, FREN*3520

FREN*4650 Honours Seminar in French and Quebecois Studies S,F,W(3–0) [0.50]
Seminar on literary genres, movements and themes.
Prerequisite(s): FREN*2020, FREN*2030, FREN*2060, FREN*3520

FREN*4740 Research Paper in French Studies I S,F,W(3–0) [0.50]
A research paper in French on an approved topic in French literature or language. Individual tuition will be given on methods of research and techniques of writing. This course will be the equivalent of a semester course and is intended to serve as an introduction to future research at the M.A. and Ph.D. levels.
Prerequisite(s): FREN*2020, FREN*2030, FREN*2060, FREN*3520

FREN*4750 Creative Writing in French S,F,W(3–0) [0.50]
The development and revision of a major work of creative writing in French (fiction, poetry, or drama), under the supervision of a faculty member.
Prerequisite(s): (FREN*2020 or FREN*2060), FREN*2030, FREN*3520
Restriction(s): instructor consent required

FREN*4770 Research Paper in French Studies II S,F,W(3–0) [0.50]
Same as FREN*4740: Research Paper in French Studies I
Prerequisite(s): FREN*2020, FREN*2030, FREN*2060, FREN*3520, FREN*4740

FREN*4900 Applied Linguistics: French Studies W(3–0) [0.50]
A course specially designed for future teachers of French, in which the principles of linguistics are applied to the teaching of French. (Offered in even–numbered years.)
Prerequisite(s): FREN*2030, FREN*3230, LING*1000 or permission of the department

XII—Course Descriptions, Geography

Department of Geography.

Students majoring in other departments may take a number of Geography courses without the prerequisites listed below if they obtain the permission of the instructor.

Note: **Several courses in Geography are listed as acceptable for the Natural and Mathematical Science B.A. Distribution Requirements or as Non–Science Electives for B.Sc. students.**

For courses without a semester designation, or with an alternate year designation, please check with the department.

GEOG*1200 People, Places and Spatial Organization F,W(3–0) [0.50]

This course introduces key concepts in Human Geography and illustrates their practical application. Topics include population mobility and migration, settlement systems, urban and rural land use patterns and locational decision–making. (Also offered through distance education format.)

GEOG*1220 Human Impact on the Environment F,W(3–0) [0.50]

A global overview of the changing relationships among society, technology and the environment. This course emphasizes the major stages of human use of resources and the environmental consequences of global changes in production systems. It contrasts Third and First World experiences, focusing on core–periphery relationships. (Also offered through distance education format.)

GEOG*1300 Introduction to the Biophysical Environment F,W(3–2) [0.50]

An introduction to Physical Geography. The principles and processes governing climate–landform–soil–vegetation systems and interrelationships. Natural and human–induced changes to environmental systems. Laboratories will address techniques of measurement, representation and analysis of environmental systems through maps, air photographs, remote sensing and field observations. (Also offered through distance education format.)

Restriction(s): GEOG*1350

GEOG*1350 Introduction to the Biophysical Environment F,W(3–0) [0.50]

An introduction to Physical Geography. The principles and processes governing climate–landform–soil–vegetation systems and interrelationships. Natural and human–induced changes to environmental systems. This is the non–laboratory version of GEOG*1300.

Restriction(s): GEOG*1300

GEOG*2000 Geomorphology F(3–2) [0.50]

An introduction to geomorphology emphasizing weathering, slope and fluvial processes within drainage basins, and glacial and periglacial processes. Application of field and laboratory techniques.

Prerequisite(s): 1 of GEOG*1300, GEOG*1350, GEOL*1000, GEOL*1100

GEOG*2030 International Political Geography W(3–0) [0.50]

Examination of the changing world political map from the perspective of national and ethnic identities, their territorial attachments and intra– and inter–state structures and processes. Territorial restructuring, international law, localization and globalization are considered. Particular attention is paid to settlement and development processes and strategies in various parts of the world.

Prerequisite(s): 5.00 credits, GEOG*1220 is recommended

GEOG*2110 Climate and the Biophysical Environment W(3–1) [0.50]

The interrelationships between the atmosphere, lithosphere, hydrosphere, and biosphere to produce distinct physical landscapes (climates, soils, vegetation). Emphasis on the role of climate and the flows of energy, water, and biogeochemicals.

Prerequisite(s): GEOG*1300 or GEOG*1350

GEOG*2210 Environment and Resources W(3–0) [0.50]

This course examines the interrelationships between people and biophysical processes. The main themes are: 1) characteristics of natural resources and processes through which they are developed and used and 2) human response to environmental conditions, including natural hazards and global change. Contemporary Canadian case studies will be presented at the regional and national scales. (Also offered through distance education format.)

Prerequisite(s): GEOG*1220 is recommended

GEOG*2230 Economic Geography F(3–0) [0.50]

An introduction to the spatial distribution of economic activity. The course examines patterns, processes and problems in extractive activities, manufacturing, marketing and the service sector, including the transportation of commodities and people. The principles of economic location are applied to regional economic analysis and development.

Prerequisite(s): GEOG*1200

GEOG*2420 Aerial–photo Interpretation F(2–3) [0.50]

An introduction to the principles and techniques of air photo interpretation and elementary photogrammetry. Topics include stereoscopic viewing, parallax, flightline planning, and mapping from air photos. Lab exercises focus on specific applications in natural habitats and in rural and urban settings.

Prerequisite(s): 0.50 credit in geography and/or earth science

GEOG*2460 Analysis in Geography F(3–2) [0.50]

The application of modern techniques to geographic study. The interpretation of geographic phenomena by objective methods. Major honours students in Geography must complete this course by the end of semester 4.

Prerequisite(s): 0.50 credit at the 1000 level in Geography

GEOG*2480 Cartographic Methods W(3–2) [0.50]
An introduction to the theory and techniques of processing and displaying spatial data. Mapping concepts such as scale, co–ordinate systems, map projections, generalization, data symbolization and map design are examined using both manual and automatic Geographic Information Systems (GIS) approaches. Major honours students in Geography must complete this course by the end of semester 4.
Prerequisite(s): 5.00 credits

GEOG*2510 Canada: A Regional Synthesis F(3–0) [0.50]
This course is designed to provide a better understanding of the nature and basis of Canadian regionalism. The first section of the course stresses the biophysical base and the inequality of the natural resource endowment. The historical geographic approach and the systematic overviews of contemporary Canada stress respectively the development and nature of the Canadian space–economy. The final section on regions, regionalism and nationalism provides an overview of the heartland–hinterland dichotomy and centrifugal and centripetal forces operative in the nation.

GEOG*3000 Fluvial Processes U(3–2) [0.50]
This course examines processes and landforms associated with rivers. Particular emphasis is placed on the interaction between water and sediment movement and channel morphology. Case studies of human impact on river systems are presented.
Prerequisite(s): GEOG*2000

GEOG*3020 Global Environmental Change F(3–1) [0.50]
Major global environmental issues examined include climate change, deforestation, desertification and global fisheries. This course is interdisciplinary, exploring the interactions of bio–physical processes with human socio–economic dynamics, including policy initiatives. Particular attention is given to global climate change, its causes, its nature and extent, its implications for ecosystems and societies, and its policy ramifications.
Prerequisite(s): 7.50 credits, GEOG*2210 is recommended

GEOG*3050 Third World Urbanization U(3–0) [0.50]
An analysis of the spatial and temporal patterns of urbanization in the Third World. Global, national and regional scales of urbanization are addressed through the presentation of concepts and theories and their application to contemporary processes. Specific foci include housing and employment, urban–rural relations, regional disparities, urban structural characteristics, and the relationship between urbanization and development processes.
Prerequisite(s): 7.50 credits, GEOG*2030 is recommended
Restriction(s): GEOG*2050

GEOG*3110 Biotic and Natural Resources F(2–2) [0.50]
This course focuses on the ecological basis for resource management, evaluates a number of current ecological theories and addresses their implications for resource management.
Prerequisite(s): 1 of BIOL*2010, BOT*2050, ENVB*2030, GEOG*2110

GEOG*3210 Management of the Biophysical Environment F(3–0) [0.50]
An examination of resource management, focusing on public and private decision–making processes. Consideration of techniques for evaluating resources, including EIA and risk analysis. Emphasis is on the economic, social and environmental implications of resource development and use. Contemporary Canadian case studies will be presented at appropriate scales. (Also offered through distance education format.)
Prerequisite(s): 7.50 credits (GEOG*2210 is recommended)

GEOG*3320 Agricultural Systems and Dynamics U(3–0) [0.50]
This course explores the structure and dynamics of food production systems in advanced economies. Particular attention is paid to the interaction of farms with the environmental, economic, social and institutional forces that shape local types and regional patterns of agricultural activity. The concept of sustainability is used as a focus for the consideration of selected trends in agriculture and associated policy and planning issues.
Prerequisite(s): 7.50 credits

GEOG*3380 The Making of the Ontario Landscape U(3–0) [0.50]
The evolution of resource use systems, settlement patterns and built environments, their interrelationships and contribution to the Ontario landscape. Emphasis is given to the interpretation and analysis of source materials. (Offered in alternate years.)
Prerequisite(s): 7.50 credits

GEOG*3400 Urban Geography U(3–0) [0.50]
A study of the evolution of the internal structure and functions of the city. Emphasis is placed on processes of social and economic change in the context of the built environment.
Prerequisite(s): 7.50 credits

GEOG*3480 Geographic Information Systems F,W(3–2) [0.50]
An introduction to Geographic Information Systems (GIS). Topics include data input and output, map creation, analysis functions, data quality issues, data management and implementation. Students are introduced to a range of GIS applications, including those in resource analysis and management. This course requires some familiarity with numerical methods and computer operations.
Prerequisite(s): 10.00 credits (GEOG*2480 is recommended)

GEOG*3490 Recreational Behaviour and Resources U(3–0) [0.50]
Trends and problems in the development, use and management of outdoor recreational and tourist resources. Emphasis is on the spatial, socio–economic and environmental implications of the relationship between recreational behaviour and resources.
Prerequisite(s): 7.50 credits

GEOG*3510 China U(3–0) [0.50]
The study of an ancient civilization significantly affected by the spread of a global capitalist economy and the development of socialism. Patterns of human organization and resource use will be examined according to the four major periods of China's recent history, namely, feudalism, colonialism, "Maoism", and "modernism". (Offered in alternate years.)
Prerequisite(s): 7.50 credits

GEOG*3530 U.S.A. U(3–0) [0.50]
The spatial evolution of the United States as a complex economy and society. Selected themes and case studies are explored in relation to the development of varied regional systems and landscapes. (Offered in alternate years.)
Prerequisite(s): 7.50 credits

GEOG*3600 Geography of a Selected Region U(3–0) [0.50]
The study of an area outside Anglo–America which will include topics in physical, economic, social and historical aspects of geography. (Offered in alternate years.)
Prerequisite(s): 7.50 credits

GEOG*3610 Environmental Hydrology W(3–1) [0.50]
An introductory course in hydrology, the study of water in the environment. Emphasis is placed on understanding and modeling the hydrologic cycle. Topics include hydrologic processes, water resources, and case studies of freshwater systems.
Prerequisite(s): 7.50 credits, (1 of GEOG*2000, GEOG*2110, other 2000 level earth science or engineering science course is recommended)

GEOG*3620 Desert Environments U(2–2) [0.50]
This course investigates the interrelationships among various biophysical processes that control weathering rates, sediment transport and landform/landscape development in arid environments. Topics will include: the concept of desertification, use and misuse of surface and ground water, salinization and the effect of human disturbance on landscape development. (Offered in alternate years.)
Prerequisite(s): 7.50 credits, (1 of GEOG*2000, GEOG*2110, other 2000 level earth science or engineering science course is recommended)

GEOG*4110 Environmental Systems Analysis U(2–2) [0.50]
An integrated systems approach to solving issues of environmental evaluation, impact and development. Focus will be on the biophysical components of the environment.
Prerequisite(s): GEOG*3110 or GEOG*3610

GEOG*4150 Sedimentary Processes U(2–2) [0.50]
This course examines the basic properties and flow characteristics of fluids that control the entrainment and transport of sediment by air and water. Bedform development in fluvial, coastal and aeolian environments are also discussed in relation to fluid flow mechanics. Lectures are complemented by weekly labs using the wind tunnel, flume and wave tank.
Prerequisite(s): GEOG*3000

GEOG*4200 City, Region and Economic Globalization U(3–0) [0.50]
Many of the traditional features of cities and regions are undergoing change by powerful forces of economic globalization. The course examines spatial patterns and processes of restructuring and adaptation in the urban sector of Canada and other developed economies. Evolving forms of cities, new production and service regions and redundant spaces are considered in the context of changing processes and policies.
Prerequisite(s): GEOG*3400

GEOG*4210 Environmental Resource Analysis U(3–1) [0.50]
This course provides an opportunity for advanced studies in resource management. A central aim is the development of an understanding of principles, practices and emerging issues relating to environmental impact assessment. The preparation and presentation of a group project is an integral component of the course.
Prerequisite(s): GEOG*3210
Equate(s): ENVS*4220

GEOG*4250 Coastal Processes U(2–2) [0.50]
This course examines the geomorphic processes and associated landforms found in the coastal zone. Initially the focus is on developing an understanding of the major controls on coastal erosion and sediment transport, including waves, nearshore currents and water level fluctuations. This is followed by the study of features and processes in selected coastal environments such as beaches, barrier islands and spits, coastal sand dunes and bluff coasts. In each case applications to problems of coastal management are introduced.
Prerequisite(s): 1 of GEOG*3000, GEOG*3610, GEOG*3620

GEOG*4390 Rural Systems in Transition U(3–0) [0.50]
This course examines patterns and processes of rural restructuring and adaptation in Canada and other advanced economies. Themes include the New Rural Economy, settlement systems and population dynamics, and emerging trends in rural service provision. Particular attention is paid to the nature of competing demands on rural resources and to the links between restructuring processes and the sustainability of rural communities.

Prerequisite(s): GEOG*3320

GEOG*4480 Applied Geographic Information Systems U(2–2) [0.50]

This course adopts a project–oriented approach to the application of Geographic Information Systems (GIS) in spatial analysis. Students will have the opportunity to design and implement a research project using GIS techniques to investigate a problem in any area of Geography.

Prerequisite(s): GEOG*3480

GEOG*4690 Geography Field Research F(3–6) [1.00]

This course provides an opportunity for senior students to develop skills in the design, implementation and presentation of a field research project. The course involves a field trip of about 10–14 days, either in Canada or abroad. This component of the course takes place between the end of the summer session and the start of classes in the fall semester. Classes during the fall semester focus on the analysis and interpretation of data and incorporate student research seminars. Information on the location and cost of the field research course is available from the department in the winter semester prior to each fall offering. Open to majors in Geography (B.A. and B.SC.(Env.) and in Earth Surface Science (B.SC.) with an overall average of at least 70% at the time of registration.

Prerequisite(s): 12.50 credits

GEOG*4880 Senior Seminar in Geography U(3–0) [0.50]

A critical overview of the evolution and current status of Geography. Particular emphasis will be given to the variety of approaches and convergence and divergence within the discipline. The interaction between human and physical geographers and their approaches to issues and the subject will be analyzed. Open to major honours students in Geography at semester 6 or above.

GEOG*4990 Independent Study in Geography U(3–0) [0.50]

The independent study option is designed to provide senior undergraduate students with an opportunity to pursue library or field research under faculty supervision and to prepare a research report. Formal agreement between the student and the faculty supervisor is required, as is approval of the department chair. Open to majors in Geography (B.A. and B.SC.(Env.) and in Earth Surface Science (B.SC.) with an overall average of at least 70% at the time of registration.

XII—Course Descriptions, Geology

Department of Land Resource Science.

GEOL*1050 Geology and the Environment F,W(2–3) [0.50]
Geological materials, their origin, recognition and economic potential, use and location; oil and gas, coal, mineral deposits, aggregate resources, groundwater, Geological basis for environmental evaluation and land use. Emphasis on local and North American examples.

GEOL*1100 Principles of Geology F,W(3–0) [0.50]
Introduction to geological principles, their historical development and application to interpreting Earth materials and processes. Suitable for those wishing a general knowledge of earth sciences. This course may not be taken for credit by students in the Earth and Atmospheric Science (B.SC.(Env.) or Earth Surface Science (B.SC.) majors. (Also offered through distance education format.)
Restriction(s): GEOL*1040, GEOL*1100, UNIV*1030

GEOL*2020 Stratigraphy F(3–0) [0.50]
Principles of recognizing and interpreting earth surface environments using examples from geology, geomorphology and archeology. Brief summary of sediment identification, recognition of processes and environments. Section description and interpretation followed by principles of physical correlation and facies interpretation. Concepts of physical, biological and radiometric dating. Controls on stratigraphic sequence development – isostasy, eustasy and tectonics. Sedimentary basin development, interpretation and history including changes in atmosphere, hydrosphere and biosphere.
Prerequisite(s): 1 of GEOL*1000, GEOL*1050, GEOL*1100, GEOG*1300, GEOG*1350 or equivalent

GEOL*2110 Earth Material Science F(3–3) [0.50]
Minerals are the building blocks of rocks, and rocks are the basis of the earth's crust. The nature , classification and recognition of the common rocks and minerals and their chemical and physical transformations is dealt with. Emphasis is on the role that minerals and rocks play in determining the abiotic character of earth–surface environments.
Prerequisite(s): 1 of GEOL*1000, GEOL*1050, GEOL*1100
Restriction(s): GEOL*2100, GEOL*3070

GEOL*2150 Glacial Geology W(3–3) [0.75]
Study of the interaction of ice and the earth's crust. Principles of physical glaciology and movement of ice masses. Origin, environment of deposition and structure of glacial materials. Periglacial phenomena with emphasis on cryoturbation. Elements of Pleistocene stratigraphy and the glacial sediments of the Great Lakes. Field trips will be scheduled.
Prerequisite(s): 1 of GEOG*1300, GEOL*1000, GEOL*1050, GEOL*1100, SOIL*2010
Restriction(s): GEOL*2160

GEOL*2160 Glacial Geology W(3–0) [0.50]
Identical to GEOL*2150 but without laboratory. Lectures taken with GEOL*2150.
Prerequisite(s): 1 of GEOG*1300, GEOL*1000, GEOL*1050, GEOL*1100, SOIL*2010
Restriction(s): GEOL*2150

GEOL*3060 Groundwater W(3–0) [0.50]
To obtain a general understanding of the physical and chemical processes that operate in the groundwater zone under natural and human–induced conditions. The interrelations between the groundwater regime and the other components of the hydrological cycle. Considerable emphasis is placed on the applied aspects of topics such as exploration, testing and development of aquifers for water supply, the chemical quality of groundwater, and the hydrogeological aspects of waste disposal.
Prerequisite(s): 1 of MATH*1000, MATH*1080, MATH*1200, IPS*1110

GEOL*3090 Applied Structural Geology W(3–0) [0.50]
Systematic study of structural elements of the earth crust. Introduces concepts on the distribution, origin and structural development of the major landforms in North America and other continents (plate tectonics). The course provides examples of structural geology applied to engineering, environmental geology, and ore geology. Hands–on experience on deformation analysis, slope stability and interpretation of structures during the field trip and in classroom simulations.(Offered in odd–numbered years.)
Prerequisite(s): 1 of GEOL*1000, GEOL*1050, suitable geomorphology credit

GEOL*3100 Non–Renewable Earth Resources W(3–0) [0.50]
An analysis of processes leading to formation and accumulation of principal non–renewable metallic and non–metallic mineral and fuel resources. Methods of extraction and processing, economic assessment, environment problems associated with resource development. Field trips may be scheduled. (Offered in even–numbered years.)
Prerequisite(s): (GEOL*1000 or GEOL*1050), 0.50 credit at the 2000 level in geology or geomorphology

GEOL*3120 Paleontology W(3–0) [0.50]
Basic principles of analysis of fossil communities (mostly marine). Students should already know the basic biology of common marine invertebrates. Sediment analysis and process interpretation to determine paleoenvironments. Analysis of fossil preservation, autecology and population structures of species; community paleoecology of selected fossil assemblages. Simple paleobiogeography and basics of community evolution through time. Stages in the evolution of marine and continental ecosystems possible causes including physical (sea–levels, meteorite impacts) and biological (predation, evolution) components. This is not a 'history of life' course. (Offered in even–numbered years.)
Prerequisite(s): ZOO*2070
Restriction(s): GEOL*3110

GEOL*3130 Agrogeology W(3–0) [0.50]
Inter–disciplinary course: geology; soil, crop and horticultural sciences; international development. The geological basis of farming, application of agrominerals, such as phosphates, limestones, gypsums, as well as fertilizers in agriculture and horticulture. Evaluating the environmental effects of mining/processing of agrominerals and the use of fertilizers. Case studies and experiences from around the world.
Prerequisite(s): 1 of AGR*2301/2, GEOL*1000, GEOL*1050, SOIL*2010

GEOL*3190 Environmental Water Chemistry F(3–0) [0.50]
An examination of the chemical composition of both natural and contaminated waters at the earth's surface and the interaction of these waters with soils and sediments. The significance of these interactions will be studied with respect to the mobility of organic and metallic constituents in geochemical cycles and as contaminants in the environment.
Prerequisite(s): 1 of CHEM*1010, CHEM*1050, CHEM*1310

GEOL*4090 Sedimentology F(3–3) [0.50]
Origin, transport, deposition of sediments, and formation of sedimentary rocks. Emphasis will be on the interpretation of recent and ancient environments of deposition, and on the uses of sedimentary materials. Six laboratories will be scheduled as field trips. One Saturday field trip may be scheduled.(Offered in even–numbered years.)
Prerequisite(s): (1 of GEOL*2020, GEOL*2150, equivalent), (0.50 credit at the 3000 level in the GEOG*XXXX or GEOL*XXXX grouping or equivalent)

GEOL*4110 Topics in Earth Science F,W(3–0) [0.50]
Lecture–discussion or seminar on selected topics in Earth Science to be conducted by faculty with expertise in the area. Students should check with the department to determine what topic, if any, will be offered during specific semesters. Field trips will be scheduled as required.
Prerequisite(s): (1 of GEOG*1300, GEOL*1000, GEOL*1050), 0.50 credit at the 3000 level in a science appropriate to chosen topic

GEOL*4120 Topics in Earth Science F,W(3–0) [0.50]
Lecture–discussion or seminar on selected topics in Earth Science to be conducted by faculty with expertise in the area. Students should check with the department to determine what topic, if any, will be offered during specific semesters. Field trips will be scheduled as required.
Prerequisite(s): (1 of GEOG*1300, GEOL*1000, GEOL*1050), 0.50 credit at the 3000 level in a science appropriate to chosen topic

GEOL*4130 Clay and Humic Chemistry W(3–3) [0.50]
Study of the fundamental chemistry of clay minerals and humic substances in the environment, with particular reference to soils, sediments and waters. Emphasis will be placed on their structures and charge characteristics in the context of surface complexation modeling of proton binding and cation and anion adsorption. (Offered in alternate years.)
Prerequisite(s): SOIL*3060 or GEOL*3190
Restriction(s): GEOL*4060

XII—Course Descriptions, German Studies

School of Languages and Literatures.

NOTE: The School reserves the right to determine the appropriate level to be taken by students enrolling in language courses.

GERM*1100 Introductory German I F,W(3–1) [0.50]

A beginning course in German. Students will attain a basic knowledge of the language and practice all four language skills (listening, speaking, reading and writing). They will also learn about aspects of German culture. This course may not normally be taken by anyone who has grade 12 or OAC German.

GERM*1110 Introductory German II F,W(3–1) [0.50]

An intensification of the four language skills introduced in GERM*1100. Students will attain a grasp of essential grammatical concepts and the ability to converse comfortably in everyday situations. This course may not normally be taken by anyone who has OAC German.

Prerequisite(s): GERM*1100 or equivalent

GERM*2240 Germany Through the Ages W(3–0) [0.50]

A survey of German history, society and culture illustrated by art, music, film and literature. This course is taught in English.

GERM*2400 Contemporary Germany W(3–0) [0.50]

A multimedia approach to contemporary German culture, 20th–century history and recent political events. Emphasis on oral work in German.

Prerequisite(s): GERM*1110 or equivalent

GERM*2490 Intermediate German I F(3–1) [0.50]

Systematic oral and written practice with discussion of contemporary texts, and comprehensive grammar review.

Prerequisite(s): 1 of OAC German, GERM*1110, equivalent

GERM*2500 Intermediate German II W(3–1) [0.50]

Further development of conversational and writing skills; introduction to more complex grammar.

Prerequisite(s): GERM*2490 or equivalent

GERM*2560 Themes in German Literature/Culture W(3–0) [0.50]

This course aims to provide students with basic skills for interpreting literary texts through an exploration of themes that have shaped German literature and culture. Note: Students intending to take both GERM*2560 and GERM*2590 should take GERM*2560 before GERM*2590.

Prerequisite(s): GERM*2490 or permission of the instructor

GERM*2590 Classics of German Literature F(3–0) [0.50]

This course is designed to introduce students to German literary texts which could be considered classics. Note: Students intending to take both GERM*2560 and GERM*2590 should take GERM*2560 before GERM*2590.

GERM*3420 Late 18th–and 19th–Century Drama W(3–1) [0.50]

German–language drama from ca. 1780 to ca. 1900 within a European context, including enlightenment, revolutionary and naturalist drama. This course is offered in conjunction with HUMN*3420. Lectures are in English. Students registered in GERM*3420 will meet a fourth hour per week to discuss texts in German. (Offered in odd–numbered years.)

Prerequisite(s): GERM*2560, GERM*2590

Restriction(s): HUMN*3420

GERM*3430 Tradition and Innovation in 20th–Century Drama W(3–1) [0.50]

Trends, themes and theories in 20th–century German–language drama, with particular focus on significant innovations (e.g. expressionist drama, Brecht's epic theatre). This course is offered in conjunction with HUMN*3430. Lectures are in English. Students registered in GERM*3430 will meet a fourth hour per week to discuss texts in German. (Offered in even–numbered years.)

Prerequisite(s): GERM*2560, GERM*2590

Restriction(s): HUMN*3430

GERM*3440 Ideals and Anxieties in 19th–Century German Literature and Culture F(3–1) [0.50]

An exploration of philosophical and artistic goals, preoccupations and themes which shaped 19th–century literature and culture. Authors and movements of international significance such as Goethe, Heine, Romanticism, Realism will be discussed. This course is offered in conjunction with HUMN*3440. Lectures are in English. Students registered in GERM*3440 will meet a fourth hour per week to discuss texts in German. (Offered in odd–numbered years.)

Prerequisite(s): GERM*2560, GERM*2590

Restriction(s): HUMN*3440

GERM*3450 (Self–) Images in 20th–Century German Literature and Culture F(3–1) [0.50]

Trends and cultural movements that have shaped the 20th–century as reflected in works of major writers (e.g. Mann, Kafka, Grass, Wolf) and film directors (e.g. Fassbinder). This course is offered in conjunction with HUMN*3450. Lectures are in English. Students registered in GERM*3450 will meet a fourth hour per week to discuss texts in German. (Offered in even–numbered years.)

Prerequisite(s): GERM*2560, GERM*2590

Restriction(s): HUMN*3450

GERM*3500 Advanced German F(3–0) [0.50]

A study of advanced German grammar as well as aspects of structure and style of the German language. Oral presentations and discussions with a special emphasis on essay writing. Translation into idiomatic German and English.

Prerequisite(s): GERM*2500

GERM*3530 German in the Workplace W(3–0) [0.50]

This course is designed to enable students to communicate and interact appropriately in professional and business situations.

Prerequisite(s): GERM*2500 or equivalent

GERM*3600 Directed Readings in German Studies U(3–0) [0.50]

A reading course in German literature designed according to the program and interest of the individual student.

GERM*4940 Research Paper in German Studies U(3–0) [0.50]

A reading course on some approved topic in German language or literature, leading to an end–of–term research paper.

XII—Course Descriptions, Greek

School of Languages and Literatures.

NOTES: Literary texts are, at all levels, studied in the original language. Students registering in these courses will be expected to have the appropriate knowledge. Higher level courses in Greek are available as language modules attached to selected Classical Studies courses. (See Classical Studies course descriptions.)

GREK*1100 Preliminary Greek I F(3–0) [0.50]

A beginning course in Greek, providing the fundamentals of structure and idiom. (This course may not be taken by anyone who has OAC Greek).

GREK*1110 Preliminary Greek II W(3–0) [0.50]

A continuation of GREK*1100.

Prerequisite(s): GREK*1100 or high school year 4 (Grade 12) Greek

GREK*2020 Greek Language and Culture F(3–0) [0.50]

Consolidation of fundamental morphology and syntax acquired in GREK*1100 and GREK*1110. Intensive reading in texts that also illuminate aspects of Greek culture.

Prerequisite(s): GREK*1100, GREK*1110

XII—Course Descriptions, History

Department of History.
Students wishing to take a 3000 level course must have pass standing in at least 5.00 university credits.
Students wishing to take a 4000 level course must have pass standing in at least 10.00 credits. Access to all 4000 level courses is restricted to students in the B.A. Honours program with a minimum 70% average in all history course attempts.
Students should note the prerequisite requirements for upper level courses in planning their individual programs.
Content of individual courses may vary depending on the instructor; students therefore should check course outlines at the time of course selection.
Courses marked (C) are core courses required of all History program students.
Courses marked (H) are honours courses. Students in a general program wishing to take these must obtain the permission of instructors concerned.

HIST*1010 Europe in the Age of Expansion F,W(3–0) [0.50]
This course will deal with the evolution and expansion of European society during the pre–industrial era. Commencing with the upheavals of Renaissance and Reformation it will survey such themes as the voyages of exploration, the impact of western culture on indigenous societies, the development of commercial capitalism, the transformation of science and technology and the conflict between imperial powers in Europe and overseas. (C)

HIST*1150 20th Century Global History F,W(3–0) [0.50]
Twentieth–century world history with particular emphasis on Asia, Africa, and Latin America.

HIST*1250 Science and Society Since 1500 F(3–0) [0.50]
This course is intended as an introduction to the history of science and its interrelationships with society in the western world since 1500, including its influence on the environment, religion, economics and political developments, warfare, etc. Particular emphasis will be laid upon scientific developments in the 19th or 20th centuries.

HIST*2000 The British Isles, 1066–1603 S,F(3–0) [0.50]
A comparative survey of the histories of England, Scotland, Ireland and Wales during the Medieval and Early Modern eras. Stress will be placed upon common themes such as institutional development, warfare and the often violent interaction between the English and the Celtic peoples.

HIST*2020 Film as History F(2–1) [0.50]
This course will consider film both as a source and as a comment on the past. Topics will vary depending on instructor expertise, and may include film as propaganda, the city in film, film as myth, women and gender in film, film and war.

HIST*2040 War and Society W(3–0) [0.50]
Concentrating on developments following the introduction of gunpowder, the course will consider the evolution of military strategy and tactics, the impact of technology on warfare, and the relationship between war and civilian populations.

HIST*2110 The Colonial Americas: A Comparative History W(3–0) [0.50]
A study of the comparative histories of colonial societies of England, France and Spain from their first settlements to independence. The course will compare the interconnections as well as the uniqueness of each colonial society in terms of their patterns of settlement, relationships with native peoples, economic and social developments, and their eventual movement toward autonomy and independence.

HIST*2150 U.S.A.: Revolution to Civil War F(3–0) [0.50]
History of the United States from 1760 to 1877. The course will consider themes of westward expansion, sectionalism and Civil War, immigration, and the growth of modern American society.
Restriction(s): HIST*2650

HIST*2200 The Medieval World W(3–0) [0.50]
The major events and developments in Europe, north Africa and Western Asia from the fall of the Roman Empire to 1500 a.d. Emphasis will be placed on the evolution of western Christianity, the rise and expansion of Islam, the emergence of the University, and the growth of literacy and print culture culminating in the humanist movement of the late Middle Ages.

HIST*2250 Environment and History S(–) [0.50]
An introduction to the field of environmental history – its nature and uses. This course provides a historical perspective to environmental issues. It examines the causes and impact of human–induced modification of the natural world in selected areas of the globe, the evolution of attitudes and ideas about the natural world over time and the growth of conservation/environmental issues and movements. (Offered through distance education format only.)

HIST*2260 Religion and Society in the Modern World F(3–0) [0.50]
A survey of the major trends in religious beliefs and practices and their social impact since the Reformation. The focus of the course is on the British Isles and North America with some discussion of developments in Continental Europe.

HIST*2390 Imperial and Soviet Russia Since 1800 W(3–0) [0.50]
An introductory survey of Russian History from the death of Catherine the Great to the onset of World War II. This course will focus on efforts by Russian rulers to modernize the Empire's social and economic institutions in response to Western influence. Attention will be directed to the study of the musical culture of Russia. Previous familiarity with basic music terminology and note reading is recommended. (Offered in odd–numbered years.) (Also listed as MUSC*2390.)

HIST*2450 Historical Methods F(3–0) [0.50]
A course designed to acquaint students with the development of historical writing, the interpretive problems surrounding the study of history, and the methods employed by historians. (C)
Prerequisite(s): 1.00 credit in history at the 1000 or 2000 level

HIST*2500 Britain and the World Since 1600 U(3–0) [0.50]
This course will survey the history of England and the Celtic Regions of the British Isles from the close of the Tudor period up to the mid–20th century. Emphasis will be placed on social and economic development before and after the Industrial Revolution as well as on those political and military challenges which have characterized Britain's status as a global power in the modern era.

HIST*2510 The Emergence of Modern European Society 1789–1945 F(3–0) [0.50]
This course will deal with the emergence of modern European society as the result of socio–economic and consequent political changes from the French Revolution to the end of World War II.

HIST*2601 Canadian History F(2–1) [0.50]
First part of the two–semester course HIST*2601/2. Refer to HIST*2601/2 for course description.
Restriction(s): HIST*2600

HIST*2601/2 Canadian History F/W(2–1) [1.00]
A study of selected events and issues in Canadian history from 1500 to the present to deepen our understanding of Canadian social, economic and political structures and values. This is a two–semester course offered over consecutive semesters. When you select it you must select HIST*2601 in the Fall semester and HIST*2602 in the Winter semester. A grade will not be assigned to HIST*2601 until HIST*2602 has been completed. (C)
Restriction(s): HIST*2600

HIST*2602 Canadian History W(2–1) [0.50]
Second part of the two–semester course HIST*2601/2. Refer to HIST*2601/2 for course description.
Prerequisite(s): HIST*2601
Restriction(s): HIST*2600

HIST*2610 Contemporary Canadian Issues S(3–0) [0.50]
A study of selected issues in modern Canadian history. The subjects investigated such as natives, the environment, the state, the family, will vary with the expertise of the instructor.

HIST*2650 America Since 1877 W(3–0) [0.50]
A survey of the history of the United States since Reconstruction. Political, social and intellectual developments will be covered, as will the rise of America to world power.

HIST*2800 The History of the Modern Family W(3–0) [0.50]
An examination of the family since 1500 with particular emphasis on the English speaking world, though comparisons will be made with other societies. Topics considered will include: change in the legal structure of marriage; power relations and sex roles within the family; the role of kin in the family; changing attitudes to sexuality; the attitude of state to the family and its functions.

HIST*2820 Modern France, 1750–1992: From Louis XV to Mitterand U(3–0) [0.50]
This course is a survey of French history from the beginning of modernization in the 18th century to the challenges of the late 20th century. Topics will include the Revolution, the Napoleonic period, social and political transformation in the 19th century, the Great War, the defeat of 1940 and Vichy, and the remarkable changes in French life since the Second World War.

HIST*2830 The Emergence of Modern Germany 1871–1990 U(3–0) [0.50]
This course will be devoted to a study of major themes in modern German history, and to an analysis of Germany's role in post–war Europe. Topics include the unification of Germany, the role of nationalism in modern German history, the significance of the Bismarck era, the rise of Hitler and the development of the two Germanies until their unification in 1990.

HIST*2850 History of Greece and Rome W(3–0) [0.50]
The history of the Mediterranean World from prehistoric Greece through Classical Greece and Rome to the legalization of Christianity in the Roman Empire in the 4th century.

HIST*2890 History of the Islamic World F(3–0) [0.50]
An introduction to the history of Islam. The course will consider the founding of Islam, its global diffusion, and its role in the transformation of modern societies in the developing world.

HIST*2910 History of Modern Asia W(3–0) [0.50]
An introduction to the histories and cultures of South, Southeast and East Asia since 1750. The course will consider the evolution of Asian religions, cultural identities, concepts of state and of society in the modern era.

HIST*2920 Republican Latin America W(3–0) [0.50]
This course will study selected themes in the history of Latin American republics from the independence period to the modern era.

HIST*2930 Women and Cultural Change F(3–0) [0.50]
Using gender and ethnicity as the main categories of analysis this course examines the history of women in the broad geographical regions of North America. The roles women have played in political, economic and private life will be emphasized.

HIST*2960 Topics in the History of Slavery U(3–0) [0.50]
This course introduces students to slavery and the slave trades of the societies of the Atlantic Rim during the era of the Atlantic slave trade. The African experience of the trade constitutes a major focus, but the course also examines aspects of the Atlantic and the trans–Saharan slave trades as they affected societies on the other side of the Atlantic and in the Islamic Middle East. The course also ex-

amiens the disputed links between the Atlantic slave trade and the rise of capitalism on the one hand and underdevelopment on the other.

HIST*3010 Government and Society in Tudor–Stuart England, 1529–1689 U(3–0) [0.50]
An assessment of the challenges facing England during its emergence from a medieval to a modern state in the 16th and 17th centuries. The course will examine such external forces as the Renaissance, Reformation and Scientific Revolution as well as domestic crises culminating in the political revolutions of 1640 and 1688.
Prerequisite(s): HIST*1010 or HIST*2000

HIST*3030 Celtic Britain and Ireland to 1066 U(3–0) [0.50]
The social, political and cultural history of the Celtic peoples of the British Isles from Prehistory to the advent of the Normans. Special consideration will be given to the development of Celtic institutions as well as to comparative study of successive waves of invaders–Romans, Anglo–Saxons, Vikings and Normans.
Prerequisite(s): HIST*2000

HIST*3060 American Society U(3–0) [0.50]
A study of selected aspects of American society focusing on the 19th and 20th Centuries. Specific topics, which will vary according to the expertise of the instructor, may include such themes as War and American society, the Jacksonian Era, Civil War America, Film and American society.
Prerequisite(s): HIST*2110 or HIST*2650

HIST*3090 Nationalism and Internationalism in Europe 1914–1957 U(3–0) [0.50]
This course will be concerned with two main themes of 20th–century European history: the impact of nationalism and the gradual emergence of international ideas and institutions. Major topics to be discussed include nationalism during the two world wars, the strengths and weaknesses of the League of Nations, and the creation of the European Economic Community.
Prerequisite(s): HIST*2510

HIST*3130 Popular Culture and Punishment, 1700–1900 U(3–0) [0.50]
The course will survey the social, political and intellectual influences upon the leisure activities of Europeans and Americans in the period with special reference to institutions such as the prison, the asylum, the reformatory and the regulation of popular culture and leisure activities. Witchcraft and the witch–hunt will be discussed.
Prerequisite(s): HIST*1010

HIST*3140 Witch–hunts and Popular Culture S(–) [0.50]
This course will explore the phenomenon of the 'witch–hunts' in early modern Europe through a focus on Scotland in the period 1560–1700. In doing so it will provide students with a background on the history of Scotland during the early modern period and introduce them to the considerable body of historical writing on the subject of the witch–hunts. In addition, students will explore notions of both elite culture and the 'popular culture' of those elements of society frequently neglected by historians. Due to the fact that the overwhelming majority of the accused witches were women, the course will include examinations of gender history and its contributions to our understandings of the period. (Offered through distance education format only.)
Prerequisite(s): HIST*1010 or consent of the department

HIST*3160 Canadian Political History Since 1867 U(3–0) [0.50]
This course consists of a detailed study of the background and development of the Canadian political process and culture. It devotes special attention to the changing role and character of the state.

HIST*3170 American Westward Expansion, 1763–1890 U(3–0) [0.50]
The course will analyse the frontier thesis as a valid interpretation of American History. It will also deal with the expansion of settlement across the continent, Manifest Destiny, the frontier and democracy, and the influence of westward expansion on the American character.
Prerequisite(s): HIST*2110 or HIST*2650

HIST*3270 Revolution in the Modern World W(3–0) [0.50]
This course offers a comparative analysis of revolutionary movements in the modern world. It focuses on the French Revolution, the development of a revolutionary tradition in the 19th century, the Russian Revolution, and the Communist Revolution in China. Comparative themes include the relative importance of ideology and class conflict, the emergence of professional revolutionaries, and the relationship between revolutions and international relations.

HIST*3290 Europe in the Age of Revolutions, 1789–1848 U(3–0) [0.50]
This course will examine changes in the structure of European society in the first half of the 19th century; the rise of new forces, e.g., liberalism, nationalism, socialism and their impact on European society and politics.
Prerequisite(s): HIST*1010 or HIST*2510

HIST*3380 Age of Imperialism, 1870–1919 U(3–0) [0.50]
An examination of the rise of modern imperialism making possible the rapid expansion of colonial empires after 1870; the nature of this expansion in Africa, Asia and Latin America; and the effects of imperialist expansion upon these societies.
Prerequisite(s): HIST*2510 or HIST*2950

HIST*3410 The History of Pre–Colonial Africa U(3–0) [0.50]
This course will include studies on the Ibo, Yoruba and Edo societies, and on the Dahomey, Hausa, Western Congo and Angola states; the effect of the Atlantic slave trade on African societies. Emphasis will be given to the householding system, lineage group organization, subsistence agriculture, and the sources of African History.

Prerequisite(s): HIST*2950

HIST*3450 Representation of History U(2–1) [0.50]

Critical analysis of public representations and appropriations of history in such forms as websites, films, television, museums, archives, commemorations, historical fiction, and popular non–fiction.

Prerequisite(s): HIST*2450

HIST*3470 Independent Reading U(3–0) [0.50]

A course of independent study, based on a comprehensive reading list provided by the department. Evaluation will be based on 2 written examinations.

Prerequisite(s): 7.50 credits

HIST*3480 Workplace Learning S,F,W(–) [0.50]

An independent study course based on either History related voluntary or paid workplace experience. Evaluation will be based on assignments relating to work duties. These will usually be in the form of a weekly journal, and a major project relating to some specific aspect of the work experience. Students interested in this option must have their project approved by the department prior to the semester in which they plan to engage in their work experience. Students will then be assigned to a faculty supervisor who will oversee the project.

Prerequisite(s): 7.50 university–level credits including 1.50 History or equivalent credits

Restriction(s): instructor consent required

HIST*3530 Celtic Britain and Ireland Since 1603 U(3–0) [0.50]

This course will deal with the Celtic peoples in the British Isles and their effort to maintain their cultural, economic and political independence.

Prerequisite(s): 1 of HIST*2000, HIST*2500, HIST*3030

HIST*3540 World War Two U(3–0) [0.50]

An in–depth analysis of the immediate causes and impact of the Second World War focusing on the influence of military events, on the social, political and economic developments of the major participating nations.

Prerequisite(s): 2 of HIST*1150, HIST*2040, HIST*2500, HIST*2510, HIST*2601/2, HIST*2650, HIST*2830, HUMN*2050

HIST*3570 Women in Modern Europe U(3–0) [0.50]

This course will examine selected topics in modern European women's history. Attention will be given to action in the public sphere, women's personal and family lives and occupations.

Prerequisite(s): 1 of HIST*2500, HIST*2510, HIST*2800, HIST*2930

HIST*3580 Women's History in Asia/Africa U(3–0) [0.50]

The roles of women in Asia or Africa. The specific topics covered will be announced each year. Students should consult with the department as to topics to be dealt with in each offering. Specific topics will be announced prior to the course selection period.

Prerequisite(s): 1 of HIST*1150, HIST*2800, HIST*2890, HIST*2910, HIST*2930

HIST*3600 Modern Quebec Since 1850 U(3–0) [0.50]

A course examining the social, economic, and political evolution of Quebec as well as the province's relations with the rest of Canada. Topics discussed include nationalism, the role of the church, the growth of trade unionism, Quebec and federalism, the Quiet Revolution.

Prerequisite(s): HIST*2601/2

HIST*3650 Twentieth–Century America U(3–0) [0.50]

Starting at the end of World War II, this course considers the nature, origins, and ending of the Cold War, political and social changes in the post–war period and the conflicts in recent decades over issues of race, ethnicity, gender, and culture.

Prerequisite(s): HIST*2650

HIST*3660 Canadian Social History Since Confederation U(3–0) [0.50]

An examination of selected themes in the development of modern Canadian society such as the role of class, the social consequences of industrialization and urbanization, immigration, ethnicity and religion, education and culture.

Prerequisite(s): HIST*2601/2

HIST*3750 The Reformation U(3–0) [0.50]

The changes in religious, social and cultural life in 16th century Europe. this course will examine the impact of humanism, the developments in urban culture known as the Renaissance, the reform movements, in central and western Europe, the Catholic response, and the resulting disintegration of the medieval social order.

Prerequisite(s): HIST*1010

HIST*3820 Early Modern France U(3–0) [0.50]

This course surveys French History from the renaissance to the French Revolution. Students will examine the emergence of the powerful monarchy, 16th–century religious conflict and civil war, and the social, political and intellectual developments of the 17th and 18th centuries, which culminated in the 1789 Revolution.

HIST*3910 Africa Since 1800 U(3–0) [0.50]

This course will trace the suppression of the slave trade and the opening of Africa to European imperialism. Emphasis will be given to resistance movements and rising nationalism between the two World Wars. An endeavour will be made to relate the national liberation movement to the achievement of independence.

Prerequisite(s): HIST*2950

HIST*3930 Black America in the 20th–Century U(3–0) [0.50]
A study in depth of the demographic expansion of the Black population in the United States since the Reconstruction; W.E.B. Du Bois, the Niagara Movement and the NAACP; the ”great migrations”; the rise of the ghettos; the impacts of the Great Depression and World War II; Martin Luther King and the civil rights movement.

HIST*3970 Independent Reading II U(3–0) [0.50]
Similar to HIST*3470.
Prerequisite(s): HIST*3470
Restriction(s): HIST*3480

HIST*4040 Topics in Scottish History U(3–0) [0.50]
A seminar course dealing with selected aspects of Scottish social, economic and political history. The seminars will be based upon an examination of primary sources from the University library’s extensive Scottish Collections, as well as secondary literature. Students should consult with the department for specific offerings. (H)
Prerequisite(s): HIST*3530
Restriction(s): 70% average in all History course attempts

HIST*4050 Topics in Scottish History U(3–0) [0.50]
A seminar course dealing with selected aspects of Scottish social, economic and political history. The seminars will be based upon an examination of primary sources from the University library’s extensive Scottish Collections, as well as secondary literature. Students should consult with the department for specific offerings. (H)
Prerequisite(s): HIST*3530
Restriction(s): 70% average in all History course attempts

HIST*4100 Africa and the Slave Trades U(3–0) [0.50]
This course will discuss the origins, character, and operation of slavery and the export slave trades in Africa. It will examine the interaction between domestic slavery and the export slave trades, on the one hand, and demographic, political, economic, social and cultural impact on African states and societies, on the other. Other themes to be examined include slave resistance in Africa, and abolition and the introduction of legitimate commerce and their impact on Africa.
Prerequisite(s): one of HIST*2960(, HIST*3410(, HIST*3910(

HIST*4160 Seminar in Canadian Political History U(3–0) [0.50]
Political events, key personalities, the political process, and state instruments and institutions will be analyzed with a view to understanding historical aspects of the political system and culture in Canada. (H)
Prerequisite(s): HIST*2601/2
Restriction(s): 70% average in all History course attempts

HIST*4190 The American South U(3–0) [0.50]
A study of the slave south from colonial times to the Civil War, this course will concentrate on the evolution of the plantation system and slave society, the growth of a distinctive south civilization, and the immediate causes of the Civil War. (H)
Prerequisite(s): HIST*2650
Restriction(s): 70% average in all History course attempts

HIST*4210 Seminar in American Political History U(3–0) [0.50]
This course will examine a variety of topics drawn from the 19th– and 20th–centuries. (H)
Prerequisite(s): HIST*2110
Restriction(s): 70% average in all History course attempts

HIST*4280 Poverty and Policy in the Victorian Age U(3–0) [0.50]
Starting with the debates over the New Poor Law of l834, this course will examine the changing content of the notion of poverty, and changing methods adopted to treat it. It will also look at the lives of the poor, in so far as these can be reconstructed from contemporary sources. (H)
Prerequisite(s): HIST*2500
Restriction(s): 70% average in all History course attempts

HIST*4470 Special History Project Seminar I U(3–0) [0.50]
This course is designed to train honours students in the techniques of research, interpretation and writing of history. The student will choose a topic for intensive study from a list approved by the department. (H)
Restriction(s): 70% average in all History course attempts, consent of the instructor

HIST*4560 Topics in Revolution U(3–0) [0.50]
A seminar course designed to explore one or more social or political or intellectual revolutions in the early modern or modern era depending on the expertise of the instructor. Students should consult the department for specific offerings. (H)
Prerequisite(s): consent of the instructor
Restriction(s): 70% average in all History course attempts

HIST*4570 Topics in Revolution U(3–0) [0.50]
A seminar course designed to explore one or more social or political or intellectual revolutions in the early modern or modern era depending on the expertise of the instructor. Students should consult the department for specific offerings. (H)
Prerequisite(s): consent of the instructor
Restriction(s): 70% average in all History course attempts

HIST*4580 Topics in Revolution U(3–0) [0.50]
A seminar course designed to explore one or more social or political or intellectual revolutions in the early modern or modern era depending on the expertise of the instructor. Students should consult the department for specific offerings. (H)
Prerequisite(s): consent of the instructor
Restriction(s): 70% average in all History course attempts

HIST*4620 Seminar in North American Rural History U(3–0) [0.50]
This course will examine selected topics in the social and economic transformation of rural North America. (H)
Prerequisite(s): 1 of HIST*2110, HIST*2601/2, HIST*2650
Restriction(s): 70% average in all History course attempts

HIST*4640 Canadian Urban History U(3–0) [0.50]
A study of the city–building process, with particular emphasis on the growth of the large city and the spread of the urban network. (H)
Restriction(s): 70% average in all History course attempts

HIST*4680 The U.S. in the Era of Urbanization, 1870–1920 U(1–2) [0.50]
This course will examine social and intellectual developments in the United States with emphasis placed on the period between the Civil War and World War I. An important area of study will be the nature and consequences of urban development. Stress is laid on the reading of primary sources. (H)
Prerequisite(s): HIST*2650
Restriction(s): 70% average in all History course attempts

HIST*4700 Topics in Medieval History U(3–0) [0.50]
A detailed analysis of selected aspects of the Middle Ages from c. 1000. Students should consult the department for specific offerings. (H)
Prerequisite(s): HIST*2000 or HIST*2200
Restriction(s): 70% average in all History course attempts

HIST*4710 Topics in Medieval History U(3–0) [0.50]
A detailed analysis of selected aspects of the Middle Ages from c. 1000. Students should consult the department for specific offerings. (H)
Prerequisite(s): HIST*2000 or HIST*2200
Restriction(s): 70% average in all History course attempts

HIST*4890 Gender in Modern Asia F(3–0) [0.50]
This course will focus on the differing perspectives on gender history arising in the developing world, with particular emphasis on modern Asia and the Middle East. (H)
Prerequisite(s): HIST*2910 or HIST*2930
Restriction(s): registration in a History honours program (major or minor), 70% average in all History course attempts

HIST*4900 Imperialism and Nationalism in South Asia U(3–0) [0.50]
This course will examine India's experience of and reaction to colonial rule from the advent of the British Raj" in 1757 through to decolonization in 1947. Emphasis will be placed not only on mainstream political movements, but also on the role played by subaltern groups such as women, peasants and workers.
Prerequisite(s): HIST*2890 or HIST*2910
Restriction(s): 70% average in all History course attempts

HIST*4970 Special History Project Seminar II U(3–0) [0.50]
A continuation of HIST*4470. (H)
Restriction(s): 70% average in all History course attempts, consent of the instructor

XII—Course Descriptions, Horticultural Science

Department of Plant Agriculture, Horticultural Science Division.

HORT*3010 Annual, Perennial and Indoor Plants – Identification and Use F(2–2) [0.50]
The identification and adaptation of annual, biennial, perennial herbaceous and indoor plants. Lectures will be integrated with outdoor laboratory activities to emphasize utilization of plant groups in park, perennial border, general landscape botanic garden and interiorscape settings.
Prerequisite(s): 0.50 credit in botany

HORT*3220 Turf Management F(3–0) [0.50]
Principles and practices of turf production and management of all aspects of the turf industry including golf courses, athletic fields, parks, roadsides, reclamation sites and nursery sod production.
Prerequisite(s): 0.50 credit in botany

HORT*3230 Plant Propagation F(2–2) [0.50]
Principles and practices of propagation for horticultural plants. Sexual (seed) propagation to include seed maturation, dormancy and seed germination; vegetative (asexual) propagation, including division, layering, budding, grafting and tissue culture.
Prerequisite(s): BIOL*1040

HORT*3260 Woody Plants F(1–3) [0.50]
Identification and cultural adaptation of native and introduced woody plants useful in cultivated landscapes and natural areas.
Prerequisite(s): BIOL*1030

HORT*3280 Greenhouse Production W(3–3) [0.50]
Principles and practices of production, culture and marketing of greenhouse flower and vegetable crops.
Prerequisite(s): BOT*3310 or PBIO*3110

HORT*3340 Culture of Plants W(3–2) [0.50]
Site preparation, plant establishment and culture of plants in various landscape settings. The course will examine the problems of disturbed planting sites, urban environment and the culture of plants in high traffic areas. Arboricultural cultivation and maintenance of woody plants with practical application will be discussed.
Prerequisite(s): BIOL*1040 or equivalent

HORT*3510 Vegetable Production F(3–3) [0.50]
The vegetable industry and the characteristics, culture, storage and marketing of field–grown vegetable crops will be studied. Organic vegetable production will also be considered.
Prerequisite(s): BOT*2100

HORT*4080 Controlled Environment Systems for Plants W(3–3) [0.50]
An examination of controlled environments, including: commercial greenhouses, plant growth chambers, advanced life support systems for space, urban office towers and other indoor spaces where some form of environment control/management is required. The material presented will address sensor requirements and principles of operation, feedback control requirements and computer–automated systems in plant growth facilities.
Prerequisite(s): at least 3.00 credits from BOT*, CROP*, HORT*, PBIO* courses including BOT*2100

HORT*4250 Nursery Production W(2–3) [0.50]
Methods of production for field and container grown landscape nursery stock including cultural management and merchandising in wholesale and retail operations.
Prerequisite(s): 1 of AGR*2451/2, 1.00 credit in horticulture, botany or a related field

HORT*4300 Postharvest Physiology W(3–3) [0.50]
An examination and discussion of physiological and biochemical processes unique to postharvest development and deterioration. Principles and practices of storing fruits, vegetables, and florists' and nursery stocks as well as marketing pathways for horticultural crops will be considered.
Prerequisite(s): BOT*3300 or PBIO*3110

HORT*4380 Tropical and Sub–Tropical Horticultural Crops F(3–0) [0.50]
Principles involved in the production and utilization of tropical and sub–tropical horticultural crops and agroforestry. (Offered in odd–numbered years.)
Prerequisite(s): AGR*1101/2 or AGR*1250

HORT*4420 Fruit Crops F(3–3) [0.50]
Growth patterns, fruiting characteristics and adaptation to environmental conditions of fruit crops in temperate regions. Classification, cultural practices including propagation and the physiological principles underlying these practices will be emphasized.
Prerequisite(s): BOT*2100

HORT*4900 Horticultural Science Research I S,F,W(1–5) [0.50]
The student, in consultation with a faculty member, will select and define a research problem. Supervisory arrangements should be made at least 1 semester prior to commencing the course. The course will include preparation of a detailed literature review, project proposal and progress report. This course will normally be followed by HORT*4910 to provide 2 semesters for completion of the project.
Prerequisite(s): completion of semester 6 in the B.SC. or B.SC.(Agr.) program

HORT*4910 Horticultural Science Research II S,F,W(1–5) [0.50]
A continuation of HORT*4900 in which the student will complete the research, write up the research findings in a scholarly scientific style and present a seminar.
Prerequisite(s): HORT*4900

XII—Course Descriptions, Hospitality and Tourism Management

School of Hospitality and Tourism Management.

HTM*1000 Introduction to Hospitality and Tourism Management F(1–2) [0.50]
A survey of the hospitality and tourism industry, with reference to its historical development, growth, organization; the management process, and the scope of the industry today. (Also offered through distance education format.)
Equate(s): HAFA*1000

HTM*2000 Hospitality and Tourism Purchasing Management W(3–0) [0.50]
The management of the purchasing function in hospitality businesses as it applies to food, beverages, supplies, equipment, furnishings and services. The focus is on the process of managing the supply channel as well as on developing appropriate policies and procedures.
Prerequisite(s): 1 of HAFA*1000, HTM*1000, (ECON*1050, HAFA*2700), (ECON*1050, HTM*2700)
Equate(s): HAFA*2000

HTM*2010 Hospitality and Tourism Business Communications F,W(3–0) [0.50]
Designed to enhance students' professionalism in the hospitality and tourism fields by improving their communication skills. The focus is primarily on writing (business letters, memos, and reports), but also includes effective speaking/presentation skills. The assignments are based on hospitality and tourism issues.
Prerequisite(s): 1 of HAFA*1000, HAFA*2700, HTM*1000, HTM*2700
Equate(s): HAFA*2010

HTM*2030 Control Systems in the Hospitality and Tourism Industry F,W(2–2) [0.50]
A study of the policies and procedures required to control food, beverage, payroll and other operating costs. Areas examined include such topics as cost behaviour and analysis, menu analysis, budget preparation and the interpretation of data. The course will also stress the application of analytical techniques. (Also offered through distance education format.)
Prerequisite(s): 1 of HAFA*2000, HAFA*2700, HTM*2000, HTM*2700
Equate(s): HAFA*2030

HTM*2100 Lodging Operations W(3–0) [0.50]
A study of the nature of unit operations in the various sectors of the lodging industry and of the functions and systems of lodging operations. Topics will include organization structure and responsibilities, sociotechnical systems and legal and security aspects.
Prerequisite(s): HAFA*1000 or HTM*1000
Equate(s): HAFA*2100

HTM*2150 Introduction to Canadian Business Management U(3–0) [0.50]
An introductory course in the fundamentals of business management in Canada. Students will be exposed to the basic functions of business and management. This course will also cover small business and entrepreneurship, forms of business ownership, competing in the global business environment and the economic and political realities of business in Canada today. This course may not be taken for credit by Bachelor of Commerce students. (Offered through distance education format only.)
Equate(s): HAFA*2150
Restriction(s): B.COMM. students cannot take this course for credit

HTM*2200 Organizational Design and Effectiveness F,W(3–0) [0.50]
The course examines and analyzes organizations as open systems and focuses on such variables as external environment, technology, structure (and their interrelationships) as well as on group dynamics and leadership. (Also offered through distance education format.)
Prerequisite(s): 5.00 credits
Equate(s): HAFA*2200

HTM*2700 Introductory Foods F,W(3–2) [0.50]
Scientific principles and their application to food preparation and food consumption. An integrated lecture and laboratory approach is used to study the chemical and physical properties of foods.
Prerequisite(s): 1 of Grade 12U Chemistry, OAC Chemistry, CHEM*1000, CHEM*1040, CHEM*1060, CHEM*1100
Equate(s): HAFA*2700

HTM*2740 Cultural Aspects of Food F(3–0) [0.50]
A survey of cultural influences on individual and group food habits and patterns. The study of the selection and uses of food; food beliefs, attitudes and related behaviours within the context of cultural systems.
Equate(s): HAFA*2740

HTM*3000 Human Resources Management F,W(3–0) [0.50]
Drawing explicitly on such organizational behaviour theories as planned change, learning, performance enhancement, goal setting and motivation, the course examines the essential human resource function of planning, staffing, employee development and employee maintenance in a variety of organizational settings. (Also offered through distance education format.)
Prerequisite(s): 1 of AGEC*2220, FRHD*3060, HAFA*2030, HAFA*2200, HTM*2030, HTM*2220
Equate(s): HAFA*3000

HTM*3060 Lodging Management U(4–0) [0.50]
To explore and analyze the principles and practices of lodging management and related sales activities. The management of and interaction among various divisions of lodging operations are addressed, including general management, front office/housekeeping/engi-

neering divisions, food and beverage operations, sales and marketing, accounting and finance. Focus of the course is on communication both within and among departments, divisions, and most importantly, with the consumer.
Prerequisite(s): HAFA*2100 or HTM*2100
Equate(s): HAFA*3060

HTM*3070 Hospitality and Tourism Management Accounting F,W(2–2) [0.50]
Application of accounting principles to hospitality and tourism accounting systems. Emphasizes use of the uniform system of accounts for hospitality and tourism operations, principles of internal control, payroll control, budgeting, responsibility accounting and analysis of financial data. Designed to assist the student in relating accounting information to management decisions. (Also offered through distance education format.)
Prerequisite(s): AGEC*2220, (HAFA*2030 or HTM*2030)
Equate(s): HAFA*3070

HTM*3080 Marketing in the Hospitality Industry F,W(3–0) [0.50]
Focuses on the major marketing decisions that hospitality managers face in generating and sustaining demand for their products and services. Includes problems, practices, and principles that lead to pricing, distribution, location, promotion and merchandising decisions. Note: Students with credit for this course may not proceed to COST*1000.
Prerequisite(s): HAFA*2030 or HTM*2030
Equate(s): HAFA*3080

HTM*3090 Foodservice Operations Management F,W(4–6) [1.00]
The application of managerial functions to foodservice operations with the emphasis on the principles of food production and service in a commercial setting.
Prerequisite(s): (HAFA*2030 or HTM*2030), (HAFA*2700 or HTM*2700)
Equate(s): HAFA*3010, HAFA*3090, HAFA*3091:2

HTM*3100 Dimensions of Tourism U(3–0) [0.50]
The examination of tourism as an amalgam of industries—transportation, accommodation, travel, trade and other facilitating services; follows a multidisciplinary approach in its analysis, organization, planning and control.
Prerequisite(s): 5.00 credits
Equate(s): HAFA*3100

HTM*3120 Operations Analysis in the Hospitality and Tourism Industry W(2–2) [0.50]
The analysis of operations in the hospitality and tourism industry with the aim of improving productivity of resources. Specific areas to be studied include the nature of productivity, the use of work study methods, the significance of statistical concepts and the application of operations research techniques.
Prerequisite(s): (HAFA*2030 or HTM*2030), STAT*2060
Equate(s): HAFA*3120

HTM*3150 Experiential Learning in the Hospitality Industry U(3–0) [0.50]
An independent program of study formally integrating the student's academic study with a concentrated work experience. The study is to be decided by the student in consultation with the supervisory faculty (normally the department's Co–op Co–ordinator) prior to registration in the course.
Equate(s): HAFA*3150
Restriction(s): registered in the Hotel and Food Administration co–op major of the B.COMM. program and consent of the instructor

HTM*3160 Destination Management and Marketing F(3–0) [0.50]
This course examines the attractiveness of communities (urban and rural; domestic and international) for visitors and the implications that result from the development of a tourism industry. Methods to encourage visitation are explored as are the attempts to create and manage the development of the community and the tourism industry in a sustainable manner.
Prerequisite(s): HAFA*3100 or HTM*3100
Equate(s): HAFA*3160

HTM*3200 Club Management Operations U(3–0) [0.50]
This course examines the effective operation and management of private clubs including city clubs, country clubs and athletic clubs. Major topics include: the unique niche that clubs represent in the hospitality industry, the general manager/COO concept, organizational structure of clubs, role of the board of directors, membership requirements, differences between tax–exempt clubs, duties and responsibilities of department heads in private clubs, governmental regulations, preparing for a career in the club field, trends in club management and the future of clubs.
Prerequisite(s): 10.00 credits
Equate(s): HAFA*3200
Restriction(s): registration in the Hotel and Food Administration, Hotel and Food Administration Co–op or Tourism Management Majors of the B.Comm. Program

HTM*3780 Economics of Food Usage W(3–0) [0.50]
Changing patterns in the food distribution chain, legislation and consumption habits affecting the economics and usage of foods.
Prerequisite(s): 1 of COST*1000, FOOD*2010, HAFA*2700, HTM*2700
Equate(s): COST*3780, HAFA*3780

HTM*4050 Beverage Management I F(2–2) [0.50]
Provides students with a knowledge of the wine and spirits industry, and will emphasize knowledge about product purchasing, pricing, control, and service. Students must be of legal drinking age in Ontario.
Prerequisite(s): 10.00 credits
Equate(s): HAFA*4050
Restriction(s): registration in the Hotel and Food Administration, Hotel and Food Administration Co–op or Tourism Management Majors of the B.Comm. Program

HTM*4090 Hospitality and Tourism Facilities Management and Design F,W(2–2) [0.50]
This course will provide an understanding of the operation of a physical plant including such elements as systems maintenance, appropriate use of various materials, energy management, life cycle costing, and safety and security issues. This course will also equip an individual to work as a knowledgeable member of a hospitality or tourism organization's design or re–design team. Efficient and effective space utilization for both front– and back–of–the–house areas, plus a knowledge of how to read professional drawings ("blueprints") will be covered.
Prerequisite(s): 1 of HAFA*3090, HTM*3090, HAFA*3091:2
Equate(s): HAFA*4090
Restriction(s): registration in the Hotel and Food Administration, Hotel and Food Administration Co–op or Tourism Management majors of the B.COMM. Program

HTM*4100 Developing Managerial Skills F,W(4–0) [0.50]
The course uses experiential and participative learning approaches to enable aspiring managers to develop and enhance their personal and inter–personal competencies.
Prerequisite(s): HAFA*3000 or HTM*3000
Equate(s): HAFA*4100
Restriction(s): registration in the Hotel and Food Administration, Hotel and Food Administration Co–op, Human Resources Management or Tourism Management majors of the B.COMM. Program

HTM*4110 Restaurant Operations U(1–7) [0.50]
The management and operation of fine dining restaurants, and the study of major cuisines and classical cookery. Analysis of qualitative aspects of the restaurant business (ambience, total service package, and the dynamic relationship between service and the product of food and wine). Emphasis is placed upon creativity and authenticity in menu formulation, operational performance and guest satisfaction.
Prerequisite(s): 1 of HAFA*3090, HTM*3090, HAFA*3091:2
Equate(s): HAFA*4110

HTM*4120 Hospitality Business Management U(3–0) [0.50]
A course that addresses small business and entrepreneurship in the hospitality and food service industry. Planning for and operating in these industries is highlighted throughout this course. Topics include: business planning, business valuation, franchising, sources of capital and specific operating factors that influence successes as a small business.
Prerequisite(s): 1 of AGEC*2230, HAFA*3070, HTM*3070
Equate(s): HAFA*4120

HTM*4130 Current Management Topics U(3–0) [0.50]
Principal operating problems in the hospitality and tourism industry are analyzed and discussed using actual case studies. Students should check with the School of Hospitality and Tourism Management to determine what topic will be offered during specific semesters, and which prerequisites, if any, are appropriate.
Equate(s): HAFA*4130

HTM*4140 Current Management Topics U(3–0) [0.50]
Principal operating problems in the hospitality and tourism industry are analyzed and discussed using actual case studies. Students should check with the School of School of Hospitality and Tourism Management to determine what topic will be offered during specific semesters, and which prerequisites, if any, are appropriate.
Equate(s): HAFA*4140

HTM*4150 Current Management Topics U(3–0) [0.50]
Principal operating problems in the hospitality and tourism industry are analyzed and discussed using actual case studies. Students should check with the School of School of Hospitality and Tourism Management to determine what topic will be offered during specific semesters, and which prerequisites, if any, are appropriate.
Equate(s): HAFA*4150

HTM*4160 Human Resources Planning W(4–0) [0.50]
Introduces the strategic planning role that human resources professionals play in organizations. Students will confront the challenges and demands of rightsizing, technological change, corporate repositioning, cost containment, productivity improvements, and the consequences of relocation, outplacement and retraining of staff. An understanding of the essential elements of the human resource planning process in organizations will be provided. Students will acquire knowledge in analyzing, assessing and programming for the human resource requirements of organizational, business and strategic plans.
Prerequisite(s): (HAFA*2200 or HTM*2200), (HAFA*3000 or HTM*3000)
Equate(s): HAFA*4160

HTM*4170 International Tourism Development and Management W(4–0) [0.50]
This course encourages students to develop a cross–cultural awareness of the objectives and issues regarding the development of tourism as well as the management of tourism venues in foreign locations. Students will be introduced to a variety of multinational tourism policies as well as strategic and structural approaches to the development of the industry through readings and case studies. Issues relating to ownership, joint ventures, human resources, marketing, risk management, operations, accounting and taxation will be discussed.
Prerequisite(s): (HAFA*3100 or HTM*3100), (HAFA*3160 or HTM*3160)
Equate(s): HAFA*4170

HTM*4180 Beverage Management II U(2–2) [0.50]
This course provides students with knowledge of the beer, spirit, coffee and soft drink industries. The important role that these products have in the hospitality environment will be stressed. Course topics include product characteristics, purchasing, pricing, control marketing and promotion, trends and the responsible service of alcoholic beverages. Students must be of legal drinking age in Ontario.
Prerequisite(s): 10.00 credits
Equate(s): HAFA*4180

HTM*4190 Hospitality and Tourism Operations Planning F,W(4–0) [0.50]
The course examines management and organization practices as they are applied to typical hospitality and tourism operational issues. Significant decision points and sub–system interrelationships are emphasized.
Prerequisite(s): (HAFA*3070 or HTM*3070), (HAFA*3080 or HTM*3080)
Co–requisite(s): AGEC*3320
Equate(s): HAFA*4190
Restriction(s): registration in the Hotel and Food Administration, Hotel and Food Administration Co–op or Tourism Management majors of the B.COMM. Program

HTM*4200 Policy Issues in Hospitality and Tourism Management F,W(4–0) [0.50]
An integrative course intended to draw together the several disciplines in which hospitality and tourism management is based. Conceptual, analytical and decision–making skills will be developed through an extensive exposure to case studies.
Prerequisite(s): AGEC*3320, (HAFA*3070 or HTM*3070), (HAFA*3080 or HTM*3080)
Equate(s): HAFA*4200
Restriction(s): registration in the Hotel and Food Administration, Hotel and Food Administration Co–op or Tourism Management majors of the B.COMM. Program

HTM*4300 Co–operative Education Seminar U(3–0) [0.50]
An integration of the students' academic studies with their work semester experiences provided by the co–operative program. Emphasis will be placed on students critically evaluating the application of theoretical concepts in different working environments.
Prerequisite(s): registration in semester 7 of the B.Comm. program (HAFA Co–op major)
Equate(s): HAFA*4300

HTM*4390 Individuals and Groups in Organizations F,W(3–0) [0.50]
The course is concerned with the structure and dynamics of organizational systems. It highlights the concrete behaviour of individuals and groups within organizations. It addresses the action that managers must take to insure that behaviour within the organization aids rather than impedes the achievement of overall organizational goals.
Prerequisite(s): 10.00 credits
Equate(s): HAFA*4390

HTM*4500 Special Study in Hospitality and Tourism U(3–0) [0.50]
The special study option is designed to provide senior undergraduate students with an opportunity to pursue an independent course of study. The topic selected will be determined by agreement between the student and the faculty member with expertise in the area.
Equate(s): HAFA*4500
Restriction(s): registration in the Hotel and Food Administration or Tourism Management majors of the B.Comm. Program and instructor consent

XII—Course Descriptions, Human Kinetics

Department of Human Biology and Nutritional Sciences.

HK*2020 Human Musculoskeletal Anatomy F(2–2) [0.50]

A series of lectures and tutorials to discuss the anatomy of the human musculoskeletal system and the associated neural control system in humans. The clinical applications of surface anatomy will be included.

Prerequisite(s): BIOL*1040 and admission to the Sports Injury Management Area of Emphasis of the Human Kinetics major

HK*2270 Principles of Human Biomechanics W(3–1) [0.50]

Application of mechanical principles to the study of human movement. Topics include: motion analysis techniques, anthropometrics, biological tissue tolerance, muscle force generation, static and dynamic equilibrium, work/energy and impulse/momentum as they apply to the description of motion, injury of musculoskeletal tissues and optimization of human performance.

Prerequisite(s): PHYS*1000 or PHYS*1080

Equate(s): HK*3270

HK*3401 Human Anatomy F(2–3) [0.75]

First part of the two–semester course HK*3401/2. Refer to HK*3401/2 for course description.

Co–requisite(s): HK*3940 or permission of the instructor

Equate(s): HK*2910, HK*2920, HK*3401/2, HK*3401/2, HK*4951/2

Restriction(s): registration in the B.SC. Major in Human Kinetics or Bio–Medical Science, instructor consent required

HK*3401/2 Human Anatomy F/W(2–3) [1.50]

A two–semester lecture and laboratory course in human anatomy which includes a detailed study of the skeleton, upper and lower limbs, thorax, abdomen, pelvis, perineum, head, neck and central nervous system. This is a two–semester course offered over consecutive semesters. When you select it you must select HK*3401 in the Fall semester and HK*3402 in the Winter semester. A grade will not be assigned to HK*3401 until HK*3402 has been completed.

Co–requisite(s): HK*3940 or permission of the instructor

Equate(s): HK*2910, HK*2920, HK*3401/2, HK*3401/2, HK*4951/2

Restriction(s): registration in the B.SC. Major in Human Kinetics or Bio–Medical Science, instructor consent required

HK*3402 Human Anatomy W(2–3) [0.75]

Second part of the two–semester course HK*3401/2. Refer to HK*3401/2 for course description.

Prerequisite(s): HK*3401

HK*3600 Applied Human Biology F(2–3) [0.75]

Laboratory techniques which are central to human biology are covered, together with their underlying concepts. Human performance and function are evaluated through cellular, organic, systemic and whole person studies. The student's technical competence and conceptual understanding are emphasized.

Prerequisite(s): HK*2270

Co–requisite(s): HK*3940 or permission of instructor

HK*3940 Human Physiology F(6–0) [1.25]

This course consists of a series of lectures, demonstrations and tutorials designed for students desiring a knowledge of physiological concepts as they apply to human beings. The course discusses cellular physiology, neurophysiology, endocrinology, and the physiology of the following systems: cardiovascular, renal, gastrointestinal and respiratory with an emphasis on the regulation of function.

Prerequisite(s): BIOL*2210

Equate(s): HK*3941:2

HK*4070 Clinical Biomechanics F(2–2) [0.50]

Functional human anatomy and mechanical characteristics of biological tissues at the impairment and repair levels. Pathomechanics of human movement resultant from disease, abuse or trauma. Etiology, testing and correction of functional disorders with special reference to balance, posture, and gait.

Prerequisite(s): 1 of ENGG*2660, HK*3270, (HK*2270, HK*3600)

HK*4230 Advanced Study in Human Biology and Nutritional Sciences S,F,W(3–0) [0.50]

Independent literature research of an approved topic to be decided by the student in consultation with a faculty advisor.

Prerequisite(s): 12.00 credits

HK*4240 Occupational Biomechanics and Ergonomics W(3–2) [0.75]

This course introduces the methods available for reducing musculoskeletal injuries in the workplace. Topics include: biomechanical, psychophysical, physiological, and integrated approaches to performing physical demands analyses, anatomy and etiology of low back injuries and upper limb disorders, principles of redesigning tasks to reduce the risk of injury, pre–employment screening and legislated guidelines. Students apply the course material to ergonomic assessments performed in industrial environments.

Prerequisite(s): 1 of ENGG*1210, HK*3270, (HK*2270, HK*3600)

HK*4320 Work Physiology W(3–3) [0.75]

The adjustments made by the physiological regulatory systems in response to common human activities will be identified and discussed. This will include an examination of limiting factors within each system.

Prerequisite(s): 1 of HK*3940, HK*3941:2, permission of instructor

HK*4360 Research in Human Biology and Nutritional Sciences S,F,W(0–12) [1.00]
The student will select a research topic and design and complete a project in an area of interest, in consultation with a faculty advisor.
Prerequisite(s): 12.00 credits

HK*4371 Research in Human Biology and Nutritional Sciences II S,F,W(0–6) [0.50]
First part of the two–semester course HK*4371/2. Refer to HK*4371/2 for course description.
Prerequisite(s): 12.00 credits

HK*4371/2 Research in Human Biology and Nutritional Sciences II S/F,F/W,W/S(0–6) [1.00]
The student will select a research topic and design and complete a project in an area of interest, in consultation with a faculty advisor. This is a two–semester course offered over consecutive semesters. When you select it you must select HK*4371 in the first semester and HK*4372 in the second semester. A grade will not be assigned to HK*4371 until HK*4372 has been completed.
Prerequisite(s): 12.00 credits

HK*4372 Research in Human Biology and Nutritional Sciences II F,W,S(0–6) [0.50]
Second part of the two–semester course HK*4371/2. Refer to HK*4371/2 for course description.
Prerequisite(s): HK*4371

HK*4410 Research Concepts I W(3–0) [0.50]
An introduction to the research process in modern integrative biology and biomedical sciences. The course explores, through lectures, tutorials and practica, the theory and practice of scientific experimentation and communication.
Prerequisite(s): 8.00 credits
Equate(s): HK*4200

HK*4420 Research Concepts II F(3–0) [0.50]
This course will address issues such as animal usage and scientific ethics that are of significance to modern research.
Prerequisite(s): HK*4410

HK*4460 Regulation of Human Metabolism W(3–0) [0.50]
The course focuses on the underlying metabolic events that occur in association with exercise. Skeletal muscle metabolism and substrate delivery are discussed with respect to the intracellular biochemical events integrated with both the endocrine and the chemical aspects of neural mechanisms.
Prerequisite(s): (HK*3940 or HK*3941:2) and (1 of HK*4060, HK*4320, HK*4520, NUTR*4210) or permission of instructor

HK*4540 Cardio–respiratory Laboratory W(1–2) [0.25]
This lab–based course will provide the student with a knowledge of classical and recent techniques for cardio–respiratory data collection. Cardio–respiratory responses to increased metabolic demand are a major focus. Demonstration labs are minimal; student involvement in small group studies is stressed. This course is intended to be taken with HK*4520 and as a follow–up to HK*4530.
Prerequisite(s): HK*3940

HK*4550 Human Cardio–respiratory Physiology W(4–0) [0.75]
The central focus is a comprehensive examination of the effects of a variety of work parameters on normal cardio–respiratory adjustments required to meet metabolic demands. Immediate adjustments to increase metabolic rate as well as long term cardio–respiratory adaptability will be discussed.
Prerequisite(s): 1 of HK*3940, HK*3941:2, permission of the instructor
Restriction(s): HK*4530

HK*4670 Prosthetic Biomechanics W(3–1) [0.50]
The adaptability of human tissues in response to mechanical stress. Bio–electrical potentials in bone. Joint lubrication. Prosthetic replacement in human skeletal joints and limbs with reference to the associated mechanical design.
Prerequisite(s): ENGG*2660 or HK*4070

XII—Course Descriptions, Humanities

College of Arts.

HUMN*3100 London Studies in the Humanities W(2–3) [0.50]
An integrated course of studies in the Humanities (including 2 or more of theatre, visual arts, history, music, literature and philosophy) as they relate to London cultural resources. For London Semester students only.
Prerequisite(s): admission to London Semester

HUMN*3130 Women in Modern Spanish Fiction W(3–0) [0.50]
A study of the representation of women in Spanish literature through the analysis and interpretation of 19th–century Spanish novels. The course will be taught in English. Students will read texts in English. (Offered in even–numbered years.)
Prerequisite(s): permission of instructor
Equate(s): SPAN*3130

HUMN*3150 Paris Studies in the Humanities W(2–3) [0.50]
An integrated course of study in the Humanities (including 2 or more of theatre, visual arts, history, music, literature and philosophy) as they relate to Paris cultural resources. For Paris Semester students only.
Prerequisite(s): admission to Paris Semester

HUMN*3160 Contemporary Latin American Fiction W(3–0) [0.50]
This course will examine, in English, why and how the leading figures, such as Borges, Cortazar, Garcia Marques, Carpentier, Isabel Allende, and Luisa Valenzuela have ”made” history, not only in the way they have recreated the Latin American historical reality, but also in the way they have reformed the Hispanic literature. Two lectures per week in English and one seminar per week in Spanish. Final essay and examination will be in English, short presentations and compositions will be in Spanish. Students who select the course under the listing of HUMN*3160 will attend the first two hours. They will write a research essay.
Equate(s): SPAN*3160

HUMN*3170 Women, Virtue and Honour in Spanish Drama (In English) F(3–0) [0.50]
This is a topic–oriented course which will study, in English, major Spanish dramas: seventeenth–century works such as Lope de Vega’s Fuenteovejuna, Calderon’s Life is a Dream, Tirso de Molina’s Don Juan, and twentieth–century plays such as Garcia Forca’s The House of Bernarda Alba and Blood Wedding. In addition to the thematic focus, these texts will be studied for their artistic merit and for the specificity of the Spanish ”comedia”. Where appropriate, this course will also discuss the influence of Spanish themes on the European culture. Students who select the course under the listing of SPAN*3170 will do selected readings and assignments in Spanish.
Equate(s): SPAN*3170

HUMN*3210 Introduction to Polish History and Culture F(6–4) [1.00]
The core course for the Krakow Semester consisting of three major components: 1) Polish language training, 2) a general introduction to Polish geography, politics and contemporary life and, 3) Polish history and the arts. For Krakow Semester students only.
Prerequisite(s): admission to Krakow Semester

HUMN*3220 Krakow Studies in the Humanities I F(3–2) [0.50]
An integrated course of studies in the humanities as they relate to the resources of Krakow, Poland. For Krakow Semester students only.
Prerequisite(s): admission to the Krakow Semester

HUMN*3230 Krakow Studies in the Humanities II F(3–2) [0.50]
An integrated course of studies in the humanities as they relate to the resources of Krakow, Poland. For Krakow Semester students only.
Prerequisite(s): admission to the Krakow Semester

HUMN*3240 India Studies in the Humanities W(3–0) [0.50]
An integrated course of studies in the humanities as they relate to India. This course looks at selected aspects of one or more areas in the humanities, including Indian religions, philosophy, literature (in English), history, language (Hindi), art and music. For India Semester students only.
Prerequisite(s): admission to the India Semester

HUMN*3300 Latin American Studies in the Humanities W(1–2) [0.50]
An integrated course of studies in the humanities as they relate to the resources of Latin America.
Prerequisite(s): admission to the Latin America semester, consent of the instructor and satisfactory participation in a bi–weekly preparation seminar during the fall semester

HUMN*3420 Late 18th–and 19th–Century Drama W(3–0) [0.50]
German–language drama from ca. 1780 to ca. 1900 within a European context, including enlightenment, revolutionary and naturalist drama. Texts are read in English. Students who want a German credit must be registered in GERM*3420. Lectures are in English and the laboratory is conducted in German. (Offered in odd–numbered years.)
Prerequisite(s): 5.00 University credits
Equate(s): GERM*3420

HUMN*3430 Tradition and Innovation in 20th–Century Drama W(3–0) [0.50]
Trends, themes and theories in 20th–century German–language drama, with particular focus on significant innovations (e.g. expressionist drama, Brecht's epic theatre. Texts are read and discussed in English. Students who wish for a German credit must register for GERM*3430. (Offered in even–numbered years.)
Prerequisite(s): 5.00 University credits
Equate(s): GERM*3430

HUMN*3440 Ideals and Anxieties in 19th–Century German Literature F(3–0) [0.50]
An exploration of philosophical and artistic goals, preoccupations and themes which shaped 19th–century literature and culture. Authors and movements of international significance such as Goethe, Heine, Romanticism, Realism will be discussed. Texts are read and discussed in English. Students who wish for a German credit must register for GERM*3440. (Offered in odd–numbered years.)
Prerequisite(s): 5.00 University credits
Equate(s): GERM*3440

HUMN*3450 20th Century Prose and Poetry (II) F(3–0) [0.50]
Trends and cultural movements that have shaped the 20th–century as reflected in works of major writers (e.g. Mann, Kafka, Grass, Wolf) and film directors (e.g. Fassbinder). Texts are read and discussed in English. Students who wish for a German credit must register for GERM*3450. (Offered in even–numbered years.)
Prerequisite(s): 5.00 University credits
Equate(s): GERM*3450

HUMN*3501 Independent Interdisciplinary Research Project F(3–0) [0.50]
First part of the two–semester course HUMN*3501/2. Refer to HK*3501/2 for course description.

HUMN*3501/2 Independent Interdisciplinary Research Project F/W(3–0) [1.00]
A two–semester course designed for students enrolled in the B.A. program in 1 of the College of Arts disciplines. Students in a general program with no major must seek the approval of the B.A. program counselor. Students will prepare proposals for independent research projects spanning 2 or more disciplines, at least 1 of which must be from the College of Arts, and arrange for faculty members representing at least 2 of these disciplines to provide supervision. Projects are subject to the approval of the department(s) or school(s) concerned and must be submitted to the appropriate chair(s) or director(s) by the end of the course selection period prior to beginning the course. Subject to approval, this course may be accepted as credit towards an honours major in Art History, Drama, English, Studio Art, French, History, German, Italian, Spanish, Classical Languages, Classical Studies, Music and Philosophy. This is a two–semester course offered over consecutive semesters. When you select it you must select HUMN*3501 in the Fall semester and HUMN*3502 in the Winter semester. A grade will not be assigned to HUMN*3501 until HUMN*3502 has been completed.

HUMN*3502 Independent Interdisciplinary Research Project W(3–0) [0.50]
Second part of the two–semester course HUMN*3501/2. Refer to HK*3501/2 for course description.

HUMN*4170 Don Quixote and the Picaresque Novel (In English) F(3–0) [0.50]
This course will study, in English, the importance of this Spanish masterpiece in the development of the modern European novel, and it will examine the first European picaresque work, Lazarillo de Tormes, in the light of the picaresque tradition which followed in Europe and the Americas. The course will also concentrate on the notion of play and laughter (Bakhtin) as means of survival. Students who select the course under the listing of SPAN*4170 will do selected readings and assignments in Spanish.
Equate(s): SPAN*4170

XII—Course Descriptions, Interdisciplinary Physical Science

IPS*4001 Chemical Physics Research Project F(0–9) [0.75]
First part of the two–semester course IPS*4001/2. Refer to IPS*4001/2 for course description.
Prerequisite(s): (CHEM*3870 or CHEM*4880), PHYS*3100 (of which CHEM*3870 may be taken concurrently)
Restriction(s): instructor consent required

IPS*4001/2 Chemical Physics Research Project F/W(0–9) [1.50]
A two–semester research project supervised by a faculty member from Physics or from Chemistry and Biochemistry, or by a pair of faculty members spanning the 2 departments in order to expand cross disciplinary opportunities. Students will participate in the seminar and reporting activities of either CHEM*4900, CHEM*4910 or PHYS*4500, PHYS*4510, and may utilize modules from PHYS*4500 as preparation if necessary. This is a two–semester course offered over consecutive semesters. When you select it you must select IPS*4001 in the Fall and IPS*4002 in the Winter semester. A grade will not be assigned to IPS*4001 until IPS*4002 has been completed.
Prerequisite(s): (CHEM*3870 or CHEM*4880), PHYS*3100 (of which CHEM*3870 may be taken concurrently)
Restriction(s): instructor consent required

IPS*4002 Chemical Physics Research Project W(0–9) [0.75]
Second part of the two–semester course IPS*4001/2. Refer to IPS*4001/2 for course description.
Prerequisite(s): IPS*4001

XII—Course Descriptions, Interdisciplinary Social Science

College of Social and Applied Human Sciences.

ISS*2000 Asia U(3–0) [0.50]
This course will survey China and/or India, noting the major historical trends, cultural factors, economic systems, and political institutions and political processes. Department of Political Science.

ISS*2500 Management in Organizations W(3–0) [0.50]
A first course in management designed to consider the management of any organization whether profit–motivated or non–profit, private or public, from the perspective of the social sciences. School of Hospitality and Tourism Management.

ISS*2990 Introduction to Marx W(3–0) [0.50]
An interdisciplinary course designed to acquaint students with the thought of Karl Marx. Departments of History, Philosophy, Political Science and Sociology and Anthropology.

ISS*3100 London Studies in the Social Sciences W(2–3) [0.50]
An integrated course of studies in the social sciences as they relate to the resources of London. For London Semester students only.
Prerequisite(s): admission to the London Semester

ISS*3150 Paris Studies in the Social Sciences W(2–0) [0.50]
An integrated course of studies in the social sciences as they relate to the resources of Paris. For Paris Semester students only.
Prerequisite(s): admission to the Paris Semester

ISS*3250 Krakow Studies in the Social Sciences I F(3–2) [0.50]
An integrated course of studies in the social sciences as they relate to the resources in Krakow, Poland. For Krakow students only.
Prerequisite(s): admission to the Krakow Semester

ISS*3260 Krakow Studies in the Social Sciences II F(3–2) [0.50]
An integrated course of studies in the social sciences as they relate to the resources in Krakow, Poland. For Krakow students only.
Prerequisite(s): admission to Krakow Semester

ISS*3270 India Studies in the Social Sciences W(3–0) [0.50]
An integrated course of studies in the social sciences as they relate to India. This course looks at selected aspects of one or more areas in the social, geographic, economic and political aspects of Indian society. For India Semester students only.
Prerequisite(s): admission to the India Semester

ISS*3300 Latin American Studies in the Social Sciences W(1–2) [0.50]
An integrated course of studies in the social sciences as they relate to the resources of Latin America.
Prerequisite(s): admission to the Latin America semester, consent of the instructor and satisfactory participation in a bi–weekly preparation seminar during the fall semester

ISS*3420 Women Social and Political Theorists W(3–0) [0.50]
The writings of seventeenth and nineteenth century women social and political theorists will be explored as contributing to the development of classical and contemporary social and political theory. These women wrote on status of women and gender role issues as well as dealing with such fundamental matters as the nature and origin of society/social contract, political rights and obligations, government, constitutional change, revolution, slavery, socialism, the welfare state, imperialism and racism. An important feature of the course would be to show women theorists' contributions on central political interests and the integration of gender issues with those of class and race. Department of Sociology and Anthropology and Department of Political Science.
Prerequisite(s): SOAN*2111/2 or POLS*2000

ISS*4000 Research Project in Environmental Studies F,W(3–0) [0.50]
This course is required of all senior students in the Environmental Studies Minor. It provides an opportunity to formulate and investigate an issue of environmental concern from an integrative human and biophysical perspective. Students must consult with the Environmental Studies co–ordinator before course selection. Department of Geography.
Prerequisite(s): registration in the Environmental Studies minor and 4.00 credits in the minor

XII—Course Descriptions, Interdisciplinary University

UNIV*2050 The 5000 Days S,F,W(3–0) [0.50]
An interdisciplinary approach to environmental issues which offers opportunities to investigate social processes and philosophical considerations with respect to the position and influence of humankind, and the development of social conditions, values and economic activities that have led to our present situation. These investigations are carried out within the context of physical environmental considerations, such as the sate of the earth, forests, air water and our use of energy, and will lead the student to a detailed consideration of the future. (Offered through distance education format only.)

UNIV*3010 University Studies in London I S(3–0) [0.50]
An intensive and integrated course of study in the arts, social sciences and/or sciences as they relate to the resources of London. For London Summer Session students only.
Prerequisite(s): admission to the London Summer Session

UNIV*3020 University Studies in London II S(3–0) [0.50]
An intensive and integrated course of study in the arts, social sciences and/or sciences as they relate to the resources of London. For London Summer Session students only.
Prerequisite(s): admission to the London Summer Session

UNIV*3150 University Studies in Paris I W(2–3) [0.50]
An integrated course of study in subject areas that will vary from year to year but relate to resources in Paris.
Prerequisite(s): admission to the Paris Semester

UNIV*3160 University Studies in Paris II W(2–3) [0.50]
An integrated course of study in subject areas that will vary from year to year but relate to resources in Paris.
Prerequisite(s): admission to the Paris Semester

UNIV*3170 University Studies in Paris III W(2–3) [0.50]
An integrated course of study in subject areas that will vary from year to year but relate to resources in Paris.
Prerequisite(s): admission to the Paris Semester

UNIV*3250 Beyond the 5000 Days S,F,W(3–0) [0.50]
The complexity and dimensions of key environmental issues introduced in UNIV*2050 are explored in greater detail. This will facilitate the student's ability to critically evaluate socio–economic–environmental linkages between contemporary challenges such as sustainable resources, energy, human population, education and communication, and environmental ethics. Supplementary voluntary workshop. (Offered through distance education format only.)
Prerequisite(s): UNIV*2050

UNIV*3400 Watershed Planning Practice S,F,W(3–0) [0.50]
This course provides a comprehensive review of watershed planning as practiced under the watershed planning initiative in Ontario. It also provides an introduction to watershed planning in other contexts (Canada, U.S.A. and developing world). The materials covered include watershed science and its application in planning and development of watershed programs at the local and municipal level. Case studies of existing watershed planning processes and programs are employed to demonstrate the application of the planning tools. Application of the watershed plans in the context of municipal official plans, plan of subdivision and part lot control are examined, along with a review of innovative planning tools (performance zoning, density control, and open space systems planning).
Prerequisite(s): ΑΓΡ*2301, ΒΙΟΛ*1040, ΕΝΠΓ*2550, (ΓΕΟΓ*2000 or ΓΕΟΓ*2210), ΣΟΑΝ*3300 or consent of the instructor

UNIV*3500 Recreation and Tourism Planning W(–) [0.50]
Application of planning theory to recreation and tourism in the private and public sectors, approaches to implementing plans, and strategies for involving stakeholders in the planning process. Focus will also be on the impact of various approaches to planning recreation and tourism. (Offered through distance education format only.)
Prerequisite(s): 10.00 credits or permission of the instructor

UNIV*3550 Economic Development for Rural and Smaller Communities S,W(–) [0.50]
This course addresses the variety of challenges facing rural and smaller communities in Canada relating to livelihood creation and maintenance, employment, investment, business development, tax base maintenance and enhancement and the associated strategies for development planning and management. The roles of various agents (public, private, community, Third Sector) are addressed through the literature and case studies. The course critically examines "local" and "community" economic development, and reviews the rich Canadian experience here. The structure and dynamics of rural economies are examined. The course addresses selected methods of analysis and outlines the process of planning for, and managing, economic development at the local level. Various development organizations (e.g. cooperatives, Community Development Corporations) are examined. (Offered through distance education format only.)

UNIV*4500 Planning Industrial Ecology S,F(–) [0.50]
To create ecologically informed and professionally skilled scientists, engineers, planners, and managers by providing them with: systems–analytic frameworks to critically examine processes, products, infrastructure, management systems and public policies from the perspective of environmental sustainability; and the skill set to guide the design of appropriate responses. Course requires a science background, minimum OAC Chemistry or Physics. (Offered through distance education format only.)
Prerequisite(s): 10.00 credits or equivalent

XII—Course Descriptions, International Development

IDEV*2010 Introduction to International Development W(3–0) [0.50]
An introduction to the study of international development viewed from the perspectives of the social sciences. Special emphasis will be placed on the historical patterns of international development, the principal paradigms and the implications of these for public policy.

IDEV*3200 Individual Work/Study in International Development S,F,W(3–0) [0.50]
This course is intended for students in the International Development Program who seek to combine work and study in development with their academic course work. This credit may apply to internships with international development agencies in Canada or abroad, to research and/or experience in a developing country, or to other practica or programs.
Prerequisite(s): at least one social science course (preferably ANTH*1150 or REXT*2000), written approval of the CIDS undergraduate advisor and successful completion of 10.00 credits

IDEV*4190 Regional Context S,F,W(1.5–0) [0.25]
In this course students will learn about a region that they intend to study further in an international work/study project or in a structured semester abroad. It may be offered on a reading basis or as a seminar.
Prerequisite(s): 10.00 credits including ISS*2010 and approval of the undergraduate advisor for International Development

IDEV*4200 Advanced Work/Study in International Development S,F,W(3–0) [0.75]
This course is intended for students who seek to combine work and study in development with their academic course work. It may be used in connection with internships or work at international development agencies or other appropriate businesses and organizations (in Canada and abroad), for research and/or experience in a developing country, or for other practica or programs. Any faculty member at the University of Guelph may supervise the work/study project. In each case, the student and faculty member will agree on an outline of the work/study project and evaluation criteria. In all cases the project will involve a writing component.
Prerequisite(s): IDEV*4190 and approval of the undergraduate advisor for International Development

IDEV*4500 International Development Seminar F,W(3–0) [0.75]
This course for graduating students in international development draws upon and integrates knowledge from different areas of emphasis in the specialization. The course uses lectures, text–based seminars and guest speakers to examine topics from a variety of disciplinary perspectives. Students develop and present independent research projects which focus theoretical insight on practical concerns.
Prerequisite(s): ANTH*1150, ECON*2650, (GEOG*2570 or GEOG*3050), IDEV*2010, POLS*2080, permission of the Undergraduate Academic Adviser for International Development

XII—Course Descriptions, Italian Studies

School of Languages and Literatures.

Note: Literary texts are, at all levels, studied in the original language. Students registering in these courses will be expected to have the appropriate knowledge.

ITAL*1060 Introductory Italian I F(3–1) [0.50]

A beginning course in Italian providing the fundamentals of grammar, structure and idiom. Introduction to aspects of Italian life and culture through audio–visual aids. (This course may not be taken by students who have credit for OAC Italian or equivalent.)

ITAL*1070 Introductory Italian II W(3–1) [0.50]

A continuation of ITAL*1060. In addition to basic grammar and composition, readings from modern writers are introduced. (This course may not be taken by students who have OAC Italian or equivalent.)

ITAL*2060 Intermediate Italian I F(3–0) [0.50]

Italian grammar and syntax, composition and translation.

Prerequisite(s): ITAL*1070 or OAC Italian

ITAL*2070 Intermediate Italian II W(3–0) [0.50]

Continuation of ITAL*2060. Increased emphasis on composition and translation.

ITAL*2350 Contemporary Italian Literature W(3–0) [0.50]

Literary trends from the Unification to the present day. An examination of moral and social implications of major literary works. Special emphasis on ”verismo” and Neo–Realism. (Offered in even–numbered years.)

Prerequisite(s): ITAL*2070

ITAL*3060 Advanced Italian F(3–0) [0.50]

A seminar course in Italian grammar and syntax, composition and translation. (Offered in odd–numbered years.)

Prerequisite(s): ITAL*2070

ITAL*3150 Medieval Italian Literature F(3–0) [0.50]

A study of Dante, Petrarch, and Boccaccio.(Offered in even–numbered years.)

Prerequisite(s): ITAL*2070

ITAL*3280 Renaissance Italian Literature W(3–0) [0.50]

A study of Renaissance ideals as reflected in the works of Lorenzo de’ Medici, Poliziano, Machiavelli, Castiglione and Ariosto. (Offered in odd–numbered years.)

Prerequisite(s): ITAL*2070

ITAL*3530 Business Italian W(3–0) [0.50]

A detailed study of the Italian language as it is currently used in administration and business. It will cover areas such as administrative correspondence, reports, employment, business communication and advertising.

Prerequisite(s): ITAL*3060

ITAL*3950 Topics in Italian Literature F,W(3–0) [0.50]

Aspects of Italian literature. Each offering will treat a particular topic such as early texts in the Vernacular, Commedia dell‘Arte, Eighteenth–Century Drama, realism in Italian Literature, the poetry of Montale, Ungaretti, and Saba. (Offered in even–numbered years.)

ITAL*3960 Topics in Italian Literature F,W(3–0) [0.50]

Aspects of Italian literature. Each offering will treat a particular topic such as early texts in the Vernacular, Commedia dell‘Arte, Eighteenth–Century Drama, realism in Italian Literature, the poetry of Montale, Ungaretti, and Saba. (Offered in even–numbered years.)

ITAL*3970 Topics in Italian Literature F,W(3–0) [0.50]

Aspects of Italian literature. Each offering will treat a particular topic such as early texts in the Vernacular, Commedia dell‘Arte, Eighteenth–Century Drama, realism in Italian Literature, the poetry of Montale, Ungaretti, and Saba. (Offered in even–numbered years.)

ITAL*4900 Research Paper in Italian Studies F,W(3–0) [0.50]

This is the equivalent of a semester course. A research project on some aspect of Italian language, literature, or thought. The topic must be approved by the section; the paper will be written under the regular guidance of a faculty advisor.

Prerequisite(s): students must be in at least the 6th semester in the honours program in Italian

XII—Course Descriptions, Landscape Architecture

School of Environmental Design and Rural Development.

LARC*1100 Design and Communications Studio F(3–3) [0.75]
An introduction to the physical design professions with emphasis on the role of landscape architects. Emphasis on development of design awareness, process, communication skills and creativity.
Prerequisite(s): registration in the B.L.A. program

LARC*1950 History of Cultural Form I F(4–0) [0.50]
This course explores the cultural form expressed in landscapes from ancient times to the 18th century Romantic movements. (Offered through distance education format only.)

LARC*2020 Design Studio W(2–4) [0.75]
An examination of the theory, process and vocabulary of spacial design. An exploration of the social, psychological, and behavioural forces a designer must respond to. An introduction to landscape analysis.
Prerequisite(s): registration in the B.L.A. program, LARC*1100

LARC*2100 Landscape Analysis F(2–2) [0.50]
A study of biophysical factors and their influence on design. Including soils, climate, vegetation, hydrology, and fauna. Natural and Cultural systems interpretation, site assessment methods, and data presentation techniques will be outlined. Students will formulate and conduct site assessments that include resource inventories and the analysis for land use suitability.
Prerequisite(s): BOT*1150, LARC*2020
Co–requisite(s): LARC*3040

LARC*2330 Planting Design I W(1–2) [0.25]
Visual and physical characteristics of plants and their use. Design theory and its application at a site specific scale. Study of the use of plants in a wide range of applications.

LARC*2340 Planting Design II F(1–2) [0.25]
Visual and physical characteristics of plants and their use. Design theory and its application at a site specific scale. Study of the use of plants in a wide range of applications.
Prerequisite(s): LARC*2330

LARC*2410 Site Engineering F(3–1) [0.50]
A focus on contour grading to facilitate circulation, stormwater runoff, and design intent. Aspects of surveying, plotting, as well as runoff and cut and fill calculations.
Prerequisite(s): LARC*2020, LARC*2420

LARC*2420 Materials and Techniques W(3–0) [0.50]
The study of materials commonly used for landscape construction. Specification of procedures and materials for contractual purposes. Detail drafting.
Prerequisite(s): LARC*1100

LARC*2820 Urban and Regional Planning W(3–0) [0.50]
Introduction to the evolution and history of planning and its conceptual base. A study of the theoretical foundations of planning. Emphasis on the Canadian scene and on Canadian planning literature.

LARC*2950 History of Cultural Form II W(4–0) [0.50]
This course follows History of Cultural Form I (LARC*1950) and explores the cultural form of 19th century reform period through to contemporary design developments. (Offered through distance education format only.)

LARC*3040 Site Planning and Design Studio F(2–4) [0.75]
Application of the site planning process, including programming, site analysis, functional analysis and diagramming. Application of design theory and landscape analysis to site design.
Prerequisite(s): LARC*2020
Co–requisite(s): HORT*3260, LARC*2100

LARC*3050 Landscape Architecture I W(2–4) [0.75]
Lectures and projects emphasizing the integration of design theory, skills and knowledge using site scale and urban design projects. Highlighting the use of contemporary history.
Prerequisite(s): LARC*3040

LARC*3060 Landscape Architecture II F(2–4) [0.75]
Application of the landscape architectural design process to conservation, development and rehabilitation of landscapes. Projects at an intermediate scale focusing on biophysical, cultural and visual resources as primary design determinants. Emphasis on secondary research, analysis, program development, alternative concepts and design master planning.

LARC*3070 Landscape Architecture III F(2–6) [1.00]
Exercises in regional scale design and master planning to provide an understanding of the integrative design process that considers ecological, technological, socio–economic, human and aesthetic factors in the land development process. Projects focus on land planning, community design, urban design, and public involvement and communication.
Prerequisite(s): LARC*3060

LARC*3430 Landscape Construction I W(2–4) [0.50]
Lectures and studio exercises that integrate construction documentation with design. The technical procedures needed to direct design implementation including layout, grading, utility design, and planting plans.
Prerequisite(s): LARC*2410

LARC*3440 Landscape Construction II F(2–4) [0.75]
Production of construction drawings, documents and cost estimates using computer and manual techniques.
Prerequisite(s): LARC*3430
Co–requisite(s): LARC*3060

LARC*3500 Independent Study S,F,W(0–6) [0.50]
Each student establishes, in consultation with the faculty member chosen, the content of special study within the area of expertise of that instructor.
Prerequisite(s): LARC*3040

LARC*4090 Seminar W(3–0) [0.50]
An integrated overview of professional issues involving practice, ethics, environmental concerns, government policy, research needs and professional responsibilities to society. Emphasis on writing and oral presentations.
Prerequisite(s): LARC*3060

LARC*4101 Design Thesis F(1–2) [0.50]
First part of the two–semester course LARC*4101/2. Refer to LARC*4101/2 for course description.
Prerequisite(s): LARC*3050, LARC*3440

LARC*4101/2 Design Thesis F/W(1–2/2–6) [1.50]
The fall semester consists of the study of research methods, and research, writing and presentations on individually selected topics. The student uses this work to complete an individual landscape design or planning project in the winter. Each student is to integrate the knowledge and demonstrate the skills acquired in preceding courses in a professional manner. This is a two–semester course offered over consecutive semesters. When you select it you must select LARC*4101 in the first semester and LARC*4102 in the second semester. A grade will not be assigned to LARC*4101 until LARC*4102 has been completed.
Prerequisite(s): LARC*3050, LARC*3440

LARC*4102 Design Thesis W(2–6) [1.00]
Second part of the two–semester course LARC*4101/2. Refer to LARC*4101/2 for course description.
Prerequisite(s): LARC*4101

LARC*4520 Park and Recreation Administration W(3–0) [0.50]
A study of the major objectives, policies and administrative practices of the principal park and recreation agencies at various levels of government, with an emphasis on trends and implications for future roles and administrative policies of these agencies. (Offered in odd–numbered years.)
Prerequisite(s): 1.00 credit at the 2000 level in social sciences or three semesters of the B.L.A. program

LARC*4610 Professional Practice F(3–0) [0.50]
Lectures and assignments dealing with professional ethics, organizations, contract law and procedures, relationships with clients, contractors and professional practitioners, office procedure and professional promotion practices and trends.
Prerequisite(s): LARC*3050

LARC*4620 Internship in Landscape Architecture S,F,W(0–10) [1.00]
An experiential learning opportunity requiring professional office experience and faculty supervision under program regulations. Actual work experience for academic credit. Students are required to submit a project or paper as part of the course requirements.
Prerequisite(s): LARC*3060

LARC*4730 Special Study in Landscape Architecture F(0–4) [0.50]
Supervised independent study involving competitions, special projects, modules, and other formats.
Prerequisite(s): LARC*3050

LARC*4740 Case Studies S,F,W(0–6) [0.50]
Travel and field studies of selected projects as approved by a faculty member. Students are required to submit a project or paper.
Prerequisite(s): LARC*3040

XII—Course Descriptions, Latin

School of Languages and Literatures.

Note: Literary texts are, at all levels, studied in the original language. Students registering in these courses will be expected to have the appropriate knowledge. Higher level courses in Latin are available as language modules attached to selected Classical Studies courses which are taken as double–weighted courses. (See Classical Studies course descriptions.)

LAT*1100 Preliminary Latin I F(3–0) [0.50]

A beginning course in Latin providing the fundamentals of structure and grammar. (This course may not be taken by anyone who has OAC Latin).

LAT*1110 Preliminary Latin II W(3–0) [0.50]

A continuation of LAT*1100.

Prerequisite(s): LAT*1100 or Year 4 (Grade 12) Latin

LAT*2000 Latin Literature F(3–0) [0.50]

A course in Latin literature based on relevant texts.

Prerequisite(s): OAC Latin or LAT*1100

LAT*4100 Directed Readings in Latin Literature F(3–0) [0.50]

A reading course in Latin Literature designed according to the needs and the interests of the individual student.

Prerequisite(s): 1.00 credit at the 3000 level in Latin

LAT*4150 Research Paper: Latin F,W(3–0) [0.50]

A major essay on an area of study to be determined in consultation with the School.

Prerequisite(s): 1.00 credit at the 3000 level in Latin

XII—Course Descriptions, Linguistics

School of Languages and Literatures.

LING*1000 Introduction to Linguistics W(3–0) [0.50]

The nature of language. An elementary survey of linguistic disciplines. Phonetics, morphology, syntax, semantics, language, and society.

XII—Course Descriptions, Mathematics

Department of Mathematics and Statistics.

Suggested initial course sequence:

1. For students with 4U or OAC Calculus and expecting to pursue further studies in mathematics or the physical sciences: MATH*1200, MATH*1210.
2. For students interested in applications to the biological sciences: MATH*1080, MATH*2080.
3. For students not expecting to pursue further studies in mathematics: MATH*1000, one STAT*XXXX course

MATH*1000 Introductory Calculus F,W(3–1) [0.50]

A brief introduction to analytical geometry. The differential and integral calculus for algebraic, logarithmic, exponential and trigonometric functions, with applications. (Also offered through distance education format.)

Prerequisite(s): 1 4U credit in mathematics or 1 OAC credit in mathematics

Restriction(s): MATH*1080, MATH*1200, IPS*1110, not available to students registered in the B.SC. and B.SC. (Agr.) programs

MATH*1050 Introduction to Mathematical Modeling W(3–1) [0.50]

The application of non–calculus techniques in modeling ”real world” problems in business, psychology, sociology, political science and ecology. The mathematical topics introduced include graphs and directed graphs, linear programming, matrices, probability, games and decisions, and difference equations. Mathematics majors may not take this course for credit.

Equate(s): CIS*1900

MATH*1080 Elements of Calculus I F,W(3–1) [0.50]

The elements of the calculus of one variable with illustration and emphasis on its application in the biological sciences. The elementary functions, sequences and series, difference equations, differential and integral calculus.

Prerequisite(s): 4U Advanced Functions and Calculus or OAC Calculus

Restriction(s): MATH*1000, MATH*1200, IPS*1110

MATH*1200 Calculus I F(3–1) [0.50]

This is a theoretical course intended primarily for students who expect to pursue further studies in mathematics and its applications. Topics include inequalities and absolute value; compund angle formulas for trigonometric functions; limits and continuity using rigorous definitions; the derivative and derivative formulas (including derivatives of trigonometric, exponential and logarithmic functions); Fermat’s theorem; Rolle’s theorem; the mean–value theorem; applications of the derivative; Riemann sums; the definite integral; the fundamental theorem of calculus; applications of the definite integral; the mean value theorem for integrals.

Prerequisite(s): 4U Advanced Functions and Calculus or OAC Calculus

Restriction(s): MATH*1000, MATH*1080, IPS*1110

MATH*1210 Calculus II S,W(3–1) [0.50]

Topics include inverse functions, inverse trigonometric functions, hyperbolic and inverse hyperbolic functions, indeterminate forms and l’Hopital’s rule; techniques of integration; parametric equations; polar coordinates; introduction to MacLaurin and Taylor series; functions of several variables; and partial derivatives.

Prerequisite(s): 1 of MATH*1000</csRCourseCode, MATH*1080, MATH*1200, IPS*1110, permission from the department

Restriction(s): MATH*2080

MATH*1XXX Any MATH course at the 1000 level [0.00]

** PLACE HOLD FOR B.A. REQUIREMENTS — DO NOT PRINT IN COURSE DESCRIPTIONS **

MATH*2000 Set Theory F(3–1) [0.50]

The algebra of sets. Equivalence relations, mappings and inverse mappings. Review of the real number system. Countable and uncountable sets. Partially and totally ordered sets. Complex numbers and their arithmetic. Geometry and topology of the line and the plane. Emphasis is placed on developing skills in constructing mathematical proofs.

Prerequisite(s): 0.50 credit in calculus at the university level

MATH*2080 Elements of Calculus II F,W(3–1) [0.50]

Techniques of integration, introduction to differential equations and the elements of multivariate calculus. Illustrations and emphasis will be on biological applications. An introduction to vectors, multivariable and vector functions, difference equations, partial differentiation and multiple integration.

Prerequisite(s): 1 of MATH*1000, MATH*1080, MATH*1200, IPS*1110

Restriction(s): MATH*1010, MATH*1210, IPS*1210

MATH*2130 Numerical Methods S,W(3–2) [0.50]

This course provides an overview of and practical experience in utilizing algorithms for solving numerical problems arising in applied sciences. Topics covered will include solution of a single nonlinear equation, interpolation, numerical differentiation and integration, solution of differential equations and systems of linear algebraic equations. Students will utilize computers in solving problem assignments.

Prerequisite(s): 1 of MATH*1010, MATH*1210, MATH*2080, IPS*1210

MATH*2150 Applied Matrix Algebra F,W(3–1) [0.50]

Matrices and matrix operations, matrix inverse and determinant, linear equations. N–dimensional vectors: dot product, linear independence, basis and dimension. Rank of a matrix. Eigenvalues, eigenvectors and diagonalization. Applications, including least squares.

Prerequisite(s): 1 of a 4U mathematics credit, an OAC mathematics credit, first year university mathematics credit

Restriction(s): MATH*2160

MATH*2160 Linear Algebra I F(3–0) [0.50]

Matrix notation, matrix arithmetic, matrix inverse and determinant, linear systems of equations, and Gaussian elimination. The basic theory of vector spaces and linear transformations. Matrix representations of linear transformations, change of basis, diagonalization. Inner product spaces, quadratic forms, orthogonalization and projections.

Prerequisite(s): (MATH*1200 or IPS*1110), (1 of MATH*2150, 4U Geometry and Discrete Mathematics, OAC Algebra and Geometry)

MATH*2170 Differential Equations I W,S(3–1) [0.50]

First order equations, linear equations of second and higher orders, phase plane, difference equations, introduction to power series methods, Laplace transforms, formulation, solution and interpretation of differential equations of interest in science.

Prerequisite(s): 1 of MATH*1010, MATH*1210, MATH*2080, IPS*1210

Restriction(s): MATH*2270

MATH*2200 Advanced Calculus I F(3–0) [0.50]

Infinite sequences and series of numbers, power series, tests for convergence; Taylor's theorem and Taylor series for functions of one variable; planes and quadratric surfaces; limits, continuity, and differentiability; partial differentiation, directional derivatives and gradients; tangent planes, linear approximation, and Taylor's theorem for functions of two variables; critical points, extreme value problems; implicit function theorem; Jacobians; double integrals, iterated integrals and change of variables.

Prerequisite(s): 1 of MATH*1210, MATH*2080, IPS*1210

MATH*2210 Advanced Calculus II W(3–0) [0.50]

Spherical and cylindrical polar coordinate transformations; multiple integrals; line integrals; vector and scalar fields including the gradient, divergence, curl and directional derivative, and their physical interpretation; theorems of Green and Stokes; uniform convergence.

Prerequisite(s): MATH*2200 (MATH*1200 is strongly recommended)

MATH*2270 Applied Differential Equations F(3–1) [0.50]

Solution of differential equations which arise from problems in engineering. Linear equations of first and higher order; systems of linear equations; Laplace transforms; series solutions of second–order equations; introduction to partial differential equations.

Prerequisite(s): ENGG*1500, MATH*1210

Restriction(s): MATH*2170

MATH*3100 Differential Equations II F(3–1) [0.50]

First order linear systems and their general solution by matrix methods. Introduction to nonlinear systems, stability, limit cycles and chaos using numerical examples. Solution in power series of second order equations including Bessel's equation. Introduction to partial differential equations and applications.

Prerequisite(s): (MATH*2130 or PHYS*2440), (MATH*2150 or MATH*2160), MATH*2170

MATH*3130 Algebraic Structures F(3–0) [0.50]

Symmetric groups; introduction to group theory; groups, subgroups, normal subgroups, factor groups, fundamental homomorphism theorem. Introduction to ring theory; rings, subrings, ideals, quotient rings, polynomial rings, fundamental ring homomorphism theorem.

Prerequisite(s): MATH*2000, (MATH*2150 or MATH*2160)

MATH*3160 Linear Algebra II W(3–0) [0.50]

Complex vector spaces. Direct sum decompositions, Cayley–Hamilton theorem, spectral theorem for normal operators, Jordan canonical form of a matrix.

Prerequisite(s): MATH*2160

MATH*3170 Partial Differential Equations and Special Functions W(3–0) [0.50]

Wave equation, heat equation, Laplace equation, linearity and separation of variables; solution by Fourier series; Bessel and Legendre functions; Fourier transforms; introduction to the method of characteristics.

Prerequisite(s): MATH*2000, MATH*3100

MATH*3200 Real Analysis F(3–0) [0.50]

Metric spaces and normed linear spaces. Fixed point theorems with applications to fractals. Uniform continuity. Riemann–Stieltjes integration.

Prerequisite(s): MATH*2000, MATH*2160, MATH*2210

MATH*3240 Operations Research F(3–0) [0.50]

Mathematical models. Linear programming and sensitivity analysis. Network analysis: shortest path, maximum flow and minimal spanning tree problems. Introduction to non–linear programming. Constrained optimization: the Frank–Wolfe method. Deterministic and probabilistic dynamic programming.

Prerequisite(s): (MATH*2150 or MATH*2160), 0.50 credit in statistics

Co–requisite(s): MATH*2200

MATH*3260 Complex Analysis W(3–0) [0.50]

The complex derivative and planar mappings. Analytic and harmonic functions. Conformal mappings. Elementary functions. Cauchy–Goursat theorem. The Taylor and Laurent series. Calculus of residues with emphasis on applications.

Prerequisite(s): MATH*2000, MATH*2200

MATH*3510 Biomathematics W(3–0) [0.50]
Development, analysis, and interpretation of mathematical models of biological phenomena. Emphasis will be on deterministic discrete and continuous models.
Prerequisite(s): (MATH*2150 or MATH*2160), (MATH*2170 or MATH*2270), at least 0.50 credit in statistics at the 2000 level or above

MATH*4000 Advanced Differential Equations F(3–0) [0.50]
A rigorous treatment of the qualitative theory of ordinary differential equations and an introduction to the modern theory of dynamical systems, existence, uniqueness, and continuity theorems. Definition and properties of dynamical systems. Linearization and local behaviour of nonlinear systems. Stable Manifold theorem. Liapunov stability. Limit cycles and Poincaré–Bendixson Theorem. Introduction to bifurcations and chaotic dynamics.
Prerequisite(s): MATH*3100, (MATH*3160 or MATH*3200)

MATH*4050 Topics in Mathematics I W(3–0) [0.50]
Discussion of selected topics at an advanced level. Intended mainly for mathematics students in the 6th to 8th semester. Content will vary from year to year. Sample topics: probability theory, Fourier analysis, mathematical logic, operator algebras, number theory combinatorics, philosophy of mathematics, fractal geometry, chaos, stochastic differential equations. (Offered in odd–numbered years.)
Prerequisite(s): MATH*2160, MATH*3200

MATH*4060 Topics in Mathematics II W(3–0) [0.50]
Discussion of selected topics at an advanced level as in MATH*4050, but with different choice of topic. (Offered in even–numbered years.)
Prerequisite(s): MATH*2160, MATH*3200

MATH*4070 Case Studies in Modeling F(2–2) [0.50]
Study of selected topics in applied mathematics at an advanced level, intended mainly for mathematical science students in the 7th or 8th semester. Sample topics are optimal control theory and nonlinear programming. The course will include case studies of real–world problems arising from various areas and the contribution of mathematical models to their solution. Part of the course requirement will involve the completion of a mathematical modeling project in conjunction with the departmental Mathematics and Statistics Clinic. For further information concerning the Clinic, consult the department. (Offered in even–numbered years.)
Prerequisite(s): 3.50 credits in mathematical science including MATH*2130

MATH*4140 Applied Algebra W(3–0) [0.50]
Finite symmetric groups, dihedral and cyclic groups with applications to the group of symmetries of a geometric figure in the plane. Polya–Burnside method of enumeration with applications. Galois fields with applications to combinatorial design constructions. Error correcting binary codes. (Offered in even–numbered years.)
Prerequisite(s): MATH*3130

MATH*4200 Advanced Analysis F(3–0) [0.50]
Sequences and series of functions. Stone–Weierstrass approximation theorem. Compactness in function spaces. Introduction to complex dynamics and the Mandelbrot set. Multivariate differential calculus.
Prerequisite(s): MATH*3160, MATH*3200, MATH*3260

MATH*4220 Applied Functional Analysis W(3–0) [0.50]
Hilbert and Banach spaces: applications to Fourier series and numerical analysis. Hahn–Banach theorem; weak topologies. Generalized functions; application to differential equations. Completeness; uniform boundedness principle. Lebesque measure and integral; applications to probability and dynamics. Spectral theory. (Offered in even–numbered years.)
Prerequisite(s): MATH*2160, MATH*3200

MATH*4240 Advanced Topics in Modeling W(3–0) [0.50]
A study of selected advanced topics in mathematical modeling, to include model formulation, techniques of model analysis and interpretation of results. Topics usually include transportation and assignment problems, minimum cost flow problems and network simplex methods, Markov chains, queuing theory. Student participation in researching a project and in the preparation of a report.
Prerequisite(s): MATH*3240

MATH*4270 Advanced Partial Differential Equations F(3–0) [0.50]
Theory of 1st and 2nd order partial differential equations with examples. Classification of linear second order PDE. Theory and examples of associated boundary value problems. Maximum principles. Green's functions. Introduction to nonlinear PDE. Applications.
Prerequisite(s): MATH*3170, MATH*3200, MATH*3260

MATH*4290 Geometry and Topology W(3–0) [0.50]
Classical geometry of the plane and 3–space. Non–Euclidean geometries. Elementary topology of graphs and surfaces. Topics to be selected from: algebraic geometry; analysis on manifolds; Riemannian geometry; tensor analysis; homotopy and homology groups. (Offered in odd–numbered years.)
Prerequisite(s): MATH*2160, MATH*3130, MATH*3200

MATH*4430 Advanced Numerical Methods F(3–0) [0.50]
Numerical solution of linear systems, differential equations; the algebraic eigenvalue problem, interpolation and approximation of functions, numerical quadrature.
Prerequisite(s): MATH*2130, (MATH*2150 or MATH*2160), MATH*2200, (MATH*2170 or MATH*2270)

MATH*4510 Environmental Transport and Dynamics F(3–0) [0.50]
Mathematical modeling of environmental transport systems. Linear and nonlinear compartmental models. Convective and diffusive transport. Specific models selected from hydrology; ground–water and aquifer transport, dispersion of marine pollution, effluents in river systems; atmospheric pollen dispersion, plume models, dry matter suspension and deposition; Global circulation: tritium distribution. (Offered in odd–numbered years.)
Prerequisite(s): MATH*3510 or MATH*3100, 0.50 credit in statistics

XII—Course Descriptions, Meteorology

Department of Land Resource Science.

MET*1000 The Atmospheric Environment S(3–0) [0.50]

An introduction to the atmospheric environment which covers global to local scales. Topics covered are: understanding weather maps and forecasts, weather indices for plants and people, local–scale microclimates of natural surfaces and cities, intentional modification of microclimates, diffusion of pollutants in the atmosphere and their impact on air quality and climate change, policy issues associated with air quality and climate change. (Offered through distance education format only.)

Restriction(s): all other MET* courses

MET*2020 Agrometeorology W(3–0) [0.50]

Weather and climate effects on agricultural production. Relation of water balance and other climate factors to growth and yield of crops, introduction to crop–weather modelling, climate hazards and their control, weather aspects of pest and disease management.

Prerequisite(s): BIOL*1020 or BIOL*1030

MET*2030 Meteorology and Climatology F(3–2) [0.50]

Solar and terrestrial radiation; pressure systems and winds; atmospheric stability and vertical motions; air masses and fronts; clouds and precipitation; selected topics in applied meteorology including air pollution. The laboratory emphasizes the analysis and use of atmospheric data for solving environmental problems.

Prerequisite(s): 1 of PHYS*1000, PHYS*1070, PHYS*1080, PHYS*1110, PHYS*1130

MET*3050 Microclimatology W(3–0) [0.50]

Natural and intentionally–modified microclimates near the earth's surface; energy budgets; transport of mass and heat. Familiarization with some instruments for microclimatic measurements.

Prerequisite(s): 1 of MET*2020, MET*2030, GEOG*2110

MET*4210 Atmospheric Monitoring and Physical Meteorology W(3–0) [0.50]

Principles of physical meteorology presented in the framework of atmospheric monitoring. Topics include heat, solar and terrestrial radiation, humidity, other atmospheric gases, wind.(Offered in odd–numbered years.)

Prerequisite(s): MET*2030 or MET*3050

Restriction(s): MET*4230

MET*4230 Atmospheric Monitoring and Physical Meteorology W(3–3) [0.75]

Identical to MET*4210 with the addition of a laboratory component which emphasizes the principles of scientific instrumentation and the operation of meteorological sensors. Lectures taken with MET*4210. (Offered in odd–numbered years.)

Prerequisite(s): MET*2030 or MET*3050

Restriction(s): MET*4210

MET*4300 Atmospheric Transport and Chemistry W(3–0) [0.50]

Behaviour of synoptic scale weather systems and the transport of substances in the atmosphere. Chemical and photochemical transformations during transport; scavenging and removal from the atmosphere. (Offered in even–numbered years.)

Prerequisite(s): (1 of CHEM*1310, CHEM*3360, ENGG*3360, TOX*3360, ENVS*3360), MET*2030

Restriction(s): MET*4310

MET*4310 Atmospheric Transport and Chemistry W(3–3) [0.75]

Identical to MET*4300 with the addition of a laboratory component which emphasizes aspects of Dynamic and Synoptic Meteorology including weather map analysis and forecasting, atmospheric dynamics, geostrophic and thermal winds, vorticity, and mechanisms of pressure change. Lectures taken with MET*4300. (Offered in even–numbered years.)

Prerequisite(s): (1 of CHEM*1310, CHEM*3360, ENGG*3660, TOX*3360, ENVS*3360), MET*2030

Restriction(s): MET*4300

XII—Course Descriptions, Microbiology

Department of Environmental Biology.
Department of Microbiology.
Department of Pathobiology.

MICR*1010 The Microbial World F(3–0) [0.50]
A general introduction to microorganisms for non–science students. It deals with the importance of microorganisms to people and their environment. Department of Microbiology.

MICR*1020 Fundamentals of Applied Microbiology F(2–3) [0.50]
This course is designed for students in engineering and applied human nutrition. The importance of microbes from an environmental point of view, including water systems and soils as well as their importance in disease, nutrition, food and food processing will be emphasized. The theoretical basis of microbial analysis and control measures will be included. The laboratory component of the course will deal with microbial growth and practical aspects of microbial analysis of environmental and food samples including identification and enumeration of specific microorganisms and approaches for their control. B.SC. students cannot take this course for credit. Department of Microbiology.
Restriction(s): BIOL*1030, BIOL*1040

MICR*2020 Microbial Interactions and Associations F,W(3–0) [0.50]
The interactions and associations of microorganisms with each other and with components of both the biotic and abiotic worlds have an enormous impact on daily life and their influence is felt on a global basis. The diversity of microorganisms including viruses, bacteria, fungi and protozoa will be presented in the context of such interactions and impact. The interactions of microbes with host organisms in symbioses and pathogenesis, and their survival strategies in extreme environments will be examined. The host–pathogen interactions in disease will be emphasized, but balanced with consideration of the beneficial aspects of microorganisms such as their role in biogeochemical cycles and their application in biotechnology. Assignments will evaluate contemporary microbiological issues in the context of the corresponding scientific literature. Department of Microbiology.
Prerequisite(s): BIOL*1040 or equivalent

MICR*2030 Microbial Growth S,F,W(2–3) [0.50]
The environmental factors and physiological processes of microbial growth. The transport of nutrients, the metabolic availability of energy, metabolic patterns, and versatility in diverse microorganisms. Microscopy, isolation and enumeration, measurement of growth. Department of Microbiology.
Prerequisite(s): BIOL*1040

MICR*3110 Techniques in Microbiology W(3–3) [0.50]
An ”open laboratory” course. Techniques used in microbiology laboratories will be studied, including: kinetics of microbial growth, cell harvesting and disruption, separation and biochemical analysis of cell constituents. Department of Microbiology.
Prerequisite(s): CHEM*3560, MICR*2030, MBG*2020

MICR*3120 Systematic Bacteriology F(2–3) [0.50]
Classification, nomenclature, and identification of bacteria. Methods and approaches for the isolation and identification of bacteria are considered in the laboratory. The characteristics of some groups of common bacteria and the contributions of molecular systematics to bacterial classification are discussed. Department of Microbiology.
Prerequisite(s): MICR*2030

MICR*3220 Plant Microbiology F(3–0) [0.50]
Interaction between plants and microorganisms. Topics include molecular plant–microbe interactions, plant defenses, bacterial ice nucleation, interaction among plant microbes, root nodulation, mycorrhizae, wood decay, and decomposition of plant litter. Department of Environmental Biology.
Prerequisite(s): BIOL*1040, BOT*1150

MICR*3230 Immunology I F(3–0) [0.50]
An introduction to the immune response of the vertebrate host, the cells and tissues of the lymphoid system, humoral and cell–mediated immunity, the concept of immunity to diseases and current techniques in immunology. Department of Microbiology and Department of Pathobiology.
Prerequisite(s): BIOL*1040, CHEM*2580

MICR*3260 Microbial Adaptation and Development W(3–1) [0.50]
Adaptation, development, and modulation of microbial physiology in response to environmental stimuli (tutorials included). Department of Microbiology.
Prerequisite(s): CHEM*3560, (MBG*3070 or MBG*3080)

MICR*4010 Pathogenic Bacteriology F(3–0) [0.50]
Interactions between bacterial pathogens and host animals, including immune and inflammatory responses of the host’s defense mechanisms. The structural and physiological characteristics of a number of important bacteria causing human and animal diseases are considered. Department of Microbiology and Department of Pathobiology.
Prerequisite(s): MICR*3120, MICR*3230, (MBG*3070 or MBG*3080)

MICR*4120 Virology F(3–3) [0.50]
Viral diversity, structure and composition. Growth, assay and purification. Lytic replication of bacteriophages; lysogeny and transduction. Animal virus replication cycle and organization of viral DNA and RNA genomes and strategies for their expression and replication. Tumor virology. Induction and mechanism of action of interferon. Department of Microbiology.
Prerequisite(s): MBG*2020 or MBG*3070

MICR*4140 Soil Microbiology and Biotechnology F(3–0) [0.50]
The biology of soil microorganisms with an emphasis on their integrated ecology, physiology, genetics and biotechnological uses in the soil environment. The response of soil microorganisms to soil physical–chemical factors and aspects of nutrient cycling in soil. Current topics also include soil as an environment for microorganisms, microbial evolution, soil microbial biodiversity, gene flow and microbial nucleic acids in soil, microbial survival and activity in soil, metabolism of soil pollutants and metal–microbe interactions. The use of molecular–based methods to study microorganisms in soil. Regulations and guidelines on the biotechnological applications of microorganisms in the soil environment will be discussed. Department of Environmental Biology.
Prerequisite(s): BIOL*1040, CHEM*2580

MICR*4180 Microbial Processes in Environmental Management F(3–0) [0.50]
The metabolic basis of microbial processes fundamentally important in the management of agricultural, industrial or municipal wastes are examined. Topics covered include relevant considerations in using microorganisms for pollution control, factors that affect efficient microbial degradation in the environment, and major microbial enzyme systems/pathways for biodegradation of persistent pollutants. Emphasis will be placed on the biochemistry, physiology, genetics and biotechnological applications of pollutant–degrading microorganisms. Department of Environmental Biology.
Prerequisite(s): BIOL*1040, CHEM*2580

MICR*4230 Immunology II W(3–3) [0.50]
Concepts and current knowledge of the diversity of immune response, experimental systems used in studying immunology, antigen–antibody reaction methods, monoclonal antibodies, antibody engineering, hypersensitivity reactions, autoimmunity, and adhesion molecules and homing of cells of the immune system. Department of Microbiology.
Prerequisite(s): MICR*3230

MICR*4240 Topics in Microbiology S,F,W(1–3) [0.50]
Independent study of a selected topic in microbiology, involving a review and critical appraisal of the current literature. Written and oral presentations are required. Students are required to discuss a topic with a potential supervisor before registering for the course. Open to students in semesters 6, 7 and 8. Department of Microbiology.

MICR*4260 Microbial Technology W(3–0) [0.50]
Study of how the metabolism of microorganisms can be manipulated to produce goods and services. The means by which the yields of secondary metabolites, enzymes, and genetically selected products can be maximized are considered and examples of specific processes are examined. Department of Microbiology and Department of Environmental Biology.
Prerequisite(s): (MBG*2020, MICR*2030

MICR*4270 Microbial Design F(3–0) [0.50]
Diversity in structure and function of microorganisms. Adaptation to meet functional demands of the environment. Differences between the Bacteria, Archaea, and Eukarya emphasized, particularly in respect to action of antimicrobial agents. Department of Microbiology.
Prerequisite(s): CHEM*3560, (MBG*3070 or MBG*3080)
Restriction(s): MICR*3250

MICR*4290 Microbial Ecology W(2–3) [0.50]
Microorganisms and transformations involved in the major geochemical cycles in marine, fresh water and terrestrial ecosystems. Factors which affect these activities are considered including nutrition, temperature, pressure, salinity, pH, and oxidation/reduction potential. Common techniques used in ecological research such as measurement of ATP and radioisotope measurement of mineralization are studied in the laboratory section. Department of Microbiology.
Prerequisite(s): MICR*2030

MICR*4310 Research Project I S,F,W(0–12) [1.00]
Independent research projects involving experimental or practical work, conducted under the supervision of a faculty member. Results are presented in written and oral form. Students must have a research advisor and permission from the course coordinator before registering.
Prerequisite(s): consent of instructor

MICR*4320 Research Project II S,F,W(0–12) [1.00]
Independent research projects involving experimental or practical work, conducted under the supervision of a faculty member. Results are presented in written and oral form. Students must have a research advisor and permission from the course coordinator before registering. Department of Microbiology.
Prerequisite(s): MICR*4310, consent of instructor

MICR*4430 Medical Virology W(3–0) [0.50]
A study of the interactions of animal viruses and their hosts and of important diseases of humans caused by viruses in different taxonomic groups. The emphasis is on aspects of pathogenesis, epidemiology, immune responses and control. Recent advances in the application of molecular biology to the development of diagnostic tests and vaccines will be included. Department of Pathobiology.

Prerequisite(s): MICR*4120

XII—Course Descriptions, Molecular Biology and Genetics

Department of Animal and Poultry Science.
Department of Microbiology.
Department of Molecular Biology and Genetics.
Department of Plant Agriculture.
Department of Zoology.

MBG*1000 Genetics and Society F,W(3–1) [0.50]
Basic principles of genetics at work in human society. The roles of genes and inheritance in the biology of humans and the organisms with which we interact. Introduction to some of the social and ethical consequences of genetic knowledge and practice. This is a science course designed primarily for students in the Arts or Social and Applied Human Sciences. B.SC. students cannot take this course for credit towards their degree requirements. Department of Molecular Biology and Genetics.

MBG*2000 Introductory Genetics S,F,W(3–2) [0.50]
Fundamental aspects of genetics including the chromosomal basis of inheritance, cytogenetics, genes in populations and quantitative traits. Additional topics include extranuclear inheritance, human genetics, bacterial and viral genetics. The molecular nature of the gene and general mechanisms of gene expression will be introduced but not covered in detail as these topics are expanded in MBG*2020. Intended as the foundation course in genetics for science students and is a prerequisite for all upper level courses in molecular biology and genetics including MBG*2020. Department of Molecular Biology and Genetics.
Prerequisite(s): 1.00 credit at the 1000 level in biological science

MBG*2020 Introductory Molecular Biology F,W(3–2) [0.50]
Introduction to the processes by which genetic information is stored, replicated, and expressed in living organisms and the experimental techniques used to study these processes. DNA, gene–protein relationships, and the genetic code. Replication, chromosomes, transcription, and translation. Techniques employed in molecular cloning and applications. Department of Molecular Biology and Genetics.
Prerequisite(s): CHEM*2580, MBG*2000

MBG*3000 Population Genetics F(3–2) [0.50]
This course is designed to explore the concepts of random mating, inbreeding, random drift, assortative mating and selection as they relate to natural populations. The dynamic genetic structure of populations and its relationship to the process of speciation is examined. The role and significance of molecular genetics as it relates to population genetics, evolution, systematics and phylogeny is also considered. Department of Zoology.
Prerequisite(s): MBG*2000

MBG*3050 Human Genetics W(3–3) [0.50]
A course designed to introduce the student to the study of biological inheritance in humans. The course includes discussion of the genetic basis of human individual differences, gene frequencies in human populations, human behavioral genetics, human cytogenetics, biochemical genetics and developmental genetics, medical genetics and other aspects of human heredity. Department of Molecular Biology and Genetics.
Prerequisite(s): MBG*2020

MBG*3060 Quantitative Genetics W(3–2) [0.50]
The nature of Mendelian inheritance when extended to quantitative traits that are jointly influenced by the environment and the simultaneous segregation of many genes. Prediction of response to natural and artificial selection in populations. Department of Animal and Poultry Science.
Prerequisite(s): MBG*2000, 0.50 credit in statistics

MBG*3070 Bacterial Genetics F(3–3) [0.50]
Genetics of prokaryotic microorganisms and their viruses. Some major topics covered are: regulation of gene expression, analysis of bacterial and phage genomes, plasmids, transposable elements, and mutation studies. This course is restricted to students in the B.SC. Major in Microbiology or Molecular Biology and Genetics programs, unless approval by the course instructor is obtained. Department of Microbiology.
Prerequisite(s): MBG*2020, MICR*2030
Restriction(s): MBG*3080

MBG*3080 Bacterial Genetics S,F(3–0) [0.50]
Lecture portion only of MBG*3070. Department of Microbiology.
Prerequisite(s): MBG*2020, MICR*2020
Restriction(s): MBG*3070

MBG*3090 Applied Animal Breeding F(3–2) [0.50]
The basis of, and methods for, effective use of modern animal breeding tools for practical improvement of livestock species. An examination and comparison of the structure of genetic improvement programs across species. International aspects and challenges to animal breeding programs.
Prerequisite(s): MBG*2000, 0.50 credit in statistics

MBG*3100 Plant Genetics F(3–2) [0.50]
Reproduction in plants, genetic and cytogenetic structure of plants, nature of phenotypic variability in plants, patterns of response to selection in plant populations, measurement of continuous and discontinuous genetic variability in plant populations. Department of Plant Agriculture.
Prerequisite(s): (MBG*2000 or AGR*2451/2 for B.SC.(Agr.) students only), STAT*2040

MBG*3200 Genetics: Our Uncertain Heritage F(3–0) [0.50]
An examination of the ethical, social, and political issues arising from genetic manipulation, reproductive intervention and biotechnology through the joint application of principles of modern genetics and moral philosophy. Topics include eugenics, cloning, surrogate parenting, abortion, gene therapy, DNA fingerprinting and genetic diagnosis. Related issues such as scientific freedom, access to genetic information and public policy are also considered. Department of Molecular Biology and Genetics.
Prerequisite(s): MBG*2000

MBG*3350 Laboratory Methods in Molecular Biology I F,W(0–8) [0.75]
Laboratory based instruction in the basic methodologies of Molecular Biology. Students will have the opportunity to develop technical skills and practical knowledge sufficient to perform basic procedures independently, and to diagnose and analyze experimental results obtained with these techniques. Department of Molecular Biology and Genetics.
Prerequisite(s): CHEM*2580, MBG*2020
Restriction(s): registration in the B.SC. Major in Molecular Biology and Genetics, Biochemistry, Biochemistry (Co–op), Biomedical Toxicology, Biomedical Toxicology (Co–op) or instructor consent

MBG*3360 Laboratory Methods in Molecular Biology II W(0–8) [0.75]
Laboratory based instruction in the basic methodologies of Molecular Biology. Students will have the opportunity to develop technical skills and practical knowledge sufficient to perform advanced agendas independently, and to diagnose and analyze experimental results obtained with these techniques. Department of Molecular Biology and Genetics.
Prerequisite(s): MBG*3350

MBG*3600 Introduction to Genomics S,F(1.5–0) [0.25]
Genomics is the analysis of the structures and functions of entire genomes, whose nucleotide sequences are now known in part or in entirety for many different organisms. This computer–based course will provide an introduction to the methology and applicability of this new discipline. Department of Molecular Biology and Genetics. (Offered through distance education format only.)
Prerequisite(s): MBG*2020

MBG*4030 Animal Breeding Methods F(3–2) [0.50]
Theoretical and scientific aspects of practical animal breeding programs which lead to genetic improvement of efficiency and profitability of animal production. Integrates quantitative genetics with concepts of statistics, economics, biology and biotechnology and expands into development of practical breeding plans. Department of Animal and Poultry Science.
Prerequisite(s): MBG*3060

MBG*4040 Genetics and Molecular Biology of Development F(3–2) [0.50]
An examination of the genetic mechanisms which specify organismic development. Molecular biology of determination and cell differentiation, homeotic genes, oncogenes, genetic control of morphogenesis and pattern formation. Application of embryo manipulation techniques in basic science and medicine. Department of Molecular Biology and Genetics. (Offered in odd–numbered years.)
Prerequisite(s): MBG*2020
Restriction(s): MBG*4070

MBG*4070 Genetics and Molecular Biology of Development F(3–0) [0.50]
Lecture portion only of MBG*4040. (Offered in odd–numbered years.)
Prerequisite(s): MBG*2020
Restriction(s): MBG*4040

MBG*4080 Molecular Genetics F(3–0) [0.50]
The chemical nature of genetic material, transcription and the control of gene expression. DNA cloning and the use of recombinant DNA molecules in modifying gene expression. Department of Molecular Biology and Genetics.
Prerequisite(s): MBG*2020

MBG*4160 Plant Breeding W(3–2) [0.50]
Application of genetic principles to plant improvement. Topics include breeding objectives, mating systems, selection, testing and germplasm maintenance of horticultural and crop plants. Department of Plant Agriculture.
Prerequisite(s): [MBG*2000 or (MBG*3100, AGR*2451/2 (for B.SC.(Agr.) students only)], STAT*2040

MBG*4200 Transmission Genetics F(3–0) [0.50]
A critical review of genetic methodologies employed in higher eukaryotes and how formal genetic analysis can be integrated with molecular genetics in studying diverse biological research areas such as meiotic recombination, DNA repair, embryonic development, transposable elements and neurobiology. Department of Molecular Biology and Genetics. (Offered in even–numbered years.)
Prerequisite(s): MBG*2000
Equate(s): MBG*4060

MBG*4240 Applied Molecular Genetics W(3–0) [0.50]
Molecular and cellular aspects of biotechnology. In vitro manipulations of animal and plant cells. Genetic engineering in eukaryotes and development of transgenic organisms. Methods of gene therapy and molecular biology of cancer and its treatment. Department of Molecular Biology and Genetics.
Prerequisite(s): MBG*2020

MBG*4270 DNA Replication and Environmental Mutagenesis W(3–0) [0.50]
DNA replication, recombination and repair. Mechanisms of mutation and relation to carcinogenesis. Methods for detection of environmental mutagens and risk assessment. Department of Molecular Biology and Genetics. (Offered in odd–numbered years.)
Prerequisite(s): MBG*2020

MBG*4300 Plant Molecular Genetics W(3–0) [0.50]
Molecular genetics of plants. Topics include: plant genome diversity and synteny; Arabidopsis thaliana genome, hormonal, environmental and developmental regulation of gene expression; chloroplast and mitochondrial genomes; and gene expression and silencing in transgenics. The course will be delivered using a lecture and paper discussion format. Students will learn and use a variety of computer techniques to search and analyze plant genome databases.
Prerequisite(s): MBG*2020

MBG*4350 Structural Molecular Biology W(3–0) [0.50]
Architecture of protein and nucleoprotein complexes associated with gene expression; computational sequence analysis and structure prediction; gene and molecular evolution. Department of Molecular Biology and Genetics. (Offered in even–numbered years.)
Prerequisite(s): MBG*2020

MBG*4500 Research Project in Molecular Biology and Genetics I S,F,W(0–12) [1.00]
Independent theoretical and laboratory research on a topic in the discipline under the supervision of individual faculty. Students must make arrangements with both a faculty supervisor and the course coordinator prior to preregistration.
Prerequisite(s): MBG*3350, permission of the course coordinator and registration in semester 7 or 8 of the B.SC. program, Molecular Biology and Genetics Major

MBG*4510 Research Project in Molecular Biology and Genetics II S,F,W(0–12) [1.00]
Independent theoretical and laboratory research on a topic in the discipline under the supervision of individual faculty. Students must make arrangements with both a faculty supervisor and the course coordinator prior to preregistration.
Prerequisite(s): MBG*4500, registration in semester 7 or 8 of the B.SC. program, Molecular Biology and Genetics Major

MBG*4600 Topics in Molecular Biology and Genetics S,F,W(1–3) [0.50]
Independent study of a current topic in Molecular Biology and Genetics, selected from the recent research literature and involving a review and critical appraisal of underlying experimental principles. The course comprises independent library research, participation in weekly meetings, and written and oral presentations. Students must make arrangements with both faculty supervisor and the course coordinator in a prior course selection period. Open to students in semesters 6, 7, and 8 of the B.SC. Major in Molecular Biology and Genetics. Department of Molecular Biology and Genetics.
Prerequisite(s): MBG*3350, permission of course coordinator
Restriction(s): MBG*4500, MBG*4510, MICR*4240

MBG*4620 Molecular Cytogenetics W(3–3) [0.50]
Cellular controls of cell proliferation and DNA replication; chromosome structure, behaviour, and aberrations. Department of Molecular Biology and Genetics. (Offered in even–numbered years.)
Prerequisite(s): (BIOL*2200 or BIOL*2210), MBG*2020

XII—Course Descriptions, Music

School of Fine Art and Music.

Ensembles

Chamber Music
Choir
Concert Winds
Early Music Ensemble
Jazz Band
Orchestra

Solo Performance (Applied Music): *Private instruction is offered in piano, voice, orchestral instruments, and various jazz and early instruments. In order to register in Applied Music (MUSC*1500), students must arrange an audition with the School of Fine Art and Music at the time of course selection. Auditions are held prior to the first day of classes each semester. In order to continue to the 2000 level of Applied Music, students must be in a Music program (honours major or minor, or general).*
Applied Music courses are designed to be taken in successive semesters. Registration in this sequence following an interuption of a semester or more requires permission of the Director of the School. Students may be required to re–audition before registering to continue in Applied Music. Students must achieve a minimum grade 70% in Applied Music courses in order to proceed to the next level.
Topics Courses: *The School will normally offer a "Topics" course each Fall and Winter. See courses MUSC*3800 to MUSC*3850. Please consult the School of Fine Art and Music for specific titles of courses to be offered.*

MUSC*1060 Introduction to Music F,W,S(3–0) [0.50]
An introductory course intended for students with NO previous experience in music. The main concepts and terminology of music from the Medieval period through the 20th–century will be explored in connection with the study of selected musical works. (Also offered through distance education format.)

MUSC*1090 Physics of Music W(3–0) [0.50]
A course designed for arts and social science students with an interest or background in music. The fundamentals of vibrations and waves will be introduced and applied to a study of archetypal instruments. The psychoacoustic basis of pitch and loudness will be discussed. Students who have standing in any other 1000 level Physics course (except PHYS*1020, PHYS*1600, PHYS*1800) may enrol in MUSC*1090 only if they are completing an honours or general program in Music, in which case permission of the instructor is required. (Also listed as PHYS*1810.) (Offered in even–numbered years.)
Restriction(s): PHYS*1810

MUSC*1120 Introduction to Musicianship F,W(1–2) [0.25]
Ear training through dictation and sight–singing exercises. Major and minor scales, key signatures, intervals, triads and chord progressions using treble and bass clefs. Prior acquaintance with the rudiments of music (intervals, scales, rhythm, and notation) is expected.
Restriction(s): MUSC*1180

MUSC*1180 Musicianship I F,W(2–2) [0.50]
Ear training through dictation and sight–singing exercises; C clefs; elementary improvisation and harmonization.

MUSC*1250 Melody and Counterpoint W(3–0) [0.50]
An introduction to the linear aspects of music through the study of melody, species counterpoint, and figured bass.
Prerequisite(s): 1 of MUSC*1120, MUSC*1180, permission of the instructor

MUSC*1500 Applied Music I S,F,W(1–6) [0.50]
Individual instruction in the technical and stylistic aspects of artistic solo and ensemble performance. In order to register for this course, students must arrange an audition with the School of Fine Art and Music at the time of course selection.
Prerequisite(s): successful completion of an audition and registration in semesters 1 to 4

MUSC*1510 Applied Music II S,F,W(1–6) [0.50]
A continuation of MUSC*1500.
Prerequisite(s): a minimum grade of 70% in MUSC*1500

MUSC*2030 Music in Canada F(3–0) [0.50]
The background and development of musical life in Canada. Cultivation of understanding of Canadian music using recorded examples with emphasis on 20th–century compositions. (Offered in odd–numbered years.)

MUSC*2100 Creating Music on the Computer F(6–0) [0.50]
An introduction to comuter technologies as they apply to the creation and manipulation of music. Topics will be drawn from the areas of sound synthesis and processing, recording, encoding, and transcription. The course will include a classroom and an applied component.
Prerequisite(s): MUSC*1180, some computer experience is also recommended

MUSC*2140 History of Jazz F(3–0) [0.50]
A survey of the major styles, personalities, and performances of the jazz tradition in terms of its social and cultural contexts through the examination of jazz texts and commentary, autobiographies of musicians, and recorded examples of important performances. (Also offered through distance education format.)

MUSC*2150 Music and Popular Culture F,W(3–0) [0.50]
A survey of the major genres, styles, personalities and performance of popular music primarily in the 20th–century through lectures, listening, discussion and reading. Issues such as the relationships between popular music and race, class, technology, and art will be examined. Technical knowledge of music is not required.

MUSC*2180 Musicianship II F,W(2–2) [0.50]
A continuation of MUSC*1180.
Prerequisite(s): MUSC*1180

MUSC*2280 Masterworks of Music W,S(0–10) [0.50]
Selected musical works from 1600 to the present will be studied with reference to the historical, literary, and artistic milieu in which they were written and performed. Previous familiarity with basic musical terminology and note reading is required. This is a web–based course. (Offered through distance education format only.)

MUSC*2360 Tonal Harmony I F(3–0) [0.50]
The study of diatonic harmony: triads, progression, secondary dominants, harmonization of melodies and basses; dissonance treatment; diatonic modulation.
Prerequisite(s): MUSC*1250
Equate(s): MUSC*2250

MUSC*2370 Tonal Harmony II W(3–0) [0.50]
A continuation of MUSC*2360 which introduces chromatic harmonies (augmented and Neapolitan sixth chords), suspension chords, linear structures, and non–diatonic modulation.
Prerequisite(s): MUSC*2360
Equate(s): MUSC*2250

MUSC*2500 Applied Music III S,F,W(1–6) [0.50]
A continuation of MUSC*1510.
Prerequisite(s): MUSC*1180, a minimum grade of 70% in MUSC*1510 (MUSC*1180 may be taken as corequisite) and registration in a Music program (honours major or minor or general, area of concentration)

MUSC*2510 Applied Music IV S,F,W(1–6) [0.50]
A continuation of MUSC*2500.
Prerequisite(s): a minimum grade of 70% in MUSC*2500, (1 of MUSC*2600, MUSC*2610, MUSC*2620 and registration in a Music program (honours major or minor or general, area of concentration)

MUSC*2530 Instrumental Ensembles I F,W(0–2) [0.25]
The study and performance of selected instrumental music through participation in one of the School's ensembles: the University of Guelph Orchestra, Concert Winds, Jazz Band or the Early Music Ensemble. In order to register for an ensemble, the student must arrange for an audition with the School of Fine Art and Music. Auditions will be held on Special Schedule dates each Fall and Winter semester. Students are encouraged to audition for an ensemble in the Fall semester and to participate in it for both Fall and Winter semesters. Not all ensembles will be able to accept new members in Winter. Consult the School of Fine Art and Music for further information.
Prerequisite(s): consent of instructor and successful audition

MUSC*2540 Instrumental Ensembles II F,W(0–2) [0.25]
A continuation of MUSC*2530.
Prerequisite(s): MUSC*2530

MUSC*2550 Choral Ensembles I F,W(0–2) [0.25]
The study and performance of selected choral literature through participation in one of the School's ensembles; the University of Guelph Choir or the Chamber Singers. In order to register for an ensemble, the student must arrange for an audition with the School of Fine Art and Music. Auditions will be held on Special Schedule dates each Fall and Winter semester. Students are encouraged to audition for an ensemble in the Fall semester and to participate in it for both Fall and Winter semesters. Not all ensembles will be able to accept new members in Winter. Consult the School of Fine Art and Music for further information.
Prerequisite(s): consent of instructor and successful audition
Equate(s): MUSC*2520

MUSC*2560 Choral Ensembles II F,W(0–2) [0.25]
A continuation of MUSC*2550.
Prerequisite(s): MUSC*2550
Equate(s): MUSC*2520

MUSC*2570 Keyboard Accompaniment I F,W(0–2) [0.25]
Development of sight–reading and accompaniment skills for planists in close coordination with vocal and instrumental applied music students.
Prerequisite(s): MUSC*2510 and permission of the School of Fine Art and Music

MUSC*2580 Keyboard Accompaniment II F,W(0–2) [0.25]
A continuation of MUSC*2570.
Prerequisite(s): MUSC*2570

MUSC*2600 Music History I: Chant to Josquin F(3–0) [0.50]
A survey of the history of music from chant to the mid–Renaissance. Principal genres and composers from the pre–Christian era to Josquin will be studied.
Prerequisite(s): 1 of MUSC*1120, MUSC*1180
Equate(s): MUSC*2160

MUSC*2610 Music History II: The Reformation to J.S. Bach W(3–0) [0.50]
A survey of the history of music from the mid–16th century to the end of the Baroque era. Principal genres and composers from the beginning of the Italian madrigal to J.S. Bach will be studied.
Prerequisite(s): 1 of MUSC*1120, MUSC*1180, permission of the instructor
Equate(s): MUSC*2160

MUSC*2620 Music History III: Classical and Romantic Eras F(3–0) [0.50]
A survey of the history of music from the classical era to the late 19th century. Principal genres and composers from C.P.E. Bach to Brahms and Wagner will be studied.
Prerequisite(s): 1 of MUSC*1120, MUSC*1180, permission of the instructor
Equate(s): MUSC*2170

MUSC*3020 Tonal Analysis F(3–0) [0.50]
A systematic approach to the principles of reductive analysis of tonal music as they are expressed in the theories of Heinrich Schenker. Introduction of graphic notation. (Offered in odd–numbered years.)
Prerequisite(s): MUSC*2370 (may be taken as a corequisite)

MUSC*3030 Post–tonal Analysis W(3–0) [0.50]
Advanced theoretical consideration of the structure of atonal and 12–tone music. Set theory and other mathematical models. (Offered in even–numbered years.)
Prerequisite(s): MUSC*2370, MUSC*3630

MUSC*3150 Music in London F(3–0) [0.50]
A lecture/seminar course that will examine in depth choral and instrumental music of major composers from representative periods and media, performed at London, England. Compositions will be analyzed in relation to their stylistic technique, formal structure, and historical place in the repertoire of music. A professor of music will present weekly seminars, arrange assignments, and give personal supervision in London.

MUSC*3160 Music in London II F(3–0) [0.50]
A lecture/seminar course that will examine the music of major composers from representative periods in relation to its evolution and in the context of historical perspective. Musical scores and early instruments will be studied at the British Library, university libraries, and other centres. A professor of music will present weekly seminars, arrange assignments and give personal supervision in London.

MUSC*3290 Musicianship III F(3–0) [0.50]
A study of the fundamentals of conducting techniques. Emphasis on practical application to choral and instrumental organizations; score reading and analysis and interpretation of literature. (Offered in odd–numbered years.)
Prerequisite(s): (MUSC*2180, MUSC*2360) or permission of the instructor
Equate(s): MUSC*2290

MUSC*3500 Applied Music V S,F,W(1–6) [0.50]
A continuation of MUSC*2510; restricted to students in a Music program (honours major or minor or general, area of concentration).
Prerequisite(s): 3.00 credits in music courses including a minimum grade of 70% in MUSC*2510

MUSC*3510 Applied Music IV S,F,W(1–6) [0.50]
A continuation of MUSC*3500 including preparation and performance of a juried recital; restricted to students in a Music program (honours major or minor or general, area of concentration).
Prerequisite(s): 4.00 credits in music courses including a minimum grade of 70% in MUSC*3500

MUSC*3630 20th Century Music F(3–0) [0.50]
This course examines music from the late 19th century (Debussy and post–romantic composers) to the present from both historical and theoretical perspectives.
Prerequisite(s): MUSC*2370 and MUSC*2620
Restriction(s): MUSC*2630

MUSC*3750 Popular Musics of the World W(3–0) [0.50]
The major styles and genres of popular musics around the world, with an emphasis on musical style and its relationship to social processes.
Prerequisite(s): MUSC*1180, MUSC*2150

MUSC*2390 Imperial and Soviet Russia Since 1800 W(3–0) [0.50]
An introductory survey of Russian history from the death of Catherine the Great to the onset of World War II. This course will focus on efforts by Russian rulers to modernize the Empire's social and economic institutions in response to Western influence. Attention will be directed to the study of the musical culture of Russia. Previous familiarity with basic music terminology and note reading is recommended. (Also listed as HIST*2390.)
Equate(s): HIST*2390

MUSC*2110 Music of the Circum–Atlantic and the Americas F(3–0) [0.50]
This course offers an ethnomusicological examination of the musical life of West and Central Africa, the Caribbean, and the Americas.
Restriction(s): MUSC*2350

MUSC*2200 Music of the Near and Far East F(3–0) [0.50]
An ethnomusicological examination of the musical life of the Islamic world, South Asia, Indonesia, and the Far East.
Equate(s): MUSC*2350

MUSC*3740 Issues in Popular Music Studies W(3–0) [0.50]
This course examines the rise and impact of the cultural industries on production and consumption of music, the development of transnational popular music, and the role popular music plays in the politics of social identity.
Prerequisite(s): MUSC*2150

MUSC*2010 The Musical Avant–Garde F(3–0) [0.50]
An introduction to the avant–garde musical life of the 20th century including the works of Debussy, Stravinsky, Satie, Schoenberg, Cage, Cowell, and others.
Restriction(s): MUSC*3630

The following "topics" courses normally focus on current areas of faculty research, such as recent developments in jazz research, the reception of the music of Beethoven, the music of Gabriel Faure, improvisational studies, Lied and Art Song, Russian music and literature, and black music of the circum–Atlantic.

MUSC*3800 Topics in Music U(3–0) [0.50]
A course which examines selected topics in music history, performance practice, analysis, and music within its cultural context.
Prerequisite(s): consent of the instructor

MUSC*3810 Topics in Music U(3–0) [0.50]
A course which examines selected topics in music history, performance practice, analysis, and music within its cultural context.
Prerequisite(s): consent of the instructor

MUSC*3820 Topics in Ethnomusicology U(3–0) [0.50]
A detailed examination of the world's major musical traditions. Normally, the course will examine either African musical life and that of its descendants in the Americas and the Caribbean, or the musical life of India.
Prerequisite(s): MUSC*2350

MUSC*3830 Topics in Ethnomusicology U(3–0) [0.50]
A detailed examination of ethnomusicological issues, techniques, methods, and problems. Subject matter will vary according to the instructor.
Prerequisite(s): MUSC*2350

MUSC*3840 Topics in Music Theory U(3–0) [0.50]
An analytical investigation of a selected topic in music. Topics will rotate on an annual basis and may include advanced theoretical study of Western art music as well as jazz theory.
Restriction(s): consent of the instructor

MUSC*3850 Topics in Music Theory U(3–0) [0.50]
An analytical investigation of a selected topic in music. Topics will rotate on an annual basis and may include advanced theoretical study of Western art music as well as jazz theory.
Restriction(s): consent of the instructor

MUSC*4200 Directed Readings I F,W(3–0) [0.50]
A reading course designed to enable the student to investigate a topic in music not otherwise available in the curriculum.The student will design a course of readings and assignments with the instructor and submit the proposal to the Director of the School of Fine Art and Music for approval by the last day of course selection in Fall (for Winter) or Winter (for the following Fall).
Prerequisite(s): completion of the music core

MUSC*4210 Directed Readings II F,W(3–0) [0.50]
Same course description as MUSC*4200.
Prerequisite(s): completion of the music core

MUSC*4240 Experiential Learning in Music F,W(3–0) [0.50]
This experiential learning option provides qualified undergraduate students with an opportunity to design an independent program that integrates academic study, such as readings or assignments, with off–campus work or performance (paid or volunteer). Written proposals, signed by the instructor, must be submitted to the Director of the School for approval by the last day of course selection in the Fall (for Winter) or Winter (for the following Fall).
Prerequisite(s): 3.00 credits in Music and permission of instructor

MUSC*4401 Honours Music Project F,W(3–0) [0.50]
First part of the two–semester course MUSC*4401/2. Refer to MUSC*4401/2 for course description.
Prerequisite(s): completion of the music core, permission of the School and registration in an honours major in music (students who wish to propose a recital must also have completed MUSC*3510 with a minimum grade of 80%)

MUSC*4401/2 Honours Music Project F/W,W/S(3–0) [1.00]
Preparation of a major theoretical or historical paper or presentation of a full–length recital. Projects are subject to approval of the School, and must be submitted to the Director, on school forms, by the last day of course selection in the previous semester. This is a

two–semester course offered over consecutive semesters. When you select it you must select MUSC*4401 in the first semester and MUSC*4402 in the second semester. A grade will not be assigned to MUSC*4401 until MUSC*4402 has been completed.
Prerequisite(s): completion of the music core, permission of the School and registration in an honours major in music (students who wish to propose a recital must also have completed MUSC*3510 with a minimum grade of 80%)

MUSC*4402 Honours Music Project S,W(3–0) [0.50]
Second part of the two–semester course MUSC*4401/2. Refer to MUSC*4401/2 for course description.
Prerequisite(s): MUSC*4401

XII—Course Descriptions, Nutrition

Department of Animal and Poultry Science.
Department of Family Relations and Applied Nutrition.
Department of Human Biology and Nutritional Sciences.

NUTR*1010 Nutrition and Society F,W(3–0) [0.50]
The significance of nutrition in terms of individuals and societies throughout the world. Factors involved in the application of knowledge of nutritional needs and food selection. Department of Family Relations and Applied Nutrition. (Also offered through distance education format.)
Restriction(s): NUTR*2010

NUTR*2050 Family and Community Nutrition F(3–0) [0.50]
Nutritional needs through the life cycle and their significance in family and community health. Department of Family Relations and Applied Nutrition.(Also offered through distance education format.)
Prerequisite(s): NUTR*1010
Restriction(s): NUTR*3010

NUTR*2150 Introduction to Nutritional and Food Sciences F(3–0) [0.50]
This interdisciplinary course provides an introduction to the Food and Nutritional Sciences from both historical and modern perspectives. Major themes are the nutritional and functional properties of food, nutrient assimilation, food preservation and safety, and the interactions between food processing, diets and health. The course is taught by the Department of Food Science. (Also listed as FOOD*2150.)
Prerequisite(s): (CHEM*1040 or CHEM*1300), (1 of BIOL*1040, BOT*1150, MICR*1000, ZOO*1020)
Equate(s): FOOD*2010, FOOD*2150
Restriction(s): AGR*3330

NUTR*3040 Clinical Nutrition I W(3–0) [0.50]
Epidemiology, pathophysiology, and role of nutrition in the prevention and management of several major chronic conditions including cardiovascular diseases, disorders of energy balance and diabetes mellitus, with emphasis on high risk individual management approaches. Department of Family Relations and Applied Nutrition.
Prerequisite(s): BIOM*3100, CHEM*3560, FRHD*3070, NUTR*2050, (NUTR*3190 or NUTR*3210), STAT*2090
Restriction(s): registration is limited to students registered in the Applied Human Nutrition Major

NUTR*3190 Fundamentals of Nutrition F,W(3–3) [0.50]
This is the foundation course for the study of nutrition. The occurrence, uptake and metabolic role of nutrients will be discussed in relation to growth, reproduction and longevity in human subjects, domestic animals and other species; principles of experimentation and the use of analytical techniques to monitor the metabolic fate of nutrients; the integration of chemical analyses of nutrients with physiological measurements; the use of experimental animals for the detection of toxicants and nutrient deficiencies. Limited to students who require NUTR*3190 as part of their degree program. Department of Human Biology and Nutritional Sciences.
Prerequisite(s): CHEM*2580
Restriction(s): NUTR*3210

NUTR*3210 Fundamentals of Nutrition F,W(3–0) [0.50]
This is the foundation course for the study of nutrition. The occurrence, uptake and metabolic role of nutrients will be discussed in relation to growth, reproduction and longevity in human subjects, domestic animals and other species. Department of Human Biology and Nutritional Sciences.
Prerequisite(s): CHEM*2580
Restriction(s): NUTR*3190

NUTR*3330 Micronutrients, Phytochemicals and Health F(3–0) [0.50]
The course emphasizes the biochemical basis for the dietary essentiality of vitamins and minerals. The course extends the fundamentals of nutrition to include conditional essentiality of micronutrients, biochemical individuality and the use of micronutrient supplementation to promote human and animal health. Both plant and animal sources of nutrients are discussed. Department of Human Biology and Nutritional Sciences.
Prerequisite(s): NUTR*3190 or NUTR*3210

NUTR*3340 Nutrition of Fish and Crustacea W(3–0) [0.50]
The nutrition of fish and crustaceans with emphasis on those species used in aquaculture. Nutritional biochemistry, nutritional pathology and comparative nutrition of cold blooded, ammonotelic animals mainly carnivorous, contrasted with warm blooded ureotelic omnivores. Department of Animal and Poultry Science. (Offered in even–numbered years.)
Prerequisite(s): NUTR*3190 or NUTR*3210

NUTR*3350 Wildlife Nutrition W(3–0) [0.50]
A study of the nutrition of avian and mammalian wildlife with emphasis on North American species. The role of nutrition in survival and population growth of wildlife in their natural habitat. Formulation of diets for wild species in captivity. Department of Animal and Poultry Science.
Prerequisite(s): NUTR*3190 or NUTR*3210

NUTR*4010 Nutritional Assessment F(3–3) [0.75]
Principles and methods used in nutritional assessment of individuals and populations in health and disease states. Dietary, anthropometric and biochemical techniques will be primary components. Nutritional screening, advanced techniques for body composition assessment, physical exam and clinical indicators will also be addressed. Laboratories will provide the students with hands–on training of diet and anthropometric methods. Cases will be used to develop the understanding of the concepts discussed in lectures and expand on the ethical treatment of individual and group data. Significant independent learning will be required. Department of Family Relations and Applied Nutrition.
Prerequisite(s): NUTR*2050, (NUTR*3190 or NUTR*3210)
Restriction(s): registration is limited to students registered in the 4th year of the Applied Human Nutrition Major.

NUTR*4020 Nutrition, Growth and Development W(3–0) [0.50]
Relation of nutritional and environmental factors to physical and mental aspects of human growth and development through the life cycle. Department of Human Biology and Nutritional Sciences.
Prerequisite(s): (NUTR*3190 or NUTR*3210), (HK*3940 or permission of the instructor)

NUTR*4040 Clinical Nutrition II F(3–3) [0.75]
A continuation of NUTR*3040. This lecture and laboratory based course is concerned with the application of nutrition to clinical problems. Methods and content of medical nutrition therapy in prevention and treatment of gastrointestinal, renal, hepatic diseases and catabolic states will be emphasized. Ethical issues in nutrition management of disease and health professional practice will be addressed. A case study based course. Department of Family Relations and Applied Nutrition.
Prerequisite(s): NUTR*3040, BIOM*3110
Restriction(s): registration is limited to students registered in the 4th year of the Applied Human Nutrition Major

NUTR*4070 Nutrition Education F(3–0) [0.50]
Methods and approaches in nutrition education. Community programs in nutrition for different age groups; dietary counselling; nutrition education in the preschool, in prenatal and other specialized programs. Department of Family Relations and Applied Nutrition.
Prerequisite(s): FRHD*3400, NUTR*2050

NUTR*4090 Functional Foods and Nutraceuticals W(3–0) [0.50]
The course examines the relation of functional foods and nutraceuticals (FFN) to foods and drugs. The safety and efficacy of individual FFN products, and the regulatory issues that influence the development and commercialization of FFN in global markets are emphasized. The course is co–operatively taught by the Department of Human Biology and Nutritional Sciences and the Department of Food Science. (Also listed as FOOD*4090.)
Prerequisite(s): NUTR*3190 or NUTR*3210
Equate(s): FOOD*4090

NUTR*4200 Nutrition and Immune Function W(3–0) [0.50]
This course integrates existing knowledge in several areas – nutrition, metabolism and immunology. Of particular interest are the underlying mechanisms of nutritional immunomodulation with particular reference to the human problem of protein–energy malnutrition. Food sensitivities and the immunological functions of milk will also be considered. Department of Human Biology and Nutritional Sciences. (Offered in odd–numbered years.)
Prerequisite(s): NUTR*3190 or NUTR*3210

NUTR*4210 Nutrition, Exercise and Energy Metabolism F(3–0) [0.50]
Energy metabolism will be considered under the headings: thermodynamic principles, energy deposition and hormonal control of metabolism; nutrition, exercise and environmental influences on energy balance and enzyme adaptation; nutrition and exercise in the control of body composition. Department of Human Biology and Nutritional Sciences.
Prerequisite(s): (NUTR*3190 or NUTR*3210), HK*3940

NUTR*4320 Nutrition and Metabolic Control in Disease W(3–0) [0.50]
A discussion of disorders of metabolism, either inherited or acquired, in which nutrition plays a major role in the etiology, pathogenesis, or treatment. The nutritional control of the affected metabolic pathways and the interaction of nutrition with exercise, drugs and gene therapy will be presented. Department of Human Biology and Nutritional Sciences.
Prerequisite(s): NUTR*3190 or NUTR*3210

NUTR*4330 Applied Nutritional and Nutraceutical Sciences F(2–3) [0.50]
Laboratory and other investigational techniques are covered, together with their underlying concepts. The course is designed to enhance understanding of the design and use of nutraceuticals for human and animal health. Limited to students in Nutritional and Nutraceutical Sciences Major. Department of Human Biology and Nutritional Sciences.
Prerequisite(s): NUTR*3190, NUTR*3330, HK*3940

NUTR*4350 Current Issues I F(3–0) [0.50]
This course discusses controversial and/or emerging topics in Human Biology and Nutritional and Nutraceutical Sciences. Topics of current interest will be announced during the course selection period. Department of Human Biology and Nutritional Sciences.
Prerequisite(s): NUTR*3210, HK*3940, permission of the instructor

NUTR*4360 Current Issues II W(3–0) [0.50]
This course discusses controversial and/or emerging topics in Human Biology and Nutritional and Nutraceutical Sciences. Topics of current interest will be announced during the course selection period. Department of Human Biology and Nutritional Sciences.
Prerequisite(s): NUTR*3210, HK*3940, permission of the instructor

NUTR*4510 Toxicology, Nutrition and Food W(3–0) [0.50]
The role of foods, herbals and nutraceuticals as sources of antinutrients, natural toxins and environmental contaminants. The impact of toxic exposures on nutritional status. The impact of nutritional status on safe metabolism of toxins, and the use of this knowledge in the design of functional foods. Assessing the risk of genetically modified foods and radioactive contamination of a food supply. Department of Human Biology and Nutritional Sciences.
Prerequisite(s): NUTR*3190 or NUTR*3210

NUTR*4810 Applied Human Nutrition Thesis I U(3–0) [0.50]
Planning, developing and writing a research proposal under individual faculty supervision. Topic to be decided by the student in consultation with the supervisory faculty member before course selection or registration period. Department of Family Relations and Applied Nutrition.
Prerequisite(s): FRHD*3070, NUTR*2050, NUTR*3040, consent of the instructor

NUTR*4850 Field Experience in Nutrition Education W(2–4) [0.50]
Supervised experience in nutrition education and seminar. Students will apply principles of program planning, nutrition education theory and professional behaviour in a community setting. Placements may be arranged in institutional or community health settings, educational facilities, social services, or food industry. Seminar topics include professional ethics, exploring values, and issues management. Department of Family Relations and Applied Nutrition.
Prerequisite(s): FRHD*3400, NUTR*4040, NUTR*4070
Restriction(s): instructor consent required

NUTR*4900 Selected Topics in Human Nutrition W(3–0) [0.50]
Reading and discussion on selected areas in human nutrition and its application; formal class reports and term papers. Primarily for Applied Human Nutrition majors. Department of Family Relations and Applied Nutrition.
Prerequisite(s): FRHD*3070, NUTR*3040, NUTR*4010
Restriction(s): registration is limited to students registered in the 4th year of the Applied Human Nutrition Major.

NUTR*4910 Applied Human Nutrition Thesis II U(6–0) [1.00]
The student will conduct and write an undergraduate thesis under the direction of a faculty member.
Prerequisite(s): NUTR*4810

XII—Course Descriptions, Pathology

Department of Pathobiology.

Additional course listings may be found in the course descriptions for Veterinary Medicine.

PATH*3610 Principles of Disease W(3–0) [0.50]

A course designed for students with particular interests in nutrition and biology. The course presents basic concepts of disease in the cells, tissues, organs and fluids of the body. Emphasis will be on disease processes resulting from physical, toxic and microbiological and other causes. (Also offered through distance education format.)

Prerequisite(s): 1.50 credits in biology

Restriction(s): PATH*3600

PATH*4100 Diseases of Aquatic Animals F(2–2) [0.50]

A course designed to familiarize the fisheries manager, researcher or veterinarian with the basic principles of diagnosis, prevention, and control of disease of free living and captive aquatic animals, with emphasis on fish.

Prerequisite(s): 1.50 credits in biology

XII—Course Descriptions, Pharmacology

Department of Biomedical Sciences.

For course listings and descriptions see Biomedical Sciences.
Additional course listings may be found in the course descriptions for Veterinary Medicine and Toxicology.

XII—Course Descriptions, Philosophy

Department of Philosophy.

Note: *Specific descriptions of all courses to be offered in a given semester will be available from the Department of Philosophy in each preceding semester. Students are advised to consult these descriptions. Different sections of a course often emphasize different aspects of that course.*

1. All 2000 level philosophy courses are open to students who have completed 5.00 credits or who have completed one of PHIL*1000, PHIL*1010, PHIL*1050.
2. All students taking 3000 level courses should have completed at least 1.50 credits in philosophy or 7.50 credits.
3. For most 4000 level courses, students are expected to have completed at least 1.00 credits in philosophy at the 3000 level. Some 4000 level credits have specific prerequisites, e.g. PHIL*4320, PHIL*4360 (see course descriptions in the following pages). If a student is taking several credits with such prerequisites, then the number of other philosophy credits which need to be completed may exceed the general requirement of 1.00 credits at the 3000 level. PHIL*4310 is designed to be open to seventh and eighth semester students who have no previous philosophy credit. If in doubt about being well prepared for a particular course, the student should consult with either the instructor or the chair of the department.
4. Students may receive credit for PHIL*1000, PHIL*1010 and PHIL*1050, but only one may be counted towards the minimum number of philosophy credits required for a degree in philosophy. Students intending to proceed in the discipline at the 2000 level are advised to take only 0.50 credit at the 1000 level.

PHIL*1000 Introductory Philosophy F,W(3–0) [0.50]
An introduction to philosophy through primary texts in the history of philosophy, with emphasis upon traditional topics such as the nature of knowledge and the different types of knowledge, the relationship between the mind and the body, the nature of good and evil, and the nature of sound argument.

PHIL*1010 Social and Political Issues F,W(3–0) [0.50]
An introduction to philosophy, with particular emphasis upon important problems facing society today, such as punishment, animal rights, discrimination, war and violence, equality and property and the market as a value system. Some consideration of the elements of argumentation will also occur. (Also offered through distance education format.)

PHIL*1050 Introductory Philosophy: Basic Problems F,W(3–0) [0.50]
An introduction to philosophy through the exploration of basic perennial philosophical problems and questions, such as whether there is free will, a God, objective right and wrong, genuine knowledge of the world, and other topics. The readings for the course will consist primarily of 20th century philosophical writing. Some consideration of the elements of argumentation will also occur.

PHIL*2030 Philosophy of Medicine F,W(3–0) [0.50]
An examination of philosophical and ethical issues that arise in human and veterinary medicine, including such topics as the definitions of disease and health, the status of medicine as a science, the role of values in medical research and medical practice, the doctor–patient relationship, psychiatry and the control of human behaviour, and the ethics of genetic counselling.

PHIL*2060 Philosophy of Feminism W(3–0) [0.50]
An examination of metaphysical, epistemological and ethical issues in feminist philosophy, including such topics as the nature and consequences of patriarchy, human nature, sexual divisions of labour, women's studies, rationalizations of inequalities and explorations into a contemporary feminist agenda for social, political and economic changes.

PHIL*2070 Philosophy of the Environment W(3–0) [0.50]
A critical examination of a variety of current ways of thinking about the environment, aimed at developing a satisfactory philosophical approach, especially from an ethical perspective. (Also offered through distance education format.)

PHIL*2100 Critical Thinking S,F,W(3–0) [0.50]
A course designed to develop clarity of thought and method in the analysis and construction of arguments. By contrast to PHIL*2110, the emphasis here is upon informal principles of critical thinking and arguments stated in terms of ordinary language. Topics include the nature and methods of arguing, classification, definition and fallacies.

PHIL*2120 Ethics F,W(3–0) [0.50]
An examination of competing ethical theories (subjectivism, intuitionism, relativism, utilitarianism, egoism, deontologism) with a view to assessing their theoretical value as well as their ability to provide practical guidance and to resolve moral dilemmas. (Also offered through distance education format.)

PHIL*2130 Philosophy of Religion S,F(3–0) [0.50]
A consideration of various philosophical questions concerning religion, such as arguments for the existence of God, the problem of evil, the meaning of religious language, the significance of mystical experience, human immortality. (Offered in odd–numbered years.)

PHIL*2140 History of Greek and Roman Philosophy F(3–0) [0.50]
A survey of Western philosophy from the Pre–Socratics (6th–century, B.C.) to Plotinus (3rd century, A.D.).

PHIL*2160 Modern European Philosophy to Hume W(3–0) [0.50]
A survey of European philosophy from the Renaissance (15th–century) to David Hume (mid–18th century).

PHIL*2180 Philosophy of Science F,W(3–0) [0.50]
An examination of competing theories concerning the nature of science and its modes of inquiry, and the relationship between theories and data and between scientific knowledge and reality. The central problem of the course is the rational basis of scientific knowledge. Special attention will be paid to problems posed by biology.

PHIL*2350 Selected Topics in Philosophy I U(3–0) [0.50]
The topics for this course will vary from one offering to the next, and will deal with material not available in regular courses. Students are advised to consult a departmental advisor before registering.

PHIL*2370 Introduction to Metaphysics W(3–0) [0.50]
A study of major theories of the nature of reality, and of issues and problems that arise in the investigation of fundamental features of the world. Texts read may be either historical or contemporary. Among possible topics explored in the course are materialism, free will, and determinism, the nature of time, and the position of consciousness in the world.

PHIL*2600 Business and Professional Ethics W(3–0) [0.50]
An examination of ethical and evaluative issues relating to business and professional practices. Topics to be explored include the nature of values and ethical systems, duties and rights, private and public goods, the consumer movement, social marketing, corporate social accounting, private right and professional responsibility. Intended for students registered in a science or professional program, but without a background in philosophy.
Restriction(s): PHIL*3600

PHIL*3040 Philosophy of Law F(3–0) [0.50]
An examination of philosophical theories concerning the nature of law and morality. The course may also include an examination of the way in which controversial ethical and social issues are treated under the Canadian Charter of Rights and Freedoms.
Prerequisite(s): 7.50 credits
Restriction(s): PHIL*2040

PHIL*3050 Philosophy of Art W(3–0) [0.50]
A consideration of various philosophical questions concerning art such as the nature of a work of art, the nature of beauty, the relationship between the artist and the audience, the task of the art critic, the social function of art.
Prerequisite(s): 7.50 credits
Restriction(s): PHIL*2150

PHIL*3060 Medieval Philosophy W(3–0) [0.50]
A study of philosophy from the Patristic period (3rd century A.D.) to the early Renaissance (14th–century). The ideas of the central figures will be examined through original sources. (Offered in even–numbered years.)
Prerequisite(s): 1.50 credits in philosophy

PHIL*3080 History of Modern European Philosophy from Kant F(3–0) [0.50]
A survey of European philosophy from Immanuel Kant (mid–18th century) to the late 19th century.
Prerequisite(s): 1.50 credits in philosophy

PHIL*3130 Contemporary British and American Philosophy F(3–0) [0.50]
A survey of philosophical movements mainly centred in Britain and America from the late 19th–century to the present.
Prerequisite(s): 1.50 credits in philosophy including PHIL*2110

PHIL*3170 Intermediate Philosophy of Science W(3–0) [0.50]
A study of more specialized questions posed by the nature of science and its investigation. Topics may include realism and antirealism, naturalized explanations, and other contemporary problems in the philosophy of science.
Prerequisite(s): PHIL*2180

PHIL*3180 Philosophy of Mind W(3–0) [0.50]
A philosophical examination of fundamental theories and problems concerned with mind, thought, and consciousness. (Offered in even–numbered years.)
Prerequisite(s): 1.50 credits in philosophy

PHIL*3190 Theory of Knowledge W(3–0) [0.50]
A survey of traditional discussion of the problems of knowledge. Offered in odd–numbered years.
Prerequisite(s): 1.50 credits in philosophy

PHIL*3200 Contemporary European Philosophy W(3–0) [0.50]
A survey of philosophical movements mainly centred in continental Europe from the late 19th–century to the present.
Prerequisite(s): 1.50 credits in philosophy

PHIL*3230 Issues in Social and Political Philosophy W(3–0) [0.50]
A detailed examination of one or more historical or contemporary treatments of specific issues in social or political philosophy, such as: war and peace, justice. rights, social science, culture, education.
Prerequisite(s): 1.50 credits in philosophy

PHIL*3350 Selected Topics in Philosophy II U(3–0) [0.50]
The topics for this course will vary from one offering to the next, and will deal with material not available in regular courses, such as Philosophy of History, Philosophy of Social Science and advanced Philosophy of Religion. Students are advised to consult an academic counsellor before registering.
Restriction(s): registration in an honours philosophy program

PHIL*3410 Major Texts in the History of Philosophy W(3–0) [0.50]
A study of central primary sources in ancient, medieval, early modern, or nineteenth–century philosophy. The readings and periods stressed will vary from year to year. Students should consult with the department as to topics to be dealt with in each offering. Specific topics offered will be announced prior to the course selection period.

Prerequisite(s): 1.50 credits in Philosophy including at least one of PHIL*2140, PHIL*2160, PHIL*3060, PHIL*3080

PHIL*3420 Philosophical Problems of Religion F(3–0) [0.50]

A detailed examination of major problems and writings in the philosophy of religion. (Offered in even–numbered years.)

Prerequisite(s): 7.50 credits including 1 of 1.50 credits in Philosophy, PHIL*2130, PHIL*3910, PHIL*3920

PHIL*3910 Indian Philosophy F(3–0) [0.50]

An analysis of selected primary sources of Indian philosophy in translation, from the Vedic Upanishads to the ”integral yoga” of Sri Aurobindo. Emphasis will be on the basic inspirational works of Hinduism and Buddhism, and their respective views on the ultimate nature of reality, the self, suffering, freedom, ignorance and enlightenment.

Prerequisite(s): 7.50 credits

Restriction(s): PHIL*2910

PHIL*3920 Chinese Philosophy W(3–0) [0.50]

An analysis of selected primary sources of Chinese philosophy, in translation, from the I Ching to Mao Tse–tung. Emphasis will be on the foundational works of Confucianism, Taoism, Ch’an (or Zen) Buddhism, and Neo–Confucianism, concerning such issues as the ultimate nature of being, non–being and human destiny, proper government of the self, the family and society, and the principles and practice of enlightenment.

Prerequisite(s): 7.50 credits

Restriction(s): PHIL*2920

PHIL*3930 African Philosophy F(3–0) [0.50]

An introduction to the philosophical traditions of Africa, part historical and part contemporary. The shorter historical section will cover some themes from the thought of ancient Egypt, early Christian and Islamic philosophy in North Africa and precolonial traditions from West Africa. The greater section of the course will deal with philosophical movements in Africa since the 1960’s, as well as their implications for African American thought and philosophy generally. (Offered in even–numbered years.)

Prerequisite(s): 7.50 credits

PHIL*4110 Symbolic Logic U(3–0) [0.50]

A study of issues and techniques beyond the level of elementary sentential logic and quantification. A consideration of some topics in logical theory. An extension of material explored in PHIL*2110, with special focus on philosophical aspects or implications of formal logic.

Prerequisite(s): PHIL*2110

PHIL*4270 Current Philosophical Issues U(3–0) [0.50]

A study of primary philosophical texts since 1965. The focus of the course will alternate between analytic texts and issues and continental texts and issues.

Prerequisite(s): 2.00 credits in Philosophy

PHIL*4310 Applied Ethics U(3–0) [0.50]

An advanced study of specific problems in applied ethics. This is an intensive course designed for philosophy majors as well as for seventh and eighth semester students who have had no previous philosophy course.

PHIL*4320 Value Theory U(3–0) [0.50]

An advanced study of problems in social and political philosophy, aesthetics, or general theory of value.

Prerequisite(s): 1 of PHIL*2120, PHIL*3050, PHIL*3230

PHIL*4340 Ethics U(3–0) [0.50]

An advanced study of problems in contemporary ethics.

Prerequisite(s): PHIL*2120

PHIL*4360 Epistemology U(3–0) [0.50]

An examination of central problems concering the nature of knowledge. In some offerings the selection will emphasize problems in the Philosophy of Language.

Prerequisite(s): 2.50 credits in Philosophy or PHIL*3190

PHIL*4370 Metaphysics U(3–0) [0.50]

An advanced study of problems concerning the nature of reality.

PHIL*4390 Selected Topics in Philosophy III U(3–0) [0.50]

Open to honours philosophy students in their 7th and 8th semesters.

PHIL*4400 MajorTexts in Philosophy U(3–0) [0.50]

Advanced study of a major text in philosophy not treated in either PHIL*4410 or PHIL*4420.

PHIL*4410 Major Texts in Philosophy U(3–0) [0.50]

Advanced study of a major text in philosophy not treated in either PHIL*4400 or PHIL*4420.

PHIL*4420 Major Texts in Philosophy U(3–0) [0.50]

Advanced study of a major text in philosophy not treated in either PHIL*4400 or PHIL*4410.

PHIL*4800 Honours Philosophy Research Paper I U(3–0) [0.50]

The preparation of a major research paper under the supervision of a faculty member. Normally open only to 7th semester honours philosophy students.

XII—Course Descriptions, Physics

Department of Physics.

PHYS*1000 An Introduction to Mechanics F(3–2) [0.50]
A course for physical science students which develops the concepts of mechanics as applied to translational and rotational kinematics and dynamics, equilibrium of rigid bodies, oscillations, gravitation, special relativity and other elements of modern physics. Normally this is part of the two–course unit PHYS*1000 and PHYS*1010.
Prerequisite(s): [1 of 4U Physics, OAC (or equivalent) Physics, PHYS*1020], 4U or OAC (or equivalent) Calculus
Restriction(s): PHYS*1080, PHYS*1110

PHYS*1010 Introductory Electricity and Magnetism W(3–2) [0.50]
A course for physical science students on the phenomena of electromagnetism. Topics include electric charges and fields, electric potential, magnetic fields, waves and electric circuits. Normally this is part of the two–course unit PHYS*1000 and PHYS*1010.
Prerequisite(s): (MATH*1080 or MATH*1200), (1 of 4U Physics, OAC Physics, PHYS*1020)

PHYS*1020 Introductory Physics F,W(3–3) [0.50]
A course stressing the fundamental properties of particles and waves, designed for students without OAC Physics or equivalent. Topics include: the motion of particles, force, field, momentum, energy and associated conservation laws; basic interactions between particles; properties of waves. It is expected that students will have completed Grade 12 or 3U Physics and at least 1 OAC or 4U mathematics credit. This course is intended only for students who require the equivalent of 4U or OAC Physics in order to proceed to PHYS*1000, PHYS*1010, PHYS*1070, PHYS*1080, PHYS*1110, PHYS*1130, PHYS*2040. Students may not take this course for credit if they have passed 4U or OAC Physics (or equivalent). (Also offered through distance education format.)

PHYS*1070 Introductory Physics for the Life Sciences I F,W(3–3) [0.50]
Physics of matter and energy at the macroscopic and microscopic levels, with special emphasis on topics of importance to biology. Topics include properties of waves, acoustics and hearing, optical systems and vision, quantum nature of radiation and its interaction with biomolecules, electricity, high energy radiation and radioactivity.
Prerequisite(s): (1 of 4U Physics, OAC Physics, PHYS*1020), 4U or OAC Mathematics
Restriction(s): PHYS*1130

PHYS*1080 Introductory Physics for the Life Sciences II F,W(3–3) [0.50]
A course complementary to PHYS*1070 with emphasis on some aspects of classical physics important in biology. Topics include mechanics and applications to anatomical problems, fluid statics and dynamics, molecular motion, diffusion, osmosis, and heat. The course is of special importance to students in agriculture, biological science, and human kinetics.
Prerequisite(s): (1 of 4U Physics, OAC Physics, PHYS*1020), (1 of MATH*1000, MATH*1080, MATH*1200, PHYS*1070)
Restriction(s): PHYS*1000, PHYS*1110

PHYS*1110 Introductory Physics with Applications I F(3–3) [0.50]
This course is for engineering and environmental science students, and has special emphasis on analytic problem–solving. Topics include statics and dynamics, rotational motion, energy, fluid statics and dynamics, thermodynamics and transport properties. Students taking this course should already have taken MATH*1080 or MATH*1200, or be taking one of these courses concurrently.
Prerequisite(s): 1 of 4U Physics, OAC Physics, PHYS*1020
Restriction(s): PHYS*1000, PHYS*1080

PHYS*1130 Introductory Physics with Applications II W(3–3) [0.50]
This course is for engineering and environmental science students, and uses some calculus in analytic problem–solving. Topics include simple harmonic motion, waves, acoustics, optics, properties and absorption of electromagnetic radiation, blackbody radiation, solar spectrum and flux, electric field and potential, DC circuits, power transmission, nuclear processes, and radioactivity.
Prerequisite(s): (MATH*1080 or MATH*1200), [1 of 4U Physics, OAC Physics (or equivalent), PHYS*1020]
Restriction(s): PHYS*1070

PHYS*1600 Contemporary Astronomy S,F(3–0) [0.50]
A course designed for arts and social science students. Emphasis will be on the interdisciplinary and contemporary aspects of astronomy with the object of providing a perspective of our place in the physical universe. Topics will include the solar system, stars and stellar evolution, pulsars, black holes, quasars and cosmology. Students are encouraged to suggest and participate in discussion on items of special interest. Students with standing in any other 1000 level course credit in physics (except PHYS*1020, PHYS*1800, PHYS*1810) may not use this course for credit. (Also offered through distance education format.)

PHYS*1810 Physics of Music W(3–0) [0.50]
A course designed for arts and social science students with an interest or background in music. The fundamentals of vibrations and waves will be introduced and applied to a study of archetypal instruments. The psychoacoustic basis of pitch and loudness will be discussed. Students who have standing in any other 1000 level physics course, except PHYS*1020, PHYS*1600, PHYS*1800 , may enrol in this course only if they are completing an honours or general B.A. program in Music. In this case, permission of the instructor is required. (Also listed as MUSC*1090.) (Offered in even–numbered years.)
Equate(s): MUSC*1090

PHYS*2030 Biophysics of Excitable Cells W(3–1) [0.50]
An intermediate biophysics course with special emphasis on the physical properties of nerve cells and of biological transducers such as the ear and the eye.
Prerequisite(s): IPS*1220 or 1.00 credit in physics (excluding PHYS*1020, PHYS*1600, PHYS*1800, PHYS*1810)

PHYS*2040 Fundamental Electronics and Sensors W(3–3) [0.50]
An introduction to modern electronics. Topics covered include DC and AC circuit analysis, digital circuits, analog circuits with emphasis on operational amplifiers and analog–to–digital and digital–to–analog conversion. Applications include the interfacing of various sensors to measure physical parameters.
Prerequisite(s): 0.50 credit in university level calculus, (1 of 4U Physics, OAC Physics, PHYS*1020)

PHYS*2260 Experimental Basis of Quantum Physics S, W(3–0) [0.50]
The course investigates and describes the properties of atoms, nuclei and elementary particles in terms of phenomena of modern physics. Topics include wave properties of matter, particle properties of electromagnetic radiation, uncertainty principle, elementary angular momentum, spin and elementary quantum mechanics.
Prerequisite(s): (1 of MATH*1000, MATH*1080, MATH*1200, IPS*1110), (1 of IPS*1220, PHYS*1010, PHYS*2460)

PHYS*2440 Mechanics I F(3–2) [0.75]
This course and the following one, PHYS*2450, continue building the foundation in mechanics begun in the first year. These courses are intended for students proceeding to advanced studies in the physical sciences. Topics include analysis of experimental uncertainties (errors), one, two and three dimensional motion, damped and forced harmonic oscillator, gravitation and orbital motion. The laboratory work requires a formal treatment of error analysis, as well as computer programming for data analysis.
Prerequisite(s): (1 of MATH*1210+, MATH*2080, IPS*1210+), (1 of IPS*1220+, PHYS*1000+, PHYS*1080, PHYS*1110) (+preferred)

PHYS*2450 Mechanics II W(3–2) [0.75]
This course is a continuation of PHYS*2440. Topics include special relativity, noninertial reference frames, dynamics of systems of particles, rigid body dynamics and introductory fluid mechanics.
Prerequisite(s): PHYS*2440

PHYS*2460 Electricity and Magnetism I F(3–2) [0.75]
This course and the following one, PHYS*2470, continue building the foundation in electricity and magnetism begun in the first year. These two courses are intended for students proceeding to advanced studies in the physical sciences. Topics include vector calculus, electric fields, potential, electric work and energy, Gauss's Law, Poisson's and Laplace's equations, capacitors, D.C. circuits, transients and dielectric materials. The laboratory work requires a formal treatment of error analysis, as well as computer programming for data analysis.
Prerequisite(s): (1 of IPS*1220+, PHYS*1010+, PHYS*1070, PHYS*1130), (1 of MATH*1210+, MATH*2080, IPS*1210+) (+preferred)
Co–requisite(s): PHYS*2440

PHYS*2470 Electricity and Magnetism II W(3–2) [0.75]
This course is a continuation of PHYS*2460. Topics include magnetic forces and fields, the Biot–Savart equation, Ampere's Law, magnetic induction, LRC transients, A.C. circuits and magnetic materials.
Prerequisite(s): PHYS*2460

PHYS*2550 Radiation and the Environment F(3–0) [0.50]
This course reviews radiations which occur in the environment and their effects on materials and living systems. These include x–radiation, ultraviolet, visible, infrared, microwave and radio–frequency emissions; acoustical and ultrasonic radiation; and alpha, beta, and gamma radiation from radioactive material. (Offered in even–numbered years.)
Prerequisite(s): (1 of IPS*1220, PHYS*1010, PHYS*1070, PHYS*1130), 0.50 credit in mathematics at the 1000 level (excluding MATH*1040, MATH*1050)

PHYS*2600 General Astronomy S,F(3–2) [0.50]
An introduction to astronomy: the solar system, the sun, stellar and galactic structure. (Offered in the Fall semester in odd–numbered years.)
Prerequisite(s): 0.50 credit in physics at the 1000 level (excluding PHYS*1600, PHYS*1800, PHYS*1810), 0.50 credit in mathematics at the 1000 level

PHYS*3080 Energy W(3–0) [0.50]
Energy resources and the production, interconversion, consumption and waste of energy in the industrial society. Emphasis is placed on environmental impact, and nuclear fission, solar power and nuclear fusion are examined in detail.
Prerequisite(s): 0.50 credit in physics at the 1000 level (excluding PHYS*1020, PHYS*1600, PHYS*1800, PHYS*1810), 0.50 credit in mathematics at the 1000 level (excluding MATH*1040, MATH*1050)

PHYS*3100 Electronics F(3–2) [0.75]
Topics include: amplifier properties; signal processing using operational amplifiers; introduction to digital electronics, including counters and registers; circuits to convert analog signals to digital and vice–versa; introduction to the physics of semiconductor devices. The laboratory illustrates lecture topics, and a major component consists of techniques to interface a computer to integrated circuits for data acquisition.
Prerequisite(s): PHYS*2470

PHYS*3220 Waves and Optics W(3–0) [0.50]
Standing and travelling waves; normal modes; Fourier series; optics including polarization, interference and diffraction.
Prerequisite(s): PHYS*2440

PHYS*3230 Quantum Mechanics I F(3–1) [0.50]
A formal treatment of quantum mechanics. Topics include wave packets and free particle motion, the Schrodinger equation, harmonic oscillator, piecewise constant potentials, central forces and angular momentum, hydrogen atom.
Prerequisite(s): (CHEM*2070 or PHYS*2260), MATH*2160, (MATH*2170 or MATH*2270), PHYS*2470

PHYS*3240 Statistical Physics I S, F(3–0) [0.50]
Introduction to statistical physics including thermodynamics and statistical mechanics of equilibrium phenomena.
Prerequisite(s): MATH*2200, (PHYS*2260 or PHYS*2440)

PHYS*3400 Advanced Mechanics W(3–0) [0.50]
This course covers Lagrangian mechanics and Hamiltonian mechanics. Topics include least action principles, Poisson brackets, Liouville's theorem, Hamilton– Jacobi theory, the transition to quantum mechanics and introduction to non–linear dynamics.
Prerequisite(s): (MATH*2170 or MATH*2270), PHYS*2450

PHYS*3510 Intermediate Laboratory W(0–6) [0.50]
A modular course for physics students including modern and classical physics experiments. Modules include laboratory instrumentation employing computers, modern physics, waves and optics, molecular physics, biophysics, and solid state physics.
Prerequisite(s): PHYS*2450, PHYS*3100

PHYS*4040 Quantum Mechanics II W(3–0) [0.50]
A second course in quantum mechanics. Topics include spin, linear vector spaces, two–level systems, quantum dynamics, rotations and angular momentum, time dependent perturbation theory, Born approximation.
Prerequisite(s): PHYS*3230

PHYS*4120 Atomic and Molecular Physics F(3–0) [0.50]
The application of quantum theory to atomic and molecular structure, and the interaction between electromagnetic radiation and atoms and simple molecules.
Prerequisite(s): PHYS*3240, PHYS*4040

PHYS*4130 Subatomic Physics W(3–0) [0.50]
This course surveys the field of subatomic physics from radioactive emanations to conjectured subunits of nucleons. Topics include quark models; strong, electromagnetic and weak interactions; isospin, strangeness, conservation laws and symmetry principles; systematics of nuclear properties, nuclear radioactivity, nuclear models and reactions.
Prerequisite(s): PHYS*3230

PHYS*4150 Solid State Physics W(3–0) [0.50]
Bonding in solids, thermal and electrical properties of solids, energy bands, imperfections in solids, properties of semiconductors and insulators. Students taking this course must already have taken PHYS*4040 or be taking it concurrently.
Prerequisite(s): PHYS*4240
Co–requisite(s): PHYS*4040 (if not taken as a pre–requisite)

PHYS*4180 Advanced Electromagnetic Theory F(3–0) [0.50]
Radiation from localized charge–current distributions (atoms, molecules, nuclei, antennae), electromagnetic potentials,gauge transformations, Lagrangian and Hamiltonian formalisms, multipole expansions of electrostatic and magnetostatic fields, and a selection of topics from: radiation damping, Lorentz electron theory, wave guides, plasmas, relativistic electrodynamics, radiation scattering.
Prerequisite(s): PHYS*2470, PHYS*3400

PHYS*4240 Statistical Physics II F(3–0) [0.50]
A continuation of PHYS*3240 including a discussion of the grand canonical distribution, quantum statistics, and transport theory.
Prerequisite(s): PHYS*3240, (1 of CHEM*3860, PHYS*2260, PHYS*3230)

PHYS*4500 Advanced Physics Laboratory F(0–6) [0.50]
A modular course for students in any physics–related major who will study techniques of nuclear, solid state and molecular physics.
Prerequisite(s): PHYS*2450, PHYS*3100

PHYS*4510 Advanced Physics Project W(0–6) [0.50]
Students will be assigned projects related to their individual interests. These projects may be part of the ongoing research within the Physics Department. Selection of a faculty supervisor and approval of course coordinator must be obtained before course selection.
Prerequisite(s): PHYS*3510

PHYS*4540 Molecular Biophysics W(3–0) [0.50]
Physical methods of determining macromolecular structure: energetics, intramolecular and intermolecular forces, with applications to lamellar structures, information storage, DNA and RNA, recognition and rejection of foreign molecules.
Prerequisite(s): 0.50 credit in biochemistry, (CHEM*3860 or PHYS*3230)

PHYS*4560 Biophysical Methods F(3–0) [0.50]
An introduction to physical techniques to determine the structure of macromolecules and macromolecular structures of biological interest. The techniques include: differential calorimetry, X–ray and neutron scattering, electron microscopy, Raman and infrared spectroscopy, nuclear magnetic resonance, and electron spin resonance. Applications of these techniques in the study of biological membranes will be emphasized. Students taking this course should already have taken PHYS*4240 or be taking this course concurrently.
Prerequisite(s): PHYS*3220, PHYS*4040
Co–requisite(s): PHYS*4240 (if not taken as a prerequisite)

PHYS*4910 Advanced Topics in Physics I U(3–0) [0.50]
The content of this course is determined by the interests of the students. Possible topics include fluid mechanics, theory of elastic solids, general relativity, astrophysics, and chaos.
Prerequisite(s): (MATH*2150 or MATH*2160), (MATH*2170 or MATH*2270), PHYS*2450, PHYS*2470

PHYS*4920 Advanced Topics in Physics II U(3–0) [0.50]
The content of this course is determined by the interests of the students. Possible topics include fluid mechanics, theory of elastic solids, general relativity, astrophysics, and chaos.
Prerequisite(s): (MATH*2150 or MATH*2160), (MATH*2170 or MATH*2270), PHYS*2450, PHYS*2470

PHYS*4930 Advanced Topics in Physics III U(3–0) [0.50]
The content of this course is determined by the interests of the students. Possible topics include fluid mechanics, theory of elastic solids, general relativity, astrophysics, and chaos.
Prerequisite(s): (MATH*2150 or MATH*2160), (MATH*2170 or MATH*2270), PHYS*2450, PHYS*2470

PHYS*1XXX Any PHYS course at the 1000 level [0.00]
** PLACE HOLD FOR B.A. REQUIREMENTS — DO NOT PRINT IN COURSE DESCRIPTIONS **

XII—Course Descriptions, Physiology

Department of Biomedical Sciences.

For course listings and descriptions see Biomedical Sciences.

Additional course listings may be found in the course descriptions for Veterinary Medicine and Human Kinetics.

*Students wishing to study Physiology can complete a 3000 level course or course sequence in: ZOO*3200*; or ZOO*3210; or HK*3940; or BIOM*3100; and either BIOM*3110 or BIOM*3120. *In addition, students can select specialized courses at the 4000 level (preferably at least 2 with labs) offered by the:*

Department of Biomedical Sciences:

BIOM*4020	[0.50]	Physiology of Digestion
BIOM*4030	[0.50]	Endocrine Physiology
BIOM*4041/2	[1.00]	Mammalian Reproductive Biology
BIOM*4050	[0.50]	Physiology of Aging

School of Human Biology:

HK*4320	[0.75]	Work Physiology
HK*4460	[0.50]	Regulation of Human Metabolism
HK*4530	[0.50]	Human Cardiovascular Physiology

Department of Zoology:

ZOO*4170	[0.50]	Experimental Comparative Animal Physiology
ZOO*4390	[0.50]	Environmental Physiology
ZOO*4470	[0.50]	Comparative Endocrinology

XII—Course Descriptions, Plant Biology

The Plant Biology Program is administered by the Department of Botany, extension 2734, and is a joint program with courses offered by:
Department of Botany.
Department of Environmental Biology.
Department of Land Resource Science.
Department of Plant Agriculture.

PBIO*3110 Crop Physiology F(3–3) [0.50]
Physiological and biochemical principles related to production by crop canopies. Carbon fixation, leaf area, light interception, assimilate distribution, water relations and nutrient utilization are used to develop solutions to problems of crop yield and quality. Growth and development in response to cultural innovations including the use of growth regulators are also considered. Department of Plant Agriculture.
Prerequisite(s): BIOL*1040 or BOT*1150

PBIO*3750 Plant Tissue Culture F(2–3) [0.50]
An examination and discussion of the principles, protocols and utilization of plant cell tissue culture systems. In vitro propagation and regeneration, mutagenesis and selection, secondary metabolite elicitation and cell transformation techniques including protoplast fusion, direct DNA uptake and plant bacterial co–cultivation will be emphasized. Department of Plant Agriculture.
Prerequisite(s): AGR*2451/2 or BOT*2100

PBIO*4000 Molecular and Cellular Aspects of Plant–Microbe Interactions F(3–0) [0.50]
Examination of molecular and cellular aspects of the interaction between plants and microorganisms such as mycorrhizae, pathogenic fungi, Agrobacterium, pathogenic bacteria, and plant viruses. Topics include microbial virulence, signalling, gene expression, and disease resistance in plants. Departments of Botany and Environmental Biology.
Prerequisite(s): BOT*2100, (MBG*2020 and MICR*2020 are recommended)

PBIO*4030 Plant Cell Biology F(3–0) [0.50]
An examination and discussion of structure–function relationships at the subcellular level during plant growth and development. Organelles and their roles in biosynthetic, bioenergetic and physiological processes that are unique to plants will be emphasized. Department of Botany. (Offered in odd–numbered years.)
Prerequisite(s): BIOL*2210, (BOT*2100 or BOT*2300)

PBIO*4100 Soil Plant Relationships W(3–0) [0.50]
Root growth as affected by soil properties; soil plant water relations; soil aeration; absorption, translocation and function of nutrients in plants; ion transport to roots; rhizosphere effects; application of concepts to crop production. Department of Land Resource Science.
Prerequisite(s): 1 of AGR*2301/2, BOT*2100, BOT*2300, SOIL*2010, equivalent

PBIO*4150 Molecular and Cellular Aspects of Plant Development W(3–0) [0.50]
An examination of the molecular and cellular processes that underlie cellular differentiation and organ formation in plants. The roles of homeotic genes, gene regulation, cell polarity, morphogens and environmental effects in development will be discussed. Subjects will be introduced by a lecture and examined in detail in discussions of pertinent research papers. Department of Plant Agriculture. (Offered in even–numbered years.)
Prerequisite(s): 1 of BOT*2100, BOT*2300, BOT*2400

PBIO*4530 Environmental Pollution Stresses on Plants W(3–0) [0.50]
The study of environmental pollution effects on physiological and ecological processes of plants, in both managed and unmanaged ecosystems. Pollutants under study include contaminants of air (such as ozone, sulphur dioxide and UV–B radiation) and soil (such as metals and organic xenobiotics). The format includes both lecture and presentation/discussion of current and historical peer–reviewed literature. Department of Land Resource Science.
Prerequisite(s): BIOL*2060, (BOT*2100 or BOT*2300)
Equate(s): ENVB*4530

PBIO*4600 Plant Environment Interaction and Stress Physiology W(3–2) [0.75]
The effects of environmental stresses on plant growth, development and yield, and the physiological and physical mechanisms used by plants to tolerate these stresses are discussed with emphasis on low temperature, wind and water stresses. Fundamental plant processes including membrane transport, cell elongation, stomatal control, osmotic adjustment, sap flow, photosynthesis and the role of growth regulators are discussed in relation to their response to environmental stress. Department of Plant Agriculture.
Prerequisite(s): BOT*2300 or BOT*3310

PBIO*4750 Genetic Engineering of Plants W(3–3) [0.50]
An examination and discussion of the principles, protocols and applications of molecular biology and transformation technology to the genetic improvements of plants. Department of Plant Agriculture.
Prerequisite(s): MBG*2020
Equate(s): PBIO*3760

PBIO*4300 Research Opportunities in Plant Biotechnology I S,F,W(0–12) [1.00]
This course is specifically designed to encourage students to conduct research in an area of Plant Biotechnology. It is normally open to students registeered in semesters 7 and 8. Independent theoretical and laboratory research will be conducted under the supervision of

individual faculty. Oral and written presentations will be made. Students muse make arrangements with both a faculty supervisor and the course coordinator in the semester prior to registration.
Prerequisite(s): MBG*3350
Restriction(s): cannot be enrolled in PBIO*4310 concurrently, registration in semester 7 or 8 of the B.SC. Plant Biotechnology Major

PBIO*4310 Research Opportunities in Plant Biotechnology II S,F,W(0–12) [1.00]

This course is specifically designed to encourage students to conduct research in an area of Plant Biotechnology. It is normally open to students registeered in semesters 7 and 8. Independent theoretical and laboratory research will be conducted under the supervision of individual faculty. Oral and written presentations will be made. Students muse make arrangements with both a faculty supervisor and the course coordinator in the semester prior to registration.
Prerequisite(s): PBIO*4300
Restriction(s): registration in semester 7 or 8 of the B.SC. Plant Biotechnology Major

XII—Course Descriptions, Political Science

Department of Political Science.

For courses without semester designations, please check with the department. Advance schedules are available in the department.
The department works in cooperation with the department of Political Science at the University of Waterloo to offer courses via the video link classroom. These courses are identified by the designation LINK in their course description. Further information can be obtained from the department.

POLS*1150 Understanding Politics F,W(3–1) [0.50]
This is the recommended introductory course for students intending to pursue a specialization in Political Science. An introduction to the basic concepts of politics, such as liberty, equality, social justice, constitutionalism, sovereignty, federalism, parliamentary versus presidential government. The course will emphasize the meaning and use of these terms within Canada in the context of other political systems.
Restriction(s): POLS*1000, POLS*1300

POLS*1400 Public Management and Administration F(3–1) [0.50]
This course examines the changes in the organization and function of government in Canada with particular attention to selected public policy issues. The content will be adapted to meet the specialized needs of students from other disciplines. Weekly seminars are required. (Also offered through distance education format.)

POLS*1500 World Politics F(3–0) [0.50]
An examination of the fundamental patterns of international politics, focusing especially on the major issues and contemporary events at the root of international conflict. As well, the reality of globalization and interdependence is assessed in terms of the alternative patterns of international cooperation in the contemporary world. (Offered also through distance education format.)

POLS*2000 Political Theory F(3–0) [0.50]
A study of the philosophic and ideological developments which have led to the emergence of the modern state and contemporary politics.

POLS*2010 The Art of Politics U(3–0) [0.50]
An examination of the presentation of politics in film, television, classical music, plays, novels, cartoons, painting and other media.

POLS*2080 Development and Underdevelopment F(3–0) [0.50]
An examination of the politics of development, distribution and conflict in Africa, Asia, the Middle East and the Americas from a comparative and international perspective.

POLS*2100 The State in Comparative Perspective W(3–0) [0.50]
The objective of this course is to analyze in a systematic way the evolution, purposes, structures and functions of the state in relation to the economy and civil society.

POLS*2200 International Relations F(3–0) [0.50]
An introduction to basic theories and concepts in the study of international relations, including an analysis of power, national interest, security, survival, nationalism, sovereignty, decision–making, interdependence, integration, and transnationalism.

POLS*2250 Public Administration W(3–0) [0.50]
This course examines a variety of theoretical approaches to the study of organizations. It then applies these theories to the structure and operation of the government of Canada. It examines the changing role of bureaucracy in government and critically evaluates issues such as financial and administrative responsibility and accountability. (Also offered through distance education format.)

POLS*2300 Canadian Government F,W(3–0) [0.50]
Parliamentary government and federal–provincial relations lie at the heart of the Canadian government system. This course provides a detailed examination of the structure, functions, and performance of these central institutions of Canadian government in a comparative context. (Also available through distance education format.)

POLS*3000 Politics of Africa U(3–0) [0.50]
Africa in the 20th Century has been the scene of rapid political and economic change. This course analyzes African politics in the light of contemporary problems of development and modernization.
Prerequisite(s): POLS*2080 or POLS*2100

POLS*3021 History of Political Thought F(3–0) [0.50]
First part of the two–semester course POLS*3021/2. Refer to POLS*3021/2 for course description.
Prerequisite(s): POLS*2000

POLS*3021/2 History of Political Thought F/W(3–0) [1.00]
A study of selected writers in the history of political thought from antiquity to the beginning of the twentieth century. This is a two–semester course offered over consecutive semesters. When you select it you must select POLS*3021 in the Fall semester and POLS*3022 in the Winter semester. A grade will not be assigned to POLS*3021 until POLS*3022 has been completed. (Offered in alternate years.)
Prerequisite(s): POLS*2000

POLS*3022 History of Political Thought W(3–0) [0.50]
Second part of the two–semester course POLS*3021/2. Refer to POLS*3021/2 for course description.
Prerequisite(s): POLS*3021

POLS*3050 Canadian Political Parties, Elections and Pressure Groups W(3–0) [0.50]
The course emphasizes political process rather than governmental structures. Topics to be explored include the role of political parties, pressure groups, the electoral system and voting and their impact on the nature of Canada as a democratic state.

Prerequisite(s): POLS*2300

POLS*3060 Politics of the Middle East and North Africa U(3–0) [0.50]

Students will examine the political dynamics of selected states and societies (e.g. Eqypt, Syria, Saudi Arabia, Iran, Israel, Jordan and Algeria) in the Middle East and North Africa (MENA). Issues to be covered: the impact of early Middle Eastern/North African history upon today's politics; class structures in the MENA countries and their impact on politics; the rise of Arab nationalism; Zionism; the politics of oil; the status of women; the political impact of economic restructuring; Islamic movements; state–building; and political liberalization and democratization in the Middle East and North Africa.

Prerequisite(s): POLS*2080 or POLS*2100

POLS*3080 Politics of Latin America U(3–0) [0.50]

An exploration of Latin American politics from a multidimensional perspective. It analyzes the interaction among contemporary political structures, ideologies and processes in the context of socio–economic change.

Prerequisite(s): POLS*2080 or POLS*2100

POLS*3110 Politics of Ontario U(3–0) [0.50]

This course provides an overview of the political history of Ontario, the character and development of the political parties and institutions, as well as an intensive examination of selected policy issues in contemporary Ontario politics.

Prerequisite(s): 7.50 credits

POLS*3120 Human Rights, Ethics, and Development W(3–0) [0.50]

This course is intended to address the ethical issues that arise from development processes and studies by focussing on human rights. The subject is explored from a range of philosophical, religious, and cultural perspectives, including both Western and non–Western. Related themes include global and social justice; nationalism, cosmopolitanism, and multiculturalism.

Prerequisite(s): POLS*2000

POLS*3130 Law, Politics, and the Administration of Justice U(3–0) [0.50]

This course introduces students to the main structures and actors in the administration of justice in Canada. The course particularly emphasizes the study of the judicial system as a branch of government and explores the interaction between the judiciary, law, the political process and public policy. This focus will be supplemented by comparisons with the judicial process in other countries.

Prerequisite(s): 1 of POLS*1400, POLS*2250, POLS*2300

POLS*3160 Women and Politics in the Third World U(3–0) [0.50]

The purpose of this course is twofold: 1) to examine Western analyses and assumptions concerning women and politics in the Third World; and 2) to examine how women's activities in the Third World challenge our definitions and understanding of power, political participation, and empowerment.

Prerequisite(s): POLS*2080 or POLS*2100

POLS*3170 The Politics of the Western Provinces U(3–0) [0.50]

An examination of the political evolution of the Western Provinces of Canada – their political philosophies, parties, institutions and past and present problems including those related to the Constitution and national unity.

Prerequisite(s): POLS*2300

POLS*3180 Political Inquiry and Analysis F(3–0) [0.50]

Social scientists say a great many things about politics, the economy and society, but how can their claims to knowledge be evaluated? In this course the student will be introduced to a critical examination of the kinds of knowledge offered by contemporary political science, and will in the process come to a greater awareness of the methods lying behind his/her own work.

Prerequisite(s): 7.50 credits

POLS*3210 The Constitution and Canadian Federalism W(3–0) [0.50]

Canada's constitution and its federal system lie at the heart of the ongoing crisis facing the Canadian Confederation. This course examines the major features of our constitutional development, how the current system of intergovernmental relations has evolved, and the challenges posed by Canada's cultural diversity, pressures for decentralisation, and the maintenance of national sovereignty.

Prerequisite(s): POLS*2300

POLS*3250 Public Policy: Challenges and Prospects F(3–0) [0.50]

This course covers the dominant theories that explain the origins and character of public policy in Canada, and other countries. The focus will be on both governmental and nongovernmental actors.

Prerequisite(s): POLS*1400 or POLS*2250

POLS*3270 Local Government in Ontario U(3–0) [0.50]

Municipal governments are major spenders of public funds in Canada, and are also the level of government closest to the people. In this course, students will examine the major problems confronting urban government in Ontario.

Prerequisite(s): 7.50 credits

POLS*3280 Modern Political Ideologies F(3–0) [0.50]

An examination of contemporary political ideologies–liberalism and conservatism and imperialism; socialism, communism and fascism – in terms of their evolution and current political significance.

Prerequisite(s): 5.00 credits

POLS*3330 Politics and Trade Liberalization in the Americas U(3–0) [0.50]
This course examines the politics of trade in the three NAFTA countries – Canada, the US and Mexico. It examines how trade policy is made in each country and how the NAFTA has influenced domestic politics. Topics covered include trade in goods and services, investment and intellectual property.
Prerequisite(s): 1 of POLS*2100, POLS*2250, POLS*2300

POLS*3370 Environmental Policy Formation and Administration S,F(3–0) [0.50]
This course surveys both the federal and provincial governmental policies and programs relating to the management of natural resources and the control of pollution by examining the political, legal and administrative mechanisms, monitoring surveillances, and enforcement problems. (Also offered through distance education format.)
Prerequisite(s): 7.50 credits

POLS*3390 Comparative Democratic Institutions U(3–0) [0.50]
This course will analyse power in democratic political institutions. It will include an examination of executive and legislative powers and the role of political parties and elections in the exercise of these powers. Presidential and parliamentary systems are examined as well as models of majoritarian and consensual democracy.
Prerequisite(s): POLS*2100 or POLS*2300

POLS*3410 Politics and Government in the United States U(3–0) [0.50]
This course involves a treatment of the basic principles and institutions of national government and politics in the United States as well as the making and execution of public policy at the national and state levels. LINK
Prerequisite(s): POLS*2100
Equate(s): POLS*2400

POLS*3440 Corruption, Scandal and Political Ethics U(3–0) [0.50]
This course will introduce students to the phenomenon of political corruption and the study of its incidence. Attention will be paid to historical examples, contemporary scandals, and analytical articles, dealing with the nature, causes and effects, and proposed cures of political corruption, and the ethical dilemmas inherent in political life.
Prerequisite(s): 5.00 credits

POLS*3450 European Governments and Politics U(3–0) [0.50]
Europe has forged a new form of political organization, the European Union, in addition to its variety of national democratic forms. This course offers a comparative examination of selected national governments, as well as an exploration of this new supra–national organization.
Prerequisite(s): POLS*2100 or POLS*2200

POLS*3460 Communism and Post–Communism U(3–0) [0.50]
This course focuses on selected issues in the transition from Communism to Post–Communism, viewed in a country, regional or theoretical context. Topics include the rise and demise of the Soviet Union, the new political economic and social structures which are emerging among successor states and in Central and East Europe, as well as their relation with the world at large. LINK
Prerequisite(s): 1 of HIST*2390, POLS*2100, POLS*2200

POLS*3470 Business–Government Relations in Canada U(3–0) [0.50]
The public and private sectors in Canada have become more and more interrelated in recent years as evidenced by tax and expenditure policies, the role of regulation and public enterprise, and the increasing emphasis on consultation and co–ordination. This course examines the evolving relationship between governments and the private sector in Canada, including business (both large and small), organized labour, specific sectors such as agriculture and consumer affairs and voluntary organizations.
Prerequisite(s): POLS*1400 or POLS*2250

POLS*3650 The Systematic Study of Politics W(3–1) [0.50]
A treatment of empirical methods and techniques in political science, with an emphasis elementary and associational statistics. This course will enable students to confront with a trained, critical eye, the quantitative information and analysis that increasingly characterizes the discipline.
Prerequisite(s): 7.50 credits in any subject at the University
Equate(s): POLS*2630

POLS*3670 Comparative Public Policy and Administration W(3–0) [0.50]
This course examines the role of the bureaucracy in national development in various economic, social and political environments. The focus of the course is the interplay between bureaucracy, democracy and development in a comparative perspective.
Prerequisite(s): 1 of POLS*2080, POLS*2100, POLS*2250, ISS*2010

POLS*3710 Politics and Sexuality U(3–0) [0.50]
Sexuality is treated as a subject for political theory from a number of critical and interdisciplinary perspectives. The course examines the relationship between sexuality and politics by analyzing the dynamics of power in the context of sexuality.
Prerequisite(s): POLS*2000 or PHIL*2060

POLS*3730 The Americas U(3–0) [0.50]
Despite varying political systems and different historical experiences, the Americas are cohering more and more as a political, economic and social unit. This course will examine evolving political systems and processes in Canada, the United States, Latin America and the Caribbean from a comparative and theoretical perspective. Special emphasis will be placed on hemispheric and regional issues.
Prerequisite(s): POLS*2080 or POLS*2100

POLS*3790 The Political Economy of International Relations W(3–0) [0.50]
This course examines major features of the contemporary international political economy, treating major theories and concepts within this approach to international relations (hegemony, globalization , interdependence, world systems theory, etc.) and focusing on the operation of key international institutions and regimes (i.e. communications, trade and transport policy).
Prerequisite(s): 1 of POLS*2080, POLS*2100, POLS*2200, ISS*2010

POLS*3890 Government and Politics of India W(3–0) [0.50]
The course is designed to provide a survey of the history, society, culture, politics, government, bureaucracy and foreign relations of India.
Prerequisite(s): 1 of POLS*2080, POLS*2100, POLS*2200

POLS*3920 Modern China F(3–0) [0.50]
This course is a detailed study of the political history of modern China and its current politics. The main objective is to assess the extent to which the Chinese Communist Party has fulfilled its mandate, which is to build a sovereign and united China as well as to modernize the country within a socialist framework.
Prerequisite(s): 1 of POLS*2080, POLS*2100, POLS*2200

POLS*3930 Politics of the Agri–Food System U(3–0) [0.50]
Although the production and distribution of food is usually not primarily a function of government, in the 20th century government has been significantly involved in these areas. Questions about the proper role and scope of government involvement have been subject to constant debate, and the extent of this involvement has varied greatly depending on time and place. This course looks at how the state deals with the agricultural sector in different countries. (Also offered through distance education format.)
Prerequisite(s): POLS*1400, (POLS*2250 or a comparable background in a related discipline)

POLS*3940 Goverance and Accountability in Canada W(3–0) [0.50]
This course examines the role of accountability within the Canadian government. With an emphasis on fiscal policy at the federal level, the course uses an investigative framework to trace the linkages from policies and decisions to outcomes, and explores the factors that inhibit or facilitate the assignment of responsibility in a complex modern democracy. The roles of various actors (corporations, citizens, lobbyists, bureaucrats, politicians) within Canadian politics are explored, as are such issues as fiscal accountability, government spending, social programming, and economic dependency. (This is a multi–media course requiring on–line access to Netscape 4.0 or equivalent, as well as a video cassette recorder and television.) (Offered through distance education format only.)
Prerequisite(s): 5.00 credits

POLS*3960 Selected Topics in Political Science S,F,W(3–0) [0.50]
Readings and research in selected areas of the discipline not covered by regular course offerings. Students present a proposal and seek approval from a member of the department in the semester previous to enrolment in this course. The method of course presentation, emphasis, and evaluation are at the discretion of the instructor.
Prerequisite(s): 1.50 credits at the 3000 level in Political Science or equivalent

POLS*4030 Contemporary Political Theory U(3–0) [0.50]
An analysis of selected theories and political issues discussed by prominent 20th–Century thinkers. These contemporary works will be examined as part of the long tradition of political discourse dating back to the classical period.
Prerequisite(s): POLS*2000 and at least 1.00 credit at the 3000 level in Political Theory

POLS*4100 Women, Justice and Public Policy U(3–0) [0.50]
This course will use gender–based analysis in examining a series of justice and public policy issues affecting the lives of women, including equality rights, pay and employment equity, domestic violence, sexual assault, family policy, health care policy, and pornography. How do current policies that developed out of neoliberalism influence the lives of women in different ways than men? How can/should they be changed to recognize the different life experiences of women as distinguished from men? The primary focus of the topics covered in this course will be Canadian, although the experiences in other countries will be covered, particularly as it relates to ”best practices,” where appropriate.
Prerequisite(s): 2 of POLS*2250, POLS*2300, POLS*3250

POLS*4140 Canada in the Twenty–First Century W(3–0) [0.50]
An in–depth examination of selected issues concerning Canadian political institutions and process.
Prerequisite(s): POLS*2300 and 1.00 credit at the 3000 level in Canadian Government and Politics

POLS*4250 Problems in Public Administration and Public Policy W(3–0) [0.50]
An analysis of financial and personnel management problems in government, with particular reference to federal governmental practices or to particular public policy issues.
Prerequisite(s): POLS*2250 and 1.00 credit at the 3000 level in the Canadian and/or Comparative stream

POLS*4750 Theories and Problems in Comparative/International Politics U(3–0) [0.50]
A study of selected theories and problems in comparative politics and government, including such matters as the role of bureaucracy in development, comparative transitions to a market economy or changing trends in Anglo–American democracies. Variations in the course will reflect the interests of the particular instructor.
Prerequisite(s): (1 of POLS*2080, POLS*2100, POLS*2200) and 1.00 credit at the 3000 level in comparative/international politics

POLS*4930 Selected Topics in Political Science II S,F,W(3–0) [0.50]
Readings and research in selected areas of the discipline not covered by regular course offerings. Students present a proposal and seek approval from a member of the department in the semester previous to enrolment in this course. The method of course presentation, emphasis, and evaluation are at the discretion of the instructor.
Prerequisite(s): 1.50 credit at the 3000 level in Political Science or equivalent

POLS*4970 Honours Political Science Research I S,F,W(3–0) [0.50]
This is Part I of the Honours Essay. Students complete the necessary reading and research for their Honours Essay under the supervision of a department advisor. A research proposal is expected by the end of the semester. Major honours political science students must register in this course in their 7th semester. Student selection of an approved subject area and instructor must be completed in the semester previous to enrolment in this course.
Prerequisite(s): instructor's written consent

POLS*4980 Honours Political Science Research II S,F,W(3–0) [0.50]
This is Part II of the Honours Essay. Students organize and write their essays under the supervision of their advisor. Major honours political science students must register in this course in their 8th semester.
Prerequisite(s): POLS*4970

XII—Course Descriptions, Population Medicine

Department of Population Medicine.

POPM*3240 Epidemiology F(3–0) [0.50]

The course examines the basic concepts of health and disease in populations. Methods used in descriptive and analytic epidemiological studies, including the design, analysis and interpretation of results for observational studies and field trials are presented.

Prerequisite(s): BIOL*1040, STAT*2040

POPM*4040 Epidemiology of Food–borne Diseases F(3–0) [0.50]

This course examines the epidemiology and prevention of foodborne infections and intoxications, including those of both microbiological and chemical origin. Drawing on outbreak investigations, surveys, risk assessments, government surveillance systems and basic research, the biological, ecological, socio–economic and public health context of these diseases will be discussed.

Prerequisite(s): 1 of FOOD*3230, POPM*3240, permission of instructor

Restriction(s): FOOD*4210

POPM*4230 Animal Health F(3–0) [0.50]

A consideration of the common and exotic diseases of domestic animals (especially dairy cattle), their cause and recognition, and the preventive measures which may be applied to reduce losses. Methods of monitoring health and productivity in herds (particularly dairy) will be emphasized. Management practices which are associated with improved health and productivity will be discussed. Problem–based teaching methodologies will be employed to focus discussion on the quantification of the impact of management practices on health and biological efficiency. (Offered in even–numbered years.)

Prerequisite(s): 1 of ANSC*2340, ANSC*3400, ANSC*3410

XII—Course Descriptions, Psychology

Department of Psychology.

Students wishing to take a 2000, 3000 or 4000 level course without having completed the appropriate prerequisites, must receive permission of the instructor who will determine whether the student has the required background for the course. Students in all psychology courses will be encouraged to participate in the on–going research of the department.

Honours Courses*: courses marked (H) are designed for students in a psychology honours program, the Information Systems and Human Behaviour program, the Developmental Psychology Minor program, the Educational Psychology Minor program, the Organizational Behaviour Minor program, the Social Psychology program, the Cognitive Neuropsychology Minor program, Career Development Practitioner program (C.D.P.P.), or Human Resources Management major of the Bachelor of Commerce program. Students in other programs wishing to take these courses must obtain the permission of the instructors concerned. Unless otherwise specified, all other courses may be taken by general, honours, and students from other programs, providing the prerequisites are met.* ***Courses designated with (H) are Honours level courses requiring for registration a cumulative average of at least 70% in all course attempts in Psychology, or registration in either the HRM Major or ISHB Major****.*

*Psychology Core: courses marked (C) are Psychology core courses. Students registered in psychology programs are advised to complete at least 2.00 credits of the psychology core at the 2000 level prior to attempting any 3000 level psychology credit other than PSYC*3320* and PSYC*3371/2.

For courses without semester designations, please check with the department. The remaining courses will normally be offered as indicated. Advance schedules are available in the department.

PSYC*1100 Principles of Behaviour S,F,W(3–0) [0.50]

Experimental methods for the study of behaviour. The physiological basis of behaviour, sensory processes and perception. Motivation, learning and memory. (Also offered through distance education format.)

PSYC*1200 Dynamics of Behaviour S,F,W(3–0) [0.50]

Experimental methods for psychological research. Human development, intelligence, thinking and language; personality and behaviour pathology; social psychology. (Also offered through distance education format.)

PSYC*2010 Quantification in Psychology S,F,W(3–0) [0.50]

An introduction to psychological measurement and to statistical principles in psychological research. The course emphasizes descriptive statistics and introduces concepts and techniques of hypothesis testing. Cannot be taken for credit by students with credit in a 2000 level or above course in statistics. (Also offered through distance education format.)

Prerequisite(s): PSYC*1100 or PSYC*1200

PSYC*2310 Introduction to Social Psychology S,F,W(3–0) [0.50]

The content and research methods of social psychology will be explored in lectures and seminars. Content includes social perception, attraction, group dynamics, leadership, conflict and cooperation, attitude change, aggression and conformity. (Also offered through distance education format.) (C)

Prerequisite(s): PSYC*1200

PSYC*2330 Principles of Learning F,W(2–2) [0.50]

An introduction to the basic principles and concepts of classical and instrumental conditioning paradigms of learning, via lectures, demonstrations and student projects. Some student projects may involve laboratory practice on animal conditioning. This is normally a priority access course demanding at least 65% in each of the two prerequisites. Prerequisites are not waived. (C)

Prerequisite(s): PSYC*1100, PSYC*1200

PSYC*2360 Introductory Research Methods S,F,W(2–2) [0.50]

The application of scientific method in psychological experiments with laboratory demonstration.

Prerequisite(s): PSYC*1100, PSYC*1200, (PSYC*2010 or STAT*2040)

PSYC*2390 Principles of Sensation and Perception F,W(2–2) [0.50]

The course objective is to consider the processes of sensory inputs and perception. Approaches ranging from psychophysiology and cognitive psychology to physiology and anatomy will be used. In considering the psychology of sensation and perception, some of the anatomical and physiological aspects of selected senses will be covered in detail and the roles of experience, organization of inputs, and theories of perception are discussed. Topics to be emphasized will vary with the instructor, but may include ontogenetic development, learning, and modification of inputs and their perception. Students will participate in laboratory demonstrations and experiments. (Also offered through distance education format.) (C)

Prerequisite(s): PSYC*1100

PSYC*2410 Behavioural Basis of Neuroscience, I F,W(2–2) [0.50]

A general introduction to the structure and function of the nervous system. The physiological basis of sensory (input) systems and the motor (output) system are examined as are central physiological bases of processes such as arousal and emotion. Laboratory demonstrations and exercises may be included. (C)

Prerequisite(s): PSYC*1100

PSYC*2450 Introduction to Developmental Psychology F,W(3–0) [0.50]

An introduction to and an analysis of the major theories of developmental psychology. Emphasis will be placed on the processes of development in the child including physical growth, perception, cognition, personality and interactions with the social environment. The application of developmental psychology to educational and social issues will be discussed. (C)

Prerequisite(s): PSYC*1100, PSYC*1200

PSYC*2650 Introduction to Cognitive Processes F,W(2–2) [0.50]
An introduction to cognitive processes, including topics in the areas of attention, memory, language and reasoning. Students will be exposed to and participate in laboratory demonstrations and experiments. (Also offered through distance education format.) (C)
Prerequisite(s): PSYC*1100

PSYC*2740 Personality S,F,W(3–0) [0.50]
A review of the theory, assessment procedures and research findings pertinent to major personality constructs. Personality research, methodology and design will also be covered. (Also offered through distance education format.) (C)
Prerequisite(s): PSYC*1100, PSYC*1200

PSYC*3020 Psychology of Law U(3–0) [0.50]
An examination of psychological methods, findings and theories in the study of law. Topics will include the fallibility of the eyewitness; juror decisional processes; credibility of witnesses and attorneys; socialization into legal systems, police behaviour, etc. (Also offered through distance education format.)
Prerequisite(s): PSYC*2310 (also see psychology core statement)

PSYC*3030 Behavioural Aspects of Drug Action U(3–0) [0.50]
An introduction, for social scientists, to the role of biochemical events as they relate to the prediction and control of behaviour. Emphasis is given to the basic principles of drug action, chemical neuro–transmission and the characteristics of behavioral pharmacology.
Prerequisite(s): PSYC*1100, (PSYC*2410 or BIOM*4100) (also see psychology core statement)

PSYC*3040 Current Issues in Neuropsychology U(3–0) [0.50]
Major areas of applied brain research and clinical aspects of brain function will be covered. Emphasis will be given to the analysis of psychological deficits following brain damage and to selected aspects of intellectual disabilities.
Prerequisite(s): PSYC*1100, PSYC*2410 (also see psychology core statement)

PSYC*3060 Occupational Health Psychology F,W,S(3–0) [0.50]
The relationship between work, employment and both psychological and physical well–being. The promotion of workplace health through public policy and workplace intervention.
Prerequisite(s): 1 of PSYC*2010, relevant experience (also see psychology core statement), enrolment in the BCOMM Human Resources Management Major

PSYC*3070 Psychology in Human Resource Management U(3–0) [0.50]
This course explores the application of psychological theory and measurement in human resources management. A dual perspective is taken: that of the worker impacted by these practices and that of the manager responsible for implementing them. Specific topics include recruitment, personnel selection, performance management, training, and executive assessment, development, and succession. (Also offered through distance education format.)
Prerequisite(s): PSYC*1200 (also see psychology core statement) or enrolment in the BCOMM Human Resources Management Major
Restriction(s): PSYC*3510

PSYC*3080 Organizational Psychology U(3–0) [0.50]
An examination of current theories and practices in organizational psychology. Selected topics may include motivation, turnover, absenteeism, leadership, job design, work attitudes, organizational justice, and organizational development and change. (Also offered through distance education format.)
Prerequisite(s): PSYC*1200 (also see psychology core statement) or enrolment in the B.COMM. Human Resources Management Major
Restriction(s): PSYC*3510

PSYC*3100 Evolutionary Psychology U(3–0) [0.50]
Evolutionary Psychology (EP) offers a Darwinian frame of reference for studying questions about human nature. After reviewing basic material on genetics and natural selection, we will examine and criticize the contribution of EP to the understanding of the various aspects of individual and social behaviour, such as altruism, logic, mate selection, health, morality, aesthetics, and the role of culture.
Prerequisite(s): PSYC*2360 (also see psychology core statement)

PSYC*3110 Topics in Health Psychology U(3–0) [0.50]
This survey course will cover a range of topics within a specific area of Health Psychology. The focal area of the course will depend on who is teaching the course but may include: Women's Health (e.g. depression, stress, and aging), Child Health (e.g. eating disorders, chronic illness), and Public and Community Health (e.g. topics such as injury prevention, health promotion). The particular focus of the course will be announced prior to the course selection period.
Prerequisite(s): PSYC*2310, PSYC*2450 (also see psychology core statement)

PSYC*3220 Ergonomics: the Scientific Study of People–System Relationships S(3–0) [0.50]
This course provides a broad survey of the field of ergonomics from the perspective of psychology. Topics to be covered include: human–system concepts and models, safety, accidents, and human error, human perceptual capabilities, human–machine interfaces, engineering anthropometry, workplace design and evaluation methods, measuring the environment. The course will draw widely on web–based materials and require students to complete a number of interactive demonstrations and lab exercises. Students will be expected to draw upon their own workplace experiences and to actively apply the course material to practical workplace situations. (Offered through distance education only.)
Prerequisite(s): PSYC*2650, PSYC*2390

PSYC*3250 Psychological Measurement U(3–0) [0.50]
An introduction to the theory of psychological measurement and measurement procedures presently used in psychology. Coverage will include such topics as reliability, validity, test construction; and the measurement of ability, personality, attitudes, interest and achievement. (Also offered through distance education format.) (H)
Prerequisite(s): PSYC*2010 (also see psychology core statement)

PSYC*3300 The Psychology of Gender U(3–0) [0.50]
This course will examine the theories and psychological research that deals with the impact of gender upon people's lives and behaviour. Topics will include gender–role socialization and stereotypes; gender–related status and power differentials; and gender differences and dynamics in the physiological, intrapsychic, interpersonal, and socio–cultural domains.
Prerequisite(s): PSYC*1200 and at least 1.00 credits of the psychology core (also see psychology core statement)

PSYC*3310 Applied Social Psychology U(3–0) [0.50]
A number of applied issues will be examined from a social psychological perspective. These may include aggression, prejudice, helping, mental illness, crime and addiction. The format will consist of reading, discussion and research/field projects.
Prerequisite(s): PSYC*2310 (also see psychology core statement)

PSYC*3320 Statistical Principles in Psychological Research F,W(2–2) [0.50]
The course emphasizes inferential tests applied to psychological research. Topics will include: t–tests, analysis of variance, multiple correlation and regression and selected topics in non–parametric statistics. Laboratory sessions will cover statistical application exercises in psychological research. (H)
Prerequisite(s): PSYC*2010 or STAT*2040

PSYC*3330 Human Memory U(3–1) [0.50]
An examination of theoretical and empirical studies of the psychological nature of the acquisition, storage and retrieval of information. Students will be exposed to and participate in laboratory demonstrations and experiments.
Prerequisite(s): PSYC*2650 (also see psychology core statement)

PSYC*3340 Psycholinguistics U(3–1) [0.50]
An introduction to the conceptions of the structure of language as they relate to processes underlying the acquisition, production, perception and understanding of speech, and to empirical studies that bear on these conceptions. Students will be exposed to and participate in laboratory demonstrations and experiments.
Prerequisite(s): LING*1100 or PSYC*2650 (also see psychology core statement)

PSYC*3371 Research Methods F(1–4) [0.50]
First part of the two–semester course PSYC*3371/2. Refer to PSYC*3371/2 for course description. (H)
Prerequisite(s): (PSYC*1100 or PSYC*1200), (PSYC*2010 or STAT*2040), (PSYC*3320 or STAT*2050), PSYC*2360

PSYC*3371/2 Research Methods F/W(1–4) [1.00]
This is a two–semester course in design and data analysis techniques in psychological research. We will focus on the interpretation of data, the evaluation of research plans and the writing of research reports. In the fall semester, the course concentrates on experimental designs; in the winter semester it addresses quasi–experiments, surveys, and other designs. In both semesters, students design and carry out small research projects. This course is for honours psychology students, particularly those who intend to pursue graduate studies in psychology. This is a two–semester course offered over consecutive semesters. When you select this course you must select PSYC*3371 in the Fall semester and PSYC*3372 in the Winter semester. A grade will not be assigned in PSYC*3371 until PSYC*3372 has been completed. (H)
Prerequisite(s): (PSYC*1100 or PSYC*1200), (PSYC*2010 or STAT*2040), (PSYC*3320 or STAT*2050), PSYC*2360

PSYC*3372 Research Methods W(1–4) [0.50]
Second part of the two–semester course PSYC*3371/2. Refer to PSYC*3371/2 for course description. (H)
Prerequisite(s): PSYC*3371

PSYC*3390 Abnormal Psychology U(3–0) [0.50]
Current theory and research in the field of abnormal psychology will be examined in terms of various models (biological, behavioral, social and psychodynamic). Selected topics may include: stress and anxiety, affective disorders, schizophrenia, psychophysiological and personality disorders, and mental health.
Prerequisite(s): PSYC*2740 (also see psychology core statement)

PSYC*3410 Behavioural Basis of Neuroscience II U(2–2) [0.50]
This course will focus on contemporary research and theory related to such selected topics as physiological correlates of memory, learning, motivation, emotion, stress, sensory and motor functions. Both the central and peripheral components of the nervous system will be examined in relation to the above. Laboratory demonstrations, exercises and projects may be included.
Prerequisite(s): PSYC*2410 (also see psychology core statement)

PSYC*3430 Topics in Animal Learning and Cognition U(3–0) [0.50]
The study of current research in animal cognition, emphasizing such topics as numerical, spatial and logical competence, conceptual abilities, and memory. Seminar presentation and discussion will assume a basic knowledge of operant and Pavlovian conditioning as taught in PSYC*2330.
Prerequisite(s): PSYC*2330 (also see psychology core statement)

PSYC*3440 Cognitive Development U(3–0) [0.50]
An examination of theory and research pertaining to children's intellectual development. Topics include children's learning and the development of perception, memory, thinking, and language.
Prerequisite(s): FRHD*2270 or PSYC*2450 (also see psychology core statement)

PSYC*3450 Social and Personality Development U(3–0) [0.50]
An examination of research, methodological issues, and theories concerning personality–social development. Topics may include temperament, imitation, parent–child interaction, and the development of attachments, sex–roles, morality, aggression, and pro–social behaviour.
Prerequisite(s): FRHD*2270 or PSYC*2450 (also see psychology core statement)

PSYC*3460 Abnormal Development U(3–0) [0.50]
Theory, research, and aspects of current practice concerning abnormal psychological development in childhood and adolescence.
Prerequisite(s): PSYC*3440 or PSYC*3450 (also see psychology core statement)

PSYC*3480 Psychology of Sport U(3–0) [0.50]
An examination of individual and group behaviour in physical activities and sports. Emphasis will be placed on understanding psychological concepts which are pertinent to sports, e.g., motivation, social and personality development, cognition, leadership and group dynamics.
Prerequisite(s): PSYC*1100, PSYC*1200, (PSYC*2310 or PSYC*2740) (also see psychology core statement)

PSYC*3500 Approaches in the Study of Social Interactions U(3–0) [0.50]
The course concentrates on social interactions in small groups and dyads. Selected topics will be examined through reading, discussion and student projects. Topics may include: leadership, problem–solving, T–groups, social comparison, friendship, love, privacy, self and identity, nonverbal communication. (H)
Prerequisite(s): PSYC*2310 (also see psychology core statement)

PSYC*3520 Political Psychology U(3–0) [0.50]
A social psychological examination of collective behaviours, social movements, and social (policy) change, emphasizing the development and impact of mass media, and relationships with individual, collective and political violence.
Prerequisite(s): PSYC*2310 (also see psychology core statement)

PSYC*3570 The Psychology of Death and Dying U(3–0) [0.50]
An examination of theory, research, and issues in the psychology of death and dying. Emphasis is upon the cognitive operations used to process information about death and the influence of death constructs in daily life. Topics include the development of death concepts throughout the life–span, death anxiety in society, the needs of the dying person, the psychology of grieving, and unexpected losses such as deaths by suicide or miscarriage. (Offered through distance education format only.)
Prerequisite(s): 1 of PSYC*2310, PSYC*2740, PSYC*2450, work experience in related fields, permission of the instructor (also see psychology core statement)

PSYC*3660 Contemporary Psychology U(3–0) [0.50]
Some current developments in psychology. Topics will vary with the interests of faculty members assigned to the course and will be announced prior to the course selection period.
Prerequisite(s): previous study related to the topic area (also see psychology core statement)

PSYC*3680 Selected Topics in Psychology U(3–0) [0.50]
This course will highlight current and topical issues in psychology. Topics will vary with the interests of faculty members assigned to the course and will be announced prior to the course selection period.
Prerequisite(s): previous study related to the topic area (also see psychology core statement)

PSYC*3690 Community Psychology and Community Mental Health U(3–0) [0.50]
An introduction to the principles and practices of community mental health and community psychology. The course deals with the application of public health concepts to the field of mental health, the epidemiology of mental disorder in the community, the design and evaluation of preventive programs for populations at risk of illness, and the creation of alternatives to institutional treatment of the mentally ill. Several field visits to community mental health programs will be arranged. This course should be of special interest to students who are planning to pursue careers in such human service fields as social work and occupational therapy.
Prerequisite(s): PSYC*2310 (also see psychology core statement)

PSYC*3710 Psychology of Learning Difficulties and Disabilities I F(3–0) [0.50]
An examination of current theories regarding learning difficulties and disabilities in educational settings. Emphasis will be placed on cognitive, social and motivational factors associated with learning problems and on behavioral and educational remedial approaches.
Prerequisite(s): 1 of FRHD*2270, PSYC*2450, PSYC*2650 (also see psychology core statement)

PSYC*3720 Psychology of Learning Difficulties and Disabilities II W(3–0) [0.50]
Continuation of PSYC*3710. Students will develop and report on a systematic remedial project involving an underachieving school–age child.
Prerequisite(s): PSYC*3710 (also see psychology core statement)

PSYC*3800 Psychology and Education U(3–0) [0.50]
The application of psychological principles and techniques to the study of the educational process.
Prerequisite(s): PSYC*1100, (PSYC*1200 or FRHD*2270) (also see psychology core statement)

PSYC*3850 Intellectual Disabilities U(3–0) [0.50]
This course covers applied and theoretical aspects of intellectual disabilities, and lays a foundation for work in the area of intellectual disabilities. (Also offered through distance education format.)
Prerequisite(s): FRHD*2270 or PSYC*2450 (also see psychology core statement)

PSYC*3900 Psychology Research Internship F,W,S(0–6) [0.50]
This course provides an experiential learning opportunity through the active participation of the student in a faculty member's ongoing research program. It is expected that students will develop a broader appreciation of the relationship between knowledge, theory and research while acquiring basic skills in research methodologies and modes of inquiry. The course will require involvement in both the practice and reporting of research. The student must consult the supervisory faculty member before selecting or registering for the course.
Prerequisite(s): PSYC*1100, PSYC*1200, PSYC*2010 and at least 1.00 credit at the 2000 level of the psychology core

PSYC*3910 Psychology Externship F,W,S(0–6) [0.50]
An independent program of study formally integrating the student's academic study with 1 or more work experiences, to be decided by the student in consultation with the supervisory faculty (normally the department's co–op coordinator) prior to registration in the course. In order to qualify for this course, the student must be employed in a work setting at the time of registration to help ensure that a suitable project is feasible in the context of a work placement or employment. The department is not responsible for obtaining employment. The course project is aimed at making a significant contribution to the work setting. The student must consult with the supervisory faculty before selecting or registering for the course. (Enrolment is limited. Not open to co–op students.)
Prerequisite(s): (PSYC*1100, PSYC*1200, PSYC*2010 and at least 1.00 credit at the 2000 level of the psychology core) or enrolment in the B.COMM. Program, Human Resources Management Major

PSYC*4100 Applied Research in Human Resources Management F(3–0) [0.50]
This course provides students with the opportunity to conduct hands–on research in an organization on issues that relate to Human Resource Management. Students will work in groups and be expected to find organizations for their research project. Although students will be primarily accountable for finding their organizations to work with, instructor support will be provided to assist students if difficulties arise. The instructor will also serve as a resource throughout the project. Lecture topics include: understanding organizational issues, understanding the consulting process (e.g. engagement, communication, ethics), project planning, data collection methods in an applied context (e.g. sampling, confidentiality, practical constraints), and report writing. (H)
Prerequisite(s): PHIL*2600, PSYC*2360, PSYC*3070, PSYC*3080

PSYC*4310 Advanced Topics in Social Psychology U(3–0) [0.50]
An in–depth examination of specific advances in social psychological research, theory, and/or applications. Specific topics, to be announced prior to course selection, will vary according to the interests of the instructor of the course. (H)
Prerequisite(s): PSYC*3310 or PSYC*3500 (also see psychology core statement)

PSYC*4330 Advanced Topics in I/O Psychology (H) U(3–0) [0.50]
Students will examine theoretical and methodological issues in selected topic areas of industrial/organizational psychology. The focal area of the course, or range of industrial/organizational topics covered by the course, will vary depending on instructor. Selected topic areas may include leadership issues, gender issues, human rights issues, recruitment methods and outcomes, functional job analysis and validation methods, job performance criteria and appraisal tools, selection processes and tools, organizational justice, work attitudes, and prejudice and discrimination in the workplace. Specific topic areas will be announced prior to the course selection period. (H)
Prerequisite(s): PSYC*3070, PSYC*3080

PSYC*4370 History of Psychology U(3–0) [0.50]
The historical roots of modern psychology. Students electing to major by completing the Honours Thesis Courses I and II should note that they are expected to also take either PSYC*4900, or this course, prior to, or concurrent with, either PSYC*4870 or PSYC*4880 (see Graduate Advisory Note under Major). (H)
Prerequisite(s): 4.00 credits in psychology, with at least 1.00 at the 3000 level or above

PSYC*4400 Cognitive Neuropsychology Seminar U(2–2) [0.50]
This course will examine research that aims to explain patterns of impaired and intact cognitive performance seen in brain–injured patients in terms of damage to one or more of the components of a theory or model of normal cognitive functioning. The complementary aim of this course is to draw conclusions about normal, intact cognitive processes from the patterns of impaired and intact capabilities seen in brain–injured patients. Selected topics may include spatial abilities, spoken language production and comprehension, writing, reading, and memory. (H)
Prerequisite(s): PSYC*2360, (1 of PSYC*2390, PSYC*2410, PSYC*2650) (also see psychology core statement)

PSYC*4440 Contemporary Issues in Child Development U(2–2) [0.50]
This course is primarily designed for students in the Psychology program whose special interests are developmental. Students will examine theoretical and methodological issues in a specific area of developmental psychology. The course will involve detailed evaluation of selected studies and when appropriate, student research projects. (H)
Prerequisite(s): (PSYC*2360 or PSYC*3371/2), (PSYC*3440 or PSYC*3450)

PSYC*4500 Current Theoretical Issues in Psychology S,F,W(3–0) [0.50]
An independent program of study in topics of current theoretical import in psychology, to be decided by the student in consultation with the supervisory faculty member before the student may select or register for the course. (H)

Prerequisite(s): 4.00 credits in psychology, with at least 1.00 at the 3000 level or above

PSYC*4510 Current Issues in Psychology S,F,W(0–6) [0.50]

The study of issues of current interests in psychology. Topics will vary with the interests of faculty members assigned to the course and will be announced prior to the course selection period. The course is available either as a senior lecture/seminar course with regularly scheduled class times, or as an independent study course with the topic and schedule decided in advance by the student in conjunction with a supervisory faculty member. (H)

Prerequisite(s): 4.00 credits in psychology, with at least 1.00 at the 3000 level or above and previous study related to the topic area (see also psychology core statement)

PSYC*4750 Motivation U(3–0) [0.50]

This course examines the topics of motivation and emotion from various subdisciplinary perspectives, adopting a senior seminar format and problem–centred approach. (H)

Prerequisite(s): (6 of the 7 psychology core courses plus PSYC*2360 or PSYC*3371/2) or with instructor consent for students registered in the B.SC. Psychology Major Program

PSYC*4760 Seminar in Personality and Individual Differences U(3–0) [0.50]

A course in personality and individual differences intended primarily for honours students in psychology. Emphasis will be placed on a critical analysis of current controversies in the area as well as an in–depth examination of specific advances in the field. Specific topics, to be announced prior to course selection, will vary according to the interests of the instructor of the course. (H)

Prerequisite(s): PSYC*2740, PSYC*3250

PSYC*4870 Honours Thesis I F(3–0) [0.50]

Under individual faculty supervision, students plan, develop, and write a research proposal and prepare an extensive review paper on their area of research. Group sessions are held on research ethics, subject protocols and computer data handling techniques. This course will be graded on a Pass/Fail basis. Note that enrolment in this course is limited and academic records are used for student selection. Course registration requires the signature of the Chair of the department's Undergraduate Affairs and Curriculum Committee (UACC). This UACC signature is contingent upon the student demonstrating they have obtained a Thesis Supervisor's signature on the department's Thesis Registration Form and have an academic standing appropriate for application to graduate programs (see Graduate Advisory under Major). As well, registration for Honours Thesis I will require that either PSYC*4370 or PSYC*4900 is taken prior to, or concurrent with, either PSYC*4870 or PSYC*4880. (H)

Prerequisite(s): PSYC*3371/2, [70% psychology average across (PSYC*2010 or STAT*2040), (PSYC*3320 or STAT*2050), PSYC*3371/2 at the time of registration]

PSYC*4880 Honours Thesis II W(2–10) [1.00]

A continuation of PSYC*4870. Students conduct research and write an undergraduate thesis under the direction of a faculty member. This course is intended for students in the honours program. Note that registration in this course will require that either PSYC*4370 or PSYC*4900 is taken prior to, or concurrent with, either PSYC*4870 or PSYC*4880. (H)

Prerequisite(s): PSYC*4870, [70% psychology average across (PSYC*2010 or STAT*2040), (PSYC*3320 or STAT*2050), PSYC*3371/2 at the time of registration]

Restriction(s): PSYC*4881:2

PSYC*4900 Psychology Seminar U(3–0) [0.50]

Student seminars and discussions will be organized around theoretical and substantive issues in the discipline of psychology. A major objective is to assist advanced undergraduate students to achieve a degree of synthesis of materials studied in their previous psychology courses (also see psychology core statement). Students electing to Major by completing the Honours Thesis I and II should note that they are expected to also take either PSYC*4370, or this course, prior to, or concurrent with, either PSYC*4870 or PSYC*4880 (see Graduate Advisory under Major). (H)

Prerequisite(s): 4.00 credits in psychology, with at least 1.00 at the 3000 level or above

Restriction(s): registration in a Psychology Major of an Honours program and 14.00 credits

PSYC*4910 Co–operative Education Project I S,F,W(0–6) [0.50]

An independent program of study formally integrating the student's academic study with 1 or more work experiences provided by the co–operative education program, to be decided by the student in consultation with the supervisory faculty. The course is normally to be taken concurrently with a co–operative education work term, with the project preferably aimed at making a significant contribution to the work setting. (H)

Prerequisite(s): 2 co–operative education work terms

XII—Course Descriptions, Rural Extension

School of Environmental Design and Rural Development.

REXT*2000 Introduction to Rural Extension F(3–0) [0.50]
Introduction to Rural Extension including history and philosophy; learning and motivation; the rural setting; adoption/ technology transfer processes; marketing; planning; extension teaching/communication methods and technology; evaluation; extension agencies and programs.

REXT*3000 Program Development and Evaluation W(3–0) [0.50]
Concepts and processes of program development and evaluation of rural extension programs. Programs designed with client involvement, situational analysis and priority setting will receive particular attention. (Offered in odd–numbered years.)
Prerequisite(s): 10.00 credits

REXT*3040 Communication Process S,W(3–0) [0.50]
Introduction to the study of the communication process, with emphasis on the examination of symbols, meaning, patterns of miscommunication and their correctives. (Offered through distance education format only.)
Prerequisite(s): 10.00 credits

REXT*3050 Agricultural Communication I F(3–0) [0.50]
Practical and effective ways of communicating information to a broad audience via the media, focusing mainly on print media (newspapers and magazines) and agricultural media. Strong emphasis on writing and preparing ready–to–use material and strategies for getting it published. (Students will develop an understanding of the news/communications business and find where they can fit into it or use it to their advantage to get a job. Contact with professionals will be a major part of the course).
Prerequisite(s): 10.00 credits
Equate(s): REXT*4050

REXT*3060 International Communication W(3–0) [0.50]
An inquiry into the role of communication in global development. Emphasis is on the application of interpersonal, inter–cultural communication and the mass media in the development process.
Prerequisite(s): 10.00 credits

REXT*3080 Technology in Extension S(3–0) [0.50]
An examination of the issues involved in using media in formal and non–formal teaching situations. The comparative characteristics of media will be examined. The ”system approach” to the adoption of teaching strategies will be emphasized. The relationships between people and machines in education will be considered. (Offered through distance education format only.)
Prerequisite(s): 10.00 credits including 1 of CIS*1000, CIS*1200, equivalent

REXT*3100 Teaching and Learning in Non–Formal Education W(3–0) [0.50]
Learning principles, theories and practices in extension education. Emphasis is on non–formal teaching–learning situations. (Offered in even–numbered years.)
Prerequisite(s): 10.00 credits

REXT*4020 Rural Extension in Change and Development F(3–0) [0.50]
The planning and management of development programs with emphasis on the role of non–formal education and counselling in influencing behavioral change and adoption of innovation. Case studies include cross cultural and international considerations.
Prerequisite(s): 10.00 credits

REXT*4060 Agricultural Communication II W(3–0) [0.50]
Application of practical and effective writing and communication techniques, mainly through the production of print publications and the further development and application of journalistic writing and editing skills. Special emphasis on issues important to the agri–food industry.
Prerequisite(s): REXT*3050 or equivalent
Restriction(s): instructor consent required

REXT*4100 Leadership Development in Rural Organization U(3–0) [0.50]
The management of rural extension programs with emphasis on the functions and dimensions of leadership and the development of leadership in rural organizations.
Prerequisite(s): 10.00 credits

XII—Course Descriptions, Sociology

Department of Sociology and Anthropology.

The Department of Sociology and Anthropology offers three types of courses: sociology courses with the prefix SOC; anthropology courses with the prefix ANTH*; and departmental courses with the prefix SOAN*. The departmental category of courses recognizes the fact that the disciplines of sociology and sociocultural anthropology have developed in tandem and it is possible to identify large areas of overlap and convergence in the work of practitioners both historically and in the present. Departmental courses include most of the core theory and methods courses as well as many elective courses. They contribute equally to the subject matter of sociology as well as the subject matter of sociocultural anthropology for purposes of the undergraduate programs of study in both disciplines. Please see the course listings for Anthropology and for Sociology and Anthropology in this section.*

*Note: Sociology credit is also given for FRHD*3060*; LING*1000; PHIL*2180.

*Courses will normally be offered in the semesters designated. For information on other semesters these courses will be offered and the semester those courses without designations will be offered, please check with the department. In addition to regularly scheduled courses, students may elect to do independent study. A student who wishes to do a reading course should first consult the professor with whom he/she wishes to work. Course numbers available for independent study in sociology include: SOC*3840*; SOC*4740, SOC*4840, SOC*4880 and SOC*4890.

*Sociology credit may also be given for most Anthropology courses, with the exception of ANTH*3840 through ANTH*4910 inclusive. 0 All Anthropology courses may be used for credit in Sociology except for ANTH*3840 through* ANTH*4910 *inclusive.*

SOC*1100 Sociology S,F,W(3–0) [0.50]

An introductory course dealing with the basic concepts and methods of sociology applied to societies, groups and individuals. Students will gain an understanding of basic social processes such as socialization, social exchange, deviance and conformity, social change and basic social institutions such as the economy, the polity, the family, religion, education.

SOC*1500 Crime and Criminal Justice F,W(3–0) [0.50]

The course will introduce students to the study of crime and criminal justice. It will examine the various criminological theories, types of criminal behaviour, and the criminal justice system.

SOC*2010 Canadian Society U(3–0) [0.50]

A description of the structure of Canadian society with its social, political and economic tensions.

Prerequisite(s): SOC*1100

SOC*2070 Social Deviance F,W(3–0) [0.50]

An introduction to some of the basic theories of deviance and social control and their application to selected social problems.

Prerequisite(s): SOC*1100 or SOC*1500

SOC*2080 Rural Sociology W(3–0) [0.50]

An introduction to the structure and processes of rural society. This course deals with diverse topics such as agrarian movements, the rise of the agro–industrial complex, the role of the state in agriculture, the question of community, and rural environmental issues. A comparative perspective is cultivated, although the primary emphasis is on Canadian society.

Prerequisite(s): ANTH*1150 or SOC*1100

SOC*2090 Urban Sociology U(3–0) [0.50]

This course examines historical and contemporary dimensions of urban life. Specific topics may include: the geography and ecology of cities, urban cultures and lifestyles, stratification, housing, crime, demographic changes, economic and environmental issues, and global urbanization.

Prerequisite(s): SOC*1100

SOC*2190 Technology and Society W(3–0) [0.50]

This course offers a broad introduction to the social dimensions of science and technology and of emerging information technologies.

Prerequisite(s): SOC*1100

SOC*2280 Society and Environment U(3–0) [0.50]

An introduction to the nature and dimensions of the environmental crisis. The values, interests and social institutions (including government and industry) that promote pollution or environmentalism will be considered. Issues to be examined may include global warming, nuclear energy, environmental toxins, species extinction and population growth pressures.

Prerequisite(s): GEOG*1300 or GEOG*1350

SOC*2390 Class and Stratification U(3–0) [0.50]

An examination of the persistent bases of social inequalities such as wealth, income, power and prestige including class formation, class consciousness, political activity and social mobility.

Prerequisite(s): SOC*1100

SOC*2660 Contemporary Native Peoples of Canada W(3–0) [0.50]

An analysis of the impact of Euro–Canadian society on native culture. Particular emphasis will be given to contemporary issues relating to Canadian native peoples (Indians, Inuit and Metis) such as education, treaties and reserves, land claims, government administration and economic development. (Offered in odd–numbered years.)

Prerequisite(s): ANTH*1150 or SOC*1100

Restriction(s): ANTH*2660

SOC*2700 Criminological Theory W(3–0) [0.50]

The course will examine the development of criminological theory from the late 1700s to contemporary times.

Prerequisite(s): SOC*1500

SOC*2750 Serial Murder W,S(3–0) [0.50]

The course examines the theoretical and empirical literature on serial murder. It reviews the popular image of serial murder and compares this image with that derived from scholarly investigation. Specific topics include the definition of serial murder, the methods used to detect serial murder, including profiling, and the creation of serial murder typologies. The course does not discuss individual serialists. The course examines how to understand and study serial murder in modern societies. (Also offered through distance education format.)

Prerequisite(s): 1 of ANTH*1150, FRHD*1010, PHIL*1010 , POLS*1400, PSYC*1100, PSYC*1200, SOC*1100, SOC*1500

SOC*3040 Sociology of Social Welfare W(3–0) [0.50]

The course examines the major factors that shape the welfare state and considers what impact welfare policies have on people. Central to the discussion is welfare in Canada and what changes are desirable and feasible. (Offered in odd–numbered years.)

Prerequisite(s): SOAN*2111/2, SOAN*2120

SOC*3110 Comparative Religious Systems W(3–0) [0.50]

An analysis of stability and change in patterns of religious beliefs, behaviour and institutions. (Offered in odd–numbered years.)

Prerequisite(s): SOAN*2111/2, SOAN*2120

SOC*3130 Politics and Society U(3–0) [0.50]

An interpretation of the political process and its relationship to other aspects of the social structure, including such topics as political parties, movements, factions, citizen participation, power structures and the process of political exchange.

Prerequisite(s): SOAN*2111/2, SOAN*2120

SOC*3310 Contemporary Theory F(3–0) [0.50]

The course outlines and evaluates the major theories in use today. A central aspect of the course is instruction in the application of these theories.

Prerequisite(s): SOAN*2111/2, SOAN*2120

SOC*3340 Education, Change and Resistance U(3–0) [0.50]

An examination of educational institutions and their relationships to other sectors of society, in particular political and economic. Topics include the nature and objectives of education, equality of opportunity, measures of educational achievement and attainment, manifest and hidden curricula, and public policy.

Prerequisite(s): SOAN*2111/2, SOAN*2120

SOC*3380 Society and Nature U(3–0) [0.50]

Classical to contemporary theories of the relations between society and the environment will be examined. These include Cartesian, Puritan, Utilitarian, laissez–faire liberal, Marxist, ”deep ecologist” and eco–feminist approaches. Concepts to be explored are ecology, wilderness, growth, sustainability, species, domination, animal rights and stewardship.

Prerequisite(s): 1 of ANTH*1150, SOC*1100, SOC*2280, PHIL*2070

SOC*3410 Individual and Society U(3–0) [0.50]

Examining social–psychology from the sociological perspective, this course deals with the relation between social and cultural structure, on the one hand, and self or personality on the other. Employing symbolic interactionism and affect control theory, the course shows how social interaction mediated by language is the well–spring of both social cognitions and emotions.

Prerequisite(s): SOAN*2111/2, SOAN*2120

SOC*3490 Law and Society W(3–0) [0.50]

This course examines the social basis of law. Specific topics include the law as an instrument of stability or change, and the role of law makers, law enforcers and interpreters, including the legal profession, the police, judges and courts.

Prerequisite(s): (SOAN*2111/2 or SOC*2700), SOAN*2120, (SOC*2070 or SOC*2750)

SOC*3710 Young Offenders W(3–0) [0.50]

This course examines concerns about youth crime in Canada and elsewhere. It examines the history of legislation to control youth crime, criminal justice processing and practices, public reactions and concerns about youth crime and theoretical models used to explain youth crime.

Prerequisite(s): (SOAN*2111/2 or SOC*2700), SOAN*2120, (SOC*2070 or SOC*2750)

SOC*3740 Corrections and Penology F(3–0) [0.50]

The course will examine the current state of knowledge regarding the role of corrections and penology. It will examine such specific issues as public perception and reaction to the criminal justice system’s methods of punishment and treatment of criminal offenders, the effectiveness of sentencing options and policies, including fines, probation, prison sentences and parole. It will also examine the various theoretical and methodological approaches to the study of courts, corrections and penology.

Prerequisite(s): (SOAN*2111/2 or SOC*2700), SOAN*2120, (SOC*2070 or SOC*2750)

SOC*3750 Police in Society F(3–0) [0.50]

The course will examine the role of police in society. It will examine theories of policing, the history of policing and such issues as police citizen interaction, relations with visible minorities, methods for controlling police behaviour, and the effectiveness of the police in carrying out specific policy directives.

Prerequisite(s): (SOAN*2111/2 or SOC*2700), SOAN*2120, (SOC*2070 or SOC*2750)

SOC*3840 Seminar — Topics in Sociology S,F,W(3–0) [0.50]
This course will be offered as a structured seminar on various topics depending upon the interests of the faculty member teaching the course. Topics will be announced and course outlines will be available at course selection.
Prerequisite(s): 15.00 credits

SOC*4030 Advanced Topics in Criminology F(3–0) [0.50]
An in–depth study of selected issues in criminology.
Prerequisite(s): (2 of SOC*3490, SOC*3710, SOC*3740, SOC*3750), (1 of ANTH*3690, SOC*2700, SOC*3310), (SOAN*3120 or POLS*3650)

SOC*4200 Advanced Topics in Criminal Justice W(3–0) [0.50]
An in–depth study of issues in criminal justice.
Prerequisite(s): (2 of SOC*3490, SOC*3710, SOC*3740, SOC*3750), (1 of ANTH*3690, SOC*2700, SOC*3310), (SOAN*3120 or POLS*3650)

SOC*4210 Advanced Topics in Rural Sociology U(3–0) [0.50]
A critical examination of the research literature in rural sociology, both in industrial and industrializing societies.
Prerequisite(s): 12.50 credits including SOC*2080

SOC*4230 Comparative Sociology W(3–0) [0.50]
Societies and social institutions in cross–cultural perspectives. The focus of this course will vary but in every instance will explicitly involve cross–cultural comparisons. (Offered in even–numbered years.)
Prerequisite(s): 12.50 credits

SOC*4290 Applied Sociology U(2–1) [0.50]
The application of sociological knowledge and research techniques to important policy issues in contemporary Canadian society.
Prerequisite(s): 12.50 credits including (ANTH*3690 or SOC*3310), SOAN*3070, SOAN*3120

SOC*4300 Senior Seminar W(3–0) [0.50]
This course will provide an opportunity for sociology majors to consider in detail the integration of theoretical and methodological issues at an advanced level. It is meant to engage students in the latest developments in a particular area of the discipline. Course topics will be announced and course outlines will be available at course selection time. This course is highly recommended to students who are considering graduate work in sociology.
Prerequisite(s): 15.00 credits including SOAN*3070, SOAN*3120, SOC*3310

SOC*4310 Advanced Topics in Canadian Society U(3–0) [0.50]
A detailed examination of selected topics in Canadian society such as regional tensions, aboriginal issues, implications of free trade, constitutional reform, social programs.
Prerequisite(s): 12.50 credits including SOC*2010

SOC*4700 Seminar — Theoretical Issues in Sociology U(3–0) [0.50]
An examination of selected theoretical issues.
Prerequisite(s): 12.50 credits including (ANTH*3690 or SOC*3310), SOAN*3070, SOAN*3120

SOC*4740 Seminar in Sociology S,F,W(3–0) [0.50]
This course will be offered as a structured seminar on various topics depending upon the interests of the faculty member teaching the course. Topics will be announced and course outlines will be available at course selection.This course number may also be used for independent study on a topic of the student's choice. In this case, permission of the instructor who will be supervising the study is required.
Prerequisite(s): 12.50 credits

SOC*4840 Seminar in Sociology S,F,W(3–0) [0.50]
This course will be offered as a structured seminar on various topics depending upon the interests of the faculty member teaching the course. Topics will be announced and course outlines will be available at course selection.This course number may also be used for independent study on a topic of the student's choice. In this case, permission of the instructor who will be supervising the study is required.
Prerequisite(s): 12.50 credits

SOC*4880 Special Projects in Sociology S,F,W(3–0) [0.50]
The special study option is designed to provide advanced undergraduates with an opportunity independently to explore the frontiers and foundations of a field of knowledge.The subject matter will normally be study in greater depth of topics related to regular upper–level courses offered in the department which the student has taken or is taking.
Prerequisite(s): consent of the instructor

SOC*4890 Special Projects in Sociology S,F,W(3–0) [0.50]
The special study option is designed to provide advanced undergraduates with an opportunity independently to explore the frontiers and foundations of a field of knowledge.The subject matter will normally be study in greater depth of topics related to regular upper–level courses offered in the department which the student has taken or is taking.
Prerequisite(s): consent of the instructor

SOC*4900 Honours Sociology Thesis I S,F,W(3–0) [0.50]
Development and design of an honours thesis proposal conducted under the supervision of a faculty member. Recommended to Specialized Honours students.

Prerequisite(s): 15.00 credits including (ANTH*3690 or SOC*3310), SOAN*3070, SOAN*3120; a cumulative average of 70% in all Sociology and Anthropology courses

SOC*4910 Honours Sociology Thesis II S,F,W(3–0) [0.50]

Completion and presentation of honours thesis.

Prerequisite(s): SOC*4900

XII—Course Descriptions, Sociology and Anthropology

Department of Sociology and Anthropology.

The Department of Sociology and Anthropology offers three types of courses: sociology courses with the prefix SOC; anthropology courses with the prefix ANTH*; and departmental courses with the prefix SOAN*. The departmental category of courses recognizes the fact that the disciplines of sociology and sociocultural anthropology have developed in tandem and it is possible to identify large areas of overlap and convergence in the work of practitioners both historically and in the present. Departmental courses include most of the core theory and methods courses as well as many elective courses. They contribute equally to the subject matter of sociology as well as the subject matter of sociocultural anthropology for purposes of the undergraduate programs of study in both disciplines. Please see the course listings for Anthropology and for Sociology in this section*.

SOAN*2040 Globalization of Work and Organizations F,W(3–0) [0.50]

This course examines the sociological dimensions of work and occupations. Specific topics may include: the organizational context of work, occupational and labour market structures, job satisfaction, industrial relations, technological change, and the effects of gender, age, race/ethnicity on how work and employment are experienced.

Prerequisite(s): ANTH*1150 or SOC*1100

SOAN*2111 Classical Theory F(3–0) [0.50]

First part of the two–semester course SOAN*2111/2. Refer to SOAN*2111/2 for course description.

Prerequisite(s): ANTH*1150 or SOC*1100

SOAN*2111/2 Classical Theory F/W(3–0) [1.00]

This course places in context and critiques the major world views which have shaped sociology. Particular attention is paid to the theories of Marx, Durkheim and Weber. This is a two–semester course offered over consecutive semesters. When you select it you must select SOAN*2111 in the Fall semester and SOAN*2112 in the Winter semester. A grade will not be assigned to SOAN*2111 until SOAN*2112 has been completed.

Prerequisite(s): ANTH*1150 or SOC*1100

SOAN*2112 Classical Theory W(3–0) [0.50]

Second part of the two–semester course SOAN*2111/2. Refer to SOAN*2111/2 for course description.

Prerequisite(s): SOAN*2111

SOAN*2120 Introductory Methods F,W(3–0) [0.50]

A general introduction to the process of social research emphasizing research design, techniques of data collection, analysis and interpretation of research results.

Prerequisite(s): 1 of ANTH*1150, SOC*1100, SOC*1500

SOAN*2290 Identities and Cultural Diversity U(3–0) [0.50]

An examination of the interrelationships among Canadian ethnic, racial and linguistic groups including their locations in the Canadian mosaic.

Prerequisite(s): ANTH*1150 or SOC*1100

SOAN*2400 Introduction to Gender Systems F(3–0) [0.50]

An introduction to the examination of the characteristics of gender relationships both historically and cross–culturally. Amongst the emphases are theoretical approaches to gender analysis, methodologies, case studies and attention to themes such as class and stratification, race and ethnicity, identities and global restructuring as these shape gender dynamics.

Prerequisite(s): ANTH*1150 or SOC*1100

SOAN*3070 Qualitative and Observational Methods W(3–0) [0.50]

Non–quantitative techniques in social research including participant observation, unobtrusive methods, case studies and interviewing.

Prerequisite(s): SOAN*2120

SOAN*3100 Comparative Perspectives on Families and Households U(3–0) [0.50]

An exploration of how family relationships are shaped by the social context and social structure, and the theoretical frameworks used to study them. Topics may include historical development of the family, cross–cultural perspectives, family policy, household division of labour, abuse, divorce, parenthood, domestic ideology, sexuality, interracial families.

Prerequisite(s): SOAN*2120 or equivalent

Restriction(s): FRHD*3120

SOAN*3120 Quantitative Methods F(3–1) [0.50]

The course introduces basic descriptive and inferential techniques used in quantitative social research. Students will acquire the skills needed to perform basic analyses and to read the research literature. They will also acquire skills in using a standard computer package to perform data analyses. Topics include: data organization, sample description, hypothesis testing and measures of association. Note: Students who have completed any other statistics course(s) should consult with the instructor. In some instances, SOC*3120 may be waived as a departmental requirement.

Prerequisite(s): SOAN*2120

SOAN*3300 Community Development U(3–0) [0.50]

An analysis of approaches to community development defined as planned, change–directed action undertaken by individuals, groups and organizations. The course will include the examination of actual community development practices.

Prerequisite(s): SOAN*2120, SOC*2080

SOAN*3460 Ethnicity and Aging W(3–0) [0.50]
An examination of ethnic social structure, ethnicity, and aging. Variations in age related behaviour associated with ethnic groups in Canada will be viewed from a sociological and gerontological perspective. (Offered in odd–numbered years.)
Prerequisite(s): SOAN*2111/2, SOAN*2120, SOAN*2290
Restriction(s): SOC*4160

SOAN*3680 Development/Underdevelopment U(3–0) [0.50]
An examination of the process of social and economic development and underdevelopment, with special emphasis on the rural sector of countries in Africa, Latin America and Asia.
Prerequisite(s): 1 of ANTH*2160, SOAN*2120, SOC*2080, (ANTH*1150 and IDEV*2010)
Restriction(s): ANTH*3680

SOAN*4220 Canadian Rural Women F(3–0) [0.50]
An examination of socio–cultural structures and processes affecting the positions and roles of rural women in Canada. Starting from a historical perspective, special emphasis will be given to the study of farm and native women, and changes in their familial, economic, social and political roles. (Offered in odd–numbered years.)
Prerequisite(s): 12.50 credits including SOC*2080

SOAN*4240 Women and the Development Process U(3–0) [0.50]
To increase students' understanding of the relation of socio–economic, political and cultural changes on the roles of women in "developing areas" and how women, in turn, affect socio–economic changes.
Prerequisite(s): 12.50 credits including 1 of ANTH*3400, IDEV*2010, SOAN*3680

SOAN*4320 Transition from School to Work W(3–0) [0.50]
This applied course examines the evolving research and models in the transitions from school to work area. There is an evolving literature in this area based, in part, on the successful application of research in the transition from high school to postsecondary education. This 'capstone' course also considers the practical issues involved in making such a move, considering the knowledge, skills, and values needed by university students to succeed in the modern workplace (public, private, and not–for–profit sectors) in Canada. Students will complete an "Action Sociology/Anthropology Project," as well as a "Skills Portfolio," and other work related to their own transition.
Prerequisite(s): registration limited to Sociology and Anthropology majors in semester 7 or 8

XII—Course Descriptions, Soil Science

Department of Land Resource Science.

SOIL*2010 Soil Science W(3–2) [0.50]
An introduction to the principles of soil science – the origin of soils, their classification and interpretation in natural and modified environments. Soil will be studied as a product of the natural environment, with a focus on formation processes and changes which occur when it is modified through use. A variety of uses including agriculture, forestry, recreation, and urban development, will be considered. This course is not for B.SC.(Agr.) students. (Also offered through distance education format.)

SOIL*2120 Introduction to Environmental Stewardship F(3–2) [0.50]
An introduction to the concepts of resources management, environmental planning and assessment, land stewardship and sustainable development. Case studies of specific issues such as parks and natural heritage conservation, agricultural land loss, and integrated rural resources management will provide insight on approaches to decision making. Discussion of the concept of stewardship as an environmental ethic.

SOIL*3050 Land Utilization F(3–0) [0.50]
Principles of land utilization and planning at the global, national, regional and local levels. Land characterization and classification using photo–interpretive techniques and computerized soil survey interpretive programs. Land capability/suitability for agriculture, forestry and engineering purposes. Emphasis on specific land use issues in Canada.
Prerequisite(s): 1 of AGR*2301/2, GEOG*1300, GEOL*1000, SOIL*2010

SOIL*3060 Environmental Soil Chemistry F(3–2) [0.50]
The formation and properties of clay minerals and organic matter; ionic exchange, soil acidity, and alkalinity, oxidation and reduction potential, and dissolution and precipitation. Laboratory sessions will illustrate principles of soil chemistry.
Prerequisite(s): AGR*2301/2 or SOIL*2010

SOIL*3070 Environmental Soil Physics F(3–3) [0.50]
Practical aspects of water movement and contaminant transport in soils. Hands–on experience with standard laboratory and field methods of measuring soil physical properties. Applications of soil physics in characterizing pathogen and nutrient transport to groundwater, landfill cap and liner design, turf management.
Prerequisite(s): 1 of MATH*1080, AGR*2301/2, SOIL*2010

SOIL*3080 Soil and Water Conservation F(2–3) [0.50]
A lecture–demonstration course on the processes leading to deterioration of soil and water quality, the impact of deterioration on use, and preventative or corrective measures. Soil erosion by water and wind, soil compaction and salinization. Drainage channel maintenance, sedimentation and nutrient enrichment of water. Conservation programs and policies. Reclamation of severely disturbed soils and saline–sodic soils. Emphasis will be on concepts and solutions to problems in a systems approach.
Prerequisite(s): AGR*2301/2 or SOIL*2010

SOIL*3100 Resource Planning Techniques W(2–2) [0.50]
An intermediate techniques course directed at the application of a systematic approach to problem–solving in natural resource management. Major topics include procedures of ecological land classification, computer–assisted resource analysis and environmental impact assessment.
Prerequisite(s): SOIL*3050

SOIL*3200 Environmental Soil Biology W(3–3) [0.50]
Soil biological processes involving both microflora and fauna with emphasis on waste management, soil fertility and structure, plant residue decomposition and xenobiotic compound biodegradation. Students will apply this knowledge in a project involving biodegradation of an organic waste.
Prerequisite(s): 10.00 credits including 1 of AGR*2301/2, SOIL*2010

SOIL*3600 Remote Sensing W(2–4) [0.50]
An introductory course in the application of satellite imagery to studies of earth resources. Lab will introduce computer analysis of satellite data.
Prerequisite(s): 10.00 credits (recommend 1 of GEOG*2420, AGR*2301/2, SOIL*2010)

SOIL*4070 Problems in Land Resource Science S,F,W(0–6) [0.50]
Students will carry out a research project in an area of special interest. Individualized supervision will be provided by a faculty member. The preparation of an oral and/or written report will be required. Approval to take this course must be obtained from the Department Chair during the previous semester.
Prerequisite(s): ENVS*2010 and 1.00 credit at the 300 or higher level in soil science, geology or meteorology

SOIL*4090 Soil Management F(3–1) [0.50]
A lecture–tutorial course on the practical aspects of soil management for crop production as they relate to the physical, chemical and biological properties of soils; major emphasis is placed on soil fertility as related to field soil properties and fertilizer, lime and manure use, soil and plant testing for mineral nutrients. The beneficial aspects of drainage, irrigation, erosion control and related tillage practices on soil fertility are also presented. Due regard is given to both economic and environmental aspects of soil management practices.
Prerequisite(s): AGR*2301/2 or SOIL*2010

SOIL*4110 Natural Resources Management Field Camp F(0–6) [0.50]
A course directed toward investigating methods of collecting and processing land resource field data. Practice in mapping information from air photographs and ground surveys, construction of inventory maps, and integration of information. The course will consist of a

one week field camp prior to the fall semester, following which the students, working in groups, will prepare and present a comprehensive report in consultation with faculty. Students will be responsible for their living and transportation expenses for the field session, in addition to regular tuition fees. The course may be offered with different emphasis in content depending on student demand. Students are required to notify the designated departmental instructor of their intention to participate in Field Camp during the previous Winter semester (or earlier if going on exchange programs).
Prerequisite(s): SOIL*3100

SOIL*4170 Soil Processes in the Landscape F(3–3) [0.50]
This course examines the factors and processes that influence soil development, including the impact of human activities. Special attention is given to understanding the significance of key soil properties and features, with emphasis on their spatial and temporal variability. The principles of soil classification are discussed and several classification systems, including the Canadian System of Soil Classification, are examined. Basic aspects of remote sensing of soil and landscapes, digital image analysis and soil information systems are also discussed. Several field trips are scheduled to observe various soils in southern Ontario, in relation to their landscapes and usage.
Prerequisite(s): AGR*2301/2 or SOIL*2010 (recommended is 1 or more of GEOL*2150, SOIL*3060, SOIL*3070, SOIL*3200, SOIL*3600)
Restriction(s): SOIL*4140

SOIL*4210 Earth and Atmospheric Science Field Camp F(1–3) [0.50]
A course restricted to students in the Earth and Atmospheric Science major giving experience in collecting and processing field data. A complete environmental impact assessment including geology and soil classification, topographical survey using GPS, air photo and satellite image analysis, identification of plant species, and measurement of soil hydrologic properties. The course will consist of a one week field camp prior to the fall semester, following which the students, working in groups, will prepare and present a comprehensive environmental impact assessment. The field camp will be held within an easy daily driving distance to Guelph. Students are required to notify the designated departmental instructor of their intention to participate in this course during the previous winter semester (or earlier if going on exchange programs).
Prerequisite(s): 3 of GEOL*3060, GEOL*3190, SOIL*3060, SOIL*3070, SOIL*3200, SOIL*4170
Restriction(s): SOIL*4110

XII—Course Descriptions, Spanish Studies

School of Languages and Literatures.

Students have the option of studying some literary texts in the original and some in translation.

SPAN*1100 Introductory Spanish F,W(3–1) [0.50]

A course providing the basics of spoken and written Spanish for students with no previous studies in the language.

SPAN*1110 Intermediate Spanish F,W(3–1) [0.50]

A continuation of SPAN*1100 with emphasis on oral work.

Prerequisite(s): SPAN*1100

SPAN*2000 Spanish Language I F(3–1) [0.50]

A course designed to develop facility in reading, writing, understanding and speaking Spanish. Conversation, grammar and language laboratory practice.

Prerequisite(s): OAC Spanish or SPAN*1110 (or equivalent)

SPAN*2010 Spanish Language II W(3–1) [0.50]

A continuation of SPAN*2000.

Prerequisite(s): SPAN*2000

SPAN*2040 Spanish Civilization F(3–0) [0.50]

An examination of the historical and cultural events that provided the background for the development of modern Spain, as well as a visual survey of Spanish culture.

Prerequisite(s): SPAN*1110

SPAN*2990 Introduction to Hispanic Literary Studies W(3–0) [0.50]

An introduction to literary studies in Spanish. The course focuses on critical terminology and methods through a selection of prose, poetry and drama from Spain and Spanish America.

Prerequisite(s): SPAN*1110 or permission of the instructor

SPAN*3080 Spanish American Culture W(3–0) [0.50]

A survey through selected readings, class discussion and audio–visual materials of the Spanish American countries, their histories, society, institutions, and culture.

Prerequisite(s): SPAN*1110

SPAN*3110 Spanish Literature F(3–0) [0.50]

This course will study the works of prominent 20th–century poets in the context of the artistic environment of Europe as reflected in the theatre, art and film of the first two decades of the 20th century. Focus will be on poets including: Garcia Lorca, Vicente Aleixandre, Gerardo Diego; painters Salvador Dali and Pablo Picasso, and film director Luis Buñuel. (Offered in even–numbered years.)

Prerequisite(s): SPAN*2990 or permission of instructor

SPAN*3120 Post–Civil War Literature and Film W(3–0) [0.50]

This course examines contemporary Spanish Literature and film from a socio–political perspective. It will focus on the following topics: the impact on narrative and theatre of socio–cultural upheavals in the aftermath of the civil war; the role in the aesthetics of both film and literature of the Franco dictatorship and censorship in particular; the importance of post–Franco liberalization on women's creative work. (Offered in odd–numbered years.)

Prerequisite(s): SPAN*2990 or permission of instructor

SPAN*3130 Women in Modern Spanish Fiction W(3–0) [0.50]

A study of the representation of women in Spanish literature through the analysis and interpretation of Spanish 19th–century novels. The course will be taught in English. Students will read texts in Spanish. (Offered in even–numbered years.)

Prerequisite(s): permission of instructor

Restriction(s): HUMN*3130

SPAN*3160 Contemporary Latin American Fiction W(3–0) [0.50]

This course will examine, in English, why and how the leading figures, such as Borges, Cortazar, Garcia Marquez, Carpentier, Isabel Allende, and Luisa Valenzuela have "made" history, not only in the way they have recreated the Latin American historical reality, but also in the way they have reformed the Hispanic literature. Two lectures per week in English and one seminar per week in Spanish. Final essay and examination will be in English, short presentations and compositions will be in Spanish. Students who select the course under the listing of HUMN*3160 will attend the first two hours. They will write a research essay.

Restriction(s): HUMN*3160

SPAN*3170 Women, Virtue and Honour in Spanish Drama F(3–0) [0.50]

This is a topic–oriented course which will study, in English, major Spanish dramas: seventeenth–century works such as Lope de Vega's Fuenteovejuna, Calderon's Life is a Dream, Tirso de Molina's Don Juan, and twentieth–century plays such as Garcia Lorca's The House of Bernarda Alba and Blood Wedding. In addition to the thematic focus, these texts will be studied for their artistic merit and for the specificity of the Spanish "comedia". Where appropriate, this course will also discuss the influence of Spanish themes on the European culture. Texts and examinations will be in English, but selected readings and assignments will be in Spanish. Students who select the course under the listing of HUMN*3170 will do assignments in English. (Offered in even–numbered years.)

Restriction(s): HUMN*3170

SPAN*3300 Modern Spanish American Prose F(3–0) [0.50]
A study, through selected texts, of the most important aspects of Spanish American Prose up to 1940. Authors studied may include Maria Luisa Bombal, Horacio Quiroga, Jorge Icaza, Romulo Gallegos and Ricardo Guiraldes. The course will emphasize themes such as rural life, the role of native peoples, and changing attitudes to concepts such as national identity, urbanization and literary technique. (Offered in odd–numbered years.)
Prerequisite(s): SPAN*2990 or permission of instructor

SPAN*3310 The Modern Spanish American Short Story and Poetry F(3–0) [0.50]
A study of the modern Spanish American short story and an examination of the evolution of poetry among the leading Modernist and post–Modernist poets. (Offered in even–numbered years.)

SPAN*3500 Spanish Grammar and Composition I F(3–1) [0.50]
An advanced language course that focuses on the refinement of students' written and verbal communication skills in Spanish.
Prerequisite(s): SPAN*2010

SPAN*3530 Business Spanish W(3–0) [0.50]
A detailed study of the Spanish language as it is currently used in adminstration and business. It will cover areas such as administrative correspondence, reports, employment, business communication and advertising.
Prerequisite(s): SPAN*3500

SPAN*3800 Directed Readings in Spanish Studies U(3–0) [0.50]
A reading course in Spanish or Spanish American literature designed according to the previous studies and the interests of the individual student. Normally, students will not be permitted to take more than two courses in the Directed Readings sequence.
Prerequisite(s): 1.00 credit in Spanish literature at the 3000 level

SPAN*3810 Directed Readings in Spanish Studies U(3–0) [0.50]
A reading course in Spanish or Spanish American literature designed according to the previous studies and the interests of the individual student. Normally, students will not be permitted to take more than two courses in the Directed Readings sequence.
Prerequisite(s): 1.00 credit in Spanish literature at the 3000 level

SPAN*3820 Directed Readings in Spanish Studies U(3–0) [0.50]
A reading course in Spanish or Spanish American literature designed according to the previous studies and the interests of the individual student. Normally, students will not be permitted to take more than two courses in the Directed Readings sequence.
Prerequisite(s): 1.00 credit in Spanish literature at the 3000 level

SPAN*3850 Revolutionary Poetry and Poetic Revolution in Spanish America F(3–0) [0.50]
This course studies the poetry that has emerged from revolutionary movements in Cuba, Nicaragua, Chile and elsewhere, situating this poetry in the context of the search for new poetic forms. (Offered in even–numbered years.)
Prerequisite(s): SPAN*2990 or permission of the instructor

SPAN*4170 Don Quixote and the Picaresque Novel F(3–0) [0.50]
This course will study, in English, the importance of this Spanish masterpiece in the development of the modern European novel, and it will examine the first European picaresque work, Lazarillo de Tormes, in the light of the picaresque tradition which followed in Europe and the Americas. The course will also concentrate on the notion of play and laughter (Bakhtin) as means of survival. Texts and examinations will be in English, but selected readings and assignments will be in Spanish. Students who select the course under the listing of HUMN*4170 will do assignments in English. (Offered in odd–numbered years.)

SPAN*4500 Spanish Translation and Composition I F(3–0) [0.50]
An advanced composition course, with intensive written and oral practice with an emphasis on translation.
Prerequisite(s): SPAN*3530

SPAN*4520 Spanish Translation and Composition II W(3–0) [0.50]
A continuation of the work done in SPAN*4500, developing creative oral and written expression with an emphasis on translation.
Prerequisite(s): SPAN*4500

SPAN*4840 Research Paper in Spanish Studies U(3–0) [0.50]
A research paper in Spanish on any language or literature subject approved by the department. This paper will be the equivalent of a semester course.

XII—Course Descriptions, Statistics

Department of Mathematics and Statistics.

Suggested initial course sequences:

1. For students interested in applied statistics a minimal course sequence is: (STAT*2040 or STAT*2100), STAT*2050, STAT*3210, STAT*3240, STAT*3320.
2. Credit may be obtained in only 1 of STAT*2050 or STAT*2090 and only 1 of STAT*2040, STAT*2060, STAT*2080, STAT*2100, STAT*2120.
3. Graduate students may be admitted to later parts of a sequence by permission of the department.
4. Students who major or minor in Statistics may not receive credit for the following courses unless taken to satisfy the requirements of another program: ECON*2740, PSYC*2010, PSYC*3320, .

STAT*2040 Statistics I S,F,W(3–2) [0.50]

A course stressing the practical methods of Statistics. Topics include: descriptive statistics; univariate models such as binomial, Poisson, uniform and normal; central limit theorem; expected value; the t, F and chi–square models; point and interval estimation; hypothesis testing methods up to two–sample data; simple regression and correlation; ANOVA for CRD and RCBD. Assignments will deal with real data from the natural sciences. Laboratory sessions involve statistical computing and visualization using appropriate statistical software.

Prerequisite(s): 1 of 4U Advanced Functions and Calculus, OAC calculus, equivalent

Restriction(s): STAT*1000, STAT*2060, STAT*2080, STAT*2100, STAT*2120

STAT*2050 Statistics II S,F,W(3–2) [0.50]

The methods of STAT*2040 are extended to the multi–sample cases. Methods include: simple and multiple regression analysis including ANOVA and lack–of–fit; experimental design including analysis for CRD, RCBD, LSD, SPD and factorial experiments with interaction; ANCOVA; Bioassay. Assignments employing data from the natural sciences will be processed in the microcomputer laboratory.

Prerequisite(s): STAT*2040 or STAT*2100 (or equivalent)

Restriction(s): STAT*2090, STAT*2250

STAT*2060 Statistics for Business Decisions W(3–2) [0.50]

A course designed for students interested in the application of statistics in a business setting. Topics covered will include the role of statistics in business decisions, organization of data, frequency distributions, probability, normal and sampling distributions, hypothesis tests, linear regression and an introduction to time series, quality control and operations research. (Also offered through distance education format.)

Prerequisite(s): (1 of 4U mathematics, OAC mathematics, equivalent) or 0.50 credit in mathematics

Restriction(s): STAT*1000, STAT*2040, STAT*2080, STAT*2100, STAT*2120

STAT*2080 Introductory Applied Statistics I F(3–2) [0.50]

Frequency distributions, graphing and tabulation of data. Measures of central tendency, variability and association. Elementary probability. Hypothesis testing and confidence intervals. Basic concepts of experimental design; treatment designs. Simple linear regression and correlation. Illustrated with examples from a variety of disciplines, including family studies, education, marketing, medicine, psychology and sociology.

Prerequisite(s): (1 of 4U mathematics, OAC mathematics, equivalent) or 0.50 credit in mathematics

Restriction(s): STAT*1000, STAT*2040, STAT*2060, STAT*2100, STAT*2120

STAT*2090 Introductory Applied Statistics II W(3–2) [0.50]

Design of sample surveys. Analysis of qualitative data. Analysis of variance for designed experiments. Multiple regression and analysis of covariance. Some non–parametric methods. Survey of special topics such as factor analysis and cluster analysis.

Prerequisite(s): STAT*2080

Restriction(s): STAT*2050

STAT*2100 Introductory Probability and Statistics F(3–2) [0.50]

Basic probability; Discrete random variables, examples (e.g. Bernoulli, binomial, geometric, hypergeometric, Poisson), expected values, variances; Markov chains and their properties; Continuous random variables (e.g Gaussian); Methods of elementary data summarizations, analysis and statistical inference (estimation, testing, regression, and correlation). Laboratory work will include basic experimentation with sampling and with statistical computer packages.

Prerequisite(s): 1 of MATH*1010, MATH*1210, MATH*2080, IPS*1210

Restriction(s): STAT*2040, STAT*2060, STAT*2080, STAT*2120

STAT*2120 Probability and Statistics for Engineers W(3–1) [0.50]

Sample spaces. Probability, conditional probability, independence. Bayes' theorem. Probability distributions. Probability densities. Algebra of expected values. Descriptive statistics. Inferences concerning means, variances, and proportions. Curve fitting, the method of least squares, correlation. Introduction to quality control and reliability. Recommended especially for students in the B.SC.(Eng.) program.

Prerequisite(s): 1 of MATH*1010, MATH*1210, MATH*2080, IPS*1210

Restriction(s): STAT*1000, STAT*2040, STAT*2060, STAT*2080, STAT*2100

STAT*2250 Biostatistics and the Life Sciences W(3–2) [0.50]
This course in biostatistical methods will emphasize the design of research projects, data gathering, analysis and the interpretation of results. Statistical concepts underlying practical aspects of biological research will be acquired while working through the process of scientific enquiry. Weekly computer laboratory sessions will focus on practical data visualization and statistical analysis using computer statistical packages. Simple parametric and nonparametric methods are reviewed, followed by more advanced topics that will include some or all of the following: two factor ANOVA and multiple regression, and introductions to discriminant analysis, cluster analysis, principal components analysis, logistic regression, and resampling methods. (Also listed as BIOL*2250.) Departments of Mathematics and Statistics and Zoology.
Prerequisite(s): STAT*2040 or STAT*2100
Equate(s): BIOL*2250
Restriction(s): STAT*2050

STAT*3100 Introductory Mathematical Statistics I F(3–0) [0.50]
Probability spaces; discrete and continuous random variables; multivariate distributions; expectations; moments, Chebyshev's inequality, product moments; sums of random variables, generating functions; Gamma, Beta, t and F distributions; central limit theorem; sampling distributions.
Prerequisite(s): (MATH*1210 or IPS*1210), (STAT*2040 or STAT*2100)

STAT*3110 Introductory Mathematical Statistics II W(3–0) [0.50]
Estimation, unbiasedness, Cramer–Rao inequality, consistency, sufficiency, method of moments, maximum likelihood estimation; hypothesis testing, Neyman–Pearson lemma, likelihood ratio test, uniformly most powerful test; linear regression and correlation; non–parametric methods.
Prerequisite(s): STAT*3100

STAT*3210 Experimental Design W(3–0) [0.50]
Basic principles of design: randomization, replication, and local control (blocking); RCBD, Latin square and crossover designs, incomplete block designs, factorial and split–plot experiments, confounding and fractional factorial designs, response surface methodology; linear mixed model computer analysis of the designs; nonparametric methods; Taguchi philosophy.
Prerequisite(s): STAT*2050, STAT*3240
Restriction(s): STAT*4220

STAT*3240 Applied Regression Analysis F(3–2) [0.50]
Theory and applications of regression techniques; linear, non–linear and multiple regression and correlation; analysis of residuals; other statistical techniques including: response surfaces and covariance analysis, prediction and time–series analysis. The computer lab involves interactive data analysis and investigation of the methodology using SAS and/or S–PLUS statistical software.
Prerequisite(s): (MATH*1210 or IPS*1210), (MATH*2150 or MATH*2160, may be taken concurrently or with instructor permission), (STAT*2050 or STAT*2100)

STAT*3320 Sampling Theory with Applications W(3–0) [0.50]
Non–probability and probability sampling. Simple random sampling, stratified sampling, cluster sampling, systematic sampling, double sampling, two–phase sampling, multi–stage cluster sampling. Expectation and variance estimation procedures and applications of above techniques.
Prerequisite(s): (MATH*1210 or IPS*1210), (1 of STAT*2050, STAT*3240, STAT*3100)

STAT*3510 Environmental Risk Assessment W(3–0) [0.50]
Contemporary statistical methods for assessing risk, including dose–response models, survival analysis, relative risk analysis, bioassay, estimating methods for zero risk, trend analysis, survey of models for assessing risk. Case studies illustrate the methods.
Prerequisite(s): (1 of MATH*1000, MATH*1080, MATH*1200, IPS*1110), (STAT*2050 or STAT*2250)

STAT*4050 Topics in Applied Statistics I W(3–0) [0.50]
Topics such as statistical computing procedures, quality control, bioassay, survival analysis and introductory stochastic processes. Intended for statistics students and interested students in other disciplines with appropriate previous courses in statistics. Information on particular offerings will be available at the beginning of each academic year. (Offered in odd–numbered years.)
Prerequisite(s): STAT*3110, STAT*3240

STAT*4060 Topics in Applied Statistics II W(3–0) [0.50]
Same as for STAT*4050. (Offered in even–numbered years.)
Prerequisite(s): STAT*3110, STAT*3240

STAT*4080 Data Analysis F(3–2) [0.50]
Principles of statistical modelling; the likelihood function; model fitting; model choice; analysis of non–normal data; generalized linear models; binomial regression models; regression models for counts; Poisson and multinomial data; overdispersion. Statistical modelling and analysis using appropriate software (eg. Splus and/or SAS) in the computing lab.
Prerequisite(s): (MATH*2150 or MATH*2160), STAT*3110, STAT*3240

STAT*4340 Statistical Inference W(3–0) [0.50]
This course on methods of statistical inference reviews and extends the theory of estimation introduced in STAT*3110: interval estimation tests for simple and composite hypotheses, likelihood ratio tests. Recent likelihood concepts as well as classical large sample theory, asymptotics and approximations and their applications are covered. This material is directly relevant to current research and applications in areas as diverse as survival analysis, nonparametric regression and environmetrics.

Prerequisite(s): STAT*3110, STAT*3240

STAT*4350 Applied Multivariate Statistical Methods F(3–0) [0.50]

Samplings from the multivariate normal distribution, Wishart and Hotelling's T@ distribution statistical inference on the mean vector, canonical correlations, multivariate analysis of variance and covariance, multivariate regression, principal components analysis, factor analysis. Topics will be illustrated using examples from various disciplines.

Prerequisite(s): (MATH*2150 or MATH*2160), STAT*3110, STAT*3240

STAT*4360 Applied Time Series Analysis W(3–2) [0.50]

This course will investigate the nature of stationary stochastic processes from the spectral and time domain points of view. Aspects of parameter estimation and prediction in a computationally intensive environment will be the presentation style. The methods developed in this course will have applicability in many sciences such as engineering, environmental sciences, geography, soil sciences, and life sciences.

Prerequisite(s): STAT*3240 or permission of the instructor

STAT*4510 Advanced Risk Analysis F(3–0) [0.50]

Measures of risk, 2x2 tables, combining 2x2 tables, trend tests, combination and time dependent bioassays, joint action toxicity models, teratology and estimation of survival functions. Extensive use will be made of SAS and/or S–plus. Course is based on real data in risk analysis.

Prerequisite(s): STAT*3240, STAT*3510

STAT*2XXX Any STAT course at the 2000 level [0.00]

** PLACE HOLD FOR B.A. REQUIREMENTS — DO NOT PRINT IN COURSE DESCRIPTIONS **

XII—Course Descriptions, Studio Art

School of Fine Art and Music.

Studio supplies: The majority of the cost of supplies must be borne by the student. In order to permit the University to subsidize this cost and to allow for savings through discount buying, some materials are obtained through the School of Fine Art and Music by payment of a lab fee. The amount of the fee is established for each semester prior to registration.

Note: Due to limited faculty resources and facilities, enrolment in these courses may be restricted to Studio Art majors or minors. Admission to all Studio Art courses is based on the university's policy with regard to Priority Access Courses. Admission to courses is competitive based on the combined average of Studio Art and Art History courses (minimum 70%); in some courses, the grade in the prerequisite course(s) and the semester level is also a factor. Normally, students who require the course in order to complete a program requirement are given priority if they meet the minimum average requirement.

SART*1050 Visual Studies in 2–D F(0–6) [0.50]

An introduction to basic aspects of 2 dimensional visual structure and expression. Colour, drawing, spatial concepts, various materials and diverse approaches to visual order will be investigated through assigned problems, lectures and critiques.

SART*1060 Visual Studies in Media and 3–D W(0–6) [0.50]

An introduction to the basic aspects of three–dimensional and time–based art production. Various topics, materials, and diverse approaches will be investigated through assigned problems, lectures, and critiques.

Equate(s): SART*2040

Restriction(s): registration in semesters one, two, three or four

SART*2090 Drawing I F,W(0–6) [0.50]

An introduction to the basic concepts, techniques and media of drawing, through disciplined observational and imaginative study.

Prerequisite(s): SART*1050, SART*2040

SART*2200 Painting I F,W(0–6) [0.50]

Introduces various technical and aesthetic issues of painting, with an emphasis placed on representational strategies. Diverse approaches will be investigated through specific studio assignments in acrylic and oil–based media on various painting supports. Prior or concurrent Drawing classes are recommended.

Prerequisite(s): SART*1050

SART*2300 Sculpture I F,W(0–6) [0.50]

An introduction to contemporary sculptural concerns through projects and readings. Students will be actively engaged in exploring a variety of materials and ideas including modular construction, casting, and scale exercises.

Prerequisite(s): SART*1060

SART*2460 Introductory Printmaking I F(0–6) [0.50]

An introduction to the traditional printmaking media of intaglio and relief printing.

Prerequisite(s): SART*1050

SART*2470 Introductory Printmaking II W(0–6) [0.50]

An introduction to the techniques of the traditional printmaking media of lithography and silkscreen.

Prerequisite(s): SART*1050

SART*2610 Photography I F,W(0–6) [0.50]

An introduction to the creative application of photography in art; and, the basic principles of dark–room and camera skills.

Prerequisite(s): SART*1050

SART*2700 Introduction to Computer Graphics F(0–6) [0.50]

This course will extend the conceptual, technical, and aesthetic issues of studio art into the field of computer imaging. Drawings, photographs, and other found images will be scanned into the computer and digitally manipulated. Some computer experience is recommended.

Prerequisite(s): SART*1050, SART*2040

Restriction(s): registration is limited to students registered in the Art History or Studio Art specializations of the Bachelor of Arts program with an average of 70% in all ARTH* and SART* course attempts

SART*2710 Drawing Graphics on the Computer W(0–6) [0.50]

An introduction to creating original graphics on the computer using a vector graphics program. Bringing traditional drawing and painting skills into the computer, students will produce original drawings and designs using vector graphics, bezier curves, compound paths, and multiple filters. Some computer experience is recommended.

Prerequisite(s): SART*1050, SART*2040

Restriction(s): registration is limited to students registered in the Art History or Studio Art specializations of the Bachelor of Arts program with an average of 70% in all ARTH* and SART* course attempts

SART*2800 Extended Media I W(0–6) [0.50]

Basic video and digital audio editing will be integrated with other media, art forms, and issues such as performance, alternative venues, and installation, while emphasizing interdisciplinary and alternative approaches to contemporary art practice.

Prerequisite(s): SART*1060

SART*3090 Drawing II F,W(0–6) [0.50]

An extension of SART*2090 which attempts to foster understanding of the basic skills and technical issues necessary to the making of drawings while introducing the philosophical and critical issues related to the discipline.

Prerequisite(s): SART*1060, SART*2090

SART*3200 Painting II F,W(0–6) [0.50]

An extension of the work begun in SART*2200. The various technical and aesthetic issues of representational painting will be further investigated as will the diverse approaches to pictorial organization derived from observation. However, the issues of abstraction and other forms of non–representational approaches will be introduced and developed in a deeper and fuller attempt to explore the possibilities available to the painter in the late 20th century.

Prerequisite(s): SART*1060, SART*2200

SART*3300 Sculpture II F,W(0–6) [0.50]

A technical course in which specific tools of the wood and metal shops will be studied in depth through assignments. Conceptual issues will be examined in relation to the creation of objects.

Prerequisite(s): SART*1050, SART*2300

SART*3410 Intaglio F(0–6) [0.50]

In–depth investigation into aspects of intaglio printmaking.

Prerequisite(s): SART*1060, (SART*2460 or SART*2470)

SART*3450 Lithography W(0–6) [0.50]

In–depth exploration of the art of lithography.

Prerequisite(s): SART*1060, (SART*2460 or SART*2470)

SART*3470 Photo–Printmaking W(0–6) [0.50]

An investigation into the uses of photographic resources in image making to produce photo etchings, silk–screens, and lithographs. Basic darkroom skills will be directed toward the production of graphic arts film, use of the stat camera, and various photo techniques. (Offered in odd–numbered years.)

Prerequisite(s): SART*1060, (SART*2460 or SART*2470)

SART*3480 Web Development and Design F(0–6) [0.50]

An in–depth study of website design using professional web authoring software. Students will design and create a website which explores a contemporary issue in their art practice.

Prerequisite(s): SART*2700 or SART*2710

Restriction(s): registration is limited to students with an average of 70% in all SART* course attempts

SART*3750 Photography II F,W(0–6) [0.50]

A further exploration of expressive, formal and technical aspects of photography. Students without the stated prerequisite but with equivalent experience should consult the instructor.

Prerequisite(s): SART*1060, SART*2610

SART*3770 Extended Media II F(3–0) [0.50]

Further investigations into interdisciplinary alternative approaches to contemporary practice. Digital video editing will be integrated with other art forms and issues such as audio, performance, alternative venues, and installation.

Prerequisite(s): SART*1050, SART*2800

SART*3800 Experiential Learning [0.50]

An independent study course based on either Studio Art related voluntary or paid practical experience. Evaluation will be based on assignments related to work duties. Written proposals, signed by the instructor, must be submitted to the Director for the School for approval by the last day of course selection in the Fall (for Winter) or Winter (for the following Fall).

Prerequisite(s): 3.00 credits in Studio Art, consent of the instructor

Restriction(s): registration is limited to students registered in the Art History or Studio Art specializations of the Bachelor of Arts program with an average of 70% in all ARTH* and SART* course attempts

SART*4090 Drawing III F(0–6) [0.50]

Continuation of the various skills and technical issues necessary to the making of drawings. Observational drawing from the model, still life, natural forms, and interiors will be studied with a view to understanding the language and philosophical implications inherent within drawings of different styles.

Prerequisite(s): SART*3090

SART*4100 Drawing IV W(0–6) [0.50]

An advanced drawing course which explores a wider range of graphic experience including abstract, imaginary and other non–representational approaches to graphic discipline in our own time.

Prerequisite(s): SART*4090

SART*4200 Painting III F(0–6) [0.50]

A further extension of the work begun in SART*2200 and SART*3200. While the various technical and aesthetic issues will continue to be investigated through the discipline of observational painting there will be more emphasis on the critical issues relevant to contemporary painting and allowance for personal expression through both abstract and representational modes.

Prerequisite(s): SART*3200, SART*3210

SART*4210 Painting IV W(0–6) [0.50]

Advanced investigations into the role of observational study and strong emphasis on critical issues of contemporary painting whether representational, abstract, mixed–media, or other.

Prerequisite(s): SART*4200

SART*4230 Special Topics in Painting W(0–6) [0.50]
An advanced course which focuses on a specific theme, subject, or technique in painting. Topics may include the figure and narrative in painting, the landscape in contemporary painting, or New Abstraction.
Prerequisite(s): SART*3200
Restriction(s): registration is limited to students registered in the Art History or Studio Art specializations of the Bachelor of Arts program with an average of 70% in all ARTH* and SART* course attempts

SART*4300 Sculpture III W(0–6) [0.50]
Contemporary issues in sculpture will be addressed through at least 2 studio projects including 1 site–response installation, and an independent work in close consultation with the instructor. Interdisciplinary projects based on the students' own research are strongly encouraged.
Prerequisite(s): SART*3300

SART*4310 Sculpture IV F(0–6) [0.50]
In close consultation with the instructor, the student will produce a body of independent sculpture with attention to clarity of personal statement, originality, and professionalism. Interdisciplinary projects based on the students' own research are strongly encouraged.
Prerequisite(s): SART*4300

SART*4410 Experimental Printmaking F,W(0–6) [0.50]
Further investigations into traditional and photo based printing media. Use of computer graphics to augment the design process.
Prerequisite(s): 3 of SART*2460, SART*2470, SART*3410, SART*3450, SART*3470

SART*4450 Advanced Printmaking F,W(0–6) [0.50]
Continuing in–depth investigation into various printmaking media, including the use of computer graphics and advanced manipulation of photo based images to create a thematically coherent portfolio of prints.
Prerequisite(s): SART*4410

SART*4700 Photography III F(0–6) [0.50]
An introduction to colour photography and a continuing investigation of the formal, technical and theoretical issues of contemporary photography.
Prerequisite(s): SART*3750

SART*4710 Photography IV W(0–6) [0.50]
A continuing investigation of colour photography and advance investigation into contemporary issues, with opportunities for interdisciplinary approaches to photographic practice.
Prerequisite(s): SART*4700

SART*4800 Special Topics in Sculpture F(0–6) [0.50]
An advanced course which focuses on a specific theme, subject, or technique in sculpture. Subject matter will vary according to the instructor or instructors and will consist of topics not otherwise available in the curriculum. Topics may include, for example, Kinetic Media, Public Art, Mold Making, or Figuration and Installation. Normally, two different topics will be offered each year (see SART*4870).
Prerequisite(s): SART*3300
Restriction(s): registration is limited to students registered in the Art History or Studio Art specializations of the Bachelor of Arts program with an average of 70% in all ARTH* and SART* course attempts

SART*4810 Extended Media III W(0–6) [0.50]
Advanced investigations into digital video/audio editing and interdisciplinary or alternative art practices.
Prerequisite(s): SART*3770 or (SART*2800, SART*3310)

SART*4820 Extended Media IV W(0–6) [0.50]
Further investigations into digital video/audio editing and interdisciplinary or alternative art practices with emphasis on individual direction.
Prerequisite(s): SART*4810

SART*4830 Interactive Multimedia W(0–6) [0.50]
An in–depth study of two–dimensional interactive multimedia using professional authoring software. Students will design and create multimedia presentations which explore a contemporary issue in their art practice.
Prerequisite(s): SART*3480
Restriction(s): registration is limited to students registered in the Art History or Studio Art specializations of the Bachelor of Arts program with an average of 70% in all ARTH* and SART* course attempts

SART*4850 Specialized Studio Practice I F(0–6) [0.50]
An advanced and specialized workshop in individually selected studio practices which affords opportunities for interdisciplinary approaches and oversees the development of independent study strategies. Students will research and complete a major self–directed project. Not intended for all Honours students. Recommended to assist in the preparation of application to graduate school.
Prerequisite(s): a minimum of 2 courses at the 4000–level in Studio Arts, at least 1 of which must be in the principal area of specialization, and a minimum cumulative average of at least 80% in Studio Arts (SART) courses and Art History (ARTH) courses, or permission of the Director of the School

SART*4860 Specialized Studio Practice II W(0–6) [0.50]
Continuation of SART*4850.

Prerequisite(s): completion of SART*4850 with a grade of at least 80% in Studio Arts (SART) courses and Art History (ARTH) courses, or permission of the Director of the School

SART*4870 Special Topics in Sculpture W(0–6) [0.50]

An advanced course which focuses on a specific theme, subject, or technique in sculpture. Subject matter will vary according to the instructor or instructors and will consist of topics not otherwise available in the curriculum. Topics may include, for example, Kinetic Media, Public Art, Mold Making, or Figuration and Installation. Normally, two different topics will be offered each year (see SART*4800).

Prerequisite(s): (SART*3300

Restriction(s): registration is limited to students registered in the Art History or Studio Art specializations of the Bachelor of Arts program with an average of 70% in all ARTH* and SART* course attempts

XII—Course Descriptions, Toxicology

Department of Biomedical Sciences.
Department of Chemistry and Biochemistry.
Department of Environmental Biology.
Department of Mathematics and Statistics.
Department of Molecular Biology and Genetics.
Department of Pathobiology.

TOX*2000 Principles of Toxicology F(3–0) [0.50]
This course will establish the scientific principles underlying the toxic actions of various substances and will introduce the various challenges within the field of toxicology. The chemical nature of injurious substances, their uptake and metabolism by non–target organisms, and their mode of toxic action will be studied in addition to the methods used in safety evaluations and risk assessment. Department of Biomedical Sciences.
Prerequisite(s): (CHEM*1050 or CHEM*2300), (MATH*1080 or equivalent), (BIOL*1040 or equivalent) (CHEM*2300 may be taken concurrently)

TOX*3300 Analytical Toxicology F(3–3) [0.50]
A course in trace analysis designed for students in toxicology and related programs. Analytical techniques of value in analyzing samples of toxicological importance will be presented with emphasis also on sample collection and preparation prior to analysis. Department of Chemistry and Biochemistry.
Prerequisite(s): CHEM*2480, CHEM*2580, TOX*2000 (TOX*2000 may be taken concurrently)
Restriction(s): CHEM*3430, CHEM*3450

TOX*3360 Environmental Chemistry and Toxicology S,W(3–0) [0.50]
The chemistry of the natural environment; the influence of pollutants upon the environment, including methods of introduction of pollutants to, and removal of pollutants from, the environment. Department of Chemistry and Biochemistry. (Also listed as CHEM*3360.)
Prerequisite(s): CHEM*1050
Equate(s): CHEM*3360
Restriction(s): CHEM*1310

TOX*4000 Medical Toxicology F(3–3) [0.50]
The toxicology of mammalian body systems: dose–response, mechanisms and systemic sites of action of major groups of chemical toxicants. The course is designed for students majoring in biomedical toxicology. Department of Biomedical Sciences.
Prerequisite(s): BIOM*3090, TOX*3300

TOX*4100 Toxicological Pathology W(2–2) [0.50]
Evaluation of the pathologic responses of cells and tissues to toxic compounds. The course is designed for students majoring in toxicology. Department of Pathobiology.
Prerequisite(s): PATH*3610 (or equivalent)

TOX*4200 Topics in Toxicology W(0–4) [0.50]
Topics in toxicology will consist of oral and written presentations by students, faculty members, and guest lecturers. The emphasis will be on the broad integrative aspects of toxicology with particular reference to the whole organism and higher levels of natural systems; risk assessment and regulatory toxicology. This course is designed for B.SC. Honours Toxicology students in their 7th or 8th semester. Departments of Biomedical Sciences and Environmental Biology.
Prerequisite(s): TOX*2000, TOX*3300

TOX*4550 Ecotoxicological Risk Characterization W(3–0) [0.50]
A biologically based, advanced course that will give students working knowledge of current processes and techniques for ecotoxicological risk characterization. The course material will cover the topics of problem definition, dose response characterization, exposure characterization, risk assessment, and risk management decision making. (Also listed as ENVB*4550.)
Prerequisite(s): TOX*2000, ENVB*3030
Equate(s): ENVB*4550

TOX*4590 Biochemical Toxicology F(3–0) [0.50]
The biotransformation of drugs, carcinogens, and other toxicants, including consideration of human health implications of these metabolic processes. The enzymes catalyzing these reactions will be discussed in detail. Designed for students specializing in toxicology or biochemistry. Department of Chemistry and Biochemistry.
Prerequisite(s): (1 of CHEM*3430, CHEM*3450, TOX*3300), CHEM*3560, MBG*2020

XII—Course Descriptions, Veterinary Medicine

Department of Biomedical Sciences.
Department of Clinical Studies.
Department of Pathobiology.
Department of Population Medicine.

Students entering the D.V.M. Program prior to Fall 2000 should refer to the undergraduate calendar for their year of program entry for appropriate course listings.

The hours in courses below indicate the approximate equivalent number of semester course hours.

These courses will be available only to students registered in the D.V.M. program.

VETM*3000 Veterinary Biochemistry Phase 1(2–1) [0.50]
This course integrates the biochemistry of the healthy animal with a study of some abnormalities in metabolic pathways. The emphasis is on understanding the physiological and biochemical mechanisms and regulatory processes within cells, tissues and organs, as a basis for later courses on diseases. Department of Biomedical Sciences
Co–requisite(s): all Phase 1 courses

VETM*3070 Veterinary Anatomy Phase 1(2–6) [2.00]
An introduction to comparative, topographical anatomy, primarily of 4 domestic mammals: cat, dog, horse and cow. Full dissections of these species are related to the living animal and to imaging, to form the basis for future studies in clinical morphology. Students are first introduced to the major anatomical systems and then to the regions in detail: thorax, abdomen, pelvis and perineum, limbs, and head and neck. Active learning, problem solving, communication skills and the integration of material across concurrent courses are fostered. Department of Biomedical Sciences.
Co–requisite(s): all Phase 1 courses

VETM*3080 Veterinary Physiology Phase 1(3–3) [1.50]
The course describes the physiological processes carried out by the major tissues and organ systems, and the regulatory mechanisms that affect tissue and organ function. Topics dealt with in the course include the following: the cellular and chemical constituents of blood, blood coagulation and haemostasis, the function of the immune system, resistance to infectious agents and the principles of immunoprophylaxis, cardiac funtion, cardiovascular haemodynamics, blood pressure, peripheral and regional circulation of blood, the lymph circulation, the structure and function of the mammalian nervous system and organs associated with special senses, the functions of the digestive tract, lungs and kidney thermoregulation and water, electrolyte and acid–base balance. The homestatic features and species variation of the tissue organ systems will be emphasized. Departments of Biomedical Sciences and Pathobiology.
Co–requisite(s): all Phase 1 courses

VETM*3120 Veterinary Histology Phase 1(3–3) [0.75]
A lecture and laboratory course emphasizing the microscopic organization of the tissues and organs of domestic animals in various physiological states. Correlations between morphology and function of various cells and tissues comprising the organ systems will be discussed. Department of Biomedical Sciences.
Co–requisite(s): all Phase 1 courses

VETM*3210 Art of Veterinary Medicine I Phase 1(Variable) [0.50]
In a series of integrated modules, this course will assist students in increasing their self–awareness and comprehension of a range of legal, professional and ethical values and behaviours that are essential and normal components of veterinary medicine. Emphasis will be placed on understanding, evaluating and improving interpersonal relations and oral and written communication skills. The ethical principles that underlie veterinary medicine will be explored in depth. The course will also assist students in understanding their position in the developing history of veterinary medicine and inform them of emerging trends. Issues related to professional development, how other species interact with humans, and the client/patient/veterinarian triad will be introduced. The application of these learned skills in the resolution of problems will be introduced. OVC Dean's Office, Department of Population Medicine and the Veterinary Teaching Hospital.
Co–requisite(s): all Phase 1 courses

VETM*3220 Art of Veterinary Medicine II Phase 2(2–0) [0.50]
Using modules, this course will build on, and enhance, the knowledge base and skill set acquired in Phase I in the area of communications, human–animal interactions, professional development, and the client/patient/veterinarian triad. The focus in these areas will now move towards recognising difficulties that may arise and how to differentiate abnormal situations from normal ones. Problem–solving, conflict resolution and stress management through application of innate and acquired knowledge and skills will be developed. In addition, the course will introduce concepts of business and entrepreneurial skills which are required for successful veterinary practice. OVC Dean's Office, Department of Population Medicine and the Veterinary Teaching Hospital.
Prerequisite(s): VETM*3210
Co–requisite(s): all Phase 2 courses

VETM*3390 Veterinary Medical Genetics Phase 1(1–1) [0.50]
The course deals with the genetic basis of disease and birth defects in general and the salient features and inheritance patterns of the common birth defects, metabolic errors and reproductive problems in domestic animals. Department of Biomedical Sciences.
Co–requisite(s): all Phase 1 courses

VETM*3400 Health Management I Phase 1(3–1) [0.75]
The course is the first of two comprehensive and integrated courses that will span the first two phases of the DVM program. Both courses are intended to establish the foundation for, and contribute to the students' achievement of selected DVM 2000 elements of competency in the context of the principles of health management. The primary emphasis of this component is to establish the historical perspective and basic tools required for health promotion and disease prevention. Department of Population Medicine.
Co–requisite(s): all Phase 1 courses

VETM*3410 Health Management II Phase 2(3–0) [0.75]
This course is a continuation of the Phase 1 course Health Management I. Previously presented concepts will be explored in greater depth and complexity. Additional emphasis will be placed on relevant epidemiological tools for monitoring, outbreak investigation, critical appraisal and the applications of principles from the previous course in the series to measure performance, including relevant production genetics, and animal behaviour in a species/industry context. Department of Population Medicine.
Prerequisite(s): all Phase 1 courses
Co–requisite(s): all Phase 2 courses

VETM*3430 Clinical Medicine I Phase 1(Variable) [0.25]
The course will contribute to students' achievement of selected DVM 2000 elements of competency in the areas of animal handling and the clinical examination of various species. Students will become familiar with the expected variation in common clinical parameters and how this variation is impacted by aging, changes in health status, and external environmental influences and other sources of stress. Students will be introduced to clinical problem solving using case material from the Veterinary Teaching Hospital. They will develop their verbal and written communication skills through case simulations and analyses. The course will be presented using lectures, laboratory classes and independent study. The graduating competencies can be found on the OVC website (http://www.ovcnet.uoguelph.ca/homepage/html). Department of Clinical Studies.
Co–requisite(s): all Phase 1 courses

VETM*3440 Clinical Medicine II Phase 2(0–2) [0.50]
The course is a continuation of Clinical Medicine I. It will contribute to students' achievement of selected elements of graduating competency in the areas of clinical examination of specific organ systems of various species. Students will enhance and refine their clinical problem solving skills using case material from the Veterinary Teaching Hospital. They will continue to develop their verbal and written communication skills through case simulations and analyses. The course will be presented using lectures, laboratory classes and independent study. The graduating competencies can be found on the OVC website (http://www.ovcnet.uoguelph.ca/homepage/html). Department of Clinical Studies.
Prerequisite(s): all Phase 1 courses
Co–requisite(s): all Phase 2 courses

VETM*3450 Principles of Disease in Veterinary Medicine Phase 2(Variable) [2.75]
This course addresses several major topics, including principles of disease induction and transmission, host response to threat and injury, pathogenetic mechanisms of infectious and toxic agents, and manipulation of disturbances in health. The interaction among host, environmental, and etiologic factors in the development of disease will be highlighted. Students will learn to recognize, describe, and evaluate disturbances of health and homeostasis at the level of the population, individual animal, organ system, tissue and cell using a variety of diagnostic modalities. Departments of Biomedical Sciences and Pathobiology.
Prerequisite(s): all Phase 1 courses
Co–requisite(s): all Phase 2 courses

VETM*3460 Theriogenology Phase 2(Variable) [0.75]
A lecture and laboratory course covering the normal and abnormal reproductive systems of domestic animals. The course will include mammalian reproductive physiology and histology, diagnosis and treatment of reproductive disorders, including infertility, and management of breeding programs of the common domestic species. An introduction to the new reproductive technologies used in theriogenology will also be provided. Departments of Biomedical Sciences, Pathobiology and Population Medicine.
Prerequisite(s): all Phase 1 courses
Co–requisite(s): all Phase 2 courses

VETM*3470 Anaesthesiology Phase 2(Variable) [0.75]
This course provides the general principles, pharmacologic basis, and practical applications of general and local anaesthesia in small and large animals. Other topics covered include fluid and acid–base imbalance and the prevention and treatment of surgical shock. Departments of Biomedical Sciences and Clinical Studies.
Prerequisite(s): all Phase 1 courses
Co–requisite(s): all Phase 2 courses

VETM*3480 Phase 2: Special Topics Phase 2(Various) [0.50]
This course provides opportunities for students to enrich their educational experience, in depth and/or in breadth, beyond the core competency requirements of DVM 2000. This course is constructed of a series of topic–based modules related to the core teaching in Phase 2. Students will be required to take at least two of these modules. Departments of Biomedical Sciences, Clinical Studies, Pathobiology and Population Medicine.
Prerequisite(s): all Phase 1 courses
Co–requisite(s): all Phase 2 courses

VETM*3510 Principles of Surgery Phase 2(2–0) [0.25]
The principles of surgery in various animal species are given. The lecture topics include patient and surgeon preparation, tissue handling instrumentation, suturing and surgical principles and approaches to various organ systems and anatomical regions. Department of Clinical Studies.
Prerequisite(s): all Phase 1 courses
Co–requisite(s): all Phase 2 courses

VETM*4220 Art of Veterinary Medicine III Phase 3(2–0) [0.50]
This modular course will require students to apply the knowledge and skills acquired in Phases 1 and 2 to problems that incorporate aspects of one or more of the following areas: communications and conflict resolution, ethics, professional behaviour, human– animal interactions, analysis and planning, and business issues. This course will focus on methods to resolve difficulties in the above areas that are interfering with intrapersonal and interpersonal relationships and with how to return abnormal situations to normal ones. Problem–solving, conflict resolution and stress management through application of innate and acquired knowledge and skills will be expected. The course will be taught primarily through case analysis. OVC Dean's Office, Department of Population Medicine, Veterinary Teaching Hospital.
Prerequisite(s): all Phase 2 courses
Co–requisite(s): all Phase 3 courses

VETM*4450 Equine Medicine and Surgery Phase 3(3–0) [0.50]
The course will contribute to students' achievement of selected DVM 2000 elements of competency in the context of the horse. The primary emphasis is directed towards developing the skills, knowledge and attitudes that will permit the entry–level veterinarian to develop strategies to deal with common and uncommon diagnoses. Department of Clinical Studies.
Prerequisite(s): all Phase 2 courses
Co–requisite(s): all Phase 3 courses

VETM*4460 Food Animal Medicine and Surgery Phase 3(Variable) [1.00]
The course will contribute to students' achievement of selected DVM 2000 elements of competency in the context of the common ruminant species and swine. The primary emphasis is directed towards developing the skills, knowledge and attitudes that will permit the entry–level veterinarian to develop strategies to deal with common and uncommon diagnoses. The graduating competencies can be found on the OVC website (http://www.ovcnet.uoguelph.ca/homepage/html). Departments of Clinical Studies and Population Medicine.
Prerequisite(s): all Phase 2 courses
Co–requisite(s): all Phase 3 courses

VETM*4470 Medicine and Surgery of Dog and Cat Phase 3(Variable) [1.00]
The course will contribute to students' achievement of selected DVM 2000 elements of competency in the context of the dog and cat. The primary emphasis is directed towards developing the skills, knowledge and attitudes that will permit the entry–level veterinarian to develop strategies to deal with common and uncommon diagnoses. The graduating competencies can be found on the OVC website (http://www.ovcnet.uoguelph.ca/homepage/html). Department of Clinical Studies.
Prerequisite(s): all Phase 2 courses
Co–requisite(s): all Phase 3 courses

VETM*4480 Comparative Medicine Phase 3(Variable) [0.75]
The course will contribute to students' achievement of selected elements of graduating competency in the context of pet birds, commercial poultry and non–traditional species (fish, amphibians, reptiles, rabbits, rodents, ferrets, non–domestic carnivores and non–domestic ungulates). The primary emphasis is directed towards enhancing the skills, knowledge and attitudes that will permit the entry–level veterinarian to develop strategies to deal with common and uncommon diagnoses. The graduating competencies can be found on the OVC website (http://www.ovcnet.uoguelph.ca/homepage/html). Department of Pathobiology.
Prerequisite(s): all Phase 2 courses
Co–requisite(s): all Phase 3 courses

VETM*4490 Systems Pathology Phase 3(Variable) [1.00]
The course will contribute to students' achievement of selected elements of graduating competency in the context of pathobiology across the range of species. The primary emphasis is directed towards developing the skills, knowledge and attitudes that will permit the entry–level veterinarian to carry out the post–mortem examinations, select and perform relevant ancillary diagnostic tests and procedures, interpret findings, and initiate and interpret results of further investigations. The graduating competencies can be found on the OVC website (http://www.ovcnet.uoguelph.ca/homepage/html). Department of Pathobiology.
Prerequisite(s): all Phase 2 courses
Co–requisite(s): all Phase 3 courses

VETM*4520 Surgical Exercises Phase 3(Variable) [2.00]
Veterinary students receive training in preoperative planning, anaesthesia and surgical techniques, operative room decision making and post–operative care in this laboratory course. Students begin by practicing technical skills on inanimate models. They progress to performing a series of supervised operations designed to parallel the most commonly performed surgeries in private practice. A once weekly rounds period allows discussion of issues arising from the previous anaesthesia and surgery, and planning for the upcoming laboratory. Though some didactic material is presented, the course is mainly experiential. The evaluation outcome of the course is outstanding, pass or fail. Department of Clinical Studies.

Prerequisite(s): all Phase 2 courses
Co–requisite(s): all Phase 3 courses

VETM*4530 Advanced Health Management Modules Phase 3(Variable) [0.50]
The course will contribute to students' achievement of greater depth in selected elements of graduating competency in the context of health management in species of their choice. The primary emphasis is directed towards developing species–specific skills, knowledge and attitudes that will permit the entry–level veterinarian to assess and advise on animal production and performance and evaluate the necessity for, and implementation of, health management programs. The course is constructed of a series of species–based modules. Students will be required to take two of the modules. The graduating competencies can be found on the OVC website (http://www.ovc-net.uoguelph.ca/homepage/html). Department of Population Medicine.
Prerequisite(s): all Phase 2 courses
Co–requisite(s): all Phase 3 courses

VETM*4830 Small Animal Clinics Phase 4(–) [2.50]
The goal of the small animal clinics course is to assist in the role transformation from veterinary student to veterinary practitioner. The course is largely experiential in structure and process. Small groups of students will rotate through various service areas, and actively participate in the diagnosis and treatment of client–owned animals in the teaching hospital. Regularly scheduled small group discussions allow the exploration of issues arising during diagnosis and management of the individual cases. The course is competency–based. Individual competency expectations for each clinical rotation are provided. Department of Clinical Studies.
Prerequisite(s): all Phase 3 courses, <csRCourseCode>VETM*4900</csRCourseCode>
Co–requisite(s): all Phase 4 courses

VETM*4840 Large Animal Clinics Phase 4(–) [2.50]
The goal of the large animal clinics course is to assist in the role transformation from veterinary student to veterinary practitioner, with emphasis on the recognition, diagnosis, and therapeutic management of diseases of individual large domestic animals. The course is largely experiential in structure and process. Small groups of students will rotate through various service areas, and actively participate in the diagnosis and treatment of client–owned animals in the teaching hospital. Regularly scheduled small group discussions allow the exploration of issues arising during diagnosis and management of the individual cases. The course is competency–based. Individual competency expectations for each clinical rotation are provided. Department of Clinical Studies.
Prerequisite(s): all Phase 3 courses, <csRCourseCode>VETM*4900</csRCourseCode>
Co–requisite(s): all Phase 4 courses

VETM*4850 Health Management Phase 4(–) [2.50]
This course is comprised of rotations in the food and animal clinics, as well as pathology, public health, theriogenology, and ethology. The study and implementation of management programs which affect the health of animals and ultimately human beings will be emphasized. Department of Population Medicine.
Prerequisite(s): all Phase 3 courses, <csRCourseCode>VETM*4900</csRCourseCode>
Co–requisite(s): all Phase 4 courses

VETM*4870 Clinical Medicine III Phase 3(0–2) [0.25]
This course will contribute to students' achievement of selected DVM 2000 elements of competency in the context of the hospital environment. This is an integrated course in which students will enhance a variety of clinical skills, including physical examination, history taking, problem solving, and ancillary diagnostic tests and procedures. This course is primarily carried out in the Veterinary Teaching Hospital where students will be exposed to case material from the Large and Small Animal Clinics. The emphasis is directed towards enhancing the skills, knowledge and attitudes that will permit the student to maximize the benefit to be derived from senior year courses. Department of Clinical Studies.
Prerequisite(s): all Phase 2 courses
Co–requisite(s): all Phase 3 courses

VETM*4900 Veterinary Externship Phase 4(–) [2.50]
This is an eight–week experiential learning opportunity that junior students in the DVM Program must organize by the mid–way through Phase 3 using resources available through the Department of Clinical Studies. The externship must be in approved private, primary care, veterinary practice (preferably in Ontario) that involves both food animal and companion animal species. Senior students in the DVM Program, under the supervision of a designated host veterinarian, will experience being part of a team providing health care services to the public. This course will provide students with the opportunity to integrate and apply their knowledge and experience from previous courses, and further refine their problem–solving and communication skills, and enhance their ability to work as part of a team. During the externship, students will receive formative evaluations of their performance relative to diagnostic skills, delivery of veterinary care, technical skills and professional conduct. At the end of the externship, students will also receive a summative evaluation in each of these areas. In addition to keeping a daily log of cases attended, students will also be required to write one case report. Normally, this will be based on a case attended during the externship and the manuscript will be written in the format of a "Brief Communication" following the format required by the Canadian Veterinary Journal. The evaluation outcome of this course is outstanding, pass or fail. Coordinated by the Department of Clinical Studies.
Prerequisite(s): all Phase 1, Phase 2 and Phase 3 courses

XII—Course Descriptions, Women's Studies

College of Arts.

WMST*1000 Introduction to Women's Studies F(3–0) [0.50]
An introduction to the methods and analyses of Women's Studies. An interdisciplinary feminist and multicultural examination of research about women and the gendered nature of societies and cultures. Areas of inquiry may include psychology, law, science, culture, work, family, violence, health, and sexuality.
Equate(s): ISS*2200, WMST*2200

WMST*2000 Women and Representation W(3–0) [0.50]
An interdisciplinary analysis of the role gender plays in representation, drawing on areas such as television, film, music, literature, visual arts, ethnography, medicine and law. International and cross–cultural perspectives included.

WMST*3000 Feminist Theory and Methods F(3–0) [0.50]
A comparative and critical examination of feminist theories and their methodological implications, including contributions of and tensions between various feminisms. Special attention to contemporary developments in the field.
Prerequisite(s): 10.00 credits including (1 of ISS*2200, WMST*1000, WMST*2200) and 0.50 other credit from Women's Studies List A, and 1 of ARTH*2480, ANTH*3690, DRMA*2300, ENGL*2120, PHIL*2060, POLS*2000, SOC*3310

WMST*3510 Directed Readings in Women's Studies S,F,W(3–0) [0.50]
An opportunity for advanced Women's Studies undergraduates to pursue an independent course of readings and assignments in Women's Studies. The student will design a course of readings and assignments with the instructor and submit the proposal to the Coordinator of Women's Studies for approval by the last day of the Add Period of that semester.
Prerequisite(s): 10.00 credits including (1 of ISS*2200, WMST*1000, WMST*2200), at least 1.00 other credit from Women's Studies List A

WMST*3520 Independent Workplace Learning in Women's Studies S,F,W(3–0) [0.50]
An opportunity for advanced Women's Studies undergraduates to combine workplace experience (in women–focused agencies or organizations) with Women's Studies research and assignments relevant to that work. The student will design a project with the instructor and submit a proposal to the Coordinator of Women's Studies for approval by the last day of the add period of that semester.
Prerequisite(s): 10.00 credits including (1 of ISS*2200, WMST*1000, WMST*2200), at least 1.00 other credit from Women's Studies List A

WMST*4010 Seminar in Women's Studies W(3–0) [0.50]
The framework of the course will be provided by a series of unresolved issues or challenging questions regarding women which will call upon the students' critical, evaluative, and integrative abilities.The content will largely depend upon the students' backgrounds within the program and their other major areas of study.
Prerequisite(s): (1 of ISS*2200, WMST*1000, WMST*2200), at least 1.00 other credit from Women's Studies List A
Equate(s): ISS*4010

WMST*4510 Advanced Topics in Women's Studies S,F,W(3–0) [0.50]
An opportunity for advanced Women's Studies undergraduates to pursue an advanced research project in Women's Studies. The student will design a project with the instructor and submit for approval to the Coordinator of Women's Studies by the last day of the add period in that semester.
Prerequisite(s): 15.00 credits including (1 of ISS*2200, WMST*1000, WMST*2200), at least 1.00 other credit from Women's Studies List A

WMST*4520 Advanced Topics in Women's Studies S,F,W(3–0) [0.50]
An opportunity for advanced Women's Studies undergraduates to pursue an advanced research project in Women's Studies. The student will design a project with the instructor and submit for approval to the Coordinator of Women's Studies by the last day of the add period in that semester.
Prerequisite(s): 15.00 credits including (1 of ISS*2200, WMST*1000, WMST*2200), at least 1.00 other credit from Women's Studies List A

XII—Course Descriptions, Zoology

Department of Environmental Biology.

Department of Zoology.

ZOO*1500 Humans in the Natural World – a Zoological Perspective S,F,W(3–0) [0.50]

This course will examine past and present human interactions with Nature from an ecological perspective. It investigates current global issues that require multi–disciplinary environmental analysis. This course is designed for non–science students. B.SC. students cannot take this course for credit. (Also offered through distance education format.)

ZOO*2050 Natural History of Ontario S,F,W(–) [0.50]

This course provides an introduction to the natural history of Ontario. The course begins with a review of geological, ecological and evolutionary factors that have influenced species diversity in the province. Distributions and abundances of biota, primarily animals, are discussed within the context of the four major ecozones. Human impacts on the biotic diversity of Ontario are examined and the conservation of habitats and species is discussed. Students are required to do three reports, one of which involves field work. (Offered through distance education format only.)

Prerequisite(s): BIOL*1040 or equivalent

ZOO*2070 Invertebrate Zoology I F, W(2–3) [0.50]

To provide a general knowledge of the biology, functional morphology and ecology of the invertebrates from protists to molluscs.

Prerequisite(s): BIOL*1040

ZOO*2080 Invertebrate Zoology II W(2–3) [0.50]

To provide a general knowledge of the biology, functional morphology and ecology of the invertebrates from annelids to the urochordates.

Prerequisite(s): ZOO*2070

ZOO*2090 Vertebrate Structure and Function F, W(2–3) [0.50]

A comparative survey of the structure and functioning of the chordates with emphasis on the vertebrates. Course includes laboratory study of the anatomy of selected vertebrates.

Prerequisite(s): BIOL*1040

ZOO*2100 Developmental Biology F,W(3–3) [0.50]

An introduction to animal development through the study of reproduction, early embryology, histogenesis, organogenesis, and morphogenesis. The roles of determination, differentiation, growth, morphogenesis, and pattern formation will be emphasized.

Prerequisite(s): BIOL*1040

ZOO*3000 Comparative Histology F(2–3) [0.50]

An introduction to the microscopic structure of the major organ systems of the vertebrate body. The study of epithelial, connective, muscular, and nervous tissues precedes examination of the comparative histology of the circulatory, nervous, digestive, integumentary, respiratory, excretory, reproductive, endocrine, and sensory systems of vertebrates.

Prerequisite(s): 1 of BIOM*3010, BIOM*3100, HK*3940, HK*3401/2, ZOO*2090, ZOO*3200

ZOO*3010 Wild Life Parasitology F(2–3) [0.50]

To provide an introduction to parasitology citing examples from the protozoans, helminths, and arthropods with particular reference to those in wild life, including fishes.

Prerequisite(s): ZOO*2070

ZOO*3200 Comparative Animal Physiology I F(3–3) [0.50]

The course will examine the underlying molecular and cellular events which mediate physiological processes and contribute to whole animal homeostasis. Particular emphasis will be placed on comparing the strategies and adaptations used by different animals and the influence of varying environmental conditions. The course will focus on the nervous, muscular, respiratory and circulatory systems. This course involves exercises that use animals. BIOM*3100, BIOM*3110 and HK*3940 are available to cover similar material without labs.

Prerequisite(s): CHEM*2580

ZOO*3210 Comparative Animal Physiology II W(3–3) [0.50]

This is the second of a two–semester course providing an introduction to the physiological mechanisms used by vertebrates and invertebrates. The course will examine the underlying molecular and cellular events which mediate physiological processes and contribute to whole animal homeostasis. Particular emphasis will be placed on comparing the strategies and adaptations used by different animals and the influence of varying environmental conditions. The course will include an examination of digestive physiology, excretion, endocrinology and osmoregulation. This course involves exercises that use animals. BIOM*3100, BIOM*3110 and HK*3940 are available to cover similar material without labs.

Prerequisite(s): ZOO*3200

ZOO*3300 Evolution F,W(3–0) [0.50]

A comprehensive introduction to evolutionary biology, the historical development of the discipline, the extent and nature of genetic diversity, and the mechanisms of evolutionary change. Examination of adaptation and speciation, and the origins and patterns of biotic diversity through evolutionary time. Designed to integrate evolutionary theory with other fields of biology such as development, ecology and systematics.

Prerequisite(s): MBG*2000, (BIOL*2060 or BIOL*3110, which may be taken concurrently)

ZOO*4020 Ichthyology F(2–3) [0.50]
An introduction to the interrelationship of fossil and living taxa, and the fishes of the world with a special emphasis on the main Canadian and commercial forms, including detailed phyletic classification and evolution of fish–like vertebrates, their anatomical, morphological and selected ecological features.
Prerequisite(s): BIOL*3450, ZOO*2090

ZOO*4050 Natural Resources Policy W(3–0) [0.50]
An analysis of how political, economic, social and scientific factors interact to determine the policy underlying management of renewable and non–renewable natural resources provincially, nationally and internationally. The course will analyze current policies pertaining to fisheries, wild life, forestry, energy, water, minerals, international treaties and accords.
Prerequisite(s): 15.00 credits
Restriction(s): registration in semester 7 or 8

ZOO*4070 Animal Behaviour F(3–0) [0.50]
An introduction to the theories and principles of the behaviour of animals. The course will be a comparative study of learning, socialization, social interaction, and other components of animal behaviour.
Prerequisite(s): 1 of PSYC*2410, PSYC*3410, ZOO*3200

ZOO*4090 Ornithology F(2–3) [0.50]
An introduction to the biology of birds. Structure and function will be discussed in relation to various aspects of avian biology including evolution, flight, migration, reproduction, behaviour, and distribution.
Prerequisite(s): ZOO*2090

ZOO*4110 Principles of Fish and Wild Life Management F(3–0) [0.50]
Presents ecological aspects of managing populations of fish, birds and mammals, evaluates techniques and rationale for current fisheries and wild life programs. The course is not available to students in the Wild Life or Marine and Freshwater Biology majors.
Restriction(s): BIOL*4150, ZOO*4570

ZOO*4170 Experimental Comparative Animal Physiology W(2–3) [0.50]
An experimental approach to the study of physiological mechanisms and adaptive responses to changes in the environment will be stressed. The focus of the course will be on laboratory exercises.
Prerequisite(s): 1 of BIOM*3110, HK*3940, ZOO*3210

ZOO*4280 Mammalogy W(2–3) [0.50]
An introduction to the orders of mammals on a world–wide basis, with detailed examination of Canadian species.
Prerequisite(s): ZOO*2090

ZOO*4300 Marine Biology and Oceanography F(3–3) [0.75]
An intensive two–week course held in late August or early September before classes commence for the fall semester. The course is held at the Huntsman Marine Science Centre, St. Andrews, New Brunswick. The ecology, behaviour, physiology, biochemistry, biomechanics of marine plants and animals will be studied as well as basic oceanographic techniques. Students will be able to familiarize themselves with the techniques and equipment involved in various branches of marine biology and oceanography. In addition to regular tuition fees, students are responsible for the cost of transportation to St. Andrews, and for charges levied by the Huntsman Marine Science Centre for room and board. These fees are paid to Student Finance and Awards of the University of Guelph. A department application form must be submitted for approval before course selection. The signature of the course coordinator is required to select the course. This course must be recorded as part of your Fall course selection and tuition and compulsory fees will be calculated accordingly. Students taking this course DO NOT use course numbers reserved for Ontario Universities Program in Field Biology.
Prerequisite(s): BIOL*3450, ZOO*2080

ZOO*4330 Environmental Biology of Fishes W(2–3) [0.50]
A comparative examination of selected freshwater and marine fishes to illustrate the significance of environmental influences on life styles, behavioral patterns, physiological responses, population biology and community structure. The use of niche, habitat and ecotope concepts in defining the role of fishes in representative types of aquatic ecosystems. It is recommended that students take ZOO*4020 before taking ZOO*4330, even though ZOO*4020 is not required as a prerequisite.

ZOO*4350 Biology of Polluted Waters F(2–3) [0.50]
A practical course in biology of disturbed waters, and toxicity of pollutants to aquatic life. Designed to familiarize students with the characteristics of polluted ecosystems, best methods of field survey, and procedures for toxicity tests.
Prerequisite(s): BIOL*3450

ZOO*4390 Environmental Physiology F(3–0) [0.50]
A study of the influence of environmental factors on metabolic and regulatory mechanisms in animals, and of adaptational strategies for survival in different environments. How animals adapt to high pressure, low oxygen, high salinity and other environmental factors will be discussed.
Prerequisite(s): 1 of HK*3940, ZOO*3200, ZOO*3210, BIOM*3070, BIOM*3110

ZOO*4410 Field Ecology F(3–3) [0.75]
A 12–day field course held in Algonquin Park, Ontario, during August. Students independently conduct and write reports about 2 research projects of their choice and design (in consultation with faculty members), on any of: vertebrate, invertebrate, or plant ecology, and/or behaviour, in terrestrial or aquatic habitats. Emphasis is placed upon students asking ecological questions, designing experiments, and then collecting data from intensive field work. There are no formal lectures, but an organizational meeting is held in the

winter semester prior to the field course. The charge by the field station for room and board will be passed on to the student. Students are also responsible for their own transportation to and from the field station. A departmental application form must be submitted for approval at least 4 weeks prior to the last day of course selection for the Spring semester, and the signature of the course coordinator will be required to select the course. This course must be recorded as part of your Fall course selection and tuition and compulsory fees will be calculated accordingly. Students taking this course DO NOT use course numbers reserved for Ontario Universities Program in Field Biology.
Prerequisite(s): 0.50 credit in ecology

ZOO*4430 Herpetology F(2–3) [0.50]
This course will serve as an introduction to the biology of amphibians and reptilians on a world–wide basis with emphasis on the evolutionary significance of these groups.
Prerequisite(s): ZOO*2090

ZOO*4470 Comparative Endocrinology F(3–0) [0.50]
A study of the structure, function and evolution of endocrine glands and hormones, and the role of endocrines in integrating physiological functions in animals. The course is designed to familiarize biology students with current endocrine investigational methodology. (Offered in odd–numbered years.)
Prerequisite(s): 1 of BIOM*3110, HK*3940, ZOO*3210

ZOO*4490 Teaching in Zoology F,W(1–5) [0.75]
The student will undertake a teaching project of either a practical or theoretical nature under the supervision of a member of the faculty. Students must make arrangements with both a faculty supervisor and the course coordinator at least one semester in advance and the signature of the course coordinator will be required to select the course. A departmental registration form must be obtained from the course coordinator and submitted not later than the second class day of the semester in which the project is to be completed.
Prerequisite(s): normally minimum cumulative average of 75% in biology courses during first 6 semesters of a major in the College of Biological Science and permission of course coordinator

ZOO*4500 Research Problems in Zoology I F,W(1–5) [0.75]
The student will undertake a research project of either a practical or theoretical nature under the supervision of a member of the faculty. Students must make arrangements with both a faculty supervisor and the course coordinator at least one semester in advance and the signature of the course coordinator will be required to select the course. A departmental registration form must be obtained from the course coordinator and submitted not later than the second class day of the semester in which the project is to be completed.
Prerequisite(s): normally minimum cumulative average of 75% in biology courses during first 6 semesters of a major in the College of Biological Science and permission of course coordinator

ZOO*4510 Research Problems in Zoology II F,W(1–5) [0.75]
The student will undertake a research project of either a practical or theoretical nature under the supervision of one member of the faculty. Students must make arrangements with both a faculty supervisor and the course coordinator at least 1 semester in advance and the signature of the course coordinator will be required to select the course. A departmental registration form must be obtained from the course coordinator and submitted not later than the second class day of the semester in which the project is to be completed.
Prerequisite(s): normally minimum cumulative average of 75% in biology courses during first 6 semesters of a major in the College of Biological Science and permission of course coordinator

ZOO*4540 Marine and Freshwater Research F(0–6) [0.50]
In this course, students will design, execute and communicate the results of a research project involving aquatic organisms. This will involve an examination of the primary scientific literature, the formulation of hypotheses, the design of experiments, the development of analytical skills and familiarity with the operation of analytical equipment and data analysis. Faculty guidance will be provided.
Prerequisite(s): BIOL*3450, CHEM*2580, PHYS*1080, STAT*2040 or permission of instructor
Restriction(s): registration in semester 7 of the Marine and Freshwater Biology Major of the B.Sc. Program

ZOO*4560 Marine and Freshwater Adaptations W(3–0) [0.50]
Adaptations of organisms to various aquatic environments including marine polar, deep–sea, intertidal, fresh–water and alkaline lakes, will be examined. A mechanistic approach to establishing the strategies of environmental adaptation will be used. Emphasis will be placed on biochemical and biomechanical adaptations.
Prerequisite(s): CHEM*2580, PHYS*1080, BIOL*3450

ZOO*4570 Marine Ecological Processes F(3–1) [0.50]
Advanced consideration of physical and biogeochemical processes in the world's oceans. Examination of the critical dependence of biological processes on physical and chemical processes from micro– to macro–scales. The processes involved in: production and energy transfer within pelagic food webs; export of energy to the benthos; the structure and dynamics of marine communities.
Prerequisite(s): BIOL*3450, PHYS*1080

ZOO*4600 Tropical Ecology F(1–6) [0.75]
This three–week field course provides an opportunity to study the flora and fauna of marine, freshwater and terrestrial environments of the tropics. Based at field stations in Australia, the course includes lectures, field exercises and a student project. An information session is held in late November. Signature of course coordinator is required for course selection. Students are responsible for costs of food, lodging and transportation. Detailed information is available from the Department of Zoology. This course must be recorded as part of your Fall course selection and tuition and compulsory fees will be calculated accordingly. Students taking this course DO NOT use course numbers reserved for Ontario Universities Program in Field Biology.

Prerequisite(s): BIOL*1040, (BIOL*2060 or BIOL*3110)

ZOO*4610 Arctic Ecology F(1–6) [0.75]

This three–week field course provides an opportunity to study the flora and fauna of marine, freshwater and terrestrial environments of the high Arctic. Based in the high Arctic, the course includes lectures, field exercises and student projects. An information session is held in January; students are required to register before March. Signature of course coordinator is required for course selection. Students are responsible for cost of food and transportation. Detailed information is available from the Department of Zoology. (Offered in even–numbered years.) This course must be recorded as part of your Fall course selection and tuition and compulsory fees will be calculated accordingly. Students taking this course DO NOT use course numbers reserved for Ontario Universities Program in Field Biology.

Prerequisite(s): BIOL*1040, (BIOL*2060 or BIOL*3110)

ZOO*4700 Field Biology S,F,W(1–6) [0.50]

Students may apply for 2–week courses in the OUPFB (Ontario Universities Program in Field Biology). This program offers a diversity of field courses in biological subjects ranging from the Arctic to the Tropics, microbes to mammals, and covering marine, freshwater and terrestrial habitats. Costs include food and lodging and may include transportation. Detailed information is available from the Department of Zoology.

Prerequisite(s): BIOL*1040, (BIOL*2060 or BIOL*3110), permission of the Zoology field course coordinator

ZOO*4710 Field Biology S,F,W(1–6) [0.25]

Students may apply for 1–week courses in the OUPFB (Ontario Universities Program in Field Biology). This program offers a diversity of field courses in biological subjects ranging from the Arctic to the Tropics, microbes to mammals, and covering marine, freshwater and terrestrial habitats. Costs include food and lodging and may include transportation. Detailed information is available from the Department of Zoology.

Prerequisite(s): BIOL*1040, (BIOL*2060 or BIOL*3110), permission of the Zoology field course coordinator

ZOO*4800 Field Biology S,F,W(1–6) [0.50]

Students may apply for 2–week courses in the OUPFB (Ontario Universities Program in Field Biology). This program offers a diversity of field courses in biological subjects ranging from the Arctic to the Tropics, microbes to mammals, and covering marine, freshwater and terrestrial habitats. Costs include food and lodging and may include transportation. Detailed information is available from the Department of Zoology.

Prerequisite(s): BIOL*1040, (BIOL*2060 or BIOL*3110), permission of the Zoology field course coordinator

ZOO*4810 Field Biology S,F,W(1–6) [0.25]

Students may apply for 1–week courses in the OUPFB (Ontario Universities Program in Field Biology). This program offers a diversity of field courses in biological subjects ranging from the Arctic to the Tropics, microbes to mammals, and covering marine, freshwater and terrestrial habitats. Costs include food and lodging and may include transportation. Detailed information is available from the Department of Zoology.

Prerequisite(s): BIOL*1040, (BIOL*2060 or BIOL*3110), permission of the Zoology field course coordinator