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### Course Information

- **Subject Area Identifier**: Shows the subject area identifier for each course.
- **Course Title**: The title of the course.
- **Course Number**: The course number.
- **Term in Which Class is Held**: Indicates the term in which the class is held.

#### Term Designations

- **T—Tutorial**: Indicates a tutorial course.
- **R—Reading**: Indicates a reading course.
- **C—Clinical Service**: Indicates a clinical service course.
- **S—Seminar/Discussion**: Indicates a seminar or discussion course.
- **P—Practicum/Lab**: Indicates a practicum or lab course.
- **Q—Quarters (Veterinary Medicine)**: Indicates a course held in quarters (Veterinary Medicine).
- **P—Phases (Medicine and Dentistry)**: Indicates a course held in phases (Medicine and Dentistry).
- **1&2—Term 1 and 2**: Indicates a course held in Term 1 and Term 2.

#### Instructional Code Designations

- **L—Lecture**: Indicates a lecture course.
- **P—Practicum/Lab**: Indicates a practicum or lab course.
- **S—Seminar/Discussion**: Indicates a seminar or discussion course.
- **R—Reading**: Indicates a reading course.
- **T—Tutorial**: Indicates a tutorial course.
ACB — ANATOMY AND CELL BIOLOGY

Department of Anatomy and Cell Biology

ACB. 801.6 — 1and2(2L-6P-1S)
Human Gross Anatomy
A practical study of the macroscopic structure of the human body by regional dissection and study of prepared specimens. Lectures are closely integrated with the laboratory sessions. Correlation of structure and function is emphasized and surface and radiological anatomy are included.

Prerequisite(s): ACB. 210; or equivalent and permission of the instructor.

ACB. 813.6 — 1and2(8P)
Experimental Medicine
Provides advanced training in experimental methods to study the normal morphology and function of tissues and their reactions to pathogenic stimuli.

ACB. 821.3 — 1/2(4S)
Advanced Topics in Developmental Biology
A review of recent advances in the study of developmental biology. Special emphasis is placed on the contributions of different experimental animal systems to research in a variety of areas in the field.

Prerequisite(s): ACB. 330; or equivalent and permission of the instructor.

ACB. 824.3 — 1(3S/R)
Current Topics in Cell Biology of Myelinating Glia
Students will read journal articles on the myelinating glia of the CNS and PNS to identify the cell biological questions being asked, the techniques being used to study the cell biology of these cells, and the roles the cells play in normal and pathological functioning of the nervous system.

Prerequisite(s): BMSC. 220 (formerly ACB. 200) and ACB. 210 or equivalent and permission of the instructor.

ACB. 830.3 — 1/2(4S)
Advanced Topics in Cell and Molecular Biology
Recent developments in cell and molecular biology research will be examined. Students will present and evaluate selected publications from current literature. Among the topics of interest are: signal transduction, development and differentiation, apoptosis, gene expression/transcription, cell and organelle structure, and DNA dynamics and chromosome structures.

Prerequisite(s): At least one senior level course in biochemistry, genetics or cell biology; or permission from the instructor.

ACB. 834.3 — 2(2L-2P)
Advanced Functional Neuroanatomy
Will provide graduate students with detailed neuroanatomical knowledge that will enable them to explain the location and basis for functional alterations that accompany a variety of neurological disorders.

Permission of the course coordinator required.

ACB. 840.3 — 2(2L-2S)
Development of Nervous System
A comprehensive survey of the development of the vertebrate nervous system. Learning will be guided by examination of the experimental scientific literature. Topics include neurulation, cell migration, process outgrowth, trophism, differentiation, and extended consideration of the formation of synapses and refinement of patterns of connectivity.

Prerequisite(s): Permission of the instructor.

ACB. 898.3 — 1/2(2S/R)
Special Topics
Study in selected areas of morphological sciences may be undertaken with the consent of the faculty of Anatomy and Cell Biology. Involves reading assignments, lectures, and tutorials. Students will be required to critically analyse the scientific literature, participate in discussion, and give oral and/or written presentations.

Prerequisite(s): Permission of the department.

ACB. 899.6
Special Topics
Offered occasionally in special situations. Students interested in this course should contact the department of Anatomy and Cell Biology for more information.

ACB. 990
Scientific Communication
Graduate students in the Anatomy and Cell Biology program will receive practical training in written and oral scientific communication. Topics include scientific writing technique and style, effective oral communication, electronic research tools and electronic presentation tools. Graduate students will also attend a student-run seminar series, and make one presentation in that series each year they are enrolled in the program.

Prerequisite(s): Open only to graduate students in the Department of Anatomy and Cell Biology.

ACB. 994
Research
Students enrolled in the M.Sc. program must register for this course.

ACB. 996
Research
Students enrolled in the Ph.D. program must register for this course.

ACC — ACCOUNTING

Department of Accounting

ACC. 898.3 — 1(R)
Selected Readings in Accounting
Selected readings will be offered in specialized areas of scholarship within the department upon approval of the Graduate Accounting Committee.

ACC. 899
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

AGMD — AGRICULTURAL MEDICINE

Department of Medicine, Dept of

AGMD. 800.3
Public Health and Agricultural Rural Ecosystem PHARE
Provides the foundation knowledge for issues related to rural health, public health and agricultural rural ecosystems. This PHARE course provides an overview of the major health issues, general health, and health service delivery issues facing persons in rural and remote areas of Canada. It provides an overview of the environmental health challenges for rural and agricultural populations in the areas of risk management, injury control, workplace safety, food safety, and protection of the biosphere.

Note: AGMED. 800 provides the foundation for the Public Health and Agricultural Rural Ecosystem Training Program (PHARE), a graduate training program funded by the Canadian Institutes of Health Research (CIHR). As well, AGMD. 800 is beneficial as an elective to students enrolled in such disciplines as Veterinary Medicine, Agriculture, Nursing, Medicine, Dentistry, Economics, Community Health and Epidemiology, Engineering and Health Policy.

AGMD. 801.3 — 2(3L)
Introduction to Occupational Health
This course is an introduction to occupational health, industrial hygiene, and the relationship of the work environment to the broader environment. It will provide an overview of occupational hazards and illnesses including their recognition, control and prevention, as well as, the relationship between workplace exposures and the broader environment. This course includes an introduction to compensation and regulatory issues along with site visits to selected industries and job sites.

AGMD. 800.0
Seminar
Reports and discussion of current research.

AGMD. 996.0
Research
Students pursuing a graduate degree must register for this course.
ANSC — ANIMAL SCIENCE

Department of Animal and Poultry Science

ANSC. 800.3 — 1(3L)
Advanced Protein and Amino Acid Nutrition
Current information on digestibility, absorption and metabolism of nitrogen, proteins, amino acids and nucleic acids, as they apply to animals and man. Includes discussion on protein synthesis, protein catabolism and related regulatory mechanisms. The application of these processes in defining the dietary requirement, interaction and toxicity of essential and non-essential amino acids, including assessment of protein quality.

Note: Offered in alternate years.

ANSC. 801.3 — 2(3L)
Animal Experimentation
Introduction to the planning, ethics and special problems of researches working with agricultural animals. A survey of commonly used experimental designs for animal research and the statistical analysis of experiments using SAS.

Prerequisite(s): PLSC. 314.3 or equivalent

ANSC. 810.3 — 2(3L)
Nutrition of Grazing Ruminants
A concise overview of the sources, availability, functions, requirements, deficiencies, deleterious effects and interrelationships of nutrients affecting the productivity of free-ranging wild and domestic ruminant animals. Research techniques will be emphasized.

Note: Offered in alternate years.

ANSC. 811.3 — 2(3L)
Welfare of Agricultural Animals
An examination of various aspects of farm animal welfare including historical, philosophical and scientific perspectives. The positions of animal interest groups, scientific societies, and commodity groups will be discussed. Emphasis will be on agricultural animals, but material relevant to laboratory animals and wildlife may also be presented.

Prerequisite(s): Permission of Instructor.

ANSC. 812.3 — 1(3L)
Molecular Genetic Analysis
Lectures and assignments in data analysis methods used in mammalian molecular genetic studies. Topics covered include diagnostic test development and accuracy, phylogenetic analysis, parentage testing, QTL mapping, linkage mapping and LOD score calculation, genomic imprinting, and disease association analysis.

Note: Offered in alternate years.

ANSC. 815.3 — 1(3L)
Advanced Ruminant Nutrition and Metabolism
Covers the impact that nutrition has on ruminant metabolism in order to maintain optimal production throughout the animal’s life. The main emphasis is on dairy and beef cattle. The role of nutrition in the metabolism of the fetus, the calf from birth to puberty, and of the pregnant and the lactating cow is covered. Advances in feed and animal biotechnology that may improve the efficiency of production and have an impact on metabolism are discussed. Students will be assigned to a local dairy farm, cow-calf operation, or feedlot so that they can apply the knowledge gained in this course to a practical situation. Some tours will be given.

Prerequisite(s): Permission of the instructor.
Note: Offered in alternate years.

ANSC. 816.3 — 3L
Biotechnology and the Rumen Ecosystem
This course is aimed at graduate students with an interest in ruminant microbiology/nutrition and molecular biology. The focus of the class will be to develop a better understanding of the relationships between nutrition and rumen microbiology and to identify how the tools of molecular biology can be applied to further characterize the rumen ecosystem. The course combines theoretical concepts and principles with practice. Current research, recent literature, and real-life examples will be used throughout the course to gather a detailed understanding.

Prerequisite(s): ANSC. 815 or with permission from instructor.

ANSC. 820.3 — 1(3L)
Energetics and Micronutrient Nutrition
Current information on the metabolism of individual energy components, overall energy requirements and the metabolism of vitamins and minerals in animal and human nutrition.

Prerequisite(s): BIOL. 200; or equivalent.
Note: Offered in alternate years.

ANSC. 840.3 — 3L-2P
Feed Processing Concepts and Realities
This course focuses on the concepts of why we use feed processing to add value to feed ingredients for livestock and a discussion of the reality of achieving consistent increase in feed value. Laboratories will include practical applications of concepts may or may not consistently result in reality ñ improved feed value. One full day will be scheduled at the Canadian Feed Research Centre to obtain hands-on experience of feed processing using pilot line equipment.

Note: Students will have a one day field trip to the Canadian Feed Research Centre.

ANSC. 870.3 — 1(3L-4P)
Applied Animal Biotechnology
Covers reproductive technologies; transgenic techniques; molecular genetics in animal selection; use of recombinant proteins for growth, lactation and reproduction; immunological modulation of animal production; improvement of feeds and rumen organisms; improvement of health. In addition, ethical and safety aspects will be considered. Emphasizes the application and impact of biotechnological techniques on animal production rather than the techniques themselves.

Prerequisite(s): Permission of the instructor; basic genetics and physiology courses are recommended.
Note: Students who have credit for ANSC 470 may not take this course for credit.

ANSC. 898.3 — 1and2(3L)
Special Topics
Special offerings in topics relevant to Animal and Poultry Science. Examples would be Nutrition of Grazing Animals, Laboratory Techniques, Immunology, Animal Forensic Science and Use of Statistics in Animal Experimentation. Interested students should contact the Head of the Department.

ANSC. 899
Special Topics
Offered occasionally by visiting faculty and in other special situations to cover, in depth, topics that are not thoroughly covered in regularly offered courses.

ANSC. 990
Seminar
Reports and discussion of current research. Graduate students are required to attend and participate during their candidacy.

ANSC. 992.0
Project
Students undertaking the project Master’s degree (M.Ag.) must complete the course as part of the requirements for the degree.

ANSC. 994
Research
Students writing a Master’s thesis must register for this course.

ANSC. 996
Research
Students writing a Ph.D. thesis must register for this course.

ANTH — ANTHROPOLOGY

Department of Archaeology and Anthropology

ANTH. 801.3 — 1/2(3S)
Contemporary Anthropological Theory
Will survey and critically assess the works of major contributors to Anthropological theory, with an emphasis on contemporary culture theory.

Permission of the instructor required.

ANTH. 802.3 — 1/2(3S)
Community-Based Research Ethnography and Engagement
This course explores strategies for community-based research and engagement, with an emphasis on the practice of ethnography.

Permission of the instructor required.

ANTH. 804.3 — 1/2(3S)
Medical Anthropology
Will survey the theoretical and conceptual trends within the field of medical anthropology, spanning biocultural, clinical, ecological, political economic and critical interpretive approaches. The substantive areas of focus include reproductive health, infectious disease, disability, mental illness, health systems, and healing.

Permission of the instructor required.
ANTH. 806.3 — 1/2(3S)
Culture and Environment
This course is designed to teach history, theory, and central concerns of Environmental Anthropology at an advanced level. The course covers the breadth of historical development of the sub-discipline internationally, while examining selected topics in depth through a regional focus on northern North America.

Note: Students who received credit for ANTH. 898. Environmental Anthropology may not take this course for credit.

Permission of the instructor required.

ANTH. 898.3 — 1/2/1and2(3R)
Special Topics
Offered occasionally by visiting faculty and in other special situations to cover, in depth, topics that are not thoroughly covered in regularly offered courses.

Permission of the instructor required.

ANTH. 899.6 — 1/2/1and2(3R)
Special Topics
Offered occasionally by visiting faculty and in other special situations to cover, in depth, topics that are not thoroughly covered in regularly offered courses.

Permission of the instructor required.

ANTH. 990.0 — 1/2/1and2
Seminar
During residence, all graduate students will register in and attend ANTH. 990 and will make at least two presentations based on their research. Graduate students in the Anthropology program are required to attend and participate; interested undergraduate students may also be invited.

Restriction(s): Enrolment in the graduate program in Anthropology or permission of the Graduate Chair or designate.

ANTH. 994 — 1/2/1and2
Research
Students writing a Master’s thesis must register for this course.

ANTH. 996 — 1/2/1and2
Research
Students writing a Ph.D. thesis must register for this course.

APMC — APPLIED MICROBIOLOGY
Department of Food and Bioproduct Sciences

APMC. 830.3 — 2(3L)
Advanced Environmental Microbiology
Introduction to the diversity of microorganisms and the dynamics of microbial interactions. Microbial biogeochemistry of specific aquatic and terrestrial ecosystems. Selective microbial enrichment and isolation. In situ quantitation of microbial activity.

Prerequisite(s): FABS. 212 or BMSC. 210 or permission of the instructor.

APMC. 832.3 — 2(3L-1.5P)
Microbial Bioproducts in Agriculture
The world’s food, environmental and energy concerns require innovative bioproducts as natural and environmentally friendly solutions to reduce the usage of chemical pesticides and fertilizers, while enhancing agricultural crop yields and biomass production for biofuels. This course provides an overview of recent advances and discoveries of microbial bioproducts, such as inoculant biotechnology and formulation, genomics and proteomics, and their application to sustainable and organic agriculture systems.

Prerequisite(s): FABS. 212 or PLSC. 222 or permission of instructor.

APMC. 850.3 — 1/2(3L-1S)
Microbiology of the Rumen
A detailed study of the microflora and microfauna indigenous to the rumen and of the role of the rumen microflora in nutrition of the host animal. Seminars will involve reading and discussion of recent literature in selected areas.

Prerequisite(s): Permission of the instructor.

APMC. 898.3 — 1and2(R/T/P)
Special Topics and Techniques
Reading assignments, tutorials and laboratory projects in selected areas related to the student’s major field of study. A series of term papers, reviews or laboratory reports will be required.

APMC. 990
Seminar
Seminars are held weekly throughout the year. Current literature in the field of Applied Microbiology and Biotechnology is reviewed and discussed, and papers on current research topics are presented. Graduate students are required to attend and to participate.

APMC. 992.0
Project
Students undertaking the project Master’s program (M.Agr.) must register for this course.

APMC. 994
Research
Students writing a Master’s thesis must register for this course.

APMC. 996
Research
Students writing a Ph.D. thesis must register for this course.

ARCH — ARCHAEOLOGY
Department of Archaeology and Anthropology

ARCH. 805.3 — 1/2(3S)
Core Seminar in Archaeological Method and Theory
Seminars based on a series of readings dealing with the development of archaeological theory. Special emphasis will be given to anthropological archaeology and contemporary explanatory models.

Restriction: Enrolment in the Archaeology Graduate Program.

ARCH. 852.3 — 1/2(3S)
Seminar in Historical Archaeology
Readings and discussions of the major theoretical developments and research orientations within contemporary Historical Archaeology.

Prerequisite(s): ARCH. 352 or equivalent.

Permission of the instructor required.

Restriction(s): Enrolment in the Archaeology Graduate Program.

ARCH. 853.3 — 1/2(3S)
Graduate Seminar in Plains Archaeology
Deals with the prehistory of the Northern Plains with an emphasis on current issues and problem-solving.

Prerequisite(s): ARCH. 353, or equivalent.

Permission of the instructor required.

Restriction(s): Enrolment in the Archaeology Graduate Program.

ARCH. 855.3 — 1/2(3S)
Problems in Archaeology
Research on a selected problem in archaeology or the prehistory of a selected geographic area with a problem orientation. The subject will be examined by the class as a group and in detail through conferences, readings and laboratory work. A comprehensive report will be prepared by the class.

Permission of the instructor required.

Restriction(s): Enrolment in the Archaeology Graduate Program.

ARCH. 856.3 — 1/2(3S)
Graduate Seminar in Fur Trade Archaeology
Readings and discussions on the comparative methods, theoretical approaches and interpretations within archaeology of the North American interior fur trade.

Prerequisite(s): ARCH. 352 or permission of the instructor.

Restriction(s): Enrolment in the Archaeology Graduate Program.

ARCH. 857.3 — 1/2(3S)
Seminar in Pottery Analysis
Readings and discussions on the pottery produced by folk artisans in traditional settings. The mineral compositions of clays will be considered as well as the physical makeup of pottery, and its archaeological classification. There will be a practicum involving analysis and reporting on an actual pottery assemblages from the northern plains region.

Permission of the instructor required.

Restriction(s): Enrolment in the Archaeology Graduate Program.

ARCH. 858.3 — 1and2(3Sand2L)
Zooarchaeology
A reading course in method and theory relating to the identification and interpretation of faunal materials from archaeological sites. A practicum involving actual faunal assemblages is included.

Prerequisite(s): ARCH. 458. Students may take this course concurrently.

Permission of the instructor required.

Restriction(s): Enrolment in the Department of Archaeology Graduate Program.
ART. 898.3 — 1/2/1and2(3R)
Special Topics
Guided reading and discussion courses to permit advanced students to follow intensive library research into special aspects of archaeology.
Permission of the instructor required.
Restriction(s): Enrolment in the Archaeology Graduate Program.

ARCH. 899.6 — 1/2/1and2(3R)
Special Topics
Guided reading and discussion courses to permit advanced students to follow intensive library research into special aspects of archaeology.
Permission of the instructor required.
Restriction(s): Enrolment in the Archaeology Graduate Program.

ARCH. 990.0 — 1/2/1and2
Seminar
During residence, all graduate students will register in ARCH. 990 and will present at least one paper based on their own research. Graduate students are required to attend and interested undergraduate students may be invited to attend.
Restriction(s): Enrolment in the Archaeology Graduate Program or permission of the Graduate Chair or designate.

ARCH. 994 — 1/2/1and2
Research
Students writing a Master's thesis must register for this course.

ARCH. 996 — 1/2/1and2
Research
Students writing a Ph.D. thesis must register for this course.

ART — ART
Department of Art and Art History

ART. 830.6 — 1and2(1L-2S)
Critical Issues in Contemporary Art and Culture
This seminar will deal with key issues in contemporary art. Primary sources, as well as subsequent interpretations and current literature all pertaining to modern art, post-modern and the most recent cutting edge art, will serve as source material for topics selected by individual students for investigation. Faculty and students will participate through ongoing presentations, discussions and written work.
Note: Students with credit for ART. 430 may not take this course for credit.

ART. 838.3 — 1/2(1L-2S)
Extended Media
Continued research and exploration in collaborative and interdisciplinary approaches to contemporary art making. Projects will include alternative practices such as video, performance, installation, projection, and book works. Reading and discussion of related texts will accompany production of artworks. Ambitious and critical synthesis of concepts and media are expected at the graduate level.
Formerly: ART. 835.
Prerequisite(s): B.F.A. degree.

ART. 839.3 — 1/2(1L-2S)
Extended Media
Continued research and exploration in collaborative and interdisciplinary approaches to contemporary art making. Projects will include alternative practices such as video, performance, installation, projection, and book works. Reading and discussion of related texts will accompany production of artworks. Ambitious and critical synthesis of concepts and media are expected at the graduate level.
Formerly: ART. 835.
Prerequisite(s): B.F.A. degree.

ART. 841.3 — 1/2(1L-2S)
Sculpture
Research and continued identification of the concepts, materials, and means of sculpture and related work will be explored. Methods of construction (casting, carving, building, assembling, etc.) and presentation, both traditional and experimental approaches will be encouraged. This includes wide exploration of materials and combinations such as metals, wood, fabric, cement, and found objects. Ambitious and critical synthesis of materials, processes and concepts is expected at the graduate level.
Formerly: ART. 814.

ART. 842.3 — 1/2(1L-2S)
Sculpture
Research and continued identification of the concepts, materials, and means of sculpture and related work will be explored. Methods of construction (casting, carving, building, assembling, etc.) and presentation, both traditional and experimental approaches will be encouraged. This includes wide exploration of materials and combinations such as metals, wood, fabric, cement, and found objects. Ambitious and critical synthesis of materials, processes and concepts is expected at the graduate level.
Formerly: ART. 814.

ART. 851.3 — 1/2(1L-2S)
Printmaking
Studio work and exploration of the conceptual, expressive and technical means of four major print methods will be offered: Etching, Lithography, Relief Print and Serigraphy. Related photographic methods will be demonstrated. Thorough familiarity with the craft of the traditional print methods, as well as experimentation will be encouraged.
Formerly: ART. 813.
Prerequisite(s): B.F.A. degree.

ART. 852.3 — 1/2(1L-2S)
Printmaking
Studio work and exploration of the conceptual, expressive and technical means of four major print methods will be offered: Etching, Lithography, Relief Print and Serigraphy. Related photographic methods will be demonstrated. Thorough familiarity with the craft of the traditional print methods, as well as experimentation will be encouraged.
Formerly: ART. 813.
Prerequisite(s): B.F.A. degree.

ART. 861.6 — 1/2(1L-2S)
Photography
Continued development in the creative language of photography, both expressive and technical. The study will include still, motion, black and white, and color photography. Theory and practical application will be approached through direct experience with the camera and with the developing and printing processes.
Formerly: ART. 816.
Prerequisite(s): B.F.A. degree.

ART. 871.3 — 1/2(1L-2S)
Painting Media
Continual identification of concepts and methods as they relate to the expression, structure, media, and skills of painting. Students may experiment with any or all painting media and work from a choice of subject matter. Emphasis is on students’ artistic growth and development.
Formerly: ART. 811.

ART. 872.3 — 1/2(1L-2S)
Drawing
Continual identification of concepts and methods as they relate to the expression, structure, media, and skills of painting. Students may experiment with any or all painting media and work from a choice of subject matter. Emphasis is on students’ artistic growth and development.
Formerly: ART. 811.

ART. 881.3 — 1/2(1L-2S)
Drawing
Continued research and exploration of the concepts and methods of drawing as they relate to visual perception and expression, compositional design and graphic media, and skills. Use of diverse media coupled with invented and observed form is expected.
Formerly: ART. 812.

ART. 882.3 — 1/2(1L-2S)
Drawing
Continued research and exploration of the concepts and methods of drawing as they relate to visual perception and expression, compositional design and graphic media, and skills. Use of diverse media coupled with invented and observed form is expected.
Formerly: ART. 812.

ART. 889.3 — 1/2(3L)
Special Topics
Offered occasionally by regular and visiting faculty and in other special situations. Students interested in this course should contact the department for more information.

ART. 899.6 — 1and2(3L)
Special Topics
Offered occasionally by regular and visiting faculty and in other special situations. Students interested in this course should contact the department for more information.
ART. 990
Seminar
All graduate students are required to attend biweekly departmental seminars during the first two years of their program. Students will present their exhibition research and participate in seminar discussions. Departmental faculty and visiting lecturers also contribute to the program.

ART. 994
Research
Students writing a Master’s thesis must register for this course.

ART. 995
MFA Exhibition
This is a major component of the M.F.A. degree in Visual Arts. Students must select the best from work completed during the two years and mount an acceptable exhibition. This exhibition constitutes the major emphasis of the students’ study and research. The examining committee for the defense of this exhibition consists of three Art Department faculty, one external examiner and a designated chair for the exam.

ARTH — ART HISTORY
Department of Art and Art History

ARTH. 898.3 — 1/2(3L)
Special Topics
Offered occasionally by regular and visiting faculty and in other special situations. Students interested in this course should contact the department for more information.

ARTH. 899.6 — 1/2(3L)
Special Topics
Offered occasionally by regular and visiting faculty and in other special situations. Students interested in this course should contact the department for more information.

ARTH. 994
Research
Students writing an M.A. thesis must register for this course.

BIOC — BIOCHEMISTRY
Department of Biochemistry

BIOC. 820.3 — 2(3L)
Advanced Plant Biochemistry
This advanced course examines current topics in plant biochemistry with an emphasis on metabolic and developmental integration as well as plant interaction with the environment. Current literature from these subject areas will be incorporated and emphasis given to the molecular genetic approaches utilized to elucidate our current understanding.
Prerequisite(s): BIOC. 200, 220, 230, or BIOC. 211; or permission of the department.
Note: Students who have credit for BIOC. 420 may not take this course for credit. Offered in the academic year 2010-2011 and alternate years thereafter (2012-2013, etc.).

BIOC. 830.3 — 2(3L)
Cell Biochemistry
The biochemical properties of eukaryotic cells will be investigated with special emphasis on post-translational modifications of secreted and membrane proteins, cell-cell and cell-extracellular matrix interactions, signal transduction, cell-cycle control, apoptosis, neoplastic transformation and tumor progression. Students will be asked to research one of the topics discussed in the course by consulting the current literature and prepare a term paper.
Prerequisite(s): BIOC. 211; BIOC. 310; or permission of the department.
Note: Offered in 2011-2012 and alternate years thereafter (2013-2014, etc.).

BIOC. 836.3 — 2(3L-1T)
Advanced Nucleic Acids
Modern and advanced methods and strategies of nucleic acid manipulation, and characterization of genes in cells and whole organisms are presented. Topics include PCR applications, delivery of genes into cells and animals, generation of transgenic and gene knockout animals, DNA fingerprinting, and aspects of molecular medicine such as screening approaches for genetic diseases.
Prerequisite(s): Permission of the instructor.
Note: Offered in the academic year 2008/2009 and alternate years thereafter (2010/2011, etc.).

BIOC. 843.3 — 1(3L-3P)
X Ray Crystallographic Structure Determination
Describes the principles, methodology, application and limitations of the techniques in x-ray crystallographic structure elucidations. The methods employed to solve both small molecule and macromolecular crystal structures will be discussed and a small molecular structure determination will be carried out by the students.
Prerequisite(s): Permission of the instructor.
Note: Offered in 2011-2012 and alternate years thereafter (2013-2014, etc.).

BIOC. 850.3 — 1and2(1.5L)
Current Topics in Biochemistry
Reviews and discusses recent advances in Biochemistry and related areas through paper presentations by students. Students will be evaluated on their presentations and on a grant application that is prepared based on one of the papers presented.
Prerequisite(s): Permission of the department.

BIOC. 851.3 — 1and2(1.5L)
Current Topics in Biochemistry
Reviews and discusses recent advances in Biochemistry and related areas through paper presentations by students. Students will be evaluated on their presentations and on a grant application that is prepared based on one of the papers presented.
Prerequisite(s): Permission of the department.

BIOC. 898.3
Special Topics
These courses are offered occasionally by visiting faculty and in other special situations. Students interested in these courses should contact the department for more information.

BIOC. 899
Special Topics
These courses are offered occasionally by visiting faculty and in other special situations. Students interested in these courses should contact the department for more information.

BIOC. 990
Seminar
All Biochemistry graduate students must register annually for this course. The Biochemistry seminar series presents a wide range of topics from the life sciences and are held throughout the year. Students in the biochemistry graduate program are required to attend these seminars, and may also be required to attend seminars in related fields given in other departments or institutions on campus.

BIOC. 994
Research
Students writing a Master’s thesis must register for this course.

BIOC. 996
Research
Students writing a Ph.D. thesis must register for this course.

BIOE — BIOMEDICAL ENGINEERING
Department of Biomedical Engineering

BIOE. 806.3 — 1(3L)
Biomaterials
In the first month, the course will review biomaterials by classification. In the second month, the students will select a project topic to pursue. The course will then address manufacturing and testing of biomaterials, covering the topics such as corrosion, wear, and nanofabrication of biomaterials.

BIOE. 850.3 — 1/2(3L)
Synchrotron XRay Imaging
Will introduce some synchrotron specific imaging modalities such as K-edge subtraction, diffraction enhanced imaging, and phase contrast imaging with connections Made to conventional imaging. The first part of the course will cover x-ray interactions, Detection, dose estimation and source properties (conventional and synchrotron).
**BIOE. 898.3 — 1/2(3L)**
**Special Topics**

Two 3 credit-unit courses can be taken independently. Topics will be selected according to the student’s specific areas of interest. They include signal analysis for the acquisition and processing of physiological data, digital and optical picture processing for medical applications, theory of bioelectrodes, biological control theory and computer simulations of biological processes (some of these topics may be presented by faculty members specializing in that particular field).

**BIOE. 899**
**Special Topics**

Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

**BIOE. 990**
**Seminar**

Seminars are held periodically throughout the Regular Session or as a one-day symposium. Graduate students are required to make a presentation related to their thesis work or on a course project. In addition, graduate students may be required, from time to time, to attend seminars relevant to biomedical engineering given by faculty or visiting scientists in other departments. Students must enroll throughout their program.

**BIOE. 992.0**
**Project**

Students taking the project Master’s degree must register in this course.

**BIOE. 994**
**Research**

Students writing a Master’s thesis must register for this course.

**BIOE. 996**
**Research**

Students writing a Ph.D. thesis must register for this course.

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**BIOLOGICAL SCIENCES**

**BIOL. 820.3 — 2(1L-2P)**
**Plant Transcription Factors**

Based on current literature, students will discuss recent advances in transcription factors to control plant gene expression. Topics include: a genomic survey of plant transcription factors, the significance of post-translational modifications, and epigenetic regulation. Biochemical, genetic and genomics methods for studying plant transcription factors will also be highlighted.

**Prerequisite(s):** BIOL. 420 or PLSC. 416; or permission of the instructor.

**BIOL. 825.3 — 1(2S-4R)**
**Current Topics in Plant Molecular Biology**

A review of recent advances in plant molecular biology, emphasizing the use of molecular techniques in studying basic plant processes.

**Prerequisite(s):** BIOL. 815.3, BIOL. 820.3, BIOL. 830.3, or permission of the instructor.

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**BIOL. 880.3 — 2(3L)**
**Multivariate Analysis in Ecology**

An introduction to statistical methods for the classification and ordination of ecological communities, and approaches to developing multivariate statistical models of ecological interactions. Practical experience in applications of multivariate analyses will be developed by applying analyses to ecological datasets. Some previous experience with the software program R is recommended.

**Prerequisite(s):** At least one undergraduate course in univariate statistics and at least one upper level (300-400) undergraduate course in ecology.

**Note:** Offered in 2015-2016 and in odd years thereafter.

**BIOL. 883.3 — 2(2S)**
**Advanced Animal Behaviour**

This course explores, at an advanced level and through critical examination of current literature, neural mechanisms responsible for the generation of adaptive behaviours of animals. Topics for discussion will deal with structural or functional characteristics of neurons, synapses or circuits that have a definite motor or behavioural correlate.

**Prerequisite(s):** BIOL. 430 or permission of the instructor.

**Note:** Offered in 2014-2015 and in even years thereafter.

**BIOL. 889.3 — 2(2L-2S-2P)**
**Advanced Plant Pathology**

Selected topics in plant pathology and molecular plant-microbe interactions.

**Prerequisite(s):** Permission of the instructor.

**Note:** Offered in 2013-2014 and alternate years thereafter.

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**BIOL. 871.3 — 1/2(1S-3R-2P)**
**Advanced Insect Physiology**

A review of recent advances in certain fields of insect physiology.

**Prerequisite(s):** BIOL. 365, 366; or permission of the instructor.

**Note:** Offered in 2015-2016 and alternate years thereafter.

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**BIOL — BIOLOGY**

**Department of Biology**

**BIOL. 811.3 — 2(3S)**
**Cell Biology**

Review of the literature on selected topics including microscopic and sub-microscopic cellular organization, and cell function.

**Prerequisite(s):** Permission of the instructor.

**BIOL. 815.3 — 2(3S)**
**Advanced Limnology**

A review of current ecological and environmental topics concerning inland waters.

**Prerequisite(s):** BIOL. 412, or an undergraduate limnology course, or permission of the instructor.

**Note:** Offered in 2015-2016 and in odd years thereafter (2017/2018, etc.)
BLE — BIOLOGICAL ENGINEERING

Department of Chemical and Biological Engineering

BLE. 807.3 — 2(3L-3P)
Advanced Measurements
Topics include an analysis of the static and dynamic response of instruments, transducers used for measurement of temperature, pressure, strain, flow, radiation, displacement, velocity, acceleration, signal conditioning and recording.

Formerly: ABE. 807
Note: Students with credit for ABE. 807 will not receive credit for this course.

BLE. 811.3 — 1(2.5L-1.5P)
Modeling of Food Processes
Deals with mathematical/computer simulation of food processes associated with fluid flow, heat and mass transfer, internal heat generation due to biological activity and electromagnetic field treatment, and quality kinetics. Important optimization techniques will be introduced to design food processes with better energy efficiency/productivity and less quality degradation.

Formerly: ABE. 811
Note: Students with credit for ABE. 811 will not receive credit for this course.

BLE. 827.3 — 1/2(2L-3P)
Geomatics in Water Resources
Intended to provide the student with important background information on the field of Geomatics as it pertains to the area of hydrology. The course will focus on geomatics fundamentals with particular emphasis on image analysis techniques suitable for hydrological applications. GIS lectures will introduce the fundamentals of spatial data structures and introduce the student to Digital Elevation Modeling and spatial analysis. Important related materials describing projections and datums along with a basic understanding of digital image processing is also covered.

Formerly: ABE. 827

BLE. 830.3 — 1/2(3L-3P)
Design of Farm Irrigation Systems
Detailed study of the design of farm irrigation systems. Land classification and preparation. Theory and empirical methods of estimating consumptive use, hydraulics and economics of sprinkler irrigation design, fundamentals of overland flow applied to the design of surface water distribution systems.

Formerly: ABE. 830
Note: Students with credit for ABE. 830 will not receive credit for this course.

BLE. 840.3 — 1/2(2L)
Building Science
Advanced topics on: indoor air quality, workers comfort and health, and psychrometry; analysis of heat and moisture problems in buildings for cold climates, effect of moisture on the properties of agricultural products and building materials with special reference to heat transfer in the unsteady state; air infiltration in agricultural buildings; heating and ventilating loads, air distribution and heat recovery systems, and ventilation strategies; simulation and optimization of heating and ventilation systems under various weather conditions for agricultural buildings.

Formerly: ABE. 840
Note: Students with credit for ABE. 840 will not receive credit for this course.

BLE. 850.3 — 1(3L)
Post Harvest Technology
Engineering principles as applied to processing, drying and storage of various agricultural materials. Topics include thermal environment, transport process, physical properties of biological materials, postharvest metabolic changes and quality and unit operations of biomass feedstock processing. The emphasis will be on handling, storage, and drying of grains, forages, herbs and spices, biomass and their products.

Formerly: ABE. 850
Note: Students with credit for ABE. 850 will not receive credit for this course.

BLE. 853.3 — 2(3L)
Fiber Processing and Biocomposites
Will provide a comprehensive understanding of agricultural and man-made fibers, their engineering, process design, processing, characterization and application in the polymer industry to make fiber composites.

Formerly: ABE. 853
Prerequisite(s): Undergraduate degree in Engineering or Natural Sciences
Note: Students with credit for ABE. 853 will not receive credit for this course.

BLE. 898.3 — 1/2(R)
Special Topics
Special problem assignments involving investigation and/or design in each of the major study areas of agricultural engineering. Each student's work will be limited to his/her own area of specialization. A technical report in a form satisfactory to the supervisor is required.

Formerly: ABE. 898

BLE. 899.6
Special Topics
Special problem assignments involving investigation and/or design in each of the major study areas of agricultural engineering. Each student's work will be limited to his/her own area of specialization. A technical report in a form satisfactory to the supervisor is required.

Formerly: ABE. 899
BLE. 990.0
Seminar
Reports and discussions on current topics of interest to Agricultural and Bioresource Engineers. All graduate students within the Department are required to register, attend, and participate throughout their program. At least one oral presentation and one poster presentation on their thesis topic is required for registered students during the period of their candidacy, whether one year or more. For students in programs lasting more than one year, either one oral presentation or one poster presentation is required each year.
Formerly: ABE. 990
Note: Students with credit for ABE. 990 will not receive credit for this course.

BLE. 992.0
Project
Students undertaking the Project Master’s degree (M.Eng.) must register in this course. It consists of independent study and investigation of a real world problem, and submission of an acceptable report on the investigation.
Formerly: ABE. 992
Note: Students with credit for ABE. 992 will not receive credit for this course.

BLE. 994
Research
Students writing a Master’s thesis must register for this course.
Formerly: ABE. 994
Note: Students with credit for ABE. 994 will not receive credit for this course.

BLE. 996
Research
Students writing a Ph.D. thesis must register for this course.
Formerly: ABE. 996
Note: Students with credit for ABE. 996 will not receive credit for this course.

BMST — BIOMOLECULAR STRUCTURE STUDIES

BMST. 808.3 — 2(3L)
Introduction to XRay Crystallography and NMR for Macromolecules
Provides students with a basic understanding of techniques used to probe the structures of macromolecules. The core focus of the course will be X-ray crystallography and nuclear magnetic resonance spectroscopy (NMR) with applications to protein and nucleic acid structure determination.
Prerequisite(s): Permission of the instructor.

BPBE — BIORESOURCE POLICY

BPBE. 810.3 — 2(3L)
Agribusiness Management
This course is designed to provide an in-depth look at the trends and challenges facing agribusiness managers today. The course will provide agribusiness managers with the concepts and tools required to build a sustainable competitive advantage in an ever-changing economic environment. These concepts and tools are necessary for agribusiness managers to lead their human and capital resources for profit and success.
Permission of the department is required.
Restriction(s): Students will have completed a Bachelor's program in any discipline. Not available for credit to students in the M.Sc. and Ph.D. Agricultural Economics programs. BPBE. 812.3 — 1(3L)
Aboriginal Nation Building in the Twenty First Century
This course examines issues Aboriginal Governments and communities face as they enter the 21st century, including: political sovereignty, economic development, constitutional reform, cultural and language maintenance and promotion, land and water rights, religious freedom, health and social welfare, and education. Because the challenges are broad and comprehensive, the course emphasizes the breadth of issues that leaders must confront, from health, education, and social services to politics, economics, and cultural change. Research finds that the viable approaches to such areas of Nation Building must be compatible with individual societies' cultures, and Aboriginal societies are culturally heterogeneous. Therefore there is not "one size" that fits all. As such case studies derived from field research in Canada and the United States will be utilized to engage students in the classroom discussion about the challenges and opportunities that confront Aboriginal Nation in the 21st century.
Permission of the department is required.
Restriction(s): Students will have completed a Bachelor's program in any discipline.

BPBE. 825.3 — 2(3L)
Non-market Valuation for Natural Resources and the Environment
Students with credit for AGEC. 840 may not take this course for credit.

BPBE. 832.3 — 2(3L)
Agribusiness Management
This course is designed to provide an in-depth look at the trends and challenges facing agribusiness managers today. The course will provide agribusiness managers with the concepts and tools required to build a sustainable competitive advantage in an ever-changing economic environment. These concepts and tools are necessary for agribusiness managers to lead their human and capital resources for profit and success.
Prerequisite(s): Permission of the instructor.
Note: Students with credit for AGEC. 820 may not take this course for credit.

BPBE. 837.3 — 1(3S)
Environmental Economics
The study of theories of rural development in advanced-market economies, a review of empirical studies of selected North American rural economies and a survey of national and subnational North American development policies. A particular emphasis will be placed on empirical analysis of economic development issues.
Formerly: ABE. 832
Prerequisite(s): Permission of instructor.
Note: Students with credit for AGEC. 832 may not take this course for credit.

BPBE. 840.3 — 2(3L)
Economics of Agri-Food Marketing
Economic analysis of agriculture and food marketing systems. Topics include transactions costs and the role of institutions, spot markets, contracts and vertical integration, market power, price discovery, quality signalling and information asymmetry in agri-food markets. The relevant theoretical literature and empirical applications in these areas are reviewed.
Formerly: AGEC. 840
Prerequisite(s): Permission of the instructor.
Note: Students interested in a specialization in agricultural marketing should take both BPBE. 840 and 842
Note: Students with credit for AGEC. 840 may not take this course for credit.
BPBE. 842.3 — 2(3L)
Agricultural Market Organizations
Develops a conceptual framework in which organizations, their behaviour, their interactions with other firms and their impact on an industry can be studied, compared and analyzed. The relevant literature in organizational theory, industrial organization and contract theory is reviewed, especially as it focuses on theoretical and empirical work in the areas of co-operatives, agri-business firms and other forms of organizations. Examination of these types of firms is undertaken to better understand their behaviour and to develop concepts that can be put to use in analyzing other types of organizations.
Formerly: AGEC. 842
Prerequisite(s): Permission of the instructor.
Note: Students interested in a specialization in agricultural marketing should take both BPBE. 840 and. 842.
Note: Students with credit for AGEC. 842 may not take this course for credit.

BPBE. 845.3 — 2(3L)
Transportation Economics and Regulatory Policy
Economic analysis of the Canadian transportation sector, with particular emphasis on the movement of agricultural commodities. Specific topics include an overview of basic operations research methods including linear programming and efficiency measurement, analysis of industrial organization and regulation in the transportation sector using contestability theory and the new empirical industrial organization (NEIO), an introduction to the economics of networks, and an examination of the link between transportation and economic development.
Formerly: AGEC. 845
Prerequisite(s): Permission of the instructor.
Note: Students with credit for AGEC. 845 may not take this course for credit.

BPBE. 851.3 — 1(3L)
Agricultural Policy
Focuses on an economic analysis of agricultural policies in Canada. In addition, general economic policy will be discussed in terms of how it impacts on trade, investments, economic growth and efficiency.
Formerly: AGEC. 851
Prerequisite(s): Permission of the instructor.
Note: Students with credit for AGEC. 851 may not take this course for credit.

BPBE. 855.3 — 1(3L)
International Agricultural Trade Policy
The economic analysis of agricultural trade policy. Topics include introduction to international trade theory, an introduction to trade policy, methods of protection by importers and methods of protection by exporters.
Formerly: AGEC. 855
Prerequisite(s): Permission of instructor.
Note: Students with credit for AGEC. 855 may not take this course for credit.

BPBE. 860.3 — 1(3L)
Econometrics for Agricultural Economists I
Deals with the alternative methods of estimating economic relationships. Topics include a review of single-variable statistical inference, the two-variable regression model, violations of the basic assumptions of ordinary least squares regression, the multiple-variable regression model, and models that use qualitative variables.
Formerly: AGEC. 860
Prerequisite(s): BPBE. 461 or ECON. 404.
Note: Students with credit for AGEC. 860 or ECON. 808 may not take this course for credit.

BPBE. 861.3 — 2(3L)
Econometrics For Agricultural Economists II
Follows up on concepts developed in BPBE. 860. Topics include multi-variate hypothesis, extensions of multiple regression, distributed lag models, problems of estimation, and simultaneous equation methods. Econometric model building, including evaluation, forecasting, and econometric simulation will also be included.
Formerly: AGEC. 861
Prerequisite(s): BPBE. 860 or BPBE. 808.
Note: Students with credit for AGEC. 861 or ECON. 809 may not take this course for credit.

BPBE. 862.3 — 2(3L)
Advanced Econometrics
A study of advanced concepts in econometric theory and foundations. Topics include inference and distribution theory including asymptotic distributions, statistical analysis of disturbances and generalized least squares, aggregation, non-linear estimation, Bayesian methods, and control theory.
Formerly: AGEC. 862
Prerequisite(s): BPBE. 861 or ECON. 809.
Note: Students with credit for AGEC. 862 may not take this course for credit.

BPBE. 890.3 — 1(3L)
Research Procedures in Agricultural Economics
Topics from the areas of the philosophical basis of research in agricultural economics, the methods of science as applied to economic problems, current issues and problematic aspects of both the methods and substance of research in agricultural economics and initiating, organizing, funding and utilizing the results from research are examined.
Formerly: AGEC. 890
Prerequisite(s): Permission of the instructor.
Note: Students with credit for AGEC. 890 may not take this course for credit.

BPBE. 892.6 — 1and2
Aboriginal Land Management Project Course
This field-based project course focuses on some of the major issues Aboriginal Peoples face in the 21st century. It provides in-depth, hands-on exposure to Aboriginal development issues, including: wildlife, sovereignty, economic development, constitutional reform, leadership, land and water rights, etc. In particular, the course emphasizes problem definition, client relationships, and designing and completing a community based research project related to an identified community need. The course is devoted primarily to preparation and presentation of a comprehensive paper based on a field investigation. Students, in teams of two, will work with Aboriginal communities to address critical issues as identified by the community.
Permission of the department is required.
Restriction(s): Students will have completed a Bachelor's program in any discipline.

BPBE. 898.3 — 1/2(3L)
Special Topics
Reading essays and discussion in an approved special field.

BPBE. 899
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

BPBE. 990
Seminar
Reports and discussion on current development and research. All graduate students in Agricultural Economics are required to register. Attendance and at least one presentation required of postgraduate students during the period of their candidacy.
Formerly: AGEC. 990
Note: Students with credit for AGEC. 990 may not take this course for credit.

BPBE. 992.0
Project
Students undertaking the project Master's degree (M.Agr.) must complete the course as part of the requirements for the degree.
Formerly: AGEC. 992
Note: Students with credit for AGEC. 992 may not take this course for credit.

BPBE. 994
Research
Students writing a Master’s thesis must register for this course.
Formerly: AGEC. 994
Note: Students with credit for AGEC. 994 may not take this course for credit.

BPBE. 996
Research
Students writing a Ph.D. thesis must register for this course.
Formerly: AGEC. 996
Note: Students with credit for AGEC. 996 may not take this course for credit.
CE 803.3 — 2(3L)
Advanced Behaviour of Reinforced Concrete Members

The objectives of this course are for the student to become able to: analyze and design reinforced concrete members and structures, recognize the design criteria in CSA Standard A23.3, recognize the fundamental engineering mechanics related to the analysis and design of reinforced concrete members and structures, and document decisions made during the design process in coherent and legible design calculations. Topics may include, but are not limited to: shoring and construction loads; material properties; moment-curvature and load-deflection relationships; column analysis and design including slender columns in frames; bond and development of reinforcement; an introduction to prestressed concrete; shear design using truss models, compression field theory, and the modified compression field theory.

Prerequisite(s): CE 418 or its equivalent, by permission of instructor.

CE 804.3 — 2(3L)
Structural Dynamics

Behaviour of materials and structures under dynamic loading; simplified analysis and design principles of structures subjected to wind, earthquake and other dynamic loading.

Prerequisite(s): MATH. 338 or equivalent.

CE 805.3 — 3L
Structural Stability

This course provides an introduction to structural stability and its applications in design of metal members and structures. The theory of elastic member buckling is presented for columns and beams. The incorporation of member behaviour into design standards is described for common members.

Formerly: CE 898.3 Special Topics in Structural Stability.

Note: It is recommended students take CE 470 prior to CE 805. Students with credit for CE 898.3 Special Topics in Structural Stability (offered in 2009-10, 2010-11 and 2011-12) may not take this course for credit.

CE 806.3 — 2(3L)
Innovative Structural Technologies

An introduction to recent developments in the application of new materials and innovative solutions for problems in structural engineering. Major topics include the mechanics and applications of fibre-reinforced polymers; rehabilitation, repair and strengthening of structural components; and structural health monitoring of bridges.

Prerequisite(s): CE 418 or equivalent.

CE 818.3 — 1/2(3L)
Concrete Technology I

Types of cements, compounds of cements, structure of cement paste, theory and practice of aggregate grading, fresh concrete, mix design of concrete.

CE 821.3 — 1/2(3L-1.5P)
Surface Water Quality

Water quality aspects of rivers and lakes and implications of waste water input are discussed. Topics include surface water quality parameters, point and non point source input characteristics, water quality measurements, mixing and self-purification processes, water quality modelling methods.

CE 822.3 — 1/2(3L-1.5P)
Sanitary Engineering I

Water chemistry fundamentals underlying water and wastewater treatment methods and groundwater chemistry are discussed. Principles covered include kinetics, chemical equilibrium, acid-base systems, complexation, precipitation-dissolution and oxidation-reduction.

CE 824.3 — 1/2(3L)
Advanced Physical Chemical Treatment

Detailed study of the theory and design of physical and chemical unit processes utilized in water and wastewater treatment. Equalization, sedimentation, flotation, adsorption, gas stripping, membrane processes, neutralization, disinfection, water softening, chemical oxidation, ion exchange are discussed.

CE 825.3 — 1/2(3L)
Biological Waste Water Treatment

Detailed study of the theory and design of biological suspended-culture and attached-culture systems utilized in domestic wastewater treatment. Activated sludge processes, aerated lagoons, trickling filters, rotating biological contactors, submerged biofilm process, sequencing batch reactors, sludge digestion are discussed.

CE 830.3 — 1/2(3L)
Advanced Open Channel Flow

Hydraulics of open channel flow. Basic principles; specific energy; specific force; uniform flow; water surface profiles; hydraulic jump; slope-area and contracted area method; transitions for subcritical and supercritical flow; flood routing; spatially varied flow. Laboratory work includes practical design problems and some experiments in the fluid mechanics laboratory.

CE 832.3 — 1/2(2L)
Sediment Transport and River Engineering Analysis, design and control of channels, canals, and rivers, with erodible boundaries. Topics include initiation of sediment movement, transport processes, sediment transport equations, scour and deposition. Regime Theory for canals and rivers, other river development equations, channel roughness, control of rivers and effects of these controls, movable bed models. Term papers on a topic chosen by the student may be required.

CE 840.3 — 1/2(3L)
Surface Hydrology Prediction and Simulation

Consists of two major parts; the first one focuses on modelling hydrologic processes and prediction of hydrologic events using artificial neural networks (ANNs). The second part of the course focuses on presenting the concept of system dynamics and its applications in the field of hydrologic modelling. Case studies of watershed modelling, water balance, and environmental analysis will be discussed within an object-oriented simulation environment. Although environment and water resources-related applications will be dominant, the scope of the methodologies and models introduced during the course will be broad enough to benefit other students from different disciplines across campus.

CE 850.3 — 1/2(3L)
Geoenvironmental Engineering Fundamentals

An introduction to contaminant transport processes in porous media with a focus on key processes and the related chemical, physical and hydraulic properties of soils. The transport and attenuation processes for the case of saturated, homogeneous and unsaturated soils are reviewed and the governing equations are derived. Special conditions such as fractured or structured soils, unsaturated soils, and multiphase transport and partitioning, are also discussed at length.

Prerequisite(s): CE 319 or GEOE. 475 or SLSC. 322 or equivalent.

CE 851.3 — 1/2(3L)
Applications in Geoenvironmental Engineering

The course will apply the fundamental chemical, hydraulic and physical properties of soils and contaminants with an emphasis on practical engineering significance. The application of these fundamentals to geoenvironmental practice and problems is illustrated through the use of case studies. Particular focus is on two broad areas; contaminant barriers/waste management and contaminated site remediation.

CE 852.3 — 2(1L-3P)
Advanced Geotechnical Laboratory

The course will encompass practical aspects of geotechnical laboratory testing. It will include tests for determining index properties, strength and compressibility of soils and rocks. The course requirement will include critical review and discussion of test procedure and results as well as background literature.

CE 853.3 — 1/2(3L)
Geosynthetics

Types of geosynthetics; index tests; thermal/mechanical properties of polymers; textile technology; puncture/tear resistance; chemical compatibility, durability and aging; interface shear strength, sliding and pullout; design methods for base reinforcement, reinforced walls and steep slopes; case studies of geosynthetics in drainage, filtration, separation, reinforcement, waste management and mining; specifications for materials, installation. Focus on design by function.
CE 855.3 — 1/2(3L)
Advanced Soil Mechanics
Focuses on fundamental aspects of shear strength and volume change behaviour of saturated and unsaturated soils. It will also include theoretical and practical aspects of primary and secondary consolidation, settlement analysis and pore pressure parameters. An introduction to critical state soil mechanics and constitutive modelling of soils will also be provided.
Prerequisite(s): CE 328 or equivalent.

CE 856.3 — 1/2(3L)
Advanced Earth Structures
Includes analysis and design of earth slopes, embankments and retaining structures, theory and numerical simulation of seepage through earth structures, methods of stability analysis and their application to natural and engineered slopes, field instrumentation and monitoring the performance of earth structures.
Prerequisite(s): CE 328 or equivalent.

CE 858.3 — 1/2(3L)
Geotechnical Design and Analysis
Advanced topics in soil mechanics and foundation engineering: Earth pressures and design of retaining walls, braced excavations and tied back walls. Bearing capacity of shallow and deep foundations. Settlement analyses and the selection of soil deformation and strength parameters. The design of pile foundations, load test methods and analysis of data.
Prerequisite(s): CE 417 or equivalent.

CE 864.3 — 1/2(1L-3P)
Terrain Analysis and Site Investigation
Air photo interpretation is used to evaluate the physical environment for engineering and environmental planning purposes. The emphasis is on the engineering significance of landforms and their materials. The site investigation portion will focus on methods to extending ground surface interpretation into the subsurface to provide an understanding of the physical environment.

CE 865.3 — 3L
Intelligent Transportation Systems
This course investigates the technologies and application of various Intelligent Transportation Systems (ITS) employed in the Transportation Engineering field. Focus of this course is the benefits ITS can provide road managers and users across diverse transportation infrastructure applications.
Note: Students with credit for CE 898 Special Topics in Intelligent Transportation Systems may not take this course for credit.

CE 866.3 — 1/2(3L)
Pavement Management System I
Stress analysis, theory and design of flexible and rigid pavements, aggregates, soil cement, asphalt aggregate mixtures, salt, lime and other methods of stabilization, study of road tests.

CE 867.3 — 1/2(2L-3P)
Pavement Management System II
Properties and tests of bituminous materials; rheology of asphalt; asphalt mix design; construction practices and control; performance of asphalt pavements.

CE 868.3 — 1/3(L)
Introduction to Decision Analysis
Decision Analysis combination of systems engineering and statistical decision theory, specifically designed to address the issues of complexity and uncertainty typically related to important decisions. Students will become familiar with the discipline of Decision Analysis, be able to model and analyze decision using the Decision Analysis framework, understand and model attitudes to risks and be conversant with the software package DPL.
Prerequisite(s): Must be graduate student in Civil and Geological Engineering.

CE 871.3 — 1/2(3L)
Advanced Physical Hydrogeology
Aquifer characterization; Mapping flow in regional systems; Groundwater in the hydrologic cycle; Principles of hydraulic testing; Groundwater as a resource; Stress, strain and pore fluids; Heat transport in groundwater systems.
Prerequisite(s): CE 319 or GEOE. 475 or SLSC. 322 or equivalent.

CE 874.3 — 1/2(3L)
Underground Rock Mechanics
Prerequisite(s): GEOE. 414 or equivalent.

CE 876.3 — 1/2(3L)
Mechanics of Rock Masses
In soils, deformation occurs as a result of strains throughout the soil mass, with the mass behaving essentially as a continuum. By contrast, rock response is controlled by deformations along discrete discontinuities including fissures, cracks, joints, and faults. For this reason, different approaches to characterization analysis and design are required.
Prerequisite(s): GEOE. 315 or equivalent.

CE 888.3 — 2(3L)
Advanced Fluid Mechanics
Introduces students to advanced topics in fluid mechanics and covers laminar and turbulent flow; boundary layers; turbulence; and turbulent jets. The main theories of fluid mechanics are shown to be based on the conservation of momentum or navier-stokes equations.
Prerequisite(s): Undergraduate course in fluid mechanics.

CE 889.3 — 2(3L)
Finite Element Method
Review of stiffness matrix method, two dimensional finite element analysis, plate bending formulations and non-linear problems; field problems, seepage, settlement, etc.; analysis of shells, vibration and stability problems; introduction to finite element methods followed by a separate group studies of specific field problems related to structures, geotechnical and transportation problems, engineering mechanics, etc.

CE 898.3 — 1/2(L/S/P)
Special Topics
May consist of assigned reading, lectures by staff members, discussion periods and laboratory exercises with reports. Depending on the interests of the student and his/her supervisor, the topics are selected from one of the research fields of Civil Engineering, including: Structural, Soil, or Fluid Mechanics; Sanitary Engineering; Transportation Engineering and related subjects.

CE 899.6 — 1and2(L/S/P)
Special Topics
May consist of assigned reading, lectures by staff members, discussion periods and laboratory exercises with reports. Depending on the interests of the student and his supervisor, the topics are selected from one of the research fields of Civil Engineering, including: Structural, Soil, or Fluid Mechanics; Sanitary Engineering; Transportation Engineering and related subjects.

CE 990
Seminar
A seminar is held periodically throughout the regular session. The current literature is reviewed and discussed. Graduate students are required to attend these meetings for the duration of their program.

CE 992.0
Project
Students undertaking the project Master’s degree (M.Eng.) must register in this course. It consists of independent study and investigation of a real world problem, and submission of an acceptable report on the investigation.

CE 994
Research
Students writing a Master’s thesis must register for this course.

CE 996
Research
Students writing a Ph.D. thesis must register for this course.
CHE — CHEMICAL ENGINEERING

Department of Chemical and Biological Engineering

CHE. 811.3 — 1/2(3L)
Principles and Applications of Heterogeneous Catalysis
Focuses on the theoretical aspects and important industrial applications of heterogeneous catalysis and the information needed to work with solid catalysts in the laboratory, pilot plant, and commercial installations. It also provides some perspective on the chemical and mathematical aspects that must be considered in reactor design.

Prerequisite(s): CHE. 411.

CHE. 861.3 — 1/2(3L-1P)
Fundamental Biochemical Engineering
Chemical engineering students learn the fundamentals regarding the microorganisms and their industrial applications. Metabolic regulations, enzymatic and biochemical reaction are covered. Batch and continuous fermentations, design of bioreactors, aération, mixing, sterilization and down stream processing are discussed.

Note: Students with credit for CHE. 461 will not receive credit for this course.

CHE. 862.3 — 1/2(3L-1P)
Advanced Biochemical Engineering
Covers the most recent areas of research progress in biochemical engineering. Topics include novel bioreactors, large-scale cultivation of plant or mammalian cells, recombinant cell fermentations, novel systems and downstream processing techniques.

Prerequisite(s): CHE. 461 or 861; or permission of the instructor.

CHE. 875.3 — 1/2(3L)
Reaction Kinetics and Reactor Design
Topics will include: Heterogeneous catalysis, non-ideal flow through reactors, non-catalytic gas-solid reactors and fixed and fluidized bed catalytic reactors.

CHE. 878.3 — 1/2(3L)
Chemical Engineering Thermodynamics
Deals with the principles of thermodynamics, equations of state, phase and chemical reaction equilibria, solution theory, and applications to industrial problems.

Prerequisite(s): CHE. 323, or equivalent.

CHE. 881.3 — 1/2(3L)
Process Engineering
Examines the methods of process engineering used to achieve the best overall processing systems and includes; synthesis of processing alternatives; structure of process system; process economics; optimization applications and methods; engineering in the presence of uncertainty; simulation approach to difficult processing situations; problem assignments; involving class discussion, with special emphasis on a knowledge of chemical processes. Process safety and hazard analysis will also be discussed. A term paper will be required.

CHE. 882.3 — 1/2(3L)
Design of Industrial Waste Treatment Systems
Designed to provide students with fundamental information regarding air and water pollution problems. Procedures for the design of air pollution control systems and wastewater treatment plants are covered. Regulation and legislation associated with air and water pollutants are discussed.

CHE. 884.3 — 1/2(3L)
Corrosion Engineering
Intended for engineers and others who wish to develop an appreciation of the principles of corrosion and corrosion control and their application to the selection of materials of construction and the protection of engineering systems.

CHE. 885.3 — 1/2(3L)
Corrosion Control in Engineering Systems
Advanced course in engineering design for the prevention and control of corrosion in a wide range of engineering systems including: chemical and petrochemical plants; conventional and nuclear power plants; transportation systems; communications; structures. Several case studies of previous corrosion problems will be included.

CHE. 888.3 — 1/2(3L)
Chemicals and Energy from Renewable Resources
Focuses on the processes that produce chemicals and/or energy from renewable resources and the associated environmental issues. The fundamental principles and the highlights of research frontiers are introduced. Students will study the basic processes such as gasification, pyrolysis, catalytic conversions and synthesis, and chemical energy production using renewable feedstock.

CHE. 893.3 — 1/2(3T)
Special Topics
Supervised investigation into selected aspects of advanced chemical engineering topics. This may take the form of assigned readings and seminars.

CHE. 899
Special Topics
Supervised investigation into selected aspects of advanced chemical engineering topics. This may take the form of assigned readings and seminars.

CHE. 990
Seminar
Papers and discussions on recent developments in chemical engineering. Graduate students are required to attend these meetings for the duration of their program. Every graduate student is expected to present a seminar related to their research or project at some time before they receive the graduate degree.

CHE. 992.0
Project
Students taking the non-thesis Master's degree (M.Eng.) must register in this course. It consists of independent study and investigation of a real world problem, and submission of an acceptable report on the problem studied.

Restriction(s): Open to students in the Master of Engineering (M.Eng.) in Chemical Engineering program.

CHE. 994
Research
Students writing a Master's thesis must register for this course.

CHE. 996
Research
Students writing a Ph.D. thesis must register for this course.

CHEM. 801.6 — 1/2(3L)
Modern Aspects of Chemistry
An overview of the core material required for graduate research in chemistry presented in modular form. Emphasis is placed on integrating chemical knowledge from all subdisciplines of chemistry encompassing both experimental and theoretical approaches.

CHEM. 815.3 — 3L
Selected Topics in Biological Chemistry
This course will instruct students in advanced and modern aspects of biological chemistry, particularly biochemical catalysis and structure-function relationships, and emphasizing chemical and quantitative approaches to biological research.

Permission of the instructor is required.

Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

CHEM. 820.3 — 1/2(3L)
Physical Methods of Molecular Structure Determination
Presents the application of various spectroscopic methods to structure determination including mass spectrometry (MS), infrared spectroscopy (IR), ultraviolet spectroscopy (UV), and 1H and 13C nuclear magnetic resonance spectroscopy (NMR). The majority of the course (approx. 75%) will focus on NMR based methods including multipulse and two dimensional techniques. Although aspects of the underlying theory are presented, the course focuses the integrated interpretation (as opposed to the theory) of various spectroscopic data for the purpose of structure determination; problem solving is emphasized.

CHEM. 823.3 — 1/2(3L)
Selected Topics in Analytical Chemistry
Selected topics that are not dealt with or are covered only briefly in other chemistry courses offered by the department.

Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.
CHEM. 832.3 — 1/2(3L)  
Selected Topics in Inorganic Chemistry  
Selected topics that are not dealt with or are covered only briefly in other chemistry courses offered by the department.  
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

CHEM. 834.3 — 1/2(3L)  
Selected Topics in Physical Chemistry  
Selected topics that are not dealt with or are covered only briefly in other chemistry courses offered by the department.  
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

CHEM. 851.3 — 1/2(3L)  
Stereochemistry and Asymmetric Synthesis  
The fundamental principles of stereochemistry and stereoisomerism in organic compounds will be described. Various strategies and methods for the synthesis of enantiomerically pure compounds will be discussed.

CHEM. 852.3 — 1/2(3L)  
Selected Topics in Organic Chemistry  
Selected topics that are not dealt with or are covered only briefly in other chemistry courses offered by the department.  
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

CHEM. 855.3 — 1/2(3L)  
Organic Reactions  
A survey of organic reactions and reagents including reaction mechanisms and synthetic applications.

CHEM. 858.3 — 1/2(3L)  
Natural Products Chemistry  
Provides a basic knowledge of natural products chemistry with emphasis on secondary metabolism. Topics covered include an overview of primary and secondary metabolism, modern techniques for studying secondary metabolism, biological reactions, chemical interactions between living organisms, and classes of bioactive compounds grouped according to building blocks and biogenesis.

CHEM. 898  
Special Topics  
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

CHEM. 899  
Special Topics  
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

CHEM. 990  
Seminar  
Papers and discussion on recent developments in Chemistry. Graduate students are required to attend these meetings for the duration of their program, and during this period, are expected to present a seminar.

CHEM. 991.0 — 1/2(1S)  
Literature Core Course  
Offers graduate students a formal framework for the critical discussion of current chemical literature and for the critical assessment of its importance. Students will give oral presentations based on research articles from premier chemical journals.

CHEM. 994  
Research  
Students writing a Master's thesis must register for this course.

CHEM. 996  
Research  
Students writing a Ph.D. thesis must register for this course.

CHEP — COMMUNITY HEALTH AND EPIDEMIOLOGY  
Department of Community Health and Epidemiology

CHEP. 800.3 — (1.5L-1.5S)  
Epidemiology I  
Introduces key concepts and the basic methods used in epidemiology to evaluate the distribution and determinants of disease, and health interventions. Examples will be drawn from communicable and chronic diseases, social epidemiology, health services research and many other related disciplines.

CHEP. 802.3 — (1L-2S)  
Community and Population Health Research Methods  
An introduction to research methods in population and community health, including quantitative, qualitative, and mixed methods. Topics include: research paradigms, the role of theory, and processes of designing studies and collecting and analyzing data.  
Prerequisite(s): Must be registered graduate student in CHEP or have permission of instructor.

CHEP. 803.3 — (3L)  
Biostatistics I  
Designed for life sciences students who wish to understand and apply commonly used advanced statistical methods which they are likely to encounter in their career. The emphasis is on the appropriate application of these research methods and the correct interpretation of their results. Topics covered are: analysis of variance, non-parametric methods, multiple regression and logistic regression. Computer software used: SPSS.  
Prerequisite(s): STAT. 244, 245; or equivalent.  
Note: Students may receive credit for only one of NURS. 818, CHEP. 805, and PUBH. 805.

CHEP. 805.3 — (3L)  
Applied Statistical Methods for Follow Up Data  
Explores the application of advanced multivariate statistical methods which are commonly used in life sciences and is an extension and continuation of Biostatistics I (CHEP. 803.3). Topics to be covered in the course are: general approaches for longitudinal data analysis, which include analysis of repeated measures using Analysis of Variance, Survival Analysis, statistical methods based on Generalized Estimating Equations and Maximum Likelihood; and brief introduction to handling missing data. Computer software used: SPSS and SAS.  
Prerequisite(s): CHEP. 805 or permission of the instructor.

CHEP. 810.3 — 1(3L)  
Advanced Topics in Clinical Trials  
Theory/practice-based course designed to provide advanced knowledge about the design and analysis of clinical trials. This course cannot be taken with STAT. 843 or VLAC. 881.  
Restriction(s): This is a required course for PhD students enrolled in the Biostatistics Graduate Program.

CHEP. 811.3 — 2(1L-2S)  
Professional Research Skills in Community and Population Health  
The goal of the course is to equip graduate students with professional research skills in areas such as grant writing, communication, critical and creative thinking, team leadership and management, research collaborations, research application process, knowledge mobilization and translation.  
Restriction(s): Must be registered in CHEP graduate program or have permission of instructor.

CHEP. 812.3 — 2(1L-2S)  
Advanced Research Seminar in Population Health  
Designed as a culminating course experience for students in the doctoral program in Community Health and Epidemiology, for whom it is required. Students will take this course as they are completing their other course requirements, and it will provide them with an opportunity to reflect, integrate and synthesize all course materials and knowledge areas in preparation for their comprehensive examinations and dissertation research. The purpose is to prepare advanced students to become effective leaders in academic and research settings in all work settings. As such, this course will integrate content and theory with population health research practice as experienced by students through previous course work and life/professional experiences. It will be overseen by the course instructor, but the students will be major participants in their own learning. Students will participate in determining the course content, design and deliver a session, and contribute to assessment of student performance in the course.  
Restriction(s): Must be registered in the Community Health and Epidemiology Ph.D. program or have received permission from the instructor.
CHEP. 813.3 — (1.5L-1.5S)
Critical Perspectives in Interdisciplinary Population Health Research
Will focus on a critical consideration of social determinants of health with a focus on the theoretical influences and methodological approaches that inform each. Conceptual and methodological strengths and challenges will be considered with a view to developing critical interpretive skills for the analysis of data sets and research reports and for the translation of findings to applied settings.
Prerequisite(s): Must be registered in CHEP graduate program, Faculty of Social Work (University of Regina) graduate program, or have permission of instructor.

CHEP. 814.3 — 2L-15
Closing the Gap Global Health and Social Inequities
Closing the Gap: Global Health and Social Inequities - is a survey course designed to give graduate students an introduction to the broad multi-disciplinary field of global health, focusing on selected issues related to global health equity, the social determinants of health and community-based approaches to “closing the gap”.

CHEP. 898.3
Special Topics
These courses are offered occasionally by visiting faculty and in other special situations. Students interested in these courses should contact the department for more information.

CHEP. 899
Special Topics
Offered occasionally by visiting faculty and in other special situations to cover, in depth, topics that are not thoroughly covered in regularly offered courses.

CHEP. 990
Seminar
A seminar is held periodically throughout the regular session during which current issues in research and practice are discussed. Graduate students are required to attend the seminars.

CHEP. 994
Research
Students writing a Master’s thesis must register for this course.

CHEP. 996
Research
Students writing a Ph.D. thesis must register for this course.

CLAS — CLASSICS

Department of History

CLAS. 899
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

CLR — CLINICAL RESEARCH

CLR. 800.3 — 1/2(3L)
Clinical Research Methodology
Will provide basic understanding, awareness and skill development in topics necessary for performing clinical research including: study design, research data collection, understanding types of clinical research studies, measurements for quantitative studies, clinical trials, qualitative methodologies, community and Aboriginal - based research, global research, research ethics, communication skills.
Prerequisite(s): Students must be enrolled in a graduate program.

CMC — COMPUTER ENGINEERING

CMCE. 898.3 — 1/2(3L)
Special Topics
Offered occasionally to cover, in depth, topics that are not thoroughly covered in regularly offered courses.

CMPT — COMPUTER SCIENCE

CMPT. 810.3 — 1/2(3L)
Algorithms
Advanced design and analysis of algorithms. Includes pattern matching in strings, augmenting algorithms on graphs (including network flows, connectivity, and matching), computational geometry (including convex hulls, Voronoi diagrams, intersection problems, and planar point location), parallel algorithms for shared memory and interconnection network models, and distributed algorithms.

CMPT. 811.3 — 1/2(3L)
Advanced Design and Analysis of Algorithms
The areas of advanced algorithms and data structures are becoming more and more important. Topics include: basic principles of algorithm design, the design of evaluation techniques, methods for prototyping and implementing graphical user interfaces, and theoretical issues underlying user input, representation, and visualization.
Prerequisite(s): CMPT. 370 or permission of the instructor.

CMPT. 812.3 — 1/2(3L)
Knowledge Representation and Reasoning
Representation of knowledge in formal languages. Inference, logic programming, efficient automated theorem proving, search techniques. Nonmonotonic logic, diagnosis explanation and other patterns of plausible inference. Probabilistic approaches including stochastic search techniques, probabilistic nets, diagnosis, inferring structure from data, belief functions, and an overview of uncertainty formalisms.

CMPT. 813.3 — 1/2(3L)
Computer Systems and Performance Evaluation
Provides a comprehensive overview of the quantitative aspects of computer systems with a particular focus on performance evaluation. Topics include performance measurement, the analysis and interpretation of measurement data, workload characterization and modeling, the design and evaluation of performance experiments, and the design and application of analytical techniques. A variety of application domains will be considered.

CMPT. 816.3 — 1/2(3L)
Software Engineering
Concerns the major practical and theoretical concepts used in building large-scale software systems. Emphasizes current software development methodologies and tool support that accompanies the methodologies. The areas of software development that will be emphasized are: requirements definition and analysis; system design; and implementation and testing.

CMPT. 817.3 — 1/2(3L)
Usability Engineering
Is a structured approach to developing usable interface designs. The course helps integrate human-computer interaction (HCI) requirements and design approaches within development projects managed by software engineering (SE) methodologies. The course also presents a requirements engineering (RE) approach to usability engineering by providing in-depth coverage of the Putting Usability First development methodology.
Prerequisite(s): CMPT. 371 or Graduate standing in Computer Science or permission of the instructor.

CMPT. 819.3 — 1/2(3L)
Image Processing and Computer Vision
An introduction to image processing and computer vision, including coverage of topics such as the basics of image representation and manipulation, edge detection, image segmentation, photometric stereo and shape from shading, optical flow, and pattern recognition.

CMPT. 820.3 — 1/2(3L)
Advanced Intelligent System
The areas of intelligent information management and intelligent user interaction are becoming more and more important. This course explores advanced techniques for the management and effective use of data in largely unstructured application environment, such as the Web, unstructured documents, user interaction, and multi-agent systems.
Prerequisite(s): Open to graduate students in computer science who have at least one undergraduate course (3 credit units) of Artificial Intelligence.
CMPT. 821.3 — 1/2(3L)
Advanced Topics in Programming Languages
Advanced topics in programming languages will be selected from: programming language design, programming languages semantics, code optimization, memory management, garbage collection, closures, functional programming, logic programming, aspect-oriented programming, concurrent programming, history of programming languages, advanced programming language features and their implementation, polymorphic type systems, domain specific languages.
Prerequisite(s): Open to graduate students in computer science who have at least one undergraduate course (3 credit units) in Programming Languages.

CMPT. 823.3 — 1/2(3L)
Compilers
The definition and classification of formal grammars. A discussion of regular and context-free grammars with their relationships to automata. Precedence, operator precedence, LR(k) and LALR(k) grammars with their associated syntactic analyzers, symbol table techniques, intermediate forms of source programs, run-time organization, code generation and optimization. Interpreters and their relation to the compilation process. Introduces translator writing systems and compiler-compilers.

CMPT. 826.3 — 1/2(3L-2P)
Data and Process Modeling
Data and process modeling applied to the storage and manipulation of large amounts of data. Topics include: dimensional data modeling; data warehousing; evaluating, enhancing, and protecting the value of information; and data mining and advanced querying.

CMPT. 829.3 — 1/2(3L)
Computer Graphics
An introduction to computer graphics that includes real-time and off-line realistic image synthesis techniques, and basic animation techniques such as key framing and physics-based methods. Programmable raster graphics, ray tracing and efficient data structures for both are also introduced.

CMPT. 830.3 — 1/2(3L)
Bioinformatics and Computational Biology
Provides an in-depth algorithms-based introduction to major concepts and techniques in bioinformatics. Topics include algorithms for structure prediction and similarity; sequence similarity and alignment; metabolic and regulatory pathways; sequence assembly, comparative genomics, expression analysis, database searching, artificial life and biological computation.
Prerequisite(s): A previous BINF class, or at least 6 credit units of previous course work in each of computer science, statistics and the life sciences.

CMPT. 831.3 — 1/2(3L)
Intractable Problems and Models of Computation
Problems with no known efficient solution are studied; exact inefficient algorithm design techniques are introduced as are efficient approximation algorithms. NP-Completeness proofs are developed as evidence of intractability. Part of the course is a rigorous and systematic introduction to models of computation via formal language theory.
Prerequisite(s): CMPT. 360 or equivalent.

CMPT. 835.3 — 2(3L-1P)
Foundations of Concurrent Programming
Theory and practice of concurrent programming. Process interaction using shared variables and message passing; parallel computing; development of correct programs; general problem solving techniques; scientific computing; distributed programming.
Prerequisite(s): CMPT. 322.

CMPT. 840.3 — 1/2(3L)
Accessible Computing
Investigates accessibility issues and features relating to the analysis and design of computing applications. It introduces major sources of information on accessible computing and works towards developing a comprehensive strategy for improving the accessibility of computing applications.
Prerequisite(s): CMPT. 360 and 332 or equivalent.

CMPT. 842.3 — 1/2(3L)
Mobile and Ubiquitous Computing
After a brief discussion of the basic problems in developing applications for mobile and ubiquitous computing, the class will focus on the use of languages (e.g., Java, C#) and middleware (e.g., CORBA, SOAP, WebServices and RMI) for developing mobile and ubiquitous applications.

CMPT. 846.3 — 3L
Software Maintenance and Evolution
This course aims to make students aware of the challenges inherent in the maintenance and evolution of software systems, and to provide a working understanding of some of the techniques and best practices currently in use for changing software safely, efficiently and in a cost effective way during the evolution.
Prerequisite(s): Permission of instructor.

CMPT. 851.3 — 1/2(3L)
Parallel Programming for Scientific Computing
Despite the advances in computing technology, we continue to need greater computing power to address important scientific questions. Because individual processors have reached their performance limits, the need for greater computing power can only be met through parallel computers. This course is intended for students interested in taking advantage of parallel and distributed computing by writing parallel code for processor-intensive applications to be run on clusters, the cloud, or shared infrastructure such as that provided by Compute Canada. The objectives of this course are to give the students an understanding of how they can use parallel computing in their research and enable them to write parallel code for their applications. Extensive use of practical examples from scientific computing will be made. The programming languages used will be Matlab and Fortran or C. Both the shared and distributed paradigms of parallel computing will be covered via the OpenMP and MPI libraries.
Permission of the Instructor is required.
Note: Undergraduate courses in Basic Numerical Analysis and Computer Programming are recommended.

CMPT. 852.3 — 1/2(3L)
Formal Artificial Intelligence
The representation of knowledge in formal languages and the technical problems arising in such representations. May include the comparative study of formalisms for reasoning with uncertain information, nonmonotonic reasoning, truth maintenance, constraint satisfaction, probabilistic causal nets, and belief revision.
Prerequisite(s): CMPT. 812 or equivalent.

CMPT. 855.3 — 1/2(3L)
Computer Networks and Distributed Systems
Includes low-level protocols (e.g., channel access protocols), routing, flow control, congestion control, transport layer protocols, protocol performance, and network measurement and workload characterization. Of particular interest are high-speed networks, B-ISDN and ATM, fast-packet switching, and gigabit networking.
Prerequisite(s): Previous course in Networks.

CMPT. 856.3 — 1/2(1.5L-1.5S-1.5P)
Software Engineering
Concerned with tools, methods, methodologies, and standards in the software engineering of conventional information systems, hypermedia and multimedia systems, and knowledge-based systems. Topics are to be selected from the following: requirements specification methodologies, object oriented design; process modeling; CASE environments and standards; software testing, validation, metrics and quality assurance; reverse engineering; shells for knowledge-based systems; second generation expert systems; knowledge acquisition; and human-computer interfaces.
Prerequisite(s): CMPT. 816 or 826 or equivalent.
CMPT. 857.3 — 1/2(3L-1.5P)
Readings in Bioinformatics
Reviews and discusses recent advances and issues in Bioinformatics through paper presentation by students. Topics will range from computational biology to artificial life and biological computation. Students will be evaluated based on their presentations and participation, as well as a small project.
Prerequisite(s): Open to students in computer science, life sciences, and natural sciences, but subject to permission of the instructors.

CMPT. 858.3 — 1/2(3L)
Topics in Modeling and Operations Research
In-depth coverage of recent research areas from Operations Research, and applications to system modeling. Advanced topics from mathematical programming, queuing theory, inventory control, simulation, Markov modeling, and simulation.
Prerequisite(s): CMPT. 818 or equivalent.

CMPT. 859.3 — 1/2(3L)
Advanced Computer Vision and Image Processing
Advanced topics in Computer Vision. Topics may be selected from the areas of image segmentation, shape-from-shading, stereo vision, shape representation and recognition, image tracking, and active vision.
Prerequisite(s): CMPT. 819 or equivalent.

CMPT. 862.3 — 1/2(3L)
Multi Agent Systems
Models, methods and applications of Multi-Agent Systems (MAS). A study of topics selected from foundational as well as current research in Actors, Coordination, Distributed AI, Massively Multi-Agent Systems, Multi-Agent Simulation, Resource Bounded MAS and Software Engineering for MAS.
Prerequisite(s): CMPT. 812 or equivalent.

CMPT. 863.3 — 1/2(3L)
Topics in Functional Programming
Functional programming languages permit a wide variety of semantic definitions and a wide variety of implementation approaches. Explores selected topics in the semantics and/or implementation of these languages. May include: algebraic semantics, type theory, polymorphic type deduction, inheritance, graph reduction, data flow, systolic/ wavefront arrays, and a variety of semantically sound optimization techniques.
Permission of instructor required
Prerequisite(s): CMPT. 813 or equivalent.

CMPT. 865.3 — 1/2(3L)
Advanced Parallel and Distributed Systems
Concerns selected design issues in distributed and parallel computer systems, particularly those most relevant to the goal of achieving high performance. In the parallel systems areas, such design issues arise in operating systems, run-time support software, compilers, and architecture. Topics concerning distributed systems may include interprocess communications, file systems, and load sharing, with emphasis on support for advanced parallel or multimedia applications.
Prerequisite(s): Previous course in operating systems; CMPT. 815, or equivalent.

CMPT. 866.3 — 1/2(3L)
Topics in Human Computer Interaction
Topics studied may include the analysis and design of human-computer interaction, user interface objects and tool kits, intelligent user interfaces and user modeling, adaptive system design, human-computer interaction standards, and computers in society.
Prerequisite(s): CMPT. 481 or CMPT. 811 or permission of instructor.

CMPT. 867.3 — 1/2(3L)
Affective Computing
Affective Computing is computing that relates to, arises from, or deliberately influences emotion. In this course, we focus on computational methods for sensing user emotion, approaches for adapting computer systems based on emotional state, and human-computer interfaces for expressing emotion.
Prerequisite(s): CMPT. 481/811 or equivalent.

CMPT. 868.3 — 1/2(3L)
Social Computing
Covers a variety of topics related to the emerging area of Social Computing and Participative Web. It will discuss theories, technologies and human issues of Web 2.0: how people network online, what networks and communities they form, why they participate and contribute, and how to design infrastructures for successful social applications.
Formerly: CMPT. 898
Permission of the instructor is required
Prerequisite(s): Experience in web programming or web-based information systems

CMPT. 872.3 — 1/2(3L)
Advanced Learning Technology
Aspects of advanced learning technology are studies, including: learner modelling, instructional planning, domain knowledge representation, authoring tools, tutorial dialogue, evaluation, semantic web technology, and theories of learning. The course takes an applied perspective, with the goal of understanding current research issues involved in building intelligent systems for use by learners.
Prerequisite(s): CMPT. 812 or permission of the instructor.

CMPT. 873.3 — 1/2(3L)
Adaptive Systems and Personalization
Research issues in adaptive systems are examined, including: user modelling, cognitive diagnosis, data mining, representations of context and affect, personal agents, collaborative filtering, group modelling, scrutability, and privacy. Issues will be explored in the context of applications such as e-learning, e-commerce, adaptive hypermedia, information systems, and recommender systems.
Prerequisite(s): CMPT. 812 or permission of the instructor.

CMPT. 874.3 — 1/2(3L-2P)
Construction of Computational Casual Models
Prerequisite(s): CMPT. 812 or permission of the instructor.

CMPT. 876.3 — 1/2(3L)
Image and Animation Synthesis
An advanced course in computer graphics, concentrating on techniques for synthesizing images and animations. Physical simulation for animation. Procedural modeling and texture synthesis. Data-driven computer graphics, including motion capture, image-based rendering and model acquisition. Further alternatives to traditional image formation methods, such as non-photorealistic rendering and point-based rendering.
Prerequisite(s): CMPT. 829

CMPT. 880.3 — 2(1.5L)
Research Methods and Topics I
An introduction to research methods and research topics in computer science. Selected topics are researched under the direct supervision of faculty members, and reports on the outcome of this research are given in both oral presentations and in written papers. Required of all students in the M.Sc. program.
Prerequisite(s): Admission to the M.Sc. program in computer science.

CMPT. 890.3 — 2(1.5L)
Research Methods and Topics II
Research methods and research topics in computer science. Selected topics are researched under the direct supervision of faculty members, and reports on the outcome of this research are given in both oral presentations and in written papers. Topics are more difficult than in CMPT. 880 and more in-depth research is expected. Required of all students in the Ph.D. program.
Prerequisite(s): Admission to the Ph.D. program in computer science.

CMPT. 898.3 Special Topics
These courses are offered occasionally by visiting faculty and in other special situations. Students interested in these courses should contact the department for more information.

CMPT. 899 Special Topics
Offered occasionally by visiting faculty and in other special situations. Students interested in these courses should contact the department for more information.

CMPT. 910.15 — 1/2(40P)
Research Internship
A student makes full-time formal or practical contributions to a research program in an unfamiliar environment. This course may be taken by a student from another institution working here, or by students from this institution working in an industrial or academic research program.

CMPT. 990 Seminar
All graduate students are required to register and regularly attend and participate in the department seminar series throughout their period of residence. Ph.D. students are required to present a seminar based on their own research.
CMPT. 992.0
Research Project
This course is a supervised graduate project in Computer Science. It is available only to students from other universities who are completing part of their program requirements at the U of S. There is no Project Option available for the University of Saskatchewan graduate programs in Computer Science.

Note: Visiting students in a joint program must register in this course. It consists of independent study and investigation of a real world problem, and submission of an acceptable report on the problem studied.

CMPT. 994
Research
Students writing a Master's thesis must register for this course.

CMPT. 996
Research
Students writing a Ph.D. thesis must register for this course.

CMRS — CLASSICAL, MEDIEVAL, AND RENAISSANCE STUDIES

Department of History
CMRS. 899
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

CMRS. 994
Research
Students writing a Master's thesis must register for this course.

COMM — COMMERCE

Department of ESB (Dean's Office)
COMM. 898
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

CMRS — CLASSICAL, MEDIEVAL, AND RENAISSANCE STUDIES

Department of History
CMRS. 899
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

CMRS. 994
Research
Students writing a Master's thesis must register for this course.

CMRS — CLASSICAL, MEDIEVAL, AND RENAISSANCE STUDIES

Department of History
CMRS. 994
Research
Students writing a Master's thesis must register for this course.

CORR — CORRECTIONS

Department of Psychology
CORR. 810.3 — (35)
Evidence Based Best Practice in Corrections
This course explores the theoretical and empirical basis of criminal behaviour. This knowledge will then be considered with respect to prediction of criminal behaviour, classification of offenders for purposes of treatment and interventions and finally effective interventions with offender populations. Each candidate will demonstrate understanding of the application of Evidence Based Practice across a jurisdictional system by preparing a literature review focusing on an issue unique to their jurisdiction.

Restriction(s): Restricted to students enrolled in the P.G.D.S.C. in Corrections program.

CORR. 820.3 — (35)
Law and Policy in Corrections
This course aims to expose the participants to statutes, acts and legislations that govern corrections, including those governing information sharing and services. Next, policies governing management of correctional clientele, including roles and responsibilities, are reviewed. Legal and policy aspects are each considered from an effective correctional intervention perspective.

Restriction(s): Restricted to students enrolled in the P.G.D.S.C. in Corrections program.

CORR. 830.4 — 1/2(3S-3P)
Essential Elements of Forensic and Correctional Assessment
This course provides content teaming and supervised field experience in general psychological and specific forensic assessment as they are applied to offender populations. Risk and criminogenic needs assessment pertaining to risk for general and specific criminal recidivism will be examined, as well the delineation of offender-specific treatment targets for intervention.

Restriction(s): Restricted to students enrolled in the P.G.D.S.C. in Corrections program.

CORR. 840.3 — 1/2(3S-3P)
Incorporating Effective Correctional Principles and Practices into Case Management
This course will examine the development case management of offenders from social service models of the late 1960’s to the present day practice of incorporating the Risk, Need, Responsivity principles and linking assessment with case management. Important concepts of assessment, risk management and rehabilitation will be explored.

Restriction(s): Restricted to students enrolled in the P.G.D.S.C. in Corrections program.

Prerequisite(s): CORR. 810, CORR. 830.

CORR. 850.7
Evidence Based Intervention with Criminal Offenders
This course will cover topics related to effective correctional intervention with institutional and community-based correctional clients, including aspects of offender screening and classification, a review of general evidence-based treatment approaches with emphasis on cognitive behavioural modalities, and an examination of their application to specific offender criminogenic needs.

Restriction(s): Restricted to students enrolled in the P.G.D.S.C. in Corrections program.

Prerequisite(s): CORR. 810, CORR. 830.

CORR. 860.3
Research and Evaluation of Effective Correctional Treatment Principles Practices and Interventions
This course explores the evaluation literature on correctional treatment and the research design and methodologies that are used to undertake these evaluation in large organizational structures. A primary objective will be to examine the research and development of the Correctional Programs Assessment Inventory (CPAI) and its use to evaluate correctional programs.

Restriction(s): Restricted to students enrolled in the P.G.D.S.C. in Corrections program.

Prerequisite(s): CORR. 810, CORR. 830.

CORR. 870.3
Achieving Program Integrity Quality Assurance and Outcomes Through Clinical Supervision
This course will examine the role of clinical supervision for assessment and case management in the development of effective correctional treatment service delivery systems. This will include the importance of professional and ethical standards for practice and how this is achieved through policy and developing formal mechanisms to evaluate performance.

Restriction(s): Restricted to students enrolled in the P.G.D.S.C. in Corrections program.

DRAM — DRAMA

Department of Drama
DRAM. 898
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

DRAM. 899
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

DRAM. 990
Seminar

DRAM. 994
Research
Students writing a Master's thesis must register for this course.

EADM — EDUCATIONAL ADMINISTRATION

Department of Educational Administration
EADM. 811.3 — 1(3S)
Theory
A wide range of concepts and processes in the study of organizations. A variety of schools of organizational thought, and examines recent trends in-in-depth study of concepts and processes in educational settings.

EADM. 811.3 — 1/2(3S)
History and Development of Organizational Theory
Traces major theories through the evolution of organizational thought, and examines recent trends in the study of organizations. A variety of schools of thought are investigated and utilized as perspectives from which to view educational organizations. The content is designed to provide a basis for further in-depth study of concepts and processes in educational settings.

EADM. 812.3 — 1/2(3S)
Educational Finance
Financing public education; educational revenues and expenditures; principles underlying grants systems for education; alternative models for financing public education; taxation and principles of taxation; financial administration in local school systems; cost-quality relations in education; trends in educational finance; financial planning in times of retrenchment.
EADM. 813.3 — 1/2(3S)
Planning and Data Based Decision Making
Designed to provide individuals with a knowledge of educational planning at the Board of Education level. Includes such theoretical aspects as the nature of educational planning, planning concepts, and approaches and models. Investigates applied aspects such as data collection, demographic analysis and enrolment forecasting, school facilities, master plans, and new planning techniques.

EADM. 816.3 — 1/3(3S)
Instructional Leadership for the Enhancement of Teaching
Focuses on the formal and informal organization of the school. The leadership styles of principals and vice-principals, as they affect curriculum development, implementation and evaluation, will be studied. Emphasis will be placed on organizational development strategies.

Prerequisite(s): EADM. 811.

EADM. 819.3 — 1/3(3S)
Leadership and Governance in First Nation Education
Focuses on First Nation educational governance, community leadership roles in Indian Control of Indian Education and examines band operated school governance across Canada. New directions in First Nation educational governance as evidenced in the Mi’Kmaq Education Act and emerging administrative mechanisms will form a major concentration of the course.

EADM. 820.3 — 1/2(3S)
Administrative Roles in School Systems
Examines the roles of various educational administrators: vice-principal, principal, assistant director and director. The relationships and functions associated with each of these roles will be examined from several perspectives - legislation, theoretical models, role theory, and research findings. The specific content will address means by which these roles can lead to effective administrative practice.

Prerequisite(s): EADM. 811.

EADM. 821.3 — 2(3S)
Organizational Behaviour in Education
Focuses on behaviour within the formal and informal contexts of the educational system. It includes such topics as motivation, group processes, communication, decision making, conflict management, leadership, power and authority.

Prerequisite(s): EADM. 811.

EADM. 824.3 — 1/2(3S)
Structure and Organization of Education in Canada
Traces the historical basis and development for the present forms of education in the various provinces in Canada. It explores the current structure and organization of education in different provinces. Finally, it studies the issues and problems germane to the Canadian educational scene.

EADM. 825.3 — 1/2(3S)
Educational and Administrative Law
Deals with constitutional law as applied to education and language, intentional wrong and defenses, the various aspects of negligence and its defenses, occupier's liability, employer's liability, administrative law, defamation, and human rights. Wherever relevant, a parallel tie-in will be made with statute law.

EADM. 826.3 — 1/2(3S)
Human Resources Leadership in Education
Designed to provide a review of the literature in personnel administration in education and exposure to applications in human resources management. The topics addressed include manpower planning, recruitment of personnel, selection of personnel, placement and induction of personnel, staff development, appraisal of personnel, administration of collective agreements, legal aspects of personnel administration and supervisory practices.

Prerequisite(s): EADM. 811.

EADM. 829.3 — 1/2(3S)
School and Organizational Renewal
Focuses on organization development as a planned and sustained effort to apply behavioral science and school effectiveness research to school and system improvement. Strategies which involve school and system members themselves in the assessment, diagnosis and transformation of their own school organization will be studied in detail.

EADM. 834.3 — 1/2(3L/5)
Case Studies in Educational Leadership
Considers issues and dilemmas arising from a wide variety of educational leadership cases. Classical and contemporary moral philosophies as well as professional ethics will be utilized to examine these problematic cases. The challenges associated with developing ethical frameworks for decision-making and with promoting ethical consciousness and competencies in particular education settings will be explored.

Prerequisite(s): EADM. 811.

EADM. 835.3 — 1/2(3S)
Governance and Policy Making in Education
Deals with the use of political, jurisprudential and organizational theories to better understand and analyse educational governance at state, system, and site-based levels. The course includes the application and assessment of various models and mechanisms of educational policy and decision making. Consideration will be given to the evolving roles and relationships of interest groups, interagency personnel, professional educators, legislators, executives, the judiciary and citizens.

Prerequisite(s): EADM. 811.

EADM. 836.3 — 1/2(3L)
Leading Community Development
Deals with issues, principles and strategies used to develop and maintain learning communities and effective community relations. Topics include: community-participation theory; contemporary leadership and followership theory; stakeholder collaboration; communication and conciliation strategies; the politics of diversity and inclusion; as well as approaches taken to community and capacity building in education.

Prerequisite(s): EADM. 811.

EADM. 881.3 — 1/2(3S)
Organizational Paradigms and Analysis
Analyzes a number of organizational paradigms based upon different sets of metatheoretical assumptions about the nature of social science and the nature of society. Emphasis will be placed on the paradigmatic shifts that are occurring in educational administration.

Prerequisite(s): EADM. 811.

EADM. 884.3 — 1/2(3S)
Policy Making in Education A Critical Perspective
An advanced doctoral level course in educational administration dealing with policy-making in education. Focuses on three main aspects of educational policy-making: building consent for educational policy; promoting deliberation, understanding, and informed action in policy-making; and synthesizing basic considerations for formulating and implementing educational policy.

EADM. 885.3 — 1/2(3S)
Research Methods
Designed to explore the various methods of research, and the problems related to research design. Special emphasis will be placed on research methods related to Educational Administration.

EADM. 892.3 — 1/2/1and2(3L)
Trends and Issues in Educational Administration
Selected current trends and issues in educational administration will be analyzed in detail. Literature, research and related developments in other areas will be examined. These courses will normally be taught during summer sessions by visiting professors with particular expertise.

Note: May be taken more than once on the recommendation of the Department Head.

EADM. 894.3 — 1and2(P), 1(P)
Laboratory in Educational Administration
Provides opportunities for students to apply theory to practice in undertaking field research projects which differ from thesis and project topics. Preparation of a scholarly report and regular consultation with faculty members are key course requirements.

Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.
EADM. 895.3 — 2(3L)
Parents and Education Theory Policy and Practice
Will provide opportunities for reflection on scholarship, policy and practice regarding parents’ positioning in relation to and engagement with schools and education. The intent of the course is to develop an empirical and theoretical understanding of educational practice and policy aimed at engaging parents. Students will be encouraged to examine theoretical underpinnings and philosophical assumptions in the context of their own understanding and practices. Students will be encouraged to discuss, write about, and reflect on the readings within their particular school/educational contexts and professional experiences.

EADM. 898.3 — 1/2(3L)
Individual Reading Course
Provides an opportunity for a student to pursue a topic of personal interest. The topic studied must fall outside the scope of educational administration courses offered, although this provision may be waived with the consent of the department. The student is responsible for defining the area of interest and approval of the project must be gained prior to registration. The student undertakes intensive reading under the guidance of a staff supervisor, and submits a major paper for assessment on or before a date agreed upon in writing with his/her supervisor. An oral examination is also required.

EADM. 899
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

EADM. 990
Seminar
A required non-credit seminar for graduate students in the Master’s and Ph.D. programs. Provides students with information, guidance, and some skills needed to succeed in and profit from their program of studies. Enhances skills in seminar participation, scholarly writing, library use, and computer applications. Discussions of educational issues, research opportunities, research protocols, and research funding sources are also included. Separate seminars are arranged for full- and part-time Master’s students and Ph.D. students.

EADM. 991.3
Educational Leadership Field Based Applications
Designed to provide students with an opportunity to participate in field-based research in the area of educational leadership. Students may choose to 1) participate in a three week field-based educational leadership internship; or 2) undertake research related to educational leadership. Both options require the submission of a research paper.
Prerequisite(s): 27 credit units of course work toward M.Ed. degree including EADM. 811, 990, ERES. 800.

EADM. 994
Research
A student undertaking research leading to a Master’s thesis must register in this course each year until the thesis is completed. This applies to thesis work done extramurally as well as intramurally.

EADM. 996
Research
Students writing a Ph.D. thesis must register in this course.

ECON — ECONOMICS

ECON. 800.3 — 1(3L)
Micro Economic Theory
Studies theories of exchange, consumer demand, production and cost, and pricing.

ECON. 801.3 — 1(3L)
Macro Economic Theory
A survey of macro-economic theory, and includes theories of the consumption function, theories of investment, money and interest rates, monetary and fiscal policy, and general equilibrium theory.

ECON. 804.3 — 1and2(3L-3P)
Research in Econometrics
A research project serves as the primary tool to learn econometric techniques, but is augmented by a consideration of the theoretical aspects of econometrics.
Preerequisite(s): ECON. 204, 305, 211, 214 or equivalents.

ECON. 805.3 — 1/2(3L)
Mathematical Analysis in Economics
A study of the mathematical formulation and investigation of economic relationships. Topics include the theory of consumer demand, theory of the individual firm, input-output analysis, models of aggregate economic activity and economic growth.

ECON. 808.3 — 1(3L)
Econometrics I
The fundamentals of estimation and inference in the classical regression model, with applied laboratory sessions using actual economic data. Topics covered typically include: multiple linear and non-linear regression models; least squares; maximum likelihood; instrumental variables; statistical properties of estimators; asymptotic theory; restrictions; measurement error; serial correlation; heteroskedasticity; systems of equations.
Note: Students with credit for BPBE. 860 will not receive credit for this course.

ECON. 809.3 — 2(3L)
Econometrics II
Considers estimation and inference in different econometrics models. The first part deals with time-series econometrics and nonstationary data: unit root; cointegration; single-equation and system methods. The second part covers panel data and discrete choice. Additional topic is added based on instructor’s current interests. Application of these techniques in applied projects.
Note: Students with credit for BPBE. 861 will not receive credit for this course.

ECON. 811.3 — 1/2(3L)
International Trade Theory
Studies recent developments in the pure theory of trade. Topics include current explanations of patterns of trade and factor movements, the formation of regional free trade areas, commercial policies and international cartels.

ECON. 812.3 — 1/2(3L)
International Monetary Economics
The nature of adjustment in open economies, under various international monetary systems, to real and monetary disturbances. The systems investigated will include fixed exchange rates, both with and without sterilization, flexible exchange rates and managed floating.

ECON. 820.3 — 1(3L)
Agricultural Policy
A study of recent developments in agricultural policy. Particular attention will be paid to the role of agriculture in programs to promote economic growth and development. Major differences in national approaches to the problems of agriculture will also be emphasized.

ECON. 823.3 — 1/2(3L)
Labour Economics
The functioning of labour markets including labour supply, labour demand, accumulation of skills, contracts, and unemployment.
Pre prerequisite(s): Graduate standing in economics, or permission of the instructor.

ECON. 830.3 — 2(3L)
Topics in Public Finance
A study of modern theoretical constructs and some of their applications. Topics include cost-benefit analysis, fiscal policy, the public debt, analysis of taxes and intergovernmental fiscal relations.

ECON. 834.3 — 2(3L)
Health Economics
Examines health economic issues and the functioning of health care markets using microeconomic theory. Topics include health insurance and demand for health, production of health, economic evaluation methods, economic explanations for the behavior of health care providers, functioning of insurance markets, cost efficiency and regulation in health care markets.
Pre prerequisite(s): Permission of the instructor.

ECON. 840.3 — 1and2(3L)
Canada United States Economics and Political Relations
Recent trends in the economic and political relations between Canada and the United States will be arranged with particular reference to agricultural policies; capital investment; economic fluctuations; energy resources; foreign trade; trade union links; transportation; defence; and institutional arrangements for dealing with joint problems.
ECON. 850.3 — 2(3L)
Game Theory Strategic and Cooperative Choices
A systematic introduction to game theory and its application in economics. Provides concepts and tools for understanding current research and performing your own research in the field. Covers both non-cooperative and cooperative game theories.
Prerequisite(s): ECON. 800 or equivalent or permission of the instructor.

ECON. 870.3 — 1/2(3L)
Topics in Behavioural Economics
Details the economics of behaviour and the importance of behavioural assumptions for the analytical predictions of economic theory, with special emphasis of the theory of the firm, household economics, experimental economics, rational choice analyses and public policy.
Note: Students may not receive credit for both ECON. 470 and 870.

ECON. 873.3 — 1(3L)
Advanced Microeconomic Theory
Provides a comprehensive treatment of general equilibrium and welfare economics, market failures, game theory, the economics of uncertainty and information, the theory of incentives.
Prerequisite(s): ECON. 800 or equivalent.

ECON. 874.3 — 1/2(3L)
Advanced Macroeconomic Theory
A survey of advanced topics in modern macroeconomic theory. Topics include theories of growth, real business cycles, search in labour markets, nominal business cycles and macro policy.
Prerequisite(s): ECON. 801 or equivalent.

ECON. 898.3 — 1/2(3L)
Special Topics
Reading, essays and discussions in an approved special field. This course will be offered only in special circumstances.

ECON. 899.6
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

ECON. 990
Seminar
Reports and discussion on current development and research. All graduate students in economics are required to register. Attendance and at least one paper is required for all postgraduate students during their time as a postgraduate student, whether for one year or more.

ECON. 992.0
Project
A required course for students following the project M.A. option. A research paper on an approved topic must be submitted. The topic may be empirical in nature, or a critical review of the literature, or a critical analysis of some theoretical problem. The paper will be examined by a supervisor and two other members of the department.

ECON. 994
Research
Students writing a Master’s thesis must register for this course.

ECON. 996
Research
Students writing a Ph.D. thesis must register for this course.
Prerequisite(s): Admission to the Economics Ph.D. program.

ECON. 805.3 — 1/2(3L)
Problems in Curriculum Research and Development
Examines contemporary curriculum issues in the context of catalysts of change and strategies of change. Students will have the opportunity to focus on their particular area of curriculum interests.
Note: Students may take this course more than once for credit; provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

ECON. 809.3 — 1(3L-1P)
Models and Methods for Evaluation of Educational Programs
Examines current models for the evaluation of educational programs. The emphasis is on exploring the range of options which is available to the program evaluator and on developing an awareness of the strengths and limitations of the models. Problems in carrying out educational evaluations are also studied: examples of such problems are the utilization of evaluation results and the ethics of evaluation.
Prerequisite(s): ECON. 801, ECON. 811, or ECON. 812; or permission of the instructor.

ECON. 810.3 — 2(2L-4P)
Design and Practice of Evaluation of Educational Programs
Takes the methods of evaluating educational programs and applies them to practical situations in classrooms, schools and school units. Particular attention will be paid to developing an awareness of the breadth of available techniques and to understanding the practical problems which arise in the conduct of evaluations.
Prerequisite(s): ECON. 809.

ECON. 811.3 — 1(3S)
Curriculum Perspectives
Will investigate a variety of curriculum perspectives in relation to educational practice in a variety of contexts.
Prerequisite(s) or Corequisite(s): B.Ed. or equivalent
Restriction(s): Restricted to students enrolled in the College of Graduate Studies and Research or non-degree status graduate students by permission.

ECON. 812.3 — 2(3S)
Curriculum Theory and Practice
Will examine theoretical underpinnings to the field of curriculum studies and implications for practice in a variety of settings.
Prerequisite(s) or Corequisite(s): B.Ed. or equivalent
Restriction(s): Restricted to students enrolled in the College of Graduate Studies and Research or non-degree status graduate students by permission.

ECON. 813.3 — 1/2(3L)
Decolonizing the Curriculum
The Canadian education system has its historic roots in the schools of Europe, particularly those of England. While education in Canada has evolved, the colonial influence of Great Britain and the neo-colonial influence of the United States cannot be underestimated. In an era where educators are increasingly aware of the diversity of their student population and the multiplicity of world views colliding in the classroom, the colonial American-European educational model is increasingly scrutinized. As Canadian educators become more aware of Aboriginal and immigrant perspectives and educational needs, the necessity of decolonizing the curriculum becomes ever more apparent.

ECON. 815.3 — 1/2(3L)
Trends and Issues in Mathematics Education
Designed to acquaint students with recent literature in the field of mathematics education. It will focus upon translating various theories of how children learn mathematics into classroom instruction.
Prerequisite(s): 12 credit units in mathematics and 6 senior credit units in mathematics education.

ECON. 820.3 — 1/2(3L)
Research in Teaching Effectiveness
Students will learn the philosophy, the principles, and the practices of communication that are applicable across disciplines in any field of teaching, especially as this communication facilitates teaching and learning development. The course content will be organized in a seminar format.
Prerequisite(s): Acceptance as a graduate student in the College of Graduate Studies and Research.

ECON. 832.3 — 1/2(3P)
Practicum
Requires students to apply in schools the knowledge of teaching and/or supervision studied in course work. The specific in-school activities will include working in a classroom, with a teacher or intern and with a group of teachers conducting an in-service program.

ECON. 835.3 — 1/2(3S)
Teachers and Children's Identity Composition in Curriculum Making
Considers the way curriculum is created as teachers and children live alongside each other in educational settings. Graduate students will also examine the ways curriculum making in relationship with other individuals shape identity in teachers and children.
Prerequisite(s) or Corequisite(s): ECON. 801, ECON. 811, ECON. 812, or ECMM. 802.
ECUR. 843.3 — 1/2(3L)
Reading Process and Practice
Provides a theoretical and research basis for understanding reading as a socio-psycholinguistic process. The aim is to seek instructional implications of theory and research as they impact on issues of reading and constructing meaning from written discourse.

ECUR. 844.3 — 1/2(3S)
Narrative Inquiry
Explores narrative inquiry as a qualitative methodology for understanding experience in diverse research settings. Students will develop an understanding of narrative inquiry as both a method and phenomenon for generating field texts and research texts. Attention to ethics will be an integral aspect of the course.

Restriction(s): Admission to the College of Graduate Studies and Research.

ECUR. 870.3 — 1/2(3L)
Literacy Education and Curriculum
Examines the field of language education, emphasizing developments at the elementary, middle years and secondary school levels. Topics include language and thought, language and learning, language arts, curricula, resources, writing and the writing process, literature and the response process, and research in language education.

Prerequisite(s): 12 credit units in English and 6 senior credit units in Language Arts Education; or permission of the instructor.

ECUR. 877.3 — 3L
Early Literacy Development
This course explores the field of early literacy education, focusing on contemporary issues and concerns pertaining to young children (up to 8 years) and involving theory, research, policy and practice. Also included is a condensed overview of literature for young children, including various forms of storytelling and Canadian picture books, contextualized within oral language development as well as emergent reading and writing.

Restriction(s): Restricted to students in the College of Graduate Studies and Research.

ECUR. 879.3 — 3L
Canadian Childrens Literature
An overview of contemporary Canadian childrens and young adult fiction reviewed through the socio-political framework of Radical Change as this theory pertains to ethnicity, gender, sexuality, and disability studies. Critical literacy is offered as a classroom approach through which literature may be explored with elementary and secondary students.

Restriction(s): Restricted to students in the College of Graduate Studies and Research.

ECUR. 899.6 — 1/2(1T-8R)
Readings Course
Provides an opportunity for students to pursue a topic of an interdisciplinary nature or multi-departmental concern. The topic must fall outside the scope of courses offered, although this provision may be waived with the consent of the departments involved. The student is responsible for defining the area of interest and the approval of the project by the sponsoring and cooperating departments must be gained prior to registration. The student undertakes intensive reading under the guidance of a staff supervisor and advisory committee and submits a major paper for assessment.

EDUC. 990
Seminar in Curriculum Research
A required seminar for Master's and Ph.D. graduate students in Curriculum Studies, taken by all full-time students throughout the academic year. Ongoing research and development projects of faculty and students form the focus of first term seminars, while readings and student-identified issues form the basis for second term seminars. This seminar also provides students with information and guidance to help them profit from their program of studies, and to utilize computer technology effectively. Separate seminars are arranged for Master's and Ph.D. students. Registration in EDUC. 990 seminar is required for one year only.

ECUR. 991.3 — (1L‑2S)
Scholarship in Teaching
Students will demonstrate their scholarship in teaching through a collection of academic and professional work. The work will be represented through portfolios, which may include multi-media presentations, critical reflections and professional development.

Prerequisite(s): 27 credit units of course work toward the M.Ed. degree.

ECUR. 992.0
Project
A student in the project route must register in this course each term every year until the project or minor thesis is completed. A project is either a minor thesis requiring research, or a project, both with intensive reading under the supervision of a faculty supervisor.

ECUR. 994
Research
A student undertaking research leading to a Master's thesis must register in this course each term every year until the thesis is completed.

ECUR. 996
Research
Students writing a Ph.D. dissertation must register for this course each term every year until the dissertation is completed.

EE — ELECTRICAL ENGINEERING

EE 701.3 — 1/2(3L‑3P)
Introductory Circuits and Electronics
A lecture/laboratory course designed for students who have little or no background experience in electronics but who wish to obtain a working knowledge of electronic devices and techniques. Fundamentals of electricity and basic laws governing voltage and current in circuit elements with direct and alternating current excitation; charge carriers in vacuum and semiconductor materials; the diode and diode circuits; the junction transistor, equivalent circuit at low frequency, the basic amplifier circuit, biasing, and digital electronics. It is expected that students will follow up with EE 702 to achieve a useful level of experience in the application of electronic devices.

EE 800.3 — 1/2(3L‑3P)
Circuit Elements in Digital Computations
The electrical circuit aspects of digital systems. Includes: logic devices, data bus design, processor architecture, input-output techniques, input-output devices, magnetic and electronic storage devices, computer communication techniques and devices.

EE 802.3 — 1/2(3L)
Advanced VLSI Design and Analysis
A study of semiconductor devices with special emphasis placed on device operation in VLSI circuits. Topics include device physics, electrical characteristics, computer simulation of circuits, speed-power-area considerations, circuit synthesis and CMOS integrated circuit design. Additional lecture topics as requested may be given. A design project is also required.

EE 810.3 — 1/2(3L)
Communication Theory I
Deterministic signal theory, noise and its physical origin, random signal theory, performance of analog and digital communication systems in the presence of noise.
EE 811.3 — 3L
Digital Signal Processing for Communications
This course teaches students the basic principles of multirate digital signal processing and how to apply these principles in the design of recursive polyphase filters. The course shall also give the students experience in designing, building and debugging fundamental circuits used in communications.
Prerequisite(s): EE 461 or equivalent (EE 880 can be accepted as co-requisite in place of this prerequisite), EE 456 or equivalent (EE 810 can be accepted as co-requisite in place of this prerequisite).

EE 812.3 — 1/2(3L)
Microwave Devices and Circuits
Practical realization of microwave devices and circuits using linear and nonlinear techniques. Topics include small signal and low noise amplifiers, power amplifiers, frequency multipliers, oscillators, RF MEMS and microwave subsystems. Emphasis is on device and circuit simulation with realistic device models and performance optimization using computer-aided design (CAD) software.

EE 813.3 — 1/2(3L)
Introduction to Pattern Recognition
A basic introduction to pattern recognition systems, Topics include vector space representation of patterns, supervised and unsupervised systems, distance matrices, discriminant functions, probability density and parameter estimation, maximum likelihood and minimum risk classification, potential functions, feature selection and clustering. A design project is also required.

EE 814.3 — 1/2(3L)
Communication Theory II
Efficient encoding and decoding schemes for reliable transmission of digital information over noisy channels. Topics will be chosen from the following: Algebraic coding (linear block codes, cyclic codes, BCH-codes, Reed-Solomon codes), Trellis coding (convolutional codes, trellis-coded modulations, Viterbi algorithm, soft-decision decoding). Turbo-like codes (turbo-codes, low-density parity-check codes, bit-interleaved coded modulation, the forward/ backward algorithm, iterative decoding).
Prerequisite(s): EE 456 or equivalent.

EE 815.3 — 1/2(3L)
Fundamentals of Wireless Communications
The goal of this course is to study the fundamentals of wireless communications, as well as to introduce the new ideas at a level accessible to the graduate student with a basic background in probability and random processes. Examples from existing wireless communications standards will be used throughout the course.
Prerequisite(s): EE 456 and EE 845.

EE 817.3 — 1(3L)
Microfabrication by Deep X-Ray Lithography Applying Synchrotron Radiation
A multidisciplinary introduction to advanced lithographic microfabrication processes, specifically focusing on X-ray lithography (XRL) using synchrotron radiation and the LIGA process. Engineering and scientific aspects of the various process steps, as well as related applications are discussed, granting in-depth knowledge on XRL and LIGA. In addition, the course introduces students to various aspects of process technology and microcomponent layout relevant to academic research and industrial applications in microsystems and microelectronics.

EE 818.3 — 1/2(3L)
Electromagnetic Wave Propagation
The fundamentals of electromagnetism and its applications. Includes Maxwell's equations, multi-pole fields, electromagnetic waves, reflection and refraction, retarded potentials and radiation, dipole antennas, antenna arrays, rectangular and cylindrical waveguides, and microwave circuits.

EE 820.3 — 1/2(3L)
Electrical Materials Science

EE 823.3 — 1/2(3L)
Solid State Electronic Devices

EE 829.3 — 1/2(3L)
Selected Topics from Optical Electronics and Imaging Science

EE 831.3 — 2(3L‑1P)
Advanced Logic Design Using Hardware Description Languages
Theory and practice of designing large digital circuits with Hardware description languages Verilog and VHDL. This course focuses on FPGAs as the target implementation technology. The architectures of selected FPGAs are compared and some details of some of the internal operation of the FPGA are covered.
Prerequisite(s): Undergraduate Degree.
Note: Offered in the academic year 2006/2007 and alternate years thereafter.

EE 840.3 — 1/2(3L‑3P)
Mathematical Methods in Engineering
Iterative techniques for solving non-linear equations with one variable; techniques for solving sets of linear algebraic equations using direct and iterative methods; Iterative methods for solving non-linear algebraic equations; LU factorization and application of LU matrices; eigenvalues, eigenvectors and modal transformation, solving sets of first- and second-order differential equations; optimization techniques.

EE 845.3 — 1/2(3L)
Random Variables in Engineering Systems
Random variables, functions of random variables, expectations, characteristic function, joint densities and distributions, sequences of random variables, concept of stochastic processes. The emphasis is on developing a working knowledge of the above theory in engineering applications.

EE 850.3 — 1/2(3L)
Reliability Engineering
Basic reliability concepts, elements of probability and statistical theory, application of important distributions, reliability in series, parallel and complex systems. Application of Markov chains in the evaluation of repairable system reliability. Utilization of Monte Carlo simulation in basic system reliability evaluation.

EE 851.3 — 1/2(3L)
Power System Reliability
Reliability evaluation of static and spinning generating capacity requirements. Interconnected system reliability concepts. Transmission system reliability evaluation. Determination of composite system reliability. Distribution system reliability evaluation. Incorporation of customer interruption costs in the evaluation of power system reliability worth.

EE 860.3 — 1/2(3L)
Power System Analysis
System representation and analytical techniques required for the solution of power system steady-state and transient problems. The use of digital computers in load flow, fault and stability studies is emphasized. HVdc transmission and power system control are briefly discussed.

EE 862.3 — 2(3L‑1P)
Multimedia Signals and Systems
Covers the principles of multimedia signal processing related to sound, image, and digital video signals, and extends the knowledge to digital video formats standardized in MPEG. This course discusses signals for human perception based on the 1D and 2D DSP theories in time and frequency domain and methods to match their speed to communication bandwidth. Multimedia protocols important in SOC (System on Chip) design and FPGA (Field Programmable Gate Array) based embedded systems are discussed.

EE 863.3 — 1/2(3L)
Power System Modeling and Control
Modeling of power systems: synchronous machines, HVDC lines, static var compensators (SVC), loads and the power network. Small-disturbance modeling and large-disturbance modeling; control of power systems: automatic generation control (AGC), frequency and voltage control. Control of power system damping and transient stability.
EE 867.3 — 2(3L)  
Economic System Operation  
Basic concepts of economic system operation; determination of system transmission losses; development of transmission loss formulae; co-ordination of incremental production costs and incremental transmission losses in composite hydro-thermal systems; economic load dispatch in thermal systems by dynamic programming; optimal economic operation of hydro-thermal systems; system operation in a deregulated environment; optimum coordination of active and reactive power and reserve in a deregulated system.

EE 868.3 — 1/2(3L)  
Digital Techniques for Power System Measurements and Protection  
Interfacing electronic devices with power systems; electronic transducers, auxiliary transformers, anti-aliasing filters, analog to digital converters, sample and hold devices and computing devices. Numerical techniques for converting quantized data to phasors and using the phasors for derived measurements, such as, power flow, apparent impedance and frequency.

EE 880.3 — 1/2(3L)  
Digital Signal Processing  
Covers z-transform, structure of discrete time systems, discrete Fourier transform, FFT (Fast Fourier Transform), spectral analysis, FIR (Finite Impulse Response) filters, IIR (Infinite Impulse Response) filters, DSP (Digital Signal Processing) microprocessor applications, and introduction to spectral estimation and adaptive digital filters.

EE 898.3  
Special Topics  
Offered occasionally by visiting faculty and in other special situations to cover, in depth, topics that are not thoroughly covered in regularly offered courses.

EE 899.6  
Special Topics  
Offered occasionally by visiting faculty and in other special situations to cover, in depth, topics that are not thoroughly covered in regularly offered courses.

EE 890  
Seminar  
A seminar is held periodically throughout the regular session during which staff and graduate students discuss current research topics. Graduate students are required to attend these seminars.

EE 991.6  
Postgraduate Diploma Project  
Students taking the Postgraduate Diploma program must register in this course. It consists of independent study and investigation of a real-world problem, and submission of an acceptable report on the investigation.

Formerly: EE 902.6.

EE 992.0  
Project  
Students undertaking the project Master's degree (M.Eng.) must register in this course. It consists of independent study and investigation of a real world problem, and submission of an acceptable report on the investigation.

EE 994  
Research  
Students writing a Master's thesis must register for this course.

EE 996  
Research  
Students writing a Ph.D. thesis must register for this course.

EFDT — EDUCATIONAL FOUNDATIONS

EFDT. 810.3 — 1/2(3L)  
Learning for Life Practice and Theory in Adult Education  
Introduces graduate students from various backgrounds to the scope and aims of modern adult education in all its diversity. The content is significantly shaped by recent studies in Canadian adult education practice and theory and these developments are viewed from international perspectives.

Formerly: ECNT. 810  
Note(s): May be offered online. Cannot receive credit for ECNT. 810 and EFDT. 810.

EFDT. 811.3 — 1/2(2P)  
Program Planning of Continuing Education  
Program development is examined within the context of Continuing Education. Specific elements of the program development process which will be discussed include the planning context, need identification, educational objectives, and learning experiences. Issues related to these concepts will be viewed from a theoretical framework. Participants will have an opportunity to apply or test some of this theory in an educational setting.

Formerly: ECNT. 811  
Prerequisite(s): EFDT. 812; or permission of the instructor.  
Note(s): Cannot receive credit for ECNT. 885 and EFDT. 815.

EFDT. 812.3 — 1/2(2P)  
Community Development Practices  
Using classroom and field community experiences as a means for generating information, the learner examines various community development practices on the Prairies. In so doing learners may assess their own level of competence in putting into practice community development theory, principles, and methods.

Formerly: ECNT. 890  
Note(s): Cannot receive credit for ECNT. 890 and EFDT. 816.

EFDT. 813.3 — 1/2(100S)  
Workplace Learning  
Provides a hands-on workplace learning experience in adult and continuing education. The learning experience is monitored throughout by a faculty advisor and a field-based supervisor. Placements are made with organizations that best suit students' academic interests and career aspirations.

Formerly: ECNT. 892  
Restriction(s): Admission to graduate program in Educational Foundations.  
Note(s): Cannot receive credit for ECNT. 892 and EFDT. 813.

EE 913.3 — 1/2(2S)  
Comparative Continuing Education  
Provides participants with an international perspective on the field of adult education and lifelong learning including critical analysis of "development" issues. Explores ethical issues that may arise for the individual practitioner in international contexts. Selected theorists are studies to give a broad overview of current research and practice in the field.

Formerly: ECNT. 878  
Note(s): Cannot receive credit for ECNT. 878 and EFDT. 813.

EFDT. 815.3 — 1/2(2P)  
Application of Learning Principles in Practice of Adult Education  
Requires participants to undertake the role of facilitator in arranging a learning experience for an adult group, using a variety of adult education procedures. The role of the project will be primarily to help the students gain increased understanding of themselves in facilitating adult learning.

Formerly: ECNT. 885  
Note(s): Cannot receive credit for ECNT. 885 and EFDT. 815.

EFDT. 817.3 — 1/2(2S)  
Trends and Issues in Continuing Education  
Some currently important aspects of the field of adult education are reviewed and analyzed.

Formerly: ECNT. 891  
Note(s): Cannot receive credit for ECNT. 891 and EFDT. 817.  
Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

EFDT. 818.3 — 1/2(100S)  
Comparative Continuing Education  
Provides participants with an international perspective on the field of adult education and lifelong learning including critical analysis of "development" issues. Explores ethical issues that may arise for the individual practitioner in international contexts. Selected theorists are studies to give a broad overview of current research and practice in the field.

Formerly: ECNT. 878  
Note(s): Cannot receive credit for ECNT. 878 and EFDT. 813.

EE 897  
Note(s): Cannot receive credit for ECNT. 897 and EFDT. 819.
EFDT. 831.3 — 1/2(3S)
Existentialism and Education
Highlights critical issues raised by existentialists which, in turn, serve as the starting point for thinking about the individual and education.

EFDT. 832.3 — 1/2(3S)
Phenomenology and Education
Inquiry into the value for education of phenomenological theory and methodology. Major works of selected phenomenologists are examined.

EFDT. 837.3 — 1/2(3S)
Educational Philosophies and Curriculum
Deals with the philosophical foundations of curriculum theory and clarifies the basis from which educational programs can be analysed. Contemporary philosophical issues related to the curriculum and school programs are examined. The writings of selected educational philosophers are studied.

EFDT. 842.3 — 1/2(3L)
History of Indian and Native Education in Western and Northern Canada
A review and examination of educational practices of Indian and Inuit people of Western and Northern Canada both before and after the arrival of Europeans. The course outlines the involvement in schooling of the Hudson’s Bay Company, missionaries and governments. Contemporary developments in education for Indian, Metis and Inuit people are discussed.

Formerly: EIND. 810
Note(s): Cannot receive credit for EIND. 810 and EFDT. 842.

EFDT. 843.3 — 1(3S)
Decolonizing Aboriginal Education
Intended to address colonization and imperialism among Aboriginal peoples, focusing specifically on the role education has played in achieving cognitive imperialism, critique the tenets of cognitive imperialism in English language, and education policy, politics, and practice, and evaluate international options for restoring Aboriginal communities.

Formerly: EIND. 851
Note(s): Cannot receive credit for EIND. 851 and EFDT. 843.

EFDT. 844.3 — 1/2(3S)
Theory and Practice of Anti-Racist Education
Examines the historical, economic and political processes and practices of racialization, and the ways in which these processes and their effects become entrenched in our social and educational institutions. Theories and practices of integrative anti-racist education will be explored, including its applications in a variety of work places.

Formerly: EIND. 852
Note(s): Cannot receive credit for EIND. 852 and EFDT. 844.

EFDT. 845.3 — 1/2(2L-1P)
Cross Cultural Research Methodology
A methodology course dealing with the adaptation of various research approaches to the study of variables across cultures. Students are expected to become involved in the design and conduct of a cross-cultural research study.

Formerly: EIND. 855
Note(s): Cannot receive credit for EIND. 855 and EFDT. 845.

EFDT. 846.3 — 2(3S)
Aboriginal Languages and Linguistic Diversity in Education
This seminar explores the state of Indigenous languages, the interrelated threats to linguistic diversity, and its foreseeable consequences for Indigenous knowledge, heritage, identity, human rights, and social justice. It critically examines post-colonial educational programming aimed at recovering, sustaining, and developing Indigenous languages.

Formerly: EIND. 871
Note(s): Cannot receive credit for EIND. 871 and EFDT. 846.

EFDT. 848.3
Resilience in Aboriginal Education
Informed by narrative literature on gender, race, sexuality, class and disability, this course examines qualities, criticisms and theories of resilience as they relate to Aboriginal Education. Diverse First Nations, M&ts and Inuit paradigms of resilience are examined to question hegemonic practices in education in relation to tensions, anxieties and crucial turning points in the lives of individuals, families and communities.

EFDT. 851.3 — 1/2(3S)
International Education and Modernization
Focuses on educational issues in development, globalization and modernization, and the role of education in international understanding and cooperation.

EFDT. 854.3
International Study Tour
Pre-departure readings and seminars introduce students to the culture of the designated country and to the history and structure of its education system. Lectures, seminars, observation, and journals are used to develop an analysis of the relationships between cultural tradition, economic and political structures, and education.

EFDT. 860.3 — 1/2(3S)
Seminar in Anthropology and Education
Investigation of selected problems in anthropology and education.

EFDT. 870.3 — 1/2(3S)
Interdisciplinary Seminar in Foundations of Education
A consideration of important educational issues from the anthropological, comparative, historical, philosophical and sociological points of view and the possible implications for a comprehensive theory of education.

EFDT. 880.3 — 1/2(3S)
Process Philosophy Ecological Education for Regeneration
Utilizes process thought as a theoretical approach to ecological education; analyzes ideas such as integral development, emergence, and transformation in ecological education; and investigates critical pedagogies, educational policy and leadership, and curriculum development.

EFDT. 881.3 — 1(3S)
Education Wisdom Nature
Traces the concept of wisdom from earliest times through a decline in interest during the Enlightenment to its present-day resurgence among feminist theologians, deep ecologists, and First Nations peoples. Conceptions of wisdom and their emotional and cognitive preconditions are explored. Educational implications are considered.

EFDT. 884.3
Life History as Education
Examines life history research and life history writing from feminist, critical race theory, critical pedagogy, and cultural studies perspectives in relation to educational inquiry. Through the study of memoir, autobiography, auto-ethnography, and contemporary fiction, the construction of identities in diverse social and political contexts is investigated.

Formerly: EFDT. 898: Special Topics in Life History as Education.
Note: Students with credit for EFDT. 898: Special Topics in Life History as Education, may not take this course for credit.

EFDT. 885.3 — 1/2(3S)
Investigations in Culture and Environment
Course participants will individually and collectively engage in inquiry into various fields and discourses of culture and environment, drawing implications for their own life and work contexts.

EFDT. 898.3 — 1/2(R)
Individual Reading
Provides students with an opportunity to study in areas of their own interest. Under the direction of a staff advisor, they plan and follow a reading program and prepare a major paper.

Note: Students may take up to 12 credit units of individual reading in their graduate program.

EFDT. 899.6 — 1and2(R)
Readings Course
Provides students with an opportunity to study in areas of their own interest. Under the direction of a staff advisor, they plan and follow a reading program and prepare a major paper.

Note: Students may take up to 12 credit units of individual reading in their graduate program.

EFDT. 990
Seminar
This is a non-credit seminar designed for students in residence. Students and faculty explore issues in the general field of educational foundations using literature that is both challenging and current.

EFDT. 992.0
Project
A compulsory course for those registered for the project Master’s route. The project must be evaluated by a committee of the department.

EFDT. 994
Research
Students undertaking research leading to a Master’s thesis must register in this course each term until the thesis is completed (applies to thesis work done extramurally as well as intramurally).
EMUS — MUSIC EDUCATION

Department of Music

EMUS. 838.3 — 3L
Advanced Choral Music Teaching in the Secondary School
An advanced methods course dealing with detailed studies and critical comparison of examples of choral curricula, selection and comprehensive analysis of choral repertoire, lesson planning, programming, research into teaching of musical literacy and techniques of evaluation. Included is a substantial and detailed examination of materials and resources, and critical research into the function and characteristics of successful secondary school choral music programs.

EMUS. 841.3 — 3L
Advanced Philosophical Basis of Music Education
An advanced investigation of cutting-edge philosophical foundations of school-based music education. Through the intensive study of several schools of philosophical inquiry—both historical and current—as well as the many principal contributions made to music philosophy and aesthetics, graduate students will develop the ability to research and to articulate their thoughts in writing on the nature and value of school-based music education as demonstrated through course work and a substantial research paper.

EMUS. 848.3 — 3L
Advanced Instrumental Music Teaching in the Secondary School
An advanced inquiry, exploration and research within the realm of instrumental music education. The successful graduate student will be able to acquire and share knowledge regarding methodology, pedagogy, assessment and current scholarly ideas within the scope of the subject. This seminar will allow the student to share their most recent experiences within the classroom (if applicable), and build their knowledge base to include the latest research and techniques prevalent and successful within the profession of music education.

EMUS. 860.3
Psychology of Music
Functions of the musical mind and factors involved in the development of musical skills and maturity.

EMUS. 890.3 — 3S
Advanced Seminar in Music Education
An advanced seminar in music education designed for graduate students. The course involves research in directed readings, written assignments, oral presentations, leading classroom seminar discussions, and other experiences to assist graduate students in complementing and integrating knowledge and abilities acquired from educational experiences, courses in music and music education, and in the practical conducting experiences (e.g., school-based or professional).

EMUS. 898.3
Special Topics
Besides topics in organization and administration, studies include music and arts education curricula. Leadership and managerial styles pertaining to the music educator will be explored. Students will gain first-hand experience in planning, coordinating and managing a major music festival.

EMUS. 899
Special Topics
Students interested in these courses should contact the department for more information.

EMUS. 994
Research
A student undertaking research leading to a thesis must register in this course each year until the thesis is complete.

ENG — ENGLISH

Department of English

ENG. 801.3 — 1/2(25)
Introduction to Textual Scholarship
An introduction to textual authority, including the study of bibliographic description, editorial technique, textual transmission, database searches, and the history of modes of publication.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

ENG. 802.6 — 1and2(25)
Studies in Literary and Cultural History
Studies of specific literary periods, literary movements, issues of influence, reputation or reception. Theories of literary history may also be studied.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

ENG. 803.3 — 1/2(25)
Topics in Literary and Cultural History
Particular topics in the study of periods, movements, issues of influence, reputation or reception. Theories of literary history may also be studied.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

ENG. 805.3 — 1/2(25)
Topics in Individual Authors
Particular topics in the work of an author writing in English, or on particular works in the author’s oeuvre.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

ENG. 811.3 — 1/2(25)
Topics in National and Regional Literatures
Particular topics in national and regional literatures and constructions of nationality.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

ENG. 817.3 — 1/2(25)
Topics in Literary and Cultural Theory
Particular topics and issues in selected theories, or on particular theorists.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

ENG. 819.3 — 1/2(25)
Topics in Methods and Texts
Particular topics and issues in the application of selected methods to selected texts.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

ENG. 842.6 — 1and2(25)
Studies in Genres and Contexts
Studies in traditional or emerging genres of writing, and in their intertextual, disciplinary, and extraliterary contexts.

ENG. 843.3 — 1/2(25)
Topics in Genres and Contexts
Particular topics and issues in traditional or emerging genres of writing, and in their intertextual, disciplinary and extraliterary contexts.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

ENG. 889.3 — 1/2(25)
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

ENG. 899.6 — 1and2(25)
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.
**ENVS — ENVIRONMENT AND SUSTAINABILITY**

Department of SENS Executive Director Office

**ENVS. 801.3 — 2(3L)**  
Ecosystem Science and Sustainability  
An introduction to how principles and concepts of ecology and ecosystems science are applied to advance environmental sustainability. Students will gain a solid understanding of how natural systems function, and how scientists apply their understanding and confront uncertainties about ecosystems to address environmental management problems, and advance environmental sustainability. This course includes an out-of-classroom weekend field component.  
*Note:* This course has excursion fees in addition to regular tuition.

**ENVS. 803.3 — 1(3L)**  
Research in Environment and Sustainability  
The purpose of this course is to introduce graduate students to conceptual, practical, and ethical issues in conducting interdisciplinary research about environment and sustainability. By the end of the course, students will have a research plan from which their proposal and research activities can be developed.

**ENVS. 804.3 — 2(3L)**  
Advanced Problem Solving for Environment and Sustainability  
This course provides an advanced opportunity to develop proficiency with interdisciplinary problem analysis frameworks. This will enable students to critically appraise and constructively engage with environmental and sustainability policy processes, and develop a functional understanding of conventional and emergent institutional approaches to problem solving.

**ENVS. 805.3 — 1(3L)**  
Data Analysis and Management  
Environmental data management is complex because of its volume, qualitative and quantitative forms, and temporal and spatial characteristics. This course introduces students to statistical, qualitative, and visual methods of problem solving and data reduction and representation and describes methods for managing large and complex data sets.

**ENVS. 806.3 — (3P)**  
Field Skills in Environment and Sustainability  
Combining a field experience at Redberry Lake Biosphere Reserve with a team-oriented sustainability assessment, this course will provide hands-on training in a variety of practical skills and techniques in ecological hydrological and social sciences related to rural communities and agro-ecosystems. Students should be prepared to work in the outdoors.  
*Restriction(s):* Enrolment in a SENS graduate program or permission from instructor

**ENVS. 807.3 — (3S)**  
Sustainability in Theory and Practice  
This course confronts the paradoxes of understanding, assessing, and resolving challenges of sustainability. Students broaden and deepen understandings of sustainability, learn about their own strengths and biases, and develop both creative and analytical skills using in-depth case studies that require interdisciplinary and intercultural perspectives.  
*Restriction(s):* Enrolment in a SENS graduate program or permission from instructor

**ENVS. 808.3 — (3S)**  
Tools and Applications for Sustainability Problem Solving  
This course is designed for graduate students to improve their knowledge of applied environmental and sustainability problems and develop problem-solving skills. The focus will be on problem identification concepts, investigation of potential causes, identification and implementation of potential causes, identification and implementation of potential solutions or remedial measures, and action plans to evaluate anticipated results.  
*Restriction(s):* Enrolment in a SENS graduate program or permission from instructor

**ENVS. 809.3 — 1/2(3L)**  
Doctoral Seminar in Environment and Sustainability  
This seminar course will examine ideas and assumptions that underpin attempts to achieve sustainability and explore different strategies aimed at advancing sustainability objectives. Students will examine fundamental conflicts in values and choices, governance options and challenges, and scientific and societal uncertainty about human-environment interactions.  
*Restriction(s):* Enrolment in the SENS Ph.D. program. Course will be made available to students in Ph.D. programs of other units by permission from instructor.

**ENVS. 811.3 — (3S)**  
Multiple Ways of Knowing in Environmental Decision Making  
This course is set in the context of environmental decision-making, and involves critical examination of human-nature relations and multiple ways of knowing (epistemologies). Knowledge systems addressed include, but are not limited to, Aboriginal knowledge systems and intuitive ways of knowing. Applications to the legal “duty to consult” with Aboriginal peoples will be addressed, and students are asked to analyze their own decision-making beliefs and practices in the context of multiple understandings of the world.  
*Note:* Students in the School of Environment and Sustainability will be given priority up to a limit of 15.

**ENVS. 821.3 — 1(3L)**  
Sustainable Water Resources  
This course will explore issues related to water resource sustainability from physical, chemical, biological, socio-economic and technological perspectives. Current threats to water resources in terms of water availability, water quality, and ecosystem services will be examined, and evolving methods to manage water resources more sustainably will be discussed.
ENVS. 822.3 — 3L
Biodiversity Conservation and Sustainability
A graduate level course designed to introduce students in an integrative manner to the field of biodiversity conservation and how to apply its principles to best promote sustainability. Understanding biodiversity and its management requires an interdisciplinary approach with particular reference to mechanisms of change and human impacts on the environment. This course will be interdisciplinary in its approach. The course will focus on: biodiversity (definition, types of biodiversity, distribution, economic and social value); threats to biodiversity (habitat loss, exotic species and their impacts, climate change); and conservation of biodiversity (species at risk, habitats, protected areas). This course will also review social, ethical and policy issues surrounding biodiversity conservation and management (international approaches and agreements, national strategy and regulations for Canada, Saskatchewan provincial regulations), including traditional knowledge.

ENVS. 823.3 — 3L
Chemicals in the Environment
This course will provide an understanding of the processes that control the movement of chemical contaminants in the environment. Local and global methods for chemical regulation/management will be addressed in the context of society and economics. The use of modeling to predict the environmental fate/effects of contaminants will be presented.
Prerequisite(s): Approval of the Course Coordinator is necessary.

ENVS. 831.3 — 1(3L)
Current Issues in Land Reclamation and Remediation
Current issues in land reclamation and remediation are examined. The impact of human activity in a variety of environments is examined and strategies for reclamation and remediation are investigated. Biophysical factors are the emphasis of the course, however the context of social and economic issues are incorporated.
Permission of the instructor
Prerequisite(s): Undergraduate degree in a relevant discipline.

ENVS. 881.3 — 3L
Resource and Environmental Policy Analysis
This course will focus on developing an understanding of natural resource and environmental challenges using economic theory. A series of natural resource and environmental issues will be studied with existing and proposed policy measures analyzed using an economic framework.
Note: Students cannot receive credit for both BPBE. 430 and ENVS. 881.

ENVS. 898.3 — 1/2(3L)
Special Topics
Offered occasionally by visiting faculty and in other special situations. Students interested in these courses should contact the school for more information.
Prerequisite(s): Registration in a graduate program.

ENVS. 899.6 — 1/2(3L)
Special Topics
Offered occasionally by visiting faculty and in other special situations. Students interested in these courses should contact the school for more information.
Prerequisite(s): Registration in a graduate program.

ENVS. 990.0 — 1/2(3L)
Seminar in Environment and Sustainability
Offered occasionally by visiting faculty and in other special situations. Students interested in these courses should contact the school for more information.

ENVS. 992.6 — 1/2(3L)
Project in Environment and Sustainability
Offered occasionally by visiting faculty and in other special situations. Students interested in these courses should contact the school for more information.

Prerequisite(s): Registration in a graduate program.

ENVS. 994.0 — 1/2(3L)
Master's Research in Environment and Sustainability
Students writing a Master's thesis must register in this course.

ENVS. 996.0 — 1/2(3L)
PhD Research in Environment and Sustainability
Students writing a Ph.D. thesis must register in this course.

EP — ENGINEERING PHYSICS

Department of Physics and Engineering Physics

EP 898.3 — 1/2(3L)
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

EP 899.6 — 1/2(3L)
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

EP 994 — 1/2(3L)
Research
Students writing a Master's thesis in Engineering Physics must register for this course.

EP 996 — 1/2(3L)
Research
Students writing a Ph.D. thesis in Engineering Physics must register for this course.

EPSE — EDUCATIONAL PSYCHOLOGY AND SPECIAL EDUCATION

Department of Ed Psych and Special Education

EPSE. 821.3 — 1/2(3L)
Educational Psychology Special Education and the Biological Basis of Behavior
Provides students with foundational knowledge in the biological basis of behavior as it relates to Educational Psychology and Special Education. It addresses the physiological basis of behaviour and cognition, neurotransmitter systems and neuropharmacology, and biological contributions to disorders frequently encountered in Educational Psychology and Special Education.
Prerequisite(s): Permission of the instructor.

EPSE. 842.3 — 1/2(3L)
Assessment Literacy in Education
An advanced course designed to provide an analysis and application of measurement and evaluation principles and practices in student assessment at all levels of education. The course addresses the development of assessment and grading instruments, collecting assessment information, and the use of assessment data.
Restriction(s): Restricted to College of Graduate Studies and Research
Prerequisite(s): EPSE. 843 and admission into the Master's Program in Educational Psychology and Special Education or permission of Department Head/Graduate Chair.

EPSE. 843.3 — 1/1.5(1P)
Theory of Educational and Psychological Measurement
A theoretical examination of the basic problems of psychological measurement, together with the statistical procedures relevant to the understanding and evaluation of tests. Both classical test theories and item response theory models are examined.
Prerequisite(s): Admission into the Master’s Program in Education Psychology and Special Education or permission of Department Head/Graduate Chair.

EPSE. 844.3 — 2(1L-2P)
Advanced Test Theory and Instrument Construction
A detailed examination of test theory within an instrument development context. Both classical test and item response theories are examined from the perspective of designing various measuring instruments. Educational and psychological test, questionnaires, interview schedules, and program evaluation instruments are among the information gathering devices which may be considered depending upon the professional interests and needs of the students. A practical skill development component is built in.
Prerequisite(s): EPSE. 843 and admission into the Master’s Program in Educational Psychology and Special Education or permission of Department Head/Graduate Chair.
EPSE. 859.3 — 1/2(1L–2S)
Seminar in Language and Learning Disability
An in-depth study of the most recent theories in the field of language and/or learning disabilities. Each student will undertake a major literature search and present one aspect of basic skills, the models of processing and the way language and/or learning disabilities interfere with normal acquisition of this basic skill.

Prerequisite(s): Admission into the Master’s Program in Educational Psychology and Special Education or permission of Department Head/Graduate Chair.

EPSE. 868.3 — 1(3S)
Behaviour Disorders Theory and Practice
Focuses on the empirically-based education and clinical management of behaviour disorders in children and adolescents. Critical issues related to theory, assessment practices, and treatment approaches are examined.

Prerequisite(s): Admission into the Master's Program in Educational Psychology and Special Education or permission of Department Head/Graduate Chair.

EPSE. 888.3 — 1/2(3S)
Trends and Issues
Reviews the theoretical and practical bases of emerging trends in the education of children and youth with special education needs. Regular faculty with specific expertise or visiting scholars on sabbatical leave will offer the course periodically. The course is adaptable for intensive, short-term offerings by outstanding visiting scholars.

Prerequisite(s): Admission into the Master's Program in Educational Psychology and Special Education or permission of Department Head/Graduate Chair.

EPSE. 899.6 — 1/2(1and2)(3P)
Special Topics
Offered occasionally by visiting faculty and in other special situations. Students interested in these courses should contact the department for more information. Consists of writing a minor thesis based on extensive readings or on experimental study. The project must be planned, carried out and reported by the student under the supervision of a faculty supervisor.

EPSE. 990
Seminar
Non-credit course for graduate students in Educational Psychology and Special Education. On-going research and development projects of students from the focus of a series of seminars.

EPSE. 993.3
Individual Research Assignment in Educational Psychology
A research-based assignment will be completed based upon a topic of study selected by the student in consultation with the course instructor (i.e., paper, applied intervention, program evaluation, etc.). The research assignment will be directed at issues and strategies of practical relevance to the workplace (i.e., educational and/or community setting).

Restriction(s): Restricted to students in the College of Graduate Studies and Research majoring in Educational Psychology and Special Education.

Prerequisite(s): ERES. 800.3, ERES. 840.3, or ERES. 843.3 for Special Education or ERES. 841.3 for Measurement and Evaluation.

EPSE. 994
Research
A student undertaking research leading to a Master's thesis must register in this course each year until the thesis is completed. This applies to thesis work done extramurally as well as intramurally.

Prerequisite: Admission into the MEd in Educational Psychology and Special Education.

EPSE. 996
Research
A student undertaking research leading to a Ph.D. thesis must register in this course each year until the thesis is completed.

ERES — EDUCATION RESEARCH
Department of Education (Dean's Office)
ERES. 800.3 — 1/2(2L–2P)
Research Methods Introductory
Introduction to research methods, with special reference to research in Education. The basic principles of research, both quantitative and qualitative, are discussed. Skills necessary for the production of research proposals are developed, e.g. techniques for surveying the research literature, and the collection and analysis of data.

ERES. 810.3 — 1(3L)
Indigenous Research Epistemology and Methods
Trends within Indigenous research as it applies to educational research will be studied in detail. Epistemological foundations, ethical considerations, and methods within Indigenous research frameworks will be explored. Throughout this course we will be referencing a variety of writings by Indigenous scholars who offer inspiration into Indigenous ways of knowing, providing a commentary on how this worldviews shapes life choices. Through these readings, literature from non-Indigenous research scholars, and course assignments, the goal is to examine the constructs of an Indigenous epistemological framework for educational research and to offer an introductory primer on key characteristics of qualitative research to design from an Indigenous perspective. This course will provide students with an opportunity to explore the connection between their worldview, their research curiosity and research design.

ERES. 820.3 — 39 Hours
Action Research in Education
The purpose of this course is to apply the theory and knowledge of effective teacher professional development through instructional leadership practice. Participants will engage in instructional, transformational, and distributed leadership theory, and apply this knowledge through meaningful contextual action research in schools. The course is also suitable and adaptable for students who wish to engage in professional development and data driven leadership using educational approaches and action research in other environments. The learning objectives include deepening your understanding of the theories of collaboration, professional learning, inquiry, professional development, and data-driven leadership; engaging in an action research project using the cycle of inquiry/action research framework; developing an appreciation for the larger community and political educational environment; and developing skills and awareness of writing requirements at the graduate level.

ERES. 840.3 — 1/2(3L–1P)
Statistical Methods Intermediate
Selected parametric and non-parametric inferential tests. Analysis of variance, one-way and factorial designs, planned and post-hoc comparisons. Computer applications of these techniques with real and/or artificial educational and social science data will be an essential component.

Prerequisite(s): Permission of the instructor.

ERES. 841.3 — 2(3L–1P)
Statistical Methods Advanced
Selected experimental and quasi-experimental designs relevant for research in education and behavioral sciences. Multiple and step-wise regression. Introduction to selected multivariate techniques. The use of the various techniques in actual and simulated data in education and behavioral sciences will be an essential component.

Prerequisite(s): ERES. 840.

ERES. 845.3 — (3S)
Qualitative Research Methods
Offers the opportunity to learn and practice inquiry processes for conducting qualitative research. Within selected theoretical frameworks, the following techniques will be studied: framing the study, participant observation, interviewing, analytic induction and constant comparison, reporting.

Prerequisite(s): ERES. 800.

ERES. 898.3
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

ERES. 899.6
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.
ETAD — EDUCATIONAL TECHNOLOGY AND DESIGN

Department of Curriculum Studies

ETAD. 802.6 — 1/2(3L)
Historical and Theoretical Foundations of Educational Technology
Examines the historical, philosophical and theoretical foundations of the field of educational technology. Focuses on the maturation of theory and research in this area of study, and the impact of educational technology on educational institutions and practice. Formerly: ECMM. 802
Note: Students with credit for ECMM. 802 will not receive credit for this course.

ETAD. 803.3 — 1/2(3L)
Multimedia Design for Learning
Presents procedures and principles for planning, producing and evaluating computer-based instruction, and how to develop the necessary print-based support materials required for its implementation. Formerly: ECMM. 803
Prerequisite(s): ECMM. 370 or equivalent computer applications course.
Note: Students with credit for ECMM. 803 will not receive credit for this course.

ETAD. 804.3 — 1/2(3L)
Designing for Distance Education
The historical and theoretical foundations of distance education from a provincial, national and international perspective. Surveys the development, organization, and practice of distance education for various educational endeavours. Focuses specifically on distance education in Saskatchewan and compares the Saskatchewan situation with similar systems across Canada. Formerly: ECMM. 804
Prerequisite(s): ECMM. 803
Note: Students with credit for ECMM. 804 will not receive credit for this course.

ETAD. 873.3 — 1/2(3L)
Instructional Design
An applied course in which principles of instructional design are used to produce self-instructional materials. Students do a major project in which they plan and implement a self-instructional module in a medium of their choice. Formerly: ECMM. 873
Note: Students with credit for ECMM. 873 will not receive credit for this course.

ETAD. 874.3 — 1/2(3L-1S)
Advanced Instructional Design
Students will learn and apply advanced concepts and approaches in instructional design including project management, client processes, and usability procedures. Students will complete an entire development process, from meeting clients and creating a design plan through product testing. Formerly: ECMM. 874
Prerequisite(s): Successful completion of ETAD. 873 (formerly ECMM. 873) or an equivalent course from another university, or permission of the instructor.
Note: Students with credit for ECMM. 874 will not receive credit for this course.

ETAD. 876.3 — 1/2(2L-1S)
Organization and Administration of Media Centres
An examination of the operation of audiovisual programs in elementary and secondary schools and school units. The course considers the facilities, materials, equipment and services required in an audio-visual program and the budgeting, personnel and staff relations required for its operation. Formerly: ECMM. 876
Note: Students with credit for ECMM. 876 will not receive credit for this course.

ETAD. 877.3 — 1/2(2L-1S)
Video Design for Learning
Designed to allow students to continue video production experiences encountered during ECMM. 476. The student will have the opportunity to script, direct, produce, and edit an individual medium length video production. The highly individualized course gives the student wide latitude and flexibility in content, technique and production time. Formerly: ECMM. 877
Prerequisite(s): ECMM. 476, or experience and permission of the department.
Note: The student should be prepared to spend somewhat more time than is normally required for a 3 credit unit course. Students with credit for ECMM. 877 will not receive credit for this course.

ETAD. 879.6 — 1and2(2L-1P)
Advanced Video Design for Learning
Investigates development of open and closed circuit television in educational institutions and integration of television into formal and informal learning situations. Development of knowledge and skills in television production, direction and script writing will be stressed in practical laboratory situations. Students will undertake major projects simulating those now utilized in educational TV. Formerly: ECMM. 879
Prerequisite(s): ECMM. 476, or experience and permission of the department.
Note: Students with credit for ECMM. 879 will not receive credit for this course.

ETAD. 898.3 — 1/2/1and2(3R)
Special Topics
A study in areas of a student's interest calling for intensive reading under the guidance of a faculty member. A proposal, representing a contract for the extent and nature of the work to be done, must be approved by CGSR. The final product is a paper or media production which is graded by the faculty member and kept on file in the Department. Formerly: ECMM. 898

ETAD. 899.6 — 1and2(3R)
Special Topics
A study in areas of a student's interest calling for intensive reading under the guidance of a faculty member. A proposal, representing a contract for the extent and nature of the work to be done, must be approved by CGSR. The final product is a paper or media production which is graded by the faculty member and kept on file in the Department. Formerly: ECMM. 899

ETAD. 991.3 — 1/2(1L)
Scholarship in Teaching
Students will demonstrate their scholarship in teaching and learning through developing a comprehensive, detailed, and coherent collection of academic and professional work. The collected work will be organized and represented through the use of an electronic portfolio and will include any variety and combination of media (e.g., text, electronic files, images, video, multimedia products, blog entries, and other appropriate resources). The e-portfolio will provide documented and organized evidence tied to learning outcomes (developmental), personal reflection and articulation of meaning (reflective) and will showcase learners' achievements in relation to particular work or learning goals (representational). A final public presentation documenting both the professional development process and the terminal product will provide a superior capstone outcome, one underscoring the critical skill of effectively and coherently communicating such a compiled work.
Restriction(s): Restricted to students in the Educational Technology and Design program in the College of Graduate Studies and Research.
Prerequisite(s): 27 credit units of course work toward the M.Ed. degree.

ETAD. 992.0
Project
The research or developmental project, required on the project option for the M.Ed., where the nature of the research or developmental project is inter-disciplinary or multi-departmental. The project must be accepted by a committee consisting of members from the sponsoring and co-operating departments and evaluated by this committee plus an external member. Formerly: ECMM. 992
Note: Students with credit for ECMM. 992 will not receive credit for this course.

ETAD. 994.0
Masters Thesis in Educational Technology and Design
Students complete an individual research project under the guidance of a supervisor and research committee. A thesis is written and examined by the research committee and an appointed External Examiner.
Restriction(s): Restricted to students in the Educational Technology and Design program in the College of Graduate Studies and Research.
Prerequisite(s): ERES. 800.3

ETAD. 996.0
PhD Research
Students admitted to a special-case Ph.D. program in Educational Technology and Design will register in this course for the duration of the graduate program.
FDSC — FOOD SCIENCE

Department of Food and Bioproduct Sciences

FDSC. 811.3 — 2(3L)
Plant and Microbial Lipids
Provides a comprehensive overview of plant and microbial lipids (fatty acids, triglycerides, glycolipids, phospholipids, sphingolipids, fatty glycosides, wax esters, estolide, isoprenoids, sterols and carotenoids), their chemical structure, properties, nutrition, biochemistry, molecular biology and biotechnology, as well as their industrial processing and utilities.
Prerequisite(s): CHEM. 250 or BMSC. 230 or equivalent or permission of the instructor.

FDSC. 817.3 — 1(3L-3P)
Analytical Techniques in Food Science
Modern analytical techniques and instruments for routine analysis and research on food products. Basic principles, analytical methods, applications, precision and sampling problems are discussed. Seminar and written assignments on current topics.
Prerequisite(s): BMSC. 200 and CHEM. 250 or equivalent or permission of the instructor.

FDSC. 842.3 — 1(3L)
Advanced Meat Science
Molecular and cellular properties of meat responsible for the functional and palatability properties of meat and processed meat products will be presented. The emphasis will be placed on molecular events occurring during the conversion of muscle to meat, industry issues and the current scientific literature.
Prerequisite(s): Permission of the instructor.

FDSC. 850.3 — 2(3L)
Advanced Food Proteins
Provides a better understanding of structure-dynamic-function relationships in food proteins from both plant and animal sources. The emphasis will be focused on protein structure, interactions, methodologies for testing protein functionality and their use in novel food and bioproducts.
Prerequisite(s): FABS. 315, FABS. 417, BMSC. 200 or permission of the instructor.

FDSC. 855.3 — 2(3L)
Functional Genomics in Food and Bioproducts
Provides a comprehensive overview of current tools and techniques used for functional genomics (bioinformatics, RNA interference, gene knockout, TILLING, EST analysis, DNA microarrays, proteomics and metabolomics) and their applications in the development of food and bioproducts.
Prerequisite(s): BIOL. 311 or permission of instructor.

FDSC. 874.3 — 2(3L)
Industrial Application of Enzymes
Will discuss the enzymes used in industrial processes, including production and quality assurance. The enzymes in the industries are powerful tools for the conversion of substances in order to provide more effective means of production. The lecture covers the enzymes found in a wide range of applications, such as foods, agriculture, household products, and chemicals.
Prerequisite(s): Basic biochemistry and microbiology knowledge is required, such as BMSC. 200 and FABS. 212.

FDSC. 898.3
Special Topics
Assigned reading, tutorials and laboratory techniques in special areas related to the student’s major field of interest. Students will be required to prepare reviews or seminars in specific topics.

FDSC. 899.6
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

FDSC. 990
Seminar
Current literature in the field of Food Science is reviewed and discussed. Staff and students present papers on current research topics. Graduate students are required to attend and participate.

FDSC. 992.0
Project
Students registering for the project Master of Agriculture degree must register in this course.

FDSC. 994
Research
Students writing a Master’s thesis must register for this course.

FDSC. 996
Research
Students writing a Ph.D. thesis must register for this course.

FIN — FINANCE

Department of Finance

FIN. 801.3 — 1/2(3L)
Advanced Corporate Finance
Provides students with a fundamental understanding of the current issues of interest in research in the modern theory of corporate finance. It provides students with a theoretical background in areas such as firm theory, security issuance, capital raising, capital structure, and corporate governance. Presentation and discussion of articles from academic journals are used as tools to enhance student learning.

FIN. 802.3 — 1(1.5L-1.5S)
Advanced Investment Theory
Develops investment theory through the financial economics framework of Von-Neumann Morgenstern utility. This allows exploration of risk aversion, stochastic dominance, and portfolio optimization. MPT and CAPM are derived. Arrow-Debreu contingent claims and option pricing theory are addressed. Additional topics include risk-neutral valuation, stochastic discount factors, and the consumption CAPM.

FIN. 803.3 — 2(2L-1P)
Empirical Methods in Finance
Presents a critical look at current financial models and gives the student experience in the systematic analysis of financial data. Students are exposed to a suite of analytical tools that allow rigorous assessment of the characteristics of financial data and models.

FIN. 805.3 — 1/2(3L)
Fixed Income Securities
This course considers the financial concepts required to invest in fixed income securities. Topics include the mathematics required to evaluate fixed income cash flows, measuring and hedging fixed income portfolio risk, the yield curve in theory and practice, repurchase agreements, interest rate forward agreements, futures contracts, swaps, and mortgage-backed securities.

FIN. 819.3 — 2(3L)
Advanced Derivative Securities
Deals selectively with the theories, strategies, and applications of derivative securities. Topics include futures and forward contracts, swaps, standard options, exotic options and other derivative securities on different underlying assets; valuation techniques; empirical studies; governance and regulation of derivative securities trading and exposure; and management of financial risks.
Departmental permission is required.
Note: Students with credit for COMM. 419 will not receive credit for this course.

FIN. 861.3 — 1(3L)
Advanced Theory of Finance
Starts out with the classic Miller-Modigliani irrelevance theorem, which describes a frictionless financial markets set-up. Various deviations from this set-up, particularly with respect to agency costs, information asymmetries, and taxes, are then introduced. Students will also study how these market imperfections affect firms’ dividend policies and capital structures.
Departmental permission is required.
Restriction(s): Current student in the College of Graduate Studies and Research
Note: Students with credit for COMM. 461 will not receive credit for this course.

FIN. 866.3 — 1(3L)
Advanced International Corporate Finance
FIN. 866 will be conducted jointly with Comm. 466 but at a much higher level. Apart from learning basic tools covered in Comm. 466, students work closely with the instructor and review several academic journal articles in the area of global legal institutions, global corporate governance, global ownership structures, global cost of capital and capital structure.
Departmental permission is required.
Restriction(s): Current student in the College of Graduate Studies and Research
Note: Students with credit for COMM. 466 will not receive credit for this course.
FIN. 867.3 — 1(3L)
Advanced Portfolio Theory and Management
The focus of this course is portfolios: portfolio analysis, selection, and management. Selected theories behind optimal portfolio construction and management are presented. Important general equilibrium models are derived and followed through the literature. The theoretical and empirical validity of these models is assessed.
Prerequisite(s): Permission of the department.
Restriction(s): Current student in the College of Graduate Studies and Research.
Note: Students with credit for COMM. 467 will not receive credit for this course.

FIN. 869.3 — 2(3L)
Advanced Management of Financial Institutions
This is a graduate seminar course that exposes students to the current state of academic research in Financial Institutions. It is geared towards students who intend to broaden their knowledge in Financial Institutions beyond the knowledge of undergraduate studies and who may intend to work in the area of financial institutions in their thesis. This course will introduce papers which uses methods specialized to this area of research.
Prerequisite(s): COMM. 469 or ECON. 311 and departmental permission.
Restriction(s): Current student in the College of Graduate Studies and Research.

FIN. 898.3
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

FIN. 990
Seminar in Finance
A forum in which faculty members, visiting professors and M.Sc. students will present research papers. All students participate in FIN. 990. Beginning in year two of their program, students are required to do a minimum of two presentations per academic year.

FIN. 994
Research in Finance
Students undertaking research must register in this course each year until completion of the program.

FREN — FRENCH
Department of Languages, Literatures, and Cultural Studies

FREN. 819.3 — 1/2(3L)
Advanced Studies in 19th Century French Literature
In a given year, a special topic in French literature of the 19th century will be studied, e.g., the second, disillusioned romantic generation (Flaubert, Baudelaire, Rimbaud and Mallarme), which idolizes art, the antithesis of money.
Prerequisite(s): Admission to graduate studies in French.

FREN. 820.3 — 1/2(3L)
Advanced Studies in French Literature of 20th Century
One aspect of 20th-century literature will be studied in depth, for example, the absurd and engagement, 20th-century attempts at tragedy, Dada and Surrealism, the Nouveau-roman.
Prerequisite(s): Admission to graduate studies in French.

FREN. 843.3 — 1/2(3L)
Advanced Studies in Quebec Novel
Advanced studies of a special topic in the Quebec novel, e.g., women writers, the social novel, the nouveau-roman, etc.
Prerequisite(s): FREN. 343 and admission to graduate studies in French.

FREN. 898.3 — 1/2(3R)
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

FREN. 899.6 — 1and2(3R)
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

FREN. 994
Research
Students writing a Master's thesis must register for this course.

GE — GENERAL ENGINEERING
Department of Engineering (Dean's Office)

GE 898.3
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

GEOG — GEOGRAPHY
Department of Geography and Planning

GEOG. 803.3 — 1/2(5)
Research in Geography
The purpose of this course is to introduce graduate students to theoretical and practical issues in geographical research. Its specific objective is to demonstrate and promote professional practices in geography culminating in a research plan that will serve as the basis for developing a graduate research proposal.
Note: Required for M.A., M.Sc. and Ph.D. students.
Prerequisite(s): Permission of the instructor.

GEOG. 880.3 — 1/2(3S)
Environmental Geographies
Introduces a range of philosophical perspectives, topical issues, and methodological approaches to studies in environmental geography. Considers research focused on applied research about management strategies and policy making as well as theoretical work focused on politics associated with environmental problems. Also examines possible synergies between the two.

GEOG. 883.3 — 1/2(1L-2S)
Advanced Geomorphology
A seminar course designed to explore recent developments in geomorphology. Topics to be covered at the discretion of the instructor.

GEOG. 885.3 — 1/2(3L-1S)
Advanced Urban Geography
The emphasis of this course lies on the links between political, economic and social processes within urban areas.

GEOG. 887.3 — 1/2(1L-2S)
Problems in Transportation
The examination of current research themes and problems in transportation geography. Alternate topics may be covered to reflect student needs.

GEOG. 845.3 — 1/2(2L)
Advanced Urban Geography
A survey of various theories of social and policy planning and their application to the geographical organization and planning of Canadian communities. The emphasis of this course lies on the links between political, economic and social processes within urban areas.

GEOG. 880.3 — 1/2(3S)
Environmental Geographies
Introduces a range of philosophical perspectives, topical issues, and methodological approaches to studies in environmental geography. Considers research focused on applied research about management strategies and policy making as well as theoretical work focused on politics associated with environmental problems. Also examines possible synergies between the two.

GEOG. 845.3 — 1/2(2L)
Advanced Urban Geography
A survey of various theories of social and policy planning and their application to the geographical organization and planning of Canadian communities. The emphasis of this course lies on the links between political, economic and social processes within urban areas.

GEOG. 845.3 — 1/2(2L)
Advanced Urban Geography
A survey of various theories of social and policy planning and their application to the geographical organization and planning of Canadian communities. The emphasis of this course lies on the links between political, economic and social processes within urban areas.

GEOG. 845.3 — 1/2(2L)
Advanced Urban Geography
A survey of various theories of social and policy planning and their application to the geographical organization and planning of Canadian communities. The emphasis of this course lies on the links between political, economic and social processes within urban areas.

GEOG. 845.3 — 1/2(2L)
Advanced Urban Geography
A survey of various theories of social and policy planning and their application to the geographical organization and planning of Canadian communities. The emphasis of this course lies on the links between political, economic and social processes within urban areas.

GEOG. 845.3 — 1/2(2L)
Advanced Urban Geography
A survey of various theories of social and policy planning and their application to the geographical organization and planning of Canadian communities. The emphasis of this course lies on the links between political, economic and social processes within urban areas.
GEOL. 866.3 — 1/2(3S)
Advanced Analytical Geochemistry
A project-based course focusing on emerging concepts and broader applications of environmental assessment principles and practices. Course topics vary from year to year following developments in the field, and may include such topics as cumulative effects assessment, strategic environmental assessment, project scoping, assessment methods and techniques, monitoring and follow-up.
Prerequisite(s): GEOL 324, and GEOL 325.

GEOL. 851.3 — 1/2(3L)
Synchrotron Hard X-ray Absorption Spectroscopy
X-ray absorption spectroscopy (XAS), a primary technique of the Canadian Light Source synchrotron, provides local molecular and electronic structure of specific chemical elements in any matrix. XAS can be applied with little pre-treatment of the sample and can be used to answer fundamental chemical questions about almost any sample or system, from soils and rocks to intact biological tissues to purified proteins or chemicals. The course will include a description of the physical principals underlying XAS, practical aspects of experimental technique, details of data analysis and some common pitfalls and difficulties. This course will equip students with a practical working knowledge of the technique and its capabilities, with examples drawn from the chemical, biomedical and environmental sciences.
Permission of the instructor is required
Note: Students cannot receive credit for both GEOL 451 and GEOL 851.

GEOL. 853.3 — 1/2(1.5L-1.5S)
Analysis of Mineral Deposits
Advanced level consideration of structural, magmatic, and hydrothermal processes involved in the formation and evolution of mineral deposits, and their relationship to the Earth and the environment. The application of petrological and geochemical techniques to mineral deposit research. Problems of current interest will be addressed through lectures, and student presentations.
Prerequisite(s): Permission of the instructor.

GEOL. 865.3 — 1/2(1.5L-1.5S)
Analysis of Mineral Deposits
Advanced level consideration of structural, magmatic, and hydrothermal processes involved in the formation and evolution of mineral deposits, and their relationship to the Earth and the environment. The application of petrological and geochemical techniques to mineral deposit research. Problems of current interest will be addressed through lectures, and student presentations.
Prerequisite(s): Permission of the instructor.

GEOL. 880.3 — 1(3S)
Seismology
Topics selected from the theory of propagation of seismic waves in layered media; theory of reflection and refraction of spherical waves, present advances in numerical filtering; information theory as related to geophysics.

GEOL. 882.3 — 1/2(3S)
Selected Topics in Geophysics
The detailed content may vary from year to year in accordance with the specific interests of students but will include some consideration of electrical methods, well-logging techniques, and other fields of applied geophysics.

GEOL. 884.3 — 1/2(2L-2P)
Geophysical Inversion
A practical course on inversion techniques in geophysics. Linear discrete inverse problems will be discussed, and an appreciation for the concepts of non-uniqueness, determinacy, and the use of a priori information will be emphasized. Students will be encouraged to use the techniques discussed in class in a computer laboratory and will be required to complete a term project with a written report, and a seminar.
Prerequisite(s): MATH 226, 338, GEOL 483, GEOF 414; orpermission of the instructor.

GEOL. 886.3 — 1/2(3S)
Advanced Environmental Impact Assessment
A reading course for graduate students focusing on areas for which there is no regular graduate course or for making up the deficiencies in the research program.

GEOL. 897.6 — 1and2(3S)
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

GEOL. 990
Departmental Seminar
During residence, candidates will register in GEOL 990 and will present at least one paper based on their own research (likely thesis research).

GEOL. 994
Research
Students writing a Master’s thesis must register for this course.

GEOL. 996
Research
Students writing a Ph.D. thesis must register for this course.

GEOL — GEOLOGY

Department of Geological Sciences

GEOL. 822.6 — 1and2(2L-3P)
Analytical Geochemistry
Analytical techniques employed by earth scientists for determining the compositions, ages, and provenance of minerals and rocks. The theory, operation, and information that can be obtained from a variety of instruments will be studied. These instruments will include the X-ray diffractometer, the X-ray fluorescence spectrometer, the electron microprobe and scanning electron microscope (SEM), the atomic-absorption spectrometer, the gas chromatograph, and isotope ratio and solid source mass spectrometers.
Prerequisite(s): GEOL 324, and 325.
GSR — GRADUATE STUDIES AND RESEARCH

GSR. 989.3 Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

GSR. 960.0 Introduction to Ethics and Integrity
This is a required course for all first year graduate students at the University of Saskatchewan. The purpose of this course is to discuss ethical issues that graduate students may face during their time at the University. All students will complete modules dealing with integrity and scholarship, graduate student-supervisor relationships, conflict of interest, conflict resolution and intellectual property and credit.

GSR. 961.0 Ethics and Integrity in Human Research
Introduces students to the ethics of research with human subjects. Students will complete the Tri-Council Policy Statement: Ethics Conduct for Research involving Humans (TCP) Tutorial and become familiar with the human ethics processes at the University of Saskatchewan.

GSR. 962.0 Ethics and Integrity in Animal Research
Introduces students to the ethics of research with animal subjects. Students will complete the Canadian Council for Animal Care tutorial and become familiar with the animal ethics processes at the University of Saskatchewan.

GSR. 979.0 — 1/2(2.5S) Introductory Instructional Skills
This course, focused on basic instructional skills, is designed for graduate students with little to no experience in teaching. In this course, the aim is to equip graduate students with the practical teaching skills needed to survive and thrive as instructors and/or teaching assistants in higher education.

Restriction(s): Only open to graduate students.

GSR. 981.0 — 5L-4P-11T-10S Canadian Academic Acculturation and Literacy for International Graduate Students
Intended for new international graduate students. This four-week, full-time course provides an introduction to the Canadian academic environment and an intensive English language skills practicum in an academic context. Lectures, tutorials and seminars are used to provide an academic experience designed to enhance student ability to conduct independent research, and critical reading and expression, both orally and written. Imbedded in this course is GSR. 960.0 Introduction to Ethics and Integrity. Facilitated delivery and subsequent tutorials focus on the practical application of academic honesty, the role of graduate students, supervisors and graduate chairs, and the expectations of a Canadian academic culture.

Note: International students attending under a special scholarship agreement will be given first priority.

GSR. 982.0 — 1and2(3S) Mentored Teaching
Designed for Ph.D. students with a University Graduate Teaching Fellowship, this course provides both theory and practice during a two-term course. In the first term, students develop the skills they need to survive their first teaching experience. In the second term, they complete a mentored teaching practicum and attend debriefing sessions to discuss the challenges and successes they are encountering in the classroom.

Restriction(s): PhD program student.

GSR. 983.0 Mentored Graduate Teaching
Under the mentorship of a senior faculty member, this course is designed to offer Doctoral candidates 3cu of teaching experience at the senior undergraduate level focusing on the graduate student's field of expertise accompanied by development of effective methods of course design and delivery.

Prerequisite(s): Ph.D. students must have completed all course work, comprehensive field examinations, and a significant portion of their research. Experience with the Gwenna Moss Teaching and Learning Centre workshops and programs is highly recommended, but not required.

GSR. 984 Thinking Critically Professional Skills for Global Citizens
Designed for graduate students who wish to enhance their ability to think critically about complex societal issues associated with professional practice, whether in arts, humanities, or sciences. GSR. 984 makes extensive use of multidisciplinary group discussions with other graduate students. Over 10 evening sessions a series of moderators will present topics such as basic elements of critical thinking, the influence of personality on our thinking, teamwork and leadership, business and ethical reasoning, indigenous cultures and knowledge, etc.

GSR. 989 Introduction to University Teaching
Designed for individuals who have no formal preparation in university teaching. It focuses on the core activities of teaching, examines their relevance, and illustrates how they are best accomplished. Practical application of the core activities to the student's field of specialization is emphasized.

Prerequisite(s): GSR. 986 or experience teaching.

GSR. 992.0 Joint Student Research
A research course for Graduate Students attending the University of Saskatchewan as a Joint Student.

Restriction(s): Open to students who are admitted to the College of Graduate Studies as a Joint Student.

HIST — HISTORY

Department of History

HIST. 801.3 — 1/2(3S) Studies in Ancient and Medieval History
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially.

HIST. 811.3 — 1/2(3S) Studies in the History of Violence
Examines theories in the multidisciplinary field of genocide studies and analyzes examples of genocide/mass killing within a comparative context. However, the course is built around themes rather than individual cases. Over the past three decades, these chosen themes have attracted strong scholarly interest. They include the definitions and typologies of genocide/mass killings by historians and social scientists; the many diverse factors that explain them; the nature of mass killings before the 20th century (especially those tied to imperial expansion and settler colonialism); modernity and mass violence; the role of leaders in planning and executing mass killings; popular participation in mass killings; religion as a factor in mass killing; gender and mass violence; the prosecution of perpetrators; and genocide prevention. The majority of the cases that we will examine occurred in the 20th century.

Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially.

HIST. 820.6 — 1and2(3S) Themes in Early Modern European History

HIST. 821.3 — 1/2(3S) Studies in Early Modern European History
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially.

HIST. 831.3 — 1/2(3S) Studies in Modern European History
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially.

HIST. 840.6 — 1and2(3S) Themes in British and Imperial History
HIST. 841.3 — 1/2(3S)
Studies in British and Imperial History
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially.

HIST. 850.6 — 1and2(3S)
Themes in Canadian History
HIST. 859.3 — 2(3S)
Studies in Canadian History
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially.

HIST. 860.6 — 1and2(3S)
Themes in Western Canadian History
HIST. 861.3 — 1/2(3S)
Studies in Western Canadian History
HIST. 870.6 — 1and2(3S)
Themes in the Americas
HIST. 871.3 — 1/2(3S)
Studies in the Americas
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially.

HIST. 880.3 — 1/2(3S)
History of History
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially.

HIST. 881.3 — 1/2(3S)
Historiography
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

HIST. 883.3 — 3S
Methods in Historical Research
This course is intended to help graduate students learn how to be a professional historian, practice writing proposals and think about the ways in which histories are crafted. We will consider shared professional standards, discuss different sources and approaches, and reflect on how one's approach shapes history writing.

HIST. 884.3 — 1(35)
Writing History
This course examines the craft of writing history and other forms of non-fiction by using a workshop approach to improve and enhance student writing skills and provide them with a better understanding and appreciation of the writing craft. Students will develop the tools and skills to write better history by studying the examples of established writers, learning the fundamentals of writing through in-class assignments, and participating in discussions of one another's work.

Restriction(s): Admission to the M.A. program in History.

HIST. 898.3 — 1/2(3S)
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

HIST. 899.6 — 1and2(3S)
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

HIST. 990 — 2(1.5S-1.5R)
Seminar
Students and faculty will make presentations concerning their current research. All candidates for a graduate degree must make one presentation. Attendance is required throughout the graduate program.

HIST. 994
Research
Students writing a Master's thesis must register for this course.

HIST. 996
Research
Students writing a Ph.D. thesis must register for this course.

HSC — HEALTH SCIENCES

HSC. 801.3 — 2(3L)
Essentials for Conducting Life and Health Sciences Research
Theory and practice-based course designed to provide in-depth knowledge and best practices for life/health science graduates of important topics that include: academic honesty, interdisciplinary research, animal and human ethics, intellectual property and preparation of a mini-grant proposal.

Note: HSC. 801 may not be taken for credit if a student is taking the CLR 800 course.

HSC. 802.3 — 1/2(3L)
Introduction to Systematic Reviews
Online distance education-based course which provides practical skills in developing and executing a systematic review on a health science topic. Students will work in teams to learn and practice established procedures for conducting secondary research (a systematic review) and meta-analysis.

Permission of the instructor
Prerequisite(s): Bachelor's degree

HSC. 898.3
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

HSC. 994.0
Health Sciences Master's in Science Research
Students writing a Master's thesis must register for this course.

HSC. 996.0
Health Sciences Doctoral Research
Students writing a PhD thesis must register for this course.

INCC — INTERDISC STUD CULTURE CREAT

INCC. 801.0 — 1/2(2T)
Reading French
Designed to develop student’s French reading skills particularly for research purposes. Primary emphasis is on the comprehension of a wide variety of texts in French.

INCC. 898.3
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

INDR — INDUSTRIAL RELATIONS

INDR. 898.3
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

INTD — INTERDISCIPLINARY GRAD STUDIES

INTD. 898.3
Special Topics
Topics will be selected according to the student’s specific area of interest.

INTD. 899.6
Special Topics
Topics will be selected according to the student's specific area of interest.

INTD. 990
Seminar
Students are required to attend and to present (as per degree requirements) at the regular INTD departmental seminar series.

INTD. 994
Research
Students writing a Master's thesis must register in this course.

INTD. 996
Research
Students writing a Ph.D. thesis must register in this course.
JSVG — JSG SCHOOL OF PUBLIC POLICY

Department of JSG Executive Director Office

JSVG. 801.3 — 1/2(3S)
Governance and Administration

Analyses governing institutions and the process of modern government within Canada as a means of enhancing a student’s understanding of policy formulation and implementation. This course is intended to provide a basis for critically assessing political and administrative decision making and policy outcomes.

Formerly: PUBP. 801
Restriction(s): Admission into the Master of Public Administration (M.P.A.) program, Master of Public Policy (M.P.P.) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP. 801 will not receive credit for this course.

JSVG. 802.3 — 1/2(3S)
Public Finance

Provides a survey of Canadian public finance. Students will examine rationales for government intervention in a market economy, the assessment of public policy, how government decisions are made and the impact of government expenditures and taxation on the economy and the well-being of Canadians, in terms of economic efficiency and interpersonal equity.

Formerly: PUBP. 802
Restriction(s): Admission into the Master of Public Administration (M.P.A.) program, Master of Public Policy (M.P.P.) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP. 802 will not receive credit for this course.

JSVG. 803.3 — 1/2(3S)
Quantitative Methods

Provides students with the statistical concepts and techniques required for conducting research and critically evaluating empirical studies. Topics include statistical inference, sampling theory, and data and regression analysis as applied to problems in public policy.

Formerly: PUBP. 811
Prerequisite(s): Students must have successfully completed an undergraduate course in statistics.
Restriction(s): Admission into the Master of Public Administration (M.P.A.) program, Master of Public Policy (M.P.P.) program, Ph.D. program, or by permission of the instructor.
Note(s): Students with credit for PUBP. 811 will not receive credit for this course.

JSVG. 805.3 — 1/2(3S)
Economics for Public Policy Analysis

To provide an economic framework for the analysis of public policy. The course uses microeconomic concepts to examine when and how the government should intervene in the economy. Using the starting point of policy as intervention, the course examines the circumstances under which government involvement is most likely to be desirable. The course then moves to consider the key instruments that government uses in its intervention. In the examination of these two broad issues, the course pays particular attention to how people and firms behave and how they are likely to respond to policy instruments. The course also develops the key concepts associated with cost-benefit analysis and shows how these concepts are used in the analysis of public policy.

Formerly: PUBP. 805
Restriction(s): Admission into the Master of Public Administration (M.P.A.) program, Master of Public Policy (M.P.P.) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP. 805 will not receive credit for this course.

JSVG. 806.3 — 1/2(3S)
Public Policy Analysis

Focuses on the analysis of the processes whereby public policies arise and are enacted in Canada. The course compares theories and models of policy making and decision making to illustrate the special requirements of the Canadian environment and examines the roles of various participants in the policy process: legislators, political parties, interest groups, administrators and administrative structures, citizens, and the judiciary.

Formerly: PUBP. 806
Restriction(s): Admission into the Master of Public Administration (M.P.A.) program, Master of Public Policy (M.P.P.) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP. 806 will not receive credit for this course.

JSVG. 807.3 — 1/2(3S)
Statistics for Public Managers

Administrative decision making and policy development often require the analysis of quantitative data. This course will introduce students to descriptive and inferential statistics often used in policy environments so that they will be effective data users and interpreters. Students will be taught how to use and present descriptive statistics.

Formerly: PUBP. 804 and JSGS. 804
Restriction(s): Admission into the Master of Public Administration (M.P.A.) program, Master of Public Policy (M.P.P.) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP. 804 or JSGS. 804 will not receive credit for this course.

JSVG. 808.3 — 1/2(3S)
Ethical Leadership and Democracy in Public Service

There is growing attention being given to executive leadership, applied ethics and efforts to create and sustain trust within and through the profession of public administration. This course descriptively and critically examines these three key concepts in relation to the professional public servant and the environments of public sector decision and policy making.

Formerly: PUBP. 856
Restriction(s): Admission into the Master of Public Administration (M.P.A.) program, Master of Public Policy (M.P.P.) program, Ph.D. program, or by permission of the instructor.
Note: Students who take this course for credit cannot also take GSPP. 808 (offered by the University of Regina) for credit. Students with credit for PUBP. 856 will not receive credit for this course.

JSVG. 809.3 — 1/2(3S)
Introduction to Law in Public Administration and Policy

This course introduces students to the fundamental elements of Canadian public law. The first part of the course focuses on the concept of the rule of law and on the separation of powers under our constitutional system, looking especially at the relationship between the legislature and the courts. This will be followed by a brief consideration of the division of powers between federal and provincial governments and the implications of an entrenched charter of rights. The second half of the course will deal with the parameters articulated by the courts for public decision making, through judicial review, and with the implications of these parameters for the definition of the mandates of decision makers.

Formerly: PUBP. 858
Restriction(s): Admission into the Master of Public Administration (M.P.A.) program, Master of Public Policy (M.P.P.) program, Ph.D. program, or by permission of the instructor.
Note: Students cannot take both this course and either/or both of GSPP. 809 and GSPP. 881 (both offered at the University of Regina) for credit. Students with credit for PUBP. 858 will not receive credit for this course.

JSVG. 811.3 — 1/2(3L)
Nongovernmental Organizations and Alternative Service Delivery

Examines the increasing role played by the third sector in Canada. Students will examine alternative allocations of responsibility for solving particular social and public problems ñ voluntary, not-for-profit, for-profit, joint public/private, public encouraged/subsidized, and publicly coerced ñ along with examples, reasons, and theories for particular forms of organization, new methods of accountability and tensions between government and its new partners.

Restriction(s): Admission into the Master of Public Administration (M.P.A.) program, Master of Public Policy (M.P.P.) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSVG. 813.3 — 1/2(3L)
Managing Change

Seeks to bring about an awareness and understanding of how organizations are managing change. The course will provide perspectives of the change strategists, the change implementors, and the change recipients. The objective of the course is to develop sensitive and effective change-agent skills in management ranks.

Restriction(s): Admission into the Master of Public Administration (M.P.A.) program, Master of Public Policy (M.P.P.) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.
JSGS. 815.3 — 1/2(3S) Strategic Human Resource Management Legal and Policy Issues
This course will expose students to the human resource and legal issues that have practical significance in the management and operations of public-sector departments, agencies, and initiatives. The course will focus on select aspects of public-sector governance, human resources, and employment. Students will be expected to apply the knowledge they learn from the course materials and lectures to problems and assignments that could typically arise in a public administration setting.

Formerly: PUBP 857
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP 857 will not receive credit for this course.

JSGS. 816.3 — 1/2(3L) Tax Policy and Fiscal Federalism
Examination of objectives of tax policy and basic principles of taxation, with special reference to Canada. Various types of Canadian taxes; federal, provincial, municipal will be analyzed and evaluated, including those on personal income, corporation income, manufacturers' sales, resource property and other taxes. Emphasis on evaluation of specific taxes and current issues in tax policies in Canada.

Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 817.3 — 1/2(3L) Health Policy
Will review the historical development of the Canadian health care system and its supporting principles, governance structures and fiscal arrangements; and examine contemporary structures and relationships. Issues such as benefit coverage, health human resources, user fees, pharmaceuticals, regional health boards, and health reform in a comparative context will be examined.

Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 818.3 — 1/2(3L) Program Evaluation
Through extensive use of examples from various fields, students will be exposed to the art and science of applying evaluation methodologies and techniques to policies and programs in both the public and non-profit sectors.

Prerequisite(s): PUBP 806, or GSP 806, or JSGS 806, or by permission of the instructor.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 819.3 — 1/2(3L) Gender and Public Policy
Will compare neo-classical and feminist approaches to the analysis of public policy. Students will examine the labour market and gender-based inequality; the family, with a particular focus on intra-household resource allocation; and will consider macro-economic issues and provide gender-based analysis in relation to public policy in Canada.

Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 820.3 — 1/2(3L) Micro Economics for Policy Analysis
Will provide students with micro-economic tools needed for public policy analysis. Students are introduced to the economic approach to the study of human behaviour. Special emphasis will be placed on the study of the circumstances under which markets achieve, or fail to achieve, and efficient allocation of the economy’s resources.

Prerequisite(s): PUBP 805, or GSPP 805, or JSGS 805, or by permission of the instructor.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 821.3 — 1/2(3L) Macro Economics for Policy Analysis
Introduces the major policy questions of macro-economics and presents macro-economic models to assist policy development. An emphasis will be placed on current policy issues including monetary policy, fiscal policy, currency regimes, productivity and growth, demographics patterns and fiscal sustainability.

Prerequisite(s): PUBP 805, or GSPP 805, or JSGS 805, or by permission of the instructor.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 822.3 — 1/2(3L) Comparative Public Policy
Uses a comparative perspective to analyze how public policy is formulated, how it can change, and why. It will discuss the roles of formal and informal institutions, of actors, structures, and networks. The aim of the course is to provide the participants with a greater understanding of classical and contemporary theories of public policy; with the ability to critically analyze and compare public policy; and to develop frameworks for comparative policy analysis.

Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 825.3 — 1/2(3L) Saskatchewan in Canadian Federalism
Examines Canadian federalism from the perspective of Saskatchewan's post-war role in shaping national policy. The province's impact on the federation is analyzed through a series of topics.

Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 827.3 — 1/2(3S) Health Care Organization and Administration
Will provide students with an understanding of issues involved in the management and organization of health services. Students will examine issues related to managing health in terms of regional health authorities, health ministries and individual health organizations.

Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 828.3 — 1/2(3L) Project Management
Will introduce students to the many phases of a project's life cycle and how to address them through knowledge and understanding of project management principles and how to manage them effectively using project management techniques by monitoring and maintaining control of scope, time, and costs within a project.

Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 831.3 — 1/2(3S) Public Management Seminar
The course examines the principles underlying the application of selected aspects of public management and examines ways in which governments apply the principles. The course compares approaches of different governments and examines some specific applications and strives to develop in students the competencies required of public servants.

Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course will be offered at the University of Regina.

JSGS. 832.3 — 1/2(3L) Population Based Health Program Management
Will apply the techniques of epidemiology and biostatistics to evaluate population-based health programs. In addition, students will become familiar with principles of public health, prevention, and health care quality management.

Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.
JSGS. 833.3 — 1/2(3L)
Performance Measurement in Health Care Organizations
Focusing on the health care imperative of accountability to the community, this course deals with the measurement of performance in health care organizations. Management control focuses on the implementation of business strategies and the attainment of organizational goals.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 837.3 — 1/2(3L)
Health Economics
Designed to provide students with an introduction to economic concepts and analysis relevant to health, health care and health care systems. Students will examine economic aspects of various elements of the healthcare sector, identify relevant policy questions and apply economic concepts and techniques to analyze them.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 838.3 — 1/2(3L)
Public Sector Financial Management
Exposes students to the significant financial issues that have practical significance in the management and operations of public sector departments, agencies, and initiatives. The course will focus on select aspects of public sector governance and financial management. Students will be expected to apply the knowledge they learn from the course materials and lectures to problems and assignments that could typically arise in a public administration setting.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.

JSGS. 839.3 — 1/2(3L)
Classic and Contemporary Readings in Policy Theory
Surveys classic and contemporary theories in public policy and public administration. It is intended to provide students with a solid theoretical foundation in decision-making processes, policy learning, policy change, institutionalism and the intellectual developments associated with the policy process.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 840.3 — 1/2(3L)
Public Policy and Public Opinion
Public opinion in its many forms has become increasingly important for government decision making and accountability processes. This course examines the underlying assumptions and research methodology used in assessing public opinion as well as governments use of public opinion and its impact on decision-making and accountability practices.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 842.3 — 1/2(3L)
American Foreign Policy in a New Era
Foreign policy decisions are the product of a historical context (individual and cultural), a complex bureaucratic process, and an intertwined domestic and international political and economic environment. In order to criticize, evaluate, and understand those decisions, this course will examine all these components in relation to emerging doctrines of U.S. foreign policy.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 845.3 — 1/2(3L)
Behavioural Social Policy
Focuses on social programs and social policy analysis in a Canadian context. Applied interdisciplinary methods used in the administration and design of social policy are discussed at length. Students will also be introduced to various types of social programs including: income security, housing and homelessness, child protection and family services.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 847.3 — 1/2(3L)
Strategic Planning for Non Profit and Public Organizations
Strategic and operational planning through discussion of the relevance of organizational values, development of mission and vision statements and techniques to align goals and objectives with organizational priorities. Financial capability analysis and budgetary role in planning will be addressed. Skills developed include critical thinking, problem solving, writing, and presentation skills.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 849.3 — (3S)
Social Economy and Public Policy
The social economy includes non-profit, community-based organizations, and co-operatives. This course focuses on how these organizations interplay with the public policies of different levels of government. Using case studies, students will examine administrative public policy, such as how the social economy is funded and how it is evaluated and held accountable, as well as substantive public policy, including community capacity building and partnership development. The course also includes a field trip to learn about local social economy organizations at work and guest lecturers, including both researchers and practitioners.
Formerly: PUBP. 849
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP. 849 will not receive credit for this course.

JSGS. 850.0
Johnson Shoyama Graduate School of Public Policy Internship Program
The JSGS internship program is a competitive process open to students in the MPA and MPP programs who have completed at least 50 percent of their program, including the core program courses, and have little or no experience in the public sector. Students will be exposed to the skills used by managers at senior levels in the public sector and will perform a variety of tasks.
Formerly: PUBP. 850
Prequisite(s): Must have completed at least 50% of the MPA or MPP program course work, including core courses.
Note: Students with credit for PUBP.850 will not receive credit for this course.

JSGS. 851.3 — 1/2(3S)
Qualitative Methods
Provides students with the opportunity to learn and practice inquiry processes for conducting qualitative research. Students will examine the following topics: issues in qualitative data (ontology, epistemology, methodology and method), collection of qualitative data (e.g., interviewing, ethnography, focus groups, case studies), analysis of data, and combining qualitative and quantitative data.
Formerly: PUBP. 810
Prequisite(s): Students must have successfully completed an undergraduate course in statistics.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP. 810 will not receive credit for this course.
JSGS. 852.3 — 1/2(3L)
Inside Government Practices and Procedures
Examines the principles underlying aspects of public management with an emphasis on the machinery of government and the ways in which governments apply public administration principles and use various instruments. Students will practice some of the competencies expected of public servants through lectures, student presentations, in-class exercises and field trips.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 853.3 — 1/2(3L)
Negotiation and Conflict Resolution
Addresses negotiations and alternative dispute resolution (ADR) in the workplace, including theoretical models and applications relevant to managing conflict in employment settings. Students will gain a firm understanding of how to resolve workplace conflict in both unionized and non-unionized environments.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 854.3 — 1/2(3S)
Higher Education Policy
Will examine the broad context in which higher education policy is made and evaluate a variety of policy initiatives launched by governments around the world. Students will become acquainted with the principal objectives of government in the higher education sector and the major policy challenges they confront.
Formerly: PUBP 854
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP. 854 will not receive credit for this course.

JSGS. 859.3 — 1/2(3S)
Innovation Policy
Is designed as a course in the theory and practice of innovation policy, including science and technology. Students will investigate the theory, methodology, and applications of innovation policy through primary readings, discourse, and writing.
Formerly: PUBP 859
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP. 859 will not receive credit for this course.

JSGS. 860.3 — 1/2(3S)
Health Systems Research Methods
This course in research methods as applied to the analysis of health systems will develop students' knowledge and skills in health systems research, including the criteria for formulating health system research problems and hypotheses, selecting the appropriate research design, conducting a systematic literature review, and methods of data collection and use.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.

JSGS. 861.3 — 2(3L)
Health Post Secondary Education and Social Programs Funding Structure and Reform
The course will establish the foundations for the current funding of health care, post-secondary education and Canadian social programs. The course will also consider the main elements of a budget. The major for the class will involve students working together to compile a provincial budget. Every province faces the same budgetary challenge: how continue to fund the rapidly increasing costs of health care while at the same time maintaining the quality of other programs and services.
Prerequisite(s): PUBH. 867 or departmental permission
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBH. 861 will not receive credit for this course.

JSGS. 862.3 — 1/2(3S)
Political Economy
Focuses on the politics of aggregating individual decisions into collective action, revealing the difficulty of formulating and implementing public policy broadly construed. The course readings emphasize formal approaches to this subject, while the assignments and discussion emphasize their application to real problems.
Formerly: PUBP 807
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP. 807 will not receive credit for this course.

JSGS. 863.3 — 1/2(3S)
Aboriginal Peoples and Public Policy
Begins with the historic framework for contemporary public policy established by treaties, reserves and legislation. Then it examines contemporary developments, including constitutional negotiations, influential court case, urbanization, comprehensive claims and self-government.
Formerly: PUBP 812
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP. 812 will not receive credit for this course.

JSGS. 864.3 — 1/2(3S)
Social Policy Interdisciplinary Perspectives
An interdisciplinary course that offers a comparative and historical perspective on social policy development, in Canada and in other advanced industrial countries.
Formerly: PUBP 814
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP. 814 will not receive credit for this course.

JSGS. 865.3 — 2(3S)
Decision Making in Organizations
Examines the manner in which decisions are made in organizations, with a particular focus on policy decisions. The course uses a wide variety of behavioral theories to look at phenomena such as policy traps, framing, unwarranted optimism, and group think.
Formerly: PUBP 830
Restriction(s): Admission to the MPA, MPP, Ph.D. or permission of the instructor.
Note: Students with credit for PUBP. 830 will not receive credit for this course.

JSGS. 866.3 — 1/2(3S)
Public Leadership Theory and Practice
Will provide students with an understanding of selected theories and practices of public leadership for various informal and agentic roles at local, regional, provincial, and federal levels.
Formerly: PUBP 836
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: Students with credit for PUBP. 836 will not receive credit for this course.

JSGS. 867.3 — 1/2(3L)
Advanced Policy Analysis
Will introduce students to applied policy analysis and key policy research methods including interviews, focus groups, and surveys. As an applied project class students will work with faculty and representatives from the Saskatchewan Government to conduct a policy analytic review for a provincial ministry.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 868.3 — 1/2(3S)
Resource and Environmental Policy
An examination of recent trends in resource and environmental policy. The course will focus on policy processes in the context of the growing integration of resource and environmental policies, multi-level governance, and civil society engagement.
Restriction(s): Admission into the Master of Public Administration (MPA) program, Master of Public Policy (MPP) program, Ph.D. program, or by permission of the instructor.
JSGS. 869.3 — 1/2(3S)
Readings in Public Policy
Examines key readings in the public policy literature and provides students with an overview of key concepts and outcomes from political science, economics, sociology, and law that are germane to the theory and practice of public policy. The aim of the course is to provide the participants with a greater understanding of classical and contemporary theories of public policy and the ability to critically analyze and compare public policy. The material covered in the course serves as the foundation for the PhD comprehensive exam.
Formerly: PUBP 820
Restriction(s): Admission into the JSGS Ph.D. program.
Note: Students with credit for PUBP 820 will not receive credit for this course.

JSGS. 870.3 — 1/2(3L)
Water Policy in an Age of Uncertainty
Will ask whether contemporary water systems embody principles that will allow them to adapt and function in a changing climate, a rapidly evolving economy, a changing settlement system, and new lifestyles. The format will include lectures, class discussion, jigsaw readings in which students read separate material and then teach content to peers, guest lectures, documentaries, and Web-based content. Students will develop a collaborative, interdisciplinary framework for evaluating sustainable water governance. Each student will use this framework to evaluate climate adaptation policy in the water sector in a major world city.
Restriction(s): Admission into the Master of Public Administration (M.P.A.) program, Master of Public Policy (M.P.P) program, Ph.D. program, admission into a program in the School of Environment and Sustainability, or by permission of the instructor.

JSGS. 871.3
Research Methods in International Trade Policy
Is designed to provide the analytical skills required to make sense of the vast literature on international trade, much of which presents data in sophisticated ways, reports the results of the use of often quite sophisticated statistical techniques, and may even be the result of mathematical modeling.
Formerly: INTR. 801
Restriction(s): Admission into the Master of International Trade (M.I.T.) program or by permission of the instructor.
Note: Students with credit for INTR. 801 will not receive credit for this course.

JSGS. 872.3
International Trade and Commercial Policy
Economic analysis of international trade policy. Economic implications of border measures, subsidies, technical standards as barriers to trade, unfair trade practices, sanctions. Dispute settlement and economic penalties. Assessment of international trade institutions and agreements.
Formerly: INTR. 802
Restriction(s): Admission into the Master of International Trade (M.I.T.) program or by permission of the instructor.
Note: Students with credit for INTR. 802 will not receive credit for this course.

JSGS. 873.3
International Trade Theory
Reviews the economic rationale and evidence used to evaluate the effects of freer trade on national economics. We will explore classical theories of trade as well as new models of trade that stress increasing returns and market structure. We will use original data sources to explore essential features of international trade.
Formerly: INTR. 803
Restriction(s): Admission into the Master of International Trade (M.I.T.) program or by permission of the instructor.
Note: Students with credit for INTR. 803 will not receive credit for this course.

JSGS. 874.3
International Monetary Economics
Reviews the factors that determine exchange rates, the benefits and costs of alternative exchange rate regimes, the efficacy of fiscal and monetary policy under different regimes, and the causes and consequences of a currency crisis. We will use original data sources to explore essential features of international monetary flows.
Formerly: INTR. 804
Restriction(s): Admission into the Master of International Trade (M.I.T.) program or by permission of the instructor.
Note: Students with credit for INTR. 804 will not receive credit for this course.

JSGS. 875.3
Politics of International Trade
Will explore the political context of international trade by examining the literature on globalization and by focusing on trade policy decision making in major trading nations as well as in regional and international organizations.
Formerly: INTR. 805
Restriction(s): Admission into the Master of International Trade (M.I.T.) program or by permission of the instructor.
Note: Students with credit for INTR. 805 will not receive credit for this course.

JSGS. 876.3
International Trade Law
Examines the law of international trade in goods and services, focusing principally on the law of the World Trade Organization, the General Agreement of Tariffs and Trade, and the North American Free Trade Agreement. This specialized sector of international law includes particular negotiation and dispute settlement processes, as well as particular types of rules restraining national restrictions on trade. These rules address tariff and non-tariff barriers, discrimination, regionalism, anti-dumping, countervailing duties and safeguard measures.
Formerly: INTR. 806
Restriction(s): Admission into the Master of International Trade (M.I.T.) program or by permission of the instructor.
Note: Students with credit for INTR. 806 will not receive credit for this course.

JSGS. 877.3
International Commercial Transactions
Examines the law of international commercial contracts, including the judicial system, the division of powers, the treatment and rights of Aboriginal Peoples, and the Charter of Rights and Freedoms.
Restriction(s): Admission into the Master of Public Administration (M.P.A.) program, Master of Public Policy (M.P.P) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.

JSGS. 878.3
International Business Environment
Looks at international trade from the perspective of the private sector practitioner, manager or consultant. Topics include FDI, international cultural, physical, economic, socioeconomic, political, legal and financial environmental forces, competitive intelligence, international marketing challenges, and international financial and human resources management.
Formerly: INTR. 808
Restriction(s): Admission into the Master of International Trade (M.I.T.) program or by permission of the instructor.
Note: Students with credit for INTR. 808 will not receive credit for this course.

JSGS. 879.3
The Management of Technology
To assist students to develop a framework for understanding and analyzing the strategic management of the research, development and commercialization of biotechnology-based products. Students will also learn the role and importance of government (domestic and international regulations), intellectual property regulations and public perception in the business strategy decision making process of firms.
Formerly: INTR. 809
Restriction(s): Admission into the Master of International Trade (M.I.T.) program or by permission of the instructor.
Note: Students with credit for INTR. 809 will not receive credit for this course.

JSGS. 881.3 — 1/2(3S)
Constitutional Law and Public Policy
Students will develop the critical skills necessary to examine Canadian constitutional framework, including the judicial system, the division of powers, the treatment and rights of Aboriginal Peoples, and the Charter of Rights and Freedoms.
Restriction(s): Admission into the Master of Public Administration (M.P.A.) program, Master of Public Policy (M.P.P) program, Ph.D. program, or by permission of the instructor.
Note: This course is offered at the University of Regina.
KIN — KINESIOLOGY

KIN. 803.3 — 1/2(R) Biomechanics
Topics include kinetic measurements, segmental energy and power flow, stresses and strains on human tissue, modeling and simulation.
Prerequisite(s): KIN. 442 or equivalent.

KIN. 805.3 — 1/2(3L) Physiology of Exercise
A reading and lecture course for the student interested in a specialized approach to the study of exercise physiology. Detailed papers will be presented by the students in both required and selected areas of exercise physiology. In addition laboratory experiences may be assigned to supplement the assigned readings. Areas to be covered include cardiopulmonary response to various types of exercise, muscle physiology and biochemistry of exercise, and the adaptation of bone to exercise.
Prerequisite(s): KIN. 225 and 226, or permission of the instructor.

KIN. 806.3 — 1/2(3L) Physical Growth and Development
Examines special topics related to growth and physiological development. Special emphasis is placed on the influence of exercise, physical activity, and athletic performance on the dynamics of growth. The course consists of special readings and assigned topics dealing with physiological function, exercise tolerance, strength and motor performance as they relate to the growth of the child.
Prerequisite(s): KIN. 320 or permission of the instructor.

KIN. 807.3 — 1(3L) Research Methods in Kinesiology
Intended to provide students with an introduction to research methods and design in Kinesiology research. Content of the class includes basic principals of both quantitative and qualitative research methods. Emphasis will be placed on developing skills necessary for an effective research proposal.
Prerequisite(s): Undergraduate course in statistics.

KIN. 808.3 — 2(3L) Data Analysis in Kinesiology
Intended to provide students with a review of quantitative data analysis. Content of the class will include the basic theory behind quantitative analysis, illustrated with hands on practical examples using available computer software. Emphasis will be placed on acquiring the knowledge to be able to apply and understand the statistical techniques using SPSS.
Prerequisite(s): Undergraduate course in statistics.

KIN. 809.3 — 1/2(3S) Health Aspects of Physical Activity and Physical Fitness
Involves a comprehensive investigation of the health implications of physical activity and exercise. Topics will include health aspects of exercise as related to current knowledge, gaps in knowledge and research needs.

KIN. 830.3 — 1/2(3L) Psychosocial Aspects of Health and Exercise Behaviour
Focuses on the psychosocial aspects of health and exercise behavior. An in-depth study and application of theoretical research to practical field settings is a central theme.
Prerequisite(s): KIN. 231 or equivalent with permission of the instructor, such as a 200 or higher undergraduate level course in Exercise Psychology, Psychology of Physical Activity and Sport, or Social Psychology of Health Behaviour and KIN. 380 or similar course with permission of the instructor, such as a course in Research Design.

KIN. 831.3 — 1/2(3L) Social Psychology of Group Processes in Physical Activity
This is a seminar-based course that includes reading and discussion of the application of theory in group processes as they relate to physical activity. This course is designed to provide students with an understanding of how groups promote individual change. Students will be exposed to selected topics in group processes (e.g., cohesion, groups as mediators, levels of analysis) as well as specific group applications such as team building and GMB interventions.
Prerequisite(s) or Corequisite(s): KIN. 807 and KIN. 830 or permission of instructor.

KIN. 861.3 — 1/2(3L) Contemporary Issues in Physical Education
Required by students enrolled in the joint M.Ed. program in Physical Education Pedagogy. The purpose of this course is to familiarize the student with the major issues facing the instruction of school-based physical education programs. The intent will be to encourage participants to take a stand on major issues and to support their positions.

KIN. 898.3 — 1/2(3R/P) Special Topics
Studies in selected areas of physical education may be undertaken by advanced students with the consent of the College Graduate Committee. This work consists of essay writing, special readings and reports on assigned topics relating to a common subject or upon a series of laboratory studies.

KIN. 899.6 Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

KIN. 990 Seminar
Review of related scientific studies. Graduate students are required to attend and present papers during their period of candidacy.

KIN. 994 Research
Students writing a Master's thesis must register for this course.

KIN. 996 Research
Students writing a Ph.D. thesis must register for this course.
LAW — LAW

Department of Law (Dean's Office)

LAW. 801.3 — 1and2(35)
Advanced Studies in Aboriginal Rights I
This advanced seminar deals with a range of areas relating to the legal status and rights of Aboriginal peoples both in Canada and in such other countries as the United States, New Zealand and Australia, including Aboriginal land rights, treaty rights, hunting and fishing rights, the Indian Act, constitutional structures, human rights, affirmative action, the impact of the criminal law, taxation and commercial law.

LAW. 802.3 — 1/2(35)
Advanced Studies in Aboriginal Rights II
Covers specific topics in areas relating to the legal status and rights of Aboriginal peoples not covered in LAW. 801.

LAW. 805.3 — 1/2(25-1T)
Advanced Criminal Law Studies
Critical analysis of criminal law with emphasis on theoretical discussion of the grounds of criminal liability and criminal responsibility. The challenges social and cultural diversity pose for the operation of criminal justice systems and perspectives arising from comparative and human rights law may be considered.
Prerequisite(s): Students must have been awarded a J.D. or L.L.B. degree.
Note: Students with credit for LAW 405 cannot receive credit for this course.

LAW. 806.3 — (35)
Advanced Studies in Law and Culture
This interdisciplinary seminar explores legal culture within the larger cultural contexts that it shapes and is shaped by. Students will study, at an advanced level, the ways in which law and cultures intersect in history, theory and practice.
Restriction: A student may not receive credit for this course and the corresponding undergraduate level course.

LAW. 818.3 — 25-1R-1/2T
Advanced Sexual Assault Law
Critical analysis of the handling of sexual assault cases by the legal process. Examines the exercise of police, prosecutorial, and judicial discretion within a framework of human rights and legal principles augmented by tools and perspectives of legal theory, psychiatry, medicine, and the social sciences.
Prerequisite(s): J.D. or LL.B. with training in criminal law, criminal procedure, and evidence.
Note: This seminar may be offered in the Fall or Winter term. In either case, the required graduate level research tutorials and all written work must be completed by the end of the April examination period in Law.

LAW. 819.3 — 1and2(35)
Indigenous Peoples in International and Comparative Law
The question of legal rights of indigenous peoples has emerged in a number of states during the last half of the twentieth century, and has influenced developments in the work of the United Nations, the Organization of American States, their constituent organizations, and of inter-governmental and non-governmental organizations. Explores these international and comparative developments, with a focus on Constitutional, legal and policy developments in selected states.
Note: A student may not receive credit for this course and the corresponding undergraduate level course.

LAW. 823.3 — 1and2(35)
Human Rights Seminar
Students will gain an understanding of contemporary debates about universalism and of the meaning of human rights in Canada with attention to political theory and international underpinnings. The concept of discrimination and the constitutional position of human rights and fundamental freedoms in Canada. Detailed analysis of the concept of equality as it is embedded in domestic anti-discrimination law and enshrined in section 15 of the Charter.
Note: A student may not receive credit for this course and the corresponding undergraduate level course.

LAW. 828.3 — 1and2(35)
Graduate Jurisprudence Seminar
This mandatory seminar investigates, across time and space, manifestations of, and alternative answers to, theoretical questions of law such as the nature of law and judicial reasoning, tensions between natural law and positivism, law and morality, law and politics, law and justice, law and order, and law and the economy.

LAW. 839.3 — 2(3L)
Canadian Legal History
Introduces students to fundamental developments in Canadian legal history and uses a historical perspective to enhance understanding of Canadian legal heritage; English, European and American influences; the interplay of colonialism and the role of Aboriginal peoples; the legacy of civil, common and customary law.

LAW. 858.3 — 35
Advanced Studies in Health Law
Students will develop and apply advanced knowledge of health law to specific topics in the areas of health care and medical research.
Note: LAW 314.3 or equivalent is recommended as a prerequisite but not required.
Restriction: A student may not receive credit for this course and the corresponding undergraduate level course.

LAW. 865.3 — 35
Advanced Seminar on Law Development and the International System
This seminar explores the interaction between law and socio-economic development (with some emphasis on international law). It will allow students to engage with the theoretical underpinnings of the law and development discourse as well as practical aspects of the development enterprise, at an advanced level.
Note: LAW 457.3 or equivalent is recommended as a prerequisite but not required.
Restriction: A student may not receive credit for this course and the corresponding undergraduate level course (LAW 465.3).

LAW. 895.3 — 35
Individual Directed Research
Students will undertake a substantial research project in an area relevant to their interests and thesis topic. Meeting times will be scheduled to suit the instructors and students concerned. Students must approach individual professors with a research proposal. All proposals must be approved by the Graduate Chair.
Note: Students must approach individual professors with a research proposal. All proposals must be approved by the Graduate Chair.

LAW. 898.3 — 1/2(35)
Special Topics
Individualized research projects may be undertaken with the supervision of faculty members often in conjunction with courses offered in the College of Law. Topics are chosen in consultation with faculty advisors to complement areas of thesis research. Assessment will be based primarily upon a series of written assignments prepared by the student over the term. Topics chosen may be selected from the following areas: Aboriginal Law, Commercial Law, Constitutional Law, Criminal Law, Agricultural Law or Human Rights, subject to faculty availability.

LAW. 899.6 — 1and2(35)
Special Topics
Individualized research projects may be undertaken with the supervision of faculty members often in conjunction with courses offered in the College of Law. Topics are chosen in consultation with faculty advisors to complement areas of thesis research. Assessment will be based primarily upon a series of written assignments prepared by the student over the term. Topics chosen may be selected from the following areas: Aboriginal Law, Commercial Law, Constitutional Law, Criminal Law, Agricultural Law or Human Rights, subject to faculty availability.

LAW. 990 Seminar
Presentations regarding current research will be made by visiting faculty, faculty and graduate students. All graduate students in residence must make a presentation at least once each year. The seminar may also seek to provide for review of current literature and developments.
Note: All graduate students are required to attend, and to participate in the course to the satisfaction of the Law Graduate Studies Committee. This is a non-credit course.

LAW. 994 Research
Completion of original research and writing of an LLM. thesis.
LING — LINGUISTICS

Department of Religion and Culture

LING. 898.3 Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

LING. 899.6 Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

LING. 990 Seminar
Students and faculty will make presentations concerning their current research. All candidates for a graduate degree must make one presentation. Attendance is required throughout the graduate program.

LING. 994 Research
Students writing a Master’s thesis must register for this course.

LING. 996.0 Research
Students enrolled in Special Case PhD in Linguistics must register for this course. This course is designed to enhance the students knowledge of the subject area. Readings are assigned on an individual basis. The course is expected to prepare the student for writing the PhD thesis. Attendance is obligatory. The course is non-credited.

MATH — MATHEMATICS

Department of Mathematics and Statistics

MATH. 811.3 — 1and2(3L)
Numerical Solution of Ordinary and Partial Differential Equations

Formerly: MATH. 814
Prerequisite(s): MATH. 314 and MATH. 338 or equivalents, or by permission of the instructor.
Note: Students with credit for MATH. 814 cannot receive credit for this course.

MATH. 818.3 — 1/2/1and2(3L)
Special Topics in Applied Mathematics
The topics to be discussed will be related to recent developments in applied mathematics (numerical analysis, differential equations, mechanics, applied analysis, etc.) of interest to the instructor and students.

Prerequisite(s): A graduate course in applied mathematics, or permission of the department.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

MATH. 838.3 — 1/2(3L)
Methods of Applied Mathematics II
The course is devoted to classical topics in Applied Mathematics, including Integral equations, Theory of Distributions, Fourier Transforms, and Calculus of Variations. By the end of the course, students will be able to analyze modern mathematical models involving ordinary and partial differential equations and integral equations, and approach the solution from different points of view, building on knowledge of classical mathematical methods and hands-on practical experience gained in this course.

Prerequisite(s): MATH. 331.3, MATH. 339.3, MATH. 371.3, and MATH. 373.3, or equivalents as determined by the college, or permission of the instructor.
Note: Cannot receive credit for MATH. 438.3 and MATH. 838.3. Cannot receive credit for MATH. 838.6 and MATH. 838.3.

MATH. 839.3 — 1/2(3L)
Methods of Applied Mathematics I
This course covers methods pertaining to the formulation and solution of problems involving linear and nonlinear Partial and Ordinary Differential Equations (PDE, ODE). Topics include: Linear equations of mathematical physics; Initial/ boundary value problems; Bases of functions; Fourier series; Operators in function spaces; Separation of variables; Method of characteristics; Green’s functions; Traveling wave solutions. At the end of the term, students will be able to formulate complex mathematical models, and approach their solution from different points of view, building on knowledge of classical mathematical methods and hands-on practical experience gained in this course.

Prerequisite(s): MATH. 331.3, MATH. 339.3, MATH. 371.3, MATH. 373.3, and MATH. 379.3, or equivalents as determined by the college, or permission of the instructor.
Note: Cannot receive credit for MATH. 439.3 and MATH. 839.3.

MATH. 863.3 — 1/2(3L)
Noncommutative Algebra
An introduction to noncommutative algebra at the graduate level. Topics will be chosen based on the needs and interests of the student; and will typically include: structure theory of noncommutative rings (finite- and infinite-dimensional), representation theory of finite groups, module theory, introduction to Lie algebras.

Note: MATH. 862.3 is not a prerequisite for this course.

MATH. 872.3 — 1/2/1and2(3L)
Special Topics in Pure Mathematics
The topics to be discussed will be related to recent developments in an area of pure mathematics (analysis, topology, algebra, etc.) of interest to the students and instructor.

Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

MATH. 875.3 — 1/2(3L)
Functional Analysis
An introduction to functional analysis at the graduate level. Topics will include Normed and Banach spaces, Bounded linear operators, The Hahn-Banach Theorem, The Principle of Uniform Boundeddness, The Open Mapping and Closed Graph Theorem, Weak and Weak topologies, Adjoint operators, Compact operators on Banach space, Hilbert spaces, Bounded linear operators on Hilbert spaces, Spectrum of operators on Hilbert spaces, Compact Normal operators.

Prerequisite(s): MATH. 371, MATH. 373, and MATH. 379 or equivalent.

MATH. 876.3 — 1/2(3L)
Operator Theory
An introduction to operator theory at the graduate level. Topics will include Banach algebras, Spectrum of an element in Banach algebras, Spectral radius, Analytic functional calculus, C-algebras of operators, Continuous and Borel functional calculus, Spectral measures.

Prerequisite(s): MATH. 371, MATH. 373, and MATH. 379 or equivalent.

MATH. 882.3 — 1/2(3L)
Algebraic Topology I
Two-dimensional Manifolds, the Fundamental Group including the Seifert-Van Kampen Theorem, Applications to Knot Theory and Group Theory.

Prerequisite(s): MATH. 485.

MATH. 889.3 Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

MATH. 899.6 Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

MATH. 990 Seminar
All graduate students in the department enroll each year. Students attend the regular department colloquia. After the first year in their program, they are expected to join the regular seminar series in their area of specialization.

MATH. 992.0 Project
Students undertaking the project Master’s degree (M.Math.) must register for this course.

MATH. 994 Research
Students writing a Master’s thesis must register for this course.

MATH. 996 Research
Students writing a Ph.D. thesis must register for this course.
MBA — MASTER BUSINESS ADMINISTRATION

Department of ESB (Dean's Office)

**MBA. 803.3 — 3 weeks (39 hours)**  
Business and Society  
Through examination and hands-on application of critical aspects in today's dynamic environment such as corporate governance, competitive contexts, innovation, business ethics and corporate social responsibility, students develop the skills needed to analyze, formulate and implement firm strategy. This course is fundamental to understanding how business works and is an introductory course for the Edwards MBA.

**MBA. 813.3 — 3L**  
Strategic Human Resources Management  
Management is most effective when human resource systems are internally consistent and aligned with organizational strategic objectives. Students learn fundamental concepts in managing people, with an emphasis on identifying the appropriate practices to apply to different organizational contexts and management situations.  
*Prerequisite(s): MBA. 803.*

**MBA. 819.3 — 3L**  
Marketing for Organizational Decision Making  
Focuses on the role that marketing plays within an organization and how it integrates into organization decision-making. It introduces an organizations revenue-generating activities for profit-oriented companies and communication activities for not-for-profit organizations and the management and strategic processes whereby products and services are developed, priced, promoted, and distributed.  
*Prerequisite(s): MBA. 803.*

**MBA. 825.3 — 3 weeks (39 hours)**  
Financial Management  
Examines the role of finance in business decision-making. Emphasis is placed on developing knowledge of theories, concepts, and analytical techniques used in business finance. Students will begin to view finance as an integral part of business and learn that all business decisions involve some form of financial analysis.  
*Prerequisite(s): MBA. 803.*

**MBA. 828.3 — 3 weeks (39 hours)**  
Tactical Strategy Implementation Evaluation and Control  
Strategic management is that set of decisions and actions which leads to the development of an effective strategy to help achieve corporate goals and objectives. Focusing on tactical implementation of strategic choices and how the benefits of strategic choices can be maximized, this course serves as the capstone to the Edwards MBA, integrating all of the concepts learned.  
*Prerequisite(s): MBA. 803; MBA. 825; or permission of the Director of the MBA program.*

**MBA. 829.3 — 3L**  
Financial Statement Analysis  
Designed to prepare future managers to effectively analyze, interpret and evaluate an entity's financial statements and related information. The entities subject to analysis will be both private and public and will be drawn from a wide variety of different industries.  
*Prerequisite(s): MBA. 803.*

**MBA. 830.3**  
Operations Management  
Explores activities related to the production of goods and delivery of services, as well as improvement of key business processes. Examines the tools, principles and analytical techniques that managers and business analysts use to investigate key issues within the operations function.  
*Prerequisite(s): MBA. 803.*  
*Note: Students with credit for MBA. 881.3 will not receive credit for this course.*

**MBA. 846.3 — 3 weeks (39 hours)**  
Entrepreneurship and Business Planning  
Provides concepts and tools to successfully develop and manage all components of a strategic business plan. Students will assess business plans from the viewpoint of entrepreneurial proponents as well as venture capital investors.  
*Prerequisite(s): MBA. 803.*

**MBA. 863.3 — 3 weeks (39 hours)**  
Accounting for Planning and Decision Making  
Introduces students to the vital role that management accounting information plays in business, including concepts, definitions and calculations. We will integrate this knowledge into the decision making aspects of management control systems that assist managers in executing their business strategy.  
*Prerequisite(s): MBA. 803.*

**MBA. 865.3 — 3 weeks (39 hours)**  
Corporate Finance  
Focuses on developing skills of the financial manager at an executive level through deeper understanding of finance concepts, theories and methodologies. Students will gain a deeper understanding of how to value investment opportunities, measure risk and return, negotiate and structure deals, raise capital in private and public markets and manage risk.  
*Prerequisite(s): MBA. 803.*

**MBA. 870.3 — 3 weeks (39 hours)**  
Leadership and Organizational Dynamics  
The role of a manager requires organizing, controlling, planning and motivating others to perform the work of the organization. The course examines articles, cases, novels, illustrations, and discussion to appreciate the totality of leadership. Students develop and hone their personal leadership philosophies.  
*Prerequisite(s): MBA. 803.*

**MBA. 877.3 — 3 weeks (39 hours)**  
International Business and Global Marketing  
Intended to provide an opportunity to understand the complexity of the global environment of business and make an attempt to systematically examine the broad dynamics of the international environmental factors that would potentially influence business activities of the firm. This would include marketing, demographic trends, economic development, natural and resource concerns, political landscape and cultural diversity.  
*Prerequisite(s): MBA. 803.*

**MBA. 879.0**  
Edwards MBA Internship Program Part I  
This course is a four-month work placement for Edwards MBA students admitted into the Edwards MBA Internship option. The focus of the internship will be for the student to gain relevant work experience. Evaluation will be based on the employer's internship evaluation and the student's performance on the internship report. This course is graded on a Pass/Fail basis.  
*Prerequisite(s): Open only to current Edwards MBA students who have an approved work placement and have received special permission from the Director of the MBA program.*

**MBA. 882.0**  
Edwards MBA Internship Program Part II  
This course is a four-month work placement for Edwards MBA students in the Edwards Business MBA Internship option. The focus of the internship will be for the student to gain relevant work experience. Evaluation will be based on the employer's internship evaluation and the student's performance on the internship report. This course is graded on a Pass/Fail basis.  
*Prerequisite(s): MBA. 879.0.*

**MBA. 883.3 — 2 weeks**  
International Study Tour  
An immersive experiential learning course designed to enhance the classroom curriculum through first-hand exposure to industry, organizations, and business practices in another cultural context. Students and faculty participate in collaborative and internationalized academic opportunities with counterparts in the host country, company visits, discussions with business leaders and cultural awareness activities.  
*Prerequisite(s): MBA. 803.*  
*Note: Students with credit for MBA. 880 will not receive credit for this course. This course was labeled MBA. 880 until 2014.*

**MBA. 889.0**  
Internship option. The focus of the internship will be for the student to gain relevant work experience. Evaluation will be based on the employer's internship evaluation and the student's performance on the internship report. This course is graded on a Pass/Fail basis.  
*Prerequisite(s): MBA. 803.*

**MBA. 888.0**  
Integrative Modules  
Provides students with an opportunity to integrate the knowledge gained in the individual functional areas. This will be a case based approach including case instruction, discussion, analysis, presentation and writing.  
*Prerequisite(s): MBA. 803.*
MCIM. 816.3 — 1(3L)
Genetic Analysis of Eukaryotic Microorganisms
Review various biochemical, genetic and molecular biological approaches in the study of model unicellular eukaryotic microorganisms, primarily Saccharomyces yeasts. Emphasis will be on genome organization and manipulation, DNA metabolism, control of gene expression and cell cycle regulation. The complete yeast genome sequence and its control of gene expression and cell cycle regulation. The complete yeast genome sequence and its organization and manipulation, DNA metabolism, control of gene expression and cell cycle regulation. The complete yeast genome sequence and its organization and manipulation, DNA metabolism, control of gene expression and cell cycle regulation. The complete yeast genome sequence and its organization and manipulation, DNA metabolism, control of gene expression and cell cycle regulation.

Prerequisite(s): MICR. 821 or permission of the instructor.

Note: Students with credit for MICR. 821 may not take this course for credit.

MCIM. 820.3 — 1(3L)
DNA Repair and Mutagenesis
Explores the process of DNA damage, repair, mutation and repair and impacts on cell survival, genome integrity, molecular evolution and human diseases. Emphasis is given to molecular, cellular, genetic and biochemical analysis of each repair pathway in various organisms. Students are expected to be familiar with the technologies and strategies in the investigations.

Formerly: MICR. 820
Note: Students with credit for MICR. 820 may not take this course for credit.

MCIM. 821.3 — 1(3L-1S)
Principles of Immunology
Considers the cellular, molecular and genetic mechanisms responsible for the physiological functioning of the immune system. Topics include the clonal selection theory, the structure and diversity of antibody molecules, the MHC-restricted recognition of antigen by T cells and the regulation of the immune response.

Formerly: MICR. 821
Note: Students with credit for MICR. 821 may not take this course for credit.

MCIM. 823.3 — 2(3L-3S)
Immunopathogenesis of Microbial Infections
Considers how the activation of innate and adaptive immune mechanisms by microbial infections contribute to pathology. Topics include basic mechanisms of immune-cell migration and inflammation, functions of cytokines, antibody and cell-mediated hypersensitivity reactions and their role in disease processes as seen in allergies and autoimmunity. A portion is devoted to transplantation immunology and to regulation of the immune response to tumors and parasites.

Formerly: MICR. 823
Prerequisite(s): MICR. 321 (formerly MICR. 421) or equivalent.

Note: Students with credit for MICR. 823 may not take this course for credit.

MCIM. 825.3 — 2(3L)
Molecular Basis of Microbial Pathogenesis
Explores ways in which microbial pathogens, particularly bacteria, interact with their hosts from a molecular and genetics perspective. Topics include general virulence mechanisms of pathogens; bacterial virulence factors and their genetic regulation; molecular genetic approaches to studying pathogenesis; and various model systems which have been used to understand pathogenic mechanisms.

Formerly: MICR. 825
Prerequisite(s): MICR. 216 (formerly MICR. 216) and a course in molecular genetics or molecular biology, or permission of the department.

Note: Students with credit for MICR. 825 may not take this course for credit.

MCIM. 827.3 — 2(3-4S)
Advanced Cellular and Molecular Immunology
Assesses the current understanding of the immune system, and the experimental means by which this has been achieved, by analyzing papers from the current and past literature.

Formerly: MICR. 827
Prerequisite(s): Permission of the department.

Note: Students with credit for MICR. 827 may not take this course for credit.

MCIM. 860.3 — 1and2(1S)
Seminar in Immunology
Current research in immunology and related areas will be presented and discussed by graduate students and faculty. Each term, each credit student will present a seminar on a recent publication from the literature and submit a term paper critically analyzing and comparing the presented data with other published information on the subject.

Formerly: MICR. 860
Prerequisite(s): 3 credit units undergraduate and/or graduate courses in Immunology.

Note: Students with credit for MICR. 860 may not take this course again for credit.

MCIM. 861.3 — 1and2(1S)
Seminar in Molecular Biology and Microbiology
Current research in molecular microbiology and related areas will be presented and discussed by graduate students and faculty. Each term (T1 and T2) the student will present a seminar on a current research topic and will submit a critical essay on a focused area of research.

Note: Students with credit for MICR. 861 may not take this course again for credit.

MCIM. 898.3 — 1/2(2L/R)
Special Topics
Study in selected areas of microbiology may be undertaken by senior students with permission of the department. The study will be arranged to suit the requirements of individual students. It may consist of lectures, essays, literature surveys and reports on assigned topics related to a specific subject. Laboratory work may be required.

Prerequisite(s): An introductory Microbiology course and permission of the department.

MCIM. 899.6
Special Topics
Study in selected areas of microbiology may be undertaken by senior students with permission of the department. The study will be arranged to suit the requirements of individual students. It may consist of lectures, essays, literature surveys and reports on assigned topics related to a specific subject. Laboratory work may be required.

Prerequisite(s): An introductory Microbiology course and permission of the department.

MCIM. 990 Seminar
Graduate students are required to present one seminar per year on their research progress as part of a graduate seminar program (usually held the end of T2), and make a formal presentation upon completion of their research program in the Microbiology and Immunology Seminar Series. Yearly registration in MCIM. 990 and attendance in the Microbiology and Immunology Seminar series is required throughout the graduate program.

MCIM. 994 Research
Students writing a Master’s thesis must register for this course.

MCIM. 996 Research
Students writing a Ph.D. thesis must register for this course.
ME 840.3 — 1/2(3L)
Theory of Inelastic Behaviour

ME 842.3 — 1/2(3L)
Advanced Surface Engineering
A wide overview of surface engineering with an emphasis on the fabrication, characterization and application of hard coatings. The course covers general concepts of surface engineering, most important techniques for fabrication and characterization of surface layers, main applications of hard coatings, and some forefront super hard coatings.
Prerequisite(s): Graduate standing or permission of the Department Head.

ME 843.3 — 1/2(3L-2P)
Materials Characterization Techniques
An overview of both established and new materials characterization techniques, including mechanical characterization (hardness measurements, tensile test), electrical characterization techniques (electrical resistivity), x-ray diffraction, thermal analysis (e.g., DTA, DSC, TGA, TMA, DMA), optical microscopy, electron microscopy (e.g., SEM, TEM, EDS, WDS), and surface analysis.
Prerequisite(s): Graduate standing or permission of the Department Head.

ME 844.3 — (3L)
Deformation and Failure of Engineering Materials
The course covers various aspects of failure mechanisms and prevention in metallic, polymeric and ceramic materials. Topics include deformation and failure modes; elements of dislocation theory; strengthening mechanisms in metals and polymers; toughening techniques in ceramic material; creep, fatigue and impact failures; basic fracture mechanics; failure investigation and analysis; case studies of past failures of engineering structures.
Prerequisite(s) or Corequisite(s): ME 324 or equivalent. Note: Departmental approval required.

ME 846.3 Advanced Materials
The course will provide students an understanding of the relationship between structure, properties and applications of various materials including metals, ceramics, polymers and composites. It also aims to develop personal skills in problem solving, research methods, research communications, and teamwork. The course is open to graduate students with a background and interest in materials science and technology.
Restriction(s): Restricted to students in the College of Graduate Studies and Research, or with departmental permission.
Note: Students may receive credit for only one of ME 846 and ME 477.

ME 854.3 — 1/2(3L)
Mechanical Vibrations
Topics covered include the study of the fundamental single-degree-of-freedom systems and the complex multiple-degree-of-freedom systems using Newton's law of motion, the energy method, Rayleigh's method, Lagrange's equations, the mechanical impedance method, influence coefficients, and matrix methods. Special topics include the study of transient vibration of continuous media. Solutions to the various differential equations encountered are presented.
Prerequisite(s): ME 321 or equivalent.

ME 857.3 — 1/2(3L)
Topics in Finite Elasticity
A review of tensor analysis, general theory of elasticity or finite deformations, constitutive equations, special problems with exact solutions, developments of plate and shell theories, solution by classical and weighted residual methods.
Prerequisite(s): CE 802 or permission of the instructor.

ME 858.3 — 1/2(2L-1P-.5S)
Mechanics of Thin Walled Structures
The problems specific for designs involving thin-walled structural members such as hollow beams, plates, membranes and shells are discussed. The emphasis is on the physical interpretations of the governing equations and on the numerical solution methods, including effective FE modeling and simulation. Stability, imperfection sensitivity, warping, and local effects are examined. Behaviour of thin-walled pressure vessels, containers, pipes, elements of aircraft and space stations, etc., are analyzed as the practicum.
Prerequisite(s): ME 323 and 450.

ME 860.3 — 1/2(3L)
Fluid Power Control
Advanced analysis of hydraulic and electrohydraulic systems, control components and actuators; application of Bond graphs to component system modeling.
Prerequisite(s): ME 431 and 335.

ME 862.3 — 1/2(3L)
Analysis and Synthesis of Linear Control Systems
Prerequisite(s): ME 431 or permission of the instructor.

ME 866.3 — (3L)
Systems Identification and Parameter Estimation
Many engineering problems involve parameter identifiability and/or parameter estimation. The main objective of this course is to provide students with concepts and methodologies for parameter identifiability and parameter estimation. Topics will include parameter identifiability, model selection, least squares, maximum likelihood and maximum a Posteriori methods for linear non-linear parameter estimation. Applications to some practical problems are also discussed.
Prerequisite(s): ME 251 and ME 431 or permission of the instructor.

ME 871.3 — (3L)
Experimental Fluid Mechanics
The fundamentals of experimental planning including parametric design of experiments and experimental trajectories are introduced. Experimental techniques for pressure, temperature, and flow rate measurement are discussed. Particle image velocimetry, laser Doppler velocimetry, and hot-wire anemometry are treated in detail. Finally, the application of uncertainty analysis to experimental techniques in the thermal sciences is considered.
Prerequisite(s): ME 335 or equivalent.

ME 872.3 — 1/2(3L)
Fundamentals of Fluid Dynamics
Development and study of the fundamental principles of fluid dynamics as applied to a continuum. Development of the constitutive equations of fluids. Analysis of incompressible inviscid and viscous flows including vortex motion, fluid jets, and flow over bodies. Student interests may determine some problem examples.

ME 874.3 — 1/2(3L)
Heat Transfer
Advanced concepts in all three modes of heat transfer (conduction, convection and radiation) are covered in this course. Topics include: analytical and numerical methods for solving steady-state and transient conduction problems, analytical and integral approaches for convection problems, radiation heat transfer between surfaces, and radiation heat transfer with participating media. Temperature and heat flux measurement techniques are also discussed.
Prerequisite(s): ME 327 or equivalent, or permission of the instructor.

ME 875.3 — 1/2(3L)
Heating Ventilating Air Conditioning
Advanced topics on: human comfort and health, indoor air quality, and psychrometry, air infiltration in buildings, cooling and heating loads for buildings; air distribution and heat recovery systems; simulation of building characteristics and systems under various weather conditions including heating and cooling equipment and natural daylighting; optimization of the thermal design and HVAC systems for buildings.

ME 877.3 — 1/2(3L)
Thermodynamics
The kinetic theory of gases is developed to illustrate the molecular description of classical quantities such as temperature, pressure and work. Transport properties such as viscosity, thermal conductivity and mass diffusivity are investigated using kinetic theory. Statistical approaches based on classical and quantum mechanics are used to describe the microscopic behaviour of substances. The microscopic interpretation of entropy is discussed. The link between microscopic behaviour and macroscopic thermodynamic properties is investigated.
Prerequisite(s): ME 417 or equivalent.
ME 879.3 — 1/2(3L)
Numerical Fluid Dynamics and Heat Transfer
An introduction to numerical methods for solving the transport equations for flow of a viscous, incompressible fluid, including convective heat transfer. A control-volume-based finite-difference method will be adopted. Students will have the opportunity to develop their own working codes for specific two-dimensional problems.
Prerequisite(s): ME 872.

ME 880.3 — 1/2(3L)
Heat and Mass Transfer in Porous Media
The principles of heat and mass transfer in porous media for single or two-phase flows: conduction, convection and radiation, macroscopic and microscopic flow models, thermodynamics of capillary systems, transport from porous surface interface, local volume averaging methodology, simultaneous heat and mass transfer and flow with phase change (e.g. drying theory). Finite difference numerical models and boundary conditions are developed for the above phenomena and applied to typical physical problems.
Prerequisite(s): Undergraduate courses in thermodynamics, heat transfer and fluid mechanics and at least one graduate course in heat transfer or fluid mechanics, or permission of the instructor.

ME 885.3 — 1/2(3L)
Neural Networks Theory and Application
Biological basis of neural networks; static and dynamic neural structures; multilayered feedforward neural networks; radial basis function networks; dynamic neural networks; fuzzy neural networks; and identification, control, vision, and pattern recognition using neural networks.
Prerequisite(s): A basic understanding of signals and dynamic systems.

ME 886.3 — 1/3L-9P
Advanced Engineering Design Methodology
The selected effective design methodologies such as Axiom design, design for manufacturing, modular design and robust design and design for control are discussed. The emphasis is placed on the general idea of these methodologies. Computer implementations of these methodologies are discussed. Applications of these methodologies to some typical engineering problems are also discussed.

ME 887.3 — 2(3L)
Introduction to Microsystems
Fundamental concepts of Microsystems and Microelectromechanical systems (MEMS) will be discussed. Materials and fabricating technologies for MEMS are outlined; this will include various lithography-based processes, etching processes, and deposition processes. Modeling of MEMS will be discussed, including mechanics, thermal fluid, and piezoelectric systems. MEMS packaging issues will be discussed. Several case studies will be provided for better understanding of the theoretical developments.

ME 897.3 — 1/2(3L)
Mechanics and Control of Robots
The course objective is to understand the mechanics and control of mechanical manipulators and mobile robots. This course will cover topics such as kinematics and dynamics of manipulators and mobile robots, trajectory and path planning, control (computed-torque control, neural network), and force control of robots and manipulators.

ME 898.3 — 1/2(3L/R/P)
Special Topics
Consists of assigned reading, lectures by faculty members, discussion periods, and laboratory exercises with reports. Depending on the interests of the student and the supervisor, topics may be selected from one of the following research fields in Mechanical Engineering: applied mechanics, bioengineering, control systems, design and manufacturing, fire protection engineering, fluid dynamics, fluid power, heat transfer, machine design, materials science and metallurgy, robotics, thermal systems, or thermodynamics.

ME 899.3 — 1/2(3L)
Fundamental Concepts of Microsystems and Introduction to Microsystems
Axiom design, design for manufacturing, modular Axiom design, design for manufacturing, modular systems, or thermodynamics.

ME 899.6 — 1/2(3L)
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

ME 990 — 1/2(3L)
Seminar
A seminar is held periodically throughout the regular session. The current research and literature is reviewed and discussed.

ME 992.0 — 1/2(3L)
Project
Students undertaking the project Master's degree (M.Eng.) must register in this course. It consists of independent study and investigation of a real-world problem, and submission of an acceptable report on the investigation.

ME 994 — 1/2(3L)
Research
Students in the M.Sc. program must register for this course.

MED — MEDICINE

MED 990 — 1/2(3L)
Seminar
Reports and discussion of current research.

MED 996 — 1/2(3L)
Research
Students writing a Master's thesis must register for this course.

MKT — MARKETING

MKT 898.3 — 1/2(3L)
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

MKT 899.6 — 1/2(3L)
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

MKT 994 — 1/2(3L)
Thesis
Students writing a Master's thesis must register for this course.

MKT 996 — 1/2(3L)
Research
MPAC. 810.3 Professionalism Skills Application and Integration

This capstone course focuses on application and integration of multi-disciplinary knowledge required for the successful practice of professional accounting. Professional and analytical skills are developed through active learning using business simulations, article reviews, workshops, discussion and reflection.

Prerequisite(s): Admission to Graduate Studies and permission of the department.

MPAC. 811.4 Performance Management I

Provides students a hands-on opportunity to develop the competencies needed to develop a risk management plan, formulate a firm’s strategic direction, and evaluate its governance. Students will learn to master these competencies using a variety of learning techniques including cases, exercises, simulations and role plays.

Restriction(s): Open to Master of Professional Accounting students only.

Note: Students with credit for MPAC. 801.3 will not receive credit for this course.

MPAC. 812.3 — SP(8L) Advanced Financial Reporting

Provides students with an in-depth knowledge of Canadian and International Generally Accepted Accounting Principles and a thorough understanding of when to apply them. This course will enhance the student's ability to understand an entity's reporting requirements and provide relevant, accurate and complete information to its stakeholders.

Permission of the department.

Prerequisite(s): Admission to College of Graduate Studies and Research.

MPAC. 813.4 Financial Reporting I

Develops an in-depth understanding of IFRS (International Financial Reporting Standards) and ASPE (Account Standards for Private Enterprises), including the underlying principles upon which the standards were developed. Students are expected to attain the competencies required of an entry-level CPA (Chartered Professional Accountant).

Restriction(s): Open to Master of Professional Accounting students only.

Note: Students with credit for MPAC. 803.4 will not receive credit for this course.

MPAC. 814.4 Finance I

Using the framework of financial valuation as an organizing tool, key topics from corporate finance are discussed including risk, return, capital-budgeting, capital structure and payout policy and valuation under leverage. Alternative approaches to valuation, real and financial options financial forecasting and models are also considered.

Restriction(s): Open to Master of Professional Accounting students only.

Note: Students with credit for MPAC. 802.3 will not receive credit for this course.

MPAC. 815.4 Assurance I

This course aims to develop knowledge of financial statement auditing concepts and practices, enhance critical thinking and analytical skills to support decision making, develop awareness of relevant academic auditing research, and develop other relevant knowledge, behaviors, and skills (e.g., adherence with professional codes of conduct, development of communication skills).

Restriction(s): Open to Master of Professional Accounting students only.

Note: Students with credit for MPAC. 807.3 will not receive credit for this course.

MPAC. 816.4 Taxation I

Examines many corporate and individual tax issues professional accountants encounter through the lens of tax policy. The course focuses on the evolution of tax policy and use of the tax act as a tool for the professional accountant in addressing client issues and tax planning.

Restriction(s): Admission to the College of Graduate Studies and Research and permission of the department.

MPAC. 821.3 Performance Management II

This course focuses on the vital role that modern management accounting information plays in running a business in today's economy in the context of performance management, and leverages technical management accounting techniques that are used to make strategic operational business decisions.

Restriction(s): Open to Master of Professional Accounting students only.

Prerequisite(s): MPAC. 811.

Note: Students with credit for MPAC. 804 will not receive credit for this course.

MPAC. 823.3 Financial Reporting II

Designed to provide mastery of additional accounting concepts, apply student knowledge in a wide variety of circumstances, and further develop the skills required of professional accountants. Emphasis in this course will be placed on integrating students' understanding of GAAP principles including Not-for-Profit GAAP and Government GAAP.

Restriction(s): Open to Master of Professional Accounting students only.

Prerequisite(s): MPAC. 813.

Note: Students with credit for MPAC. 812 will not receive credit for this course.

MPAC. 824.3 Finance II

Continuing from Finance 1, this course focuses on analysis of financial viability of businesses. Cash flow analysis, sources of capital, alternative forms of financial structure, financial restructuring alternatives and the interaction between finance and accounting are some of the topics that will be covered in this course.

Restriction(s): Open to Master of Professional Accounting students only.

Prerequisite(s): MPAC. 814.4.

MPAC. 825.3 Assurance II

Examines the provision of assurance in modern business organizations. Students are introduced to several areas in which assurance is provided, and study in detail financial statement audit and review engagements. Students will also study the provision of related professional services.

Restriction(s): Open to Master of Professional Accounting students only.

Prerequisite(s): MPAC. 815.4.

Note: Students with credit for MPAC. 806 will not receive credit for this course.

MPAC. 826.3 Taxation II

Examines many tax issues and planning opportunities professional accountants encounter. The course follows the life cycle of a business from startup to eventual sale, windup or dissolution. Personal tax and estate planning issues relevant to individual taxpayers are also discussed.

Prerequisite(s): MPAC. 816.4.

Note: Students with credit for MPAC. 808 will not receive credit for this course.

MPAC. 890.4 Integrative Capstone

Using complex, integrative comprehensive cases, the content from Finance, Performance Management, Assurance, Tax, and Financial Reporting will be reviewed and their interrelationships highlighted. A variety of pervasive skills expected from entry-level professional accountants will be reinforced in the context of solving client problems.

Prerequisite(s): Admission to Graduate Studies and permission of the department.

Note: Students with credit for MPAC. 809 will not receive credit for this course.

MPAC. 898.3 Special Topics

Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

MPAC. 899.6 Special Topics

Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

MPAC. 992.3 Research Project

Through undertaking a series of academic article critiques, this course provides students with an opportunity to develop insights into, and an appreciation for, the academic research process.

Prerequisite(s): Admission to Graduate Studies and permission of the department.
MUAP — MUSIC APPLIED

Department of Music

MUAP. 820.0 — 1and2(3P)
Wind Orchestra
To develop and refine students' musicianship and musical growth through Wind Orchestra rehearsals and performances. To help students make better musical decisions through experiencing and performing a wide variety of musical styles presented in rehearsals.
Prerequisite(s): MUAP 420.

MUS — MUSIC

Department of Music

MUS. 811.3 — 1(S)
Applied Performance Seminar I
The intensive study of an instrument or the voice, including advanced performance techniques and selected repertoire.
Formerly: MUS. 844.6
Note: Students with credit for MUS. 844.6 may not take this course for credit. Only open to M.Mus. in Performance students.

MUS. 812.3 — 1(S)
Applied Performance Seminar II
The continuation of the intensive study of an instrument or the voice, including the further development of advanced performance techniques and the assimilation of new repertoire.
Formerly: MUS. 846.6
Prerequisite(s): MUS. 811.3
Note: Students with credit for MUS. 846.6 may not take this course for credit. Only open to M.Mus. in Performance students

MUS. 813.3 — 1(S)
Applied Performance Seminar III
The continuation of the intensive study of an instrument or the voice, including the further development of advanced performance techniques and the assimilation of new repertoire.
Formerly: MUS. 846.6
Prerequisite(s): MUS. 812.3
Note: Students with credit for MUS. 846.6 may not take this course for credit. Only open to M.Mus. in Performance students

MUS. 814.3 — 1(S)
Applied Performance Seminar IV
The continuation of the intensive study of an instrument or the voice, including the further development of advanced performance techniques and the assimilation of new repertoire.
Formerly: MUS. 846.6
Prerequisite(s): MUS. 813.3
Note: Students with credit for MUS. 846.6 may not take this course for credit. Only open to M.Mus. in Performance students

MUS. 821.3 — 1/2(3L)
Pedagogy of Music History and Musicology: Materials, Methods, and Curriculum Development
Provides an overview of multifaceted resources, relying on both primary and secondary sources, historic and contemporary, available for curriculum development including music history surveys for the major and non-major, topical classes, and seminars in musicology, organology, performance practices and paleography.

MUS. 822.3 — 1/2(3L)
Seminar in Shenkerian Theory
Focuses on the development of analytical skills based on the theories of Heinrich Schenker. As the term progresses, and as students' analytical techniques develop, they will be able to deal critically with some of the heated issues surrounding this theory.
Prerequisite(s): Successful completion of the Graduate Assessment Examination in Music Theory, and permission of the instructor.

MUS. 823.3 — 1/2(3L)
Seminar in Twentieth Twenty-first Century Music
Offers a unified focus: tone color, in taking the student through the fascinating repertory of twentieth century and contemporary music. Issues of orchestration, texture and electronic and computer music will be discussed, with technical projects to allow the student to master these areas.

MUS. 828.3 — 3L
Advanced Choral Pedagogy
A detailed and systematic study of the fundamentals of choral organization, leadership, and function. Topics include: research into the dynamics of vocal production; critical analysis and psychological process of the choral audition; research into methods and practice of the placement of singers; an analysis of language and text with respect to the International Phonetic Alphabet; a substantial and detailed examination of warmups, choral balance, blend, and tone with respect to stylistic periods and trends; rehearsal management, leadership, and organizing performances.

MUS. 833.3 — 3S
Advanced Seminar in Choral Literature and Materials
A detailed examination of standard and atypical choral repertoire for mixed, male, and treble choruses. Graduate students will be expected to explore the compositions in a thorough scholarly manner as demonstrated through course work and a substantial research paper.

MUS. 838.3 — 3S
Advanced Seminar in Instrumental Conducting
An advanced study of the fundamentals of organizing and leading a wind ensemble, to further develop and expand psycho-motor and score-reading skills and conducting gestures for large and small ensembles. Furthermore, the course deals with advanced methods in studying examples of instrumental curricula, selecting repertoire, comprehensive analysis, lesson planning, programming, research into teaching of musical literacy, and evaluation. Included is a detailed examination of materials and resources as well as critical research into the characteristics of successful secondary school instrumental music programs as demonstrated through course work and a substantial research paper.

MUS. 840.3 — 1/2(3S)
Seminar in Music Literature
A seminar in which students will conduct intensive studies of a clearly defined repertoire. This repertoire may be identified by any one of a number of criteria (medium, style, style-period, nationality, composer) provided that it is directly related to the student's specific area of graduate study.

MUS. 841.3 — 1/2(3S)
Advanced Bibliography and Research Techniques
An in-depth examination of significant research materials in the principal area of applied music, music theory and musicology. Focuses on the effectiveness of research at the graduate level through the preparation of seminars, papers, and the proposing of the topic for the M.Mus. thesis.

MUS. 842.6 — 1and2(3S)
Seminar in Composition
Composition in the smaller and larger forms. Works for vocal and instrumental ensemble, chorus, band, and orchestra will be included among the major projects. Composition for the theatre will also be considered as will composition utilizing the synthesizer and the computer.

MUS. 845.3 — 1/2(3S)
Seminar in Music Analysis
The student applies theoretical knowledge to the analysis of complete compositions. Structures and relationships revealed by the analysis will be applied to the particular area of specialization.

MUS. 852.3 — 1/2(3S)
Seminar in Performance Practices
A detailed discussion of selected problems and aspects of performance practices of a particular period or genre of music. Considers aspects of articulation, ornamentation, style, tempo, dynamics, organology, iconography, tuning and temperament and will also include the reading of selected treatises on performance practices.

MUS. 853.3 — 1/2(3S)
Seminar in Musicoiogy I
A research seminar on selected topics in musicology, chosen from the Middle Ages, Renaissance, or Baroque eras. May focus on the study of manuscripts, repertoires of monophonic and/or polyphonic music, the development of genres, the examination of style(s), the consideration of composers and significant monuments of music.
MUS. 854.3 — 1/2(3S)
Seminar in Musicology II
A research seminar on selected topics in musicology, chosen from the Classical Period, Romantic Period or 20th century. May focus on the study of manuscripts, repertoires of polyphonic music, the development of genres, the examination of style(s), the consideration of composers and significant monuments of music.

MUS. 855.3 — 1/2(3S)
Seminar in 20th Century Music Theory
Encompasses the major theoretical thought of the 20th century, both that which deals with new approaches to the study of earlier music and that which presents new methods or systems of musical organization.

MUS. 863.3 — 35
Advanced Seminar in Instrumental Literature and Materials
A detailed examination of the standard and atypical wind instrument repertoire for large and small ensembles. Graduate students will be expected to explore the compositions in a thorough scholarly manner as demonstrated through coursework and two substantial research papers.

MUS. 898.3
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

MUS. 899.6
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

MUS. 992.0 — 1(3P)
Project for Master of Music Performance Majors
The major project for the MMUS degree in Performance; consists of two recitals, each approximately 60 minutes in length, accompanied by program notes. Repertoire will be chosen by the candidate and the principal advisor, and may consist of solo and/or chamber music, contingent upon student's major. A written proposal (prepared in consultation with the principal advisor) will be presented formally at a meeting of the candidate's committee. This proposal, along with program notes, must be approved by the committee. The recitals (scheduled before the end of the academic term in each year of the program) will be juried by the members of the Advisory Committee and open to the public. All Master of Music in Performance students must register in the MUS. 992 according to the timelines of the Graduate Calendar. Registration for this course must be renewed until completion of the course requirements.

Prerequisite(s): Admission to the Master of Music Performance program.

MUS. 994
Research
Students writing a Master's thesis must register for this course.

MUS. 996
Research
Students writing a Ph.D. dissertation must register for this course.

Prerequisite(s): Entry into the Ph.D. program.

NORD — NORTHERN GOVERNANCE AND DEVELOPMENT

Department of Int’l Ctr for North Gov and Dev

NORD. 836.3 — 1(3S)
Strategic Communication for Northern Development
Will introduce students to the persuasive nature of all communication with a focus on communication in the professional world. It will explore the rhetorical, political, social, cultural, and ethical aspects of professional writing in Circumpolar, Northern and Aboriginal communities through practical applications of rhetorical theory. The objective of the course is to develop students’ skill in evaluating and judging the effectiveness of those rhetorical strategies through situational analysis. Students will learn to analyze various components of communication situations, including purpose, audience, context, and political and ethical implications. Students must be prepared to use their own professional writing projects as objects of study. They will prepare analyses of the rhetorical situation of their writing and use their theoretical knowledge to edit and revise their own documents over the term. Ultimately, students will be asked to present and defend their choice of and rationale for rhetorical strategies in a final project.

Permission of the Chair of Graduate Studies in the International Centre for Northern Governance and Development is required.

Restriction(s): Restricted to students in the College of Graduate Studies and Research

NORD. 898.3
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the International Centre for Northern Governance and Development for more information.

NORD. 990.0
Graduate Seminar in Northern Governance and Development
Reports and discussion on current development and research. All graduate students in the Master of Northern Governance and Development program are required to register and attend these meetings. An orientation, research workshop, and poster presentation are required elements of the. 990 seminar.

Permission of the Chair of Graduate Studies in the International Centre for Northern Governance and Development is required.

Restriction(s): Restricted to students in the College of Graduate Studies and Research

NORD. 992.0
Project
Students are required to write a research paper of 10,000 to 12,000 words based on original research carried out within Northern and Aboriginal communities during the internship. The research paper is the final component of the program and is a requirement.

Permission of the Chair of Graduate Studies in the International Centre for Northern Governance and Development is required.

Restriction(s): Restricted to students in the College of Graduate Studies and Research

NS — NATIVE STUDIES

Department of Native Studies

NS 802.3 — 1/2(3S)
Applied Native Studies Research Methods
Emphasizes the development of skills to conduct research on, for and with Native peoples. Technical skills, evaluation skills and ethical issues will be addressed.
**NS 803.3 — 1/2(3S)**
Theoretical Issues in Native Studies
Critically examines theoretical developments in Native Studies and relevant cognate disciplines, such as Sociology, History, and Anthropology where Native issues are being addressed.

**NS 810.3 — 1/2(3S)**
Aboriginal Self Determination Through Mitho Pimachesowin
Explores a range of Aboriginal conceptual foundations of Aboriginal Self Determination and examines the emerging application of "Mitho Pimachesowin" in Aboriginal development. Historically, the Aboriginal "Way of Life" had spiritual roots and encompassed all of life, and this holistic perspective continues to influence modern developments in varying degrees. This class will introduce students to the Cree concept of Mitho Pimachesowin (ability to make a good living) and will also explore the related elements of autonomy, kinship, work ethic, respect, responsibility and resilience as they apply to contemporary initiatives in Aboriginal Self Determination.

**Permission of the department is required**
**Restriction(s):** Restricted to students in the College of Graduate Studies and Research.
**Note:** Students with credit for NS 898 ‘Aboriginal Self Determination Through Mitho Pimachesowin’ cannot receive credit for this course.

**NS 898.3**
Special Topics
Concentrated reading and research in selected areas of Native Studies.

**NS 899.6**
Special Topics
Concentrated reading and research in selected areas of Native Studies.

**NS 990**
Seminar
All students will be required to register in and attend for one year NS 990 (Graduate Seminar) and offer one seminar on their thesis research prior to graduation.

**NS 994**
Research
Students writing a Master’s thesis must register for this course.

**NS 996**
Research
Students writing a Ph.D. thesis must register in this course.

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**NURS — NURSING**

**Department of Nursing (Dean’s Office)**

**NURS. 812.3 — 1/2(3S)**
Leadership in Nursing
Facilitates the critical analysis of leadership concepts, functions, and skills in the nursing role. Ongoing integration of theoretical and research principles are stressed.

**Prerequisite(s) or Corequisite(s):** NURS. 891 or permission of the instructor.

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**NURS. 813.3 — 1/2(3S)**
Teaching in Nursing
Surveys issues, trends, and methods of nursing education. An examination of the nature of instruction in nursing education, staff development programs, and patient teaching is the main focus.

**Prerequisite(s) or Corequisite(s):** NURS. 891 or permission of the instructor.

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**NURS. 814.3 — 2/3(3S)**
Aboriginal Health Issues
Examines issues and challenges related to the health of Aboriginal populations in Canada. Health and illness concepts will be embedded within historical, social, cultural, and political realities. The student will have the opportunity to critically examine and reflect on Aboriginal health issues and health care practices.

**Prerequisite(s):** Enrollment in a graduate program and completion of at least one graduate level foundational course.

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**NURS. 815.3 — 2/3(3S)**
Advanced Forensic Mental Health
Examines issues and challenges related to advanced forensic mental health nursing as a way of bridging health care systems and criminal justice systems. Issues related to caring for vulnerable forensic populations will be embedded within social, cultural, and political realities.

**Prerequisite(s):** Enrollment in a graduate program and completion of at least one graduate level foundational course.

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**NURS. 816.3 — 2(3S)**
Community within the Context of Diversity and Vulnerability
Involves intensive inquiry into selected topics on community within the context of diversity and vulnerability. Traditions of research, philosophical assumptions and epistemological stances for conducting research with these populations will be examined. Ethical and methodological issues related to community-based research will be explored in the context of contributions to culturally relevant knowledge.

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**NURS. 818.3 — 3L**
Statistical Methodology in Nursing
This course will assist student to apply commonly used intermediate statistical method as consumers of literature or as researchers. It will introduce selected epidemiologic statistics, parametric and non-parametric inferential tests, power analysis, analysis of variance and simple regression analyses. Applied statistics in health care and program evaluation will be emphasized.

**Prerequisite(s):** An undergraduate statistics course or by permission of the instructor.

**Note:** Students may receive credit for only one of NURS. 818, CHEP. 805, and PUBH. 805.

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**NURS. 870.6 — 1(25-P)**
Advanced Health Assessment
Builds on participatory skills and knowledge in the conduct of comprehensive and focused health assessment across the life span. Lectures introduce concepts, frameworks, and techniques integral to advanced health assessment skills. Required 5 days of onsite laboratory instruction at the U of S Saskatoon Campus will provide opportunities to practice comprehensive and focused health assessment and build on the health assessment skills needed for clinical practice as a Nurse Practitioner.

This class includes 16 observational clinical hours as an introduction to the Nurse Practitioner role and the application of health assessment skills.

**Prerequisite(s):** Admission to the Master of Nursing (M.N.) Primary Health Care Nurse Practitioner MN-NP Option or PGDSC certificate program.

**Note:** Students with credit for NURS. 884.3 will not receive credit for this course. This course was labeled NURS. 884.3 until 201305.

**NURS. 878.3 — 1(40P)**
Practicum III Advanced Nursing Practice with Vulnerable Populations
Students will continue to demonstrate primary health care skills and advanced practice clinical judgment with a focus on integration and application to common medical conditions across the life span. Scholarly activities in this clinical practicum will be designed so that the student will gain increasing experience in consultation, integration of theory, research and clinical knowledge.

**Formerly:** NURS. 889

**Prerequisite(s):** NURS. 888.

**NURS. 879.3 — 2(25-P)**
Advanced Diagnostic Reasoning
Building on Advanced Health Assessment, this course develops the students knowledge of diagnostic reasoning for clinical practice. Using the assessment process students will develop and understanding of diagnostic test and procedures that will address the investigation of common medical conditions across the life span.

**Prerequisite(s):** NURS. 818.3, NURS. 883.3, NURS. 884.3

**NURS. 880.3 — 5PandSU(40P)**
Practicum I Advanced Nursing Practice in Primary Health Care
The student will provide direct care in selected primary health care settings. Students will have the opportunity to demonstrate primary health care skills and advanced practice clinical judgement. Scholarly activities in this clinical practicum will be designed so that the student will gain experience in consultation, education, integration of theory, research and clinical knowledge related to the goals of multidisciplinary health services and systems.

**Prerequisite(s):** NURS. 879, NURS. 881, NURS. 883, NURS. 870, NURS. 885, NURS. 886, NURS. 891 and a three-credit unit. 800-level Statistics course.

**Note:** Students with credit for NURS. 887.3 or NURS. 877.6 will not receive credit for this course. The current course was labeled NURS. 887.3 until 201305 and was labeled NURS. 877.6 until 201309.
NURS. 881.3 — 1(3S)
Pathophysiology-Pharmacotherapy for Advanced Nursing Practice I
Students will integrate pathophysiology and drug therapy concepts as a basis for advanced primary health care nursing practice. Students will develop diagnostic reasoning based on understanding the pathophysiology of endocrine, cardiovascular and pulmonary systems across the lifespan, and make therapeutic decisions based on pharmacotherapeutic principles, professional, ethical, regulatory, and practical aspects of prescribing.

NURS. 882.3 — 1/2(3P)
Practicum
Opportunity is provided to test and evaluate selected frameworks related to teaching, leadership, or research with an expert in one of those areas. The focus is on the integration of theory, research and practice.
Prerequisite(s) or Corequisite(s): NURS. 812 or NURS. 813 for course-based stream; NURS. 892 for thesis stream.

NURS. 883.3 — 1(3S)
Theory for Advanced Practice Nursing Roles and Primary Health Care
This course will explore and evaluate theoretical aspects, issues and roles in Advanced Nursing Practice within the context of Primary Health Care.

NURS. 885.3 — 1(3S)
Nursing Therapeutics I Individual to Community
Focuses on therapeutic approaches of advanced nursing practice with individuals, families, groups, and communities as they apply to primary health care nursing. The emphasis will be on the integration of theories and interventions with clients (individual, families, groups and communities) who have mental health needs and common medical disorders in an interdisciplinary primary health care nursing context.
Prerequisite(s): NURS. 881 and NURS. 883

NURS. 886.3 — 2(3S)
Pathophysiology-Pharmacotherapy for Advanced Nursing Practice II
Building on the knowledge and skill learned in Pathophysiology-Pharmacotherapy for Advanced Nursing Practice I, students will complete the body systems across the life span. They will incorporate both an understanding of pathophysiology and the utilization of pharmacotherapeutic principles, and professional, ethical, regulatory and practical aspects of prescribing to make therapeutic decisions.
Prerequisite(s): NURS. 881

NURS. 888.3 — 1(3S)
Nursing Therapeutics and Practicum II Advanced Management
Using theory and practice, this course builds on NURS. 880 and focuses on concepts of primary care management of complex, multidimensional health problems experienced within family, community and population contexts. The selection of clinical interventions, clinical decision making and evaluation of strategies will be stressed in relation to the primary health care nurse practitioner role.

Within the practicum, students will also focus on developing knowledge of the roles of the interdisciplinary team in primary health care. Students are required to complete a minimum of 240 hours.
Prerequisite(s): NURS. 880.

NURS. 890.3
Independent Reading and Study
Provides an opportunity for a student to pursue a topic of interest outside the scope of other courses offered. The course could explore a topic of a multidisciplinary nature. The student is responsible for defining the area of interest. Approval of the student’s advisor must be obtained before registering for the course. A paper or papers will be required for satisfactory completion of the course.

NURS. 891.3 — 1/2(3S)
Concept Clarification in Advanced Nursing Practice
Considers the current stage of theory development in nursing, critical thinking, and clarification of concepts and relationships among them that are central to advanced nursing.

NURS. 892.3 — 1/2(3S)
Research Methods
Focuses on research methodology with application to clinical nursing problems. Major emphasis will be placed on elements of the research process, critical analysis and evaluation of nursing research, quantitative and qualitative research design, and developing proposals for nursing research investigations.
Prerequisite(s) or Corequisite(s): NURS. 891 or permission of the instructor.

NURS. 893.3 — 1/2(3S)
Qualitative Research Methods
Provides opportunity for in-depth examination of the main traditions of qualitative research inquiry and methods. Included are: critical discussion of all elements of method and experience of writing a qualitative proposal with respect to health issues.

NURS. 895.3 — 1(3S)
Philosophy of Nursing Science
The theory and philosophy of nursing science will be explored through its historical context and current issues of knowledge development in the discipline of nursing. Diverse theoretical and philosophical perspectives will be critiqued and the relationship between philosophy, theory, research, and practice will be explored.

NURS. 896.3 — 2(3S)
Nursing Research Advanced Qualitative Methodologies
Involves intensive inquiry into selected qualitative research approaches, their historical development, philosophical assumptions, and epistemological stances. Ethical and methodological issues related to qualitative designs will be explored in the context of contributions to clinically relevant nursing knowledge.
Prerequisite(s) or Corequisite(s): NURS. 893 or equivalent.

NURS. 897.3 — 1(3S)
Nursing Research Advanced Research Methods in Quantitative Design
The focus of this research course is on the design of quantitative research to advance the development of nursing knowledge. The course will examine various theories and assumptions of research design, measurement, and intervention development to investigate nursing practice issues and health outcomes.
Prerequisite(s): NURS. 892 or equivalent.

NURS. 898.3
Special Topics
A combination of seminars, guided reading and special projects in selected areas of nursing. The topics to be considered will relate to the special interests of students enrolled in the course. A practicum or internship may be one of the learning methods used. Reports on readings and projects will be required.

NURS. 899.3 — 1/2(3S)
Publishable Paper
Provides assistance with writing a publishable paper. Students in the course-based option will be given credit for this course upon presentation of a paper that is suitable for peer review in a professional journal.
Prerequisite(s): To be taken in the last term of the Master of Nursing program.

NURS. 994
Thesis
Students writing a Master’s thesis must register in this course.

NURS. 996
Research
Students writing a Ph.D. thesis must register for this course.

NURS. 997.0 — 1(1S)
Doctoral Seminar
This departmental seminar includes presentations and discussions of topics relevant to doctoral roles and functions. Ph.D. students are required to attend and participate throughout their program.
NUTR — NUTRITION

Division of Nutrition

NUTR. 810.3 — 2(3L/5)
Advances in Human Nutritional Sciences Research
Recent advances in nutritional sciences with emphasis on findings that advance our knowledge of human nutrition. Students read the current literature and participate in classroom lectures and seminars.
Prerequisite(s): Undergraduate courses in NUTR at the second-year level and above.

NUTR. 811.3 — 2(3L)
Advances in Public Health Nutrition Research
Concepts and recent advances in a variety of topics in the domain of Public Health Nutrition are described and discussed with emphasis on evaluating nutritional status at population level and on community-based nutrition interventions. The course is instructed in three sections including Nutritional epidemiology, Food Security, Food and Culture. Students will be exposed to quantitative and qualitative approaches to research in public health nutrition. Students will learn through a combination of faculty lectures and student presentations, assignments, practice on data analyses and interpretation, and papers in a self-directed study format.

NUTR. 820.3 — 2(3L)
Current Issues in Nutrition
An in-depth examination of contemporary issues such as diet and heart disease, influence of lifestyle factors on nutrition, nutrition labelling and health claims, and nutraceuticals. Controversies in nutrition and cultural aspects of food are also discussed.
Prerequisite(s): Senior-level NUTR course or permission of the instructor.

NUTR. 825.3 — 1(3L-1.5T)
Nutritional Assessment
Theory and methods of nutritional assessment for individuals and groups, including methods for assessment of dietary intake, biochemical, anthropometric and clinical evaluation.
Prerequisite(s): Senior-level NUTR course or permission of the instructor.

NUTR. 850.3 — 1(3L/P)
Nutrition Program Planning and Evaluation
Provides an understanding of the theories, principles and techniques involved in planning and evaluating nutrition programs. Students will work together to plan a nutrition program for a local agency or organization.
Prerequisite(s): NUTR. 350 or permission of the instructor.

NUTR. 898.3 — 1/2(R)
Special Topics
Advanced level of guided reading and special projects in selected areas of nutrition.

NUTR. 899.6 — 1and2(R)
Special Topics
Advanced level of guided reading and special projects in selected areas of nutrition.

PATH. 990
Seminar
A seminar is held jointly with other medical departments. Graduate students are required to attend and take part in the seminar throughout their program.

PATH. 994
Research
Students writing a Master's thesis must register for this course.

PATH. 996
Research
Students writing a Ph.D. thesis must register for this course.

PCOL — PHARMACOLOGY

Department of Pharmacology

PCOL. 850.6 — 1and2(3L-15)
Graduate Pharmacology
Deals with the pharmacokinetics, pharmacodynamics, therapeutic uses and toxicity of drugs. Advanced pharmacological concepts, principles and methods are presented and discussed in weekly research seminars.
Prerequisite(s): HSC. 208 and BIOCH. 211, or their equivalents.

PCOL. 898.3 — 1/2(2R-2P-2T)
Special Topics
Work in specific areas of pharmacology may be undertaken by graduate students with the consent of the Graduate Chair of the Department. The student will work directly with a selected supervisor (i.e., a faculty member with expertise in the area selected). An Advisory Committee may also be established (optional) to include resource faculty, also with expertise in the area of interest. The student will be assigned topics to be researched and will be required to prepare reports, in the form of quality scientific reviews. The supervisor may also choose to supplement assigned topics with a series of laboratory exercises.

PCOL. 899.6 — 1/2(2R-2P-2T)
Special Topics
Work in selected areas of pharmacology may be undertaken by graduate students with the consent of the Graduate Chair of the Department. The student will work directly with a selected supervisor (i.e., a faculty member with expertise in the area selected). An Advisory Committee may also be established (optional) to include resource faculty, also with expertise in the area of interest. The student will be assigned topics to be researched and will be required to prepare reports, in the form of quality scientific reviews. The supervisor may also choose to supplement assigned topics with a series of laboratory exercises.

PCOL. 990 — (1S)
Seminar
Graduate students in the Department of Pharmacology must register for this course each year of their graduate program. The students are required to attend, and to take part in departmental seminars throughout their program.
PCOL. 994 Research
Students writing a Master’s thesis in the Department of Pharmacology must register for this course in each year of their program.

Prerequisite(s): Students must be registered in the College of Graduate Studies and Research M.Sc. program.

PCOL. 996 Research
Students writing a Ph.D thesis in the Department of Pharmacology must register for this course in each year of their program.

Prerequisite(s): Students must be registered in the College of Graduate Studies and Research Ph.D. program.

PHAR — PHARMACY

PHAR. 832.3 — 1(3L)
Drug Design
Consideration is given to the way in which new drugs are developed and the importance of drug metabolism is stressed. Some of the chemical, physicochemical and biochemical parameters affecting bioactivity are outlined.

Prerequisite(s): Permission of the instructor.

PHAR. 848.3 — 2(3L-2P)
Advanced Pharmacokinetics and Pharmacodynamics
Qualitative and quantitative aspects of drug absorption, disposition, metabolism and excretion, and drug pharmacodynamics. The course emphasizes the use of pharmacokinetic/pharmacodynamic equations and the analysis of the data.

Prerequisite(s): Basic course in pharmacokinetics or permission of the instructor.

PHAR. 854.3 — 1/2(3L)
Metabolic Transformations of Xenobiotics
An advanced study of the basic principles of the metabolism of foreign compounds in mammals. The xenobiotics covered will include drugs, food additives, agricultural chemicals and industrial chemicals. The detoxification and toxicological implications of metabolism are emphasized.

PHAR. 857.3 — 1/2(S)
Advanced Pharmacotherapy I
A detailed drug therapy course designed to prepare the student for the advanced clinical clerkship. Pathophysiology, clinical presentation, laboratory and clinical monitoring, monitoring and therapeutic regimens, both current and investigational, will be discussed. Topics include cardiovascular and pulmonary disorders, infectious disease and diabetes.

Prerequisite(s): Undergraduate courses in pharmacotherapeutics, and permission of the instructor.

PHAR. 864.3 — 1/2(3L)
Advanced Patient Education for Pharmacy Practice
Advanced level training in the complexities and nuances of educating today’s patients about drug-related matters. The focus will be on the process of the encounter rather than actual content.

Prerequisite(s): Undergraduate degree in Pharmacy or in a health-related discipline or permission of instructor.

PHAR. 865.3 — 2(3L)
Analytical Mass Spectrometry
This course will cover modern state-of-the-art mass spectrometry techniques and their usefulness in research and discovery. The course will examine instrumentation-related topics, such as ionization sources, mass analyzers and hybrid tandem mass spectrometers. The advantages of each technique will be highlighted and discussed. A second portion of the course will focus on mass spectra interpretation and the various applications of applied mass spectrometry, namely structural elucidation, quantification, and related biomedical and environmental applications. The course will also include practical demonstration of the use of tandem mass spectrometry.

Permission of the instructor is required.

PHAR. 870.3 — 1/2(3L)
Research Methods in Pharmacy Practice
Research methods and outcomes in pharmacy practice settings will be studied. The principles of qualitative and quantitative research are discussed in the context of patient education, adherence, disease state management and quality of life. Issues relating to primary data collection in health care settings and administrative databases will be considered.

Prerequisite(s): STAT course, undergraduate degree in Pharmacy or permission of instructor.

PHAR. 898.3 Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

PHAR. 899.6 Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

PHAR. 990 Seminar
Papers and discussion on recent developments in pharmaceutical fields. Graduate students are required to attend and to take part in the seminars.

PHAR. 994 Research
Students writing a Master’s thesis must register for this course.

PHAR. 996 Research
Students writing a Ph.D. thesis must register for this course.

PHIL — PHILOSOPHY

Department of Philosophy

PHIL. 808.3 — 1/2(3S)
Topics in Greek and Roman Philosophy
A seminar on philosophic thought in Ancient Greece; topics include the metaphysical, epistemological and ethical theories of Plato and Aristotle; ancient schools such as the Stoics and Neo-Platonists.

PHIL. 813.3 — 1/2(3S)
Topics in 17th and 18th Century Philosophy
A seminar in early modern philosophy concentrating on one or more of the empiricists (Locke, Berkeley, Hume) or the rationalists (Descartes, Spinoza and Leibniz).

PHIL. 814.3 — 1/2(3S)
Kant
A seminar on Kant’s critical philosophy, with an emphasis on his Critique of Pure Reason.

PHIL. 815.3 — 1/2(3S)
Topics in 19th Century Philosophy
A seminar on one or more of the authors or themes that dominated philosophical thought in Europe during the Nineteenth Century, concentrating on the post-Kantian philosophers whose works were central in the development of modern European thought.

PHIL. 816.3 — 1/2(3S)
Topics in Continental Philosophy
A seminar on modern existentialism, phenomenology or critical theory; including figures such as Kierkegaard, Nietzsche, Husserl, Heidegger, Sartre, Merleau-Ponty, Foucault and Habermas.

PHIL. 817.3 — 1/2(3S)
Topics in Contemporary Analytic Philosophy
A seminar on the developments in Anglo-American analytic philosophy during the Twentieth century, from the period of the philosophical writings of Russell and Moore up to the works of Putnam, Kripke, and Davidson.

PHIL. 819.3 — 1/2(3S)
Wittgenstein
A seminar on the thought of Wittgenstein covering either, or both, of the Tractatus and the Philosophical Investigations.

PHIL. 820.3 — 1/2(3S)
Philosophical Texts
A seminar concentrating on an important recent philosophical text. The content will vary from year to year.

PHIL. 826.3 — 1/2(3S)
Seminar in Philosophy of Mind
A seminar on topics in the philosophy of mind and cognitive science. Topics may include consciousness, mental representation, intentionality, qualia, supervenience, theoretical reduction, emotion, action and agency.

PHIL. 833.3 — 1/2(3S)
Seminar in Ethics
A seminar in ethical theory and metaethics; topics include the cognitive status of moral judgements, the logic of ethical argument, and the nature of moral reasoning.
PHIL. 842.3 — 1/2(3S)  
Topics in Philosophical Logic  
A seminar on philosophical issues pertaining to logic and its use as a philosophical tool. Topics may include the logical form of natural language, the nature of logical consequence, theories of truth, quantification and ontology, modality, conditionals, presupposition and logical pluralism.

PHIL. 844.3 — 1/2(3S)  
Seminar in Epistemology  
A seminar on current issues in epistemology; topics may include the nature of belief, truth, justification, internalism/externalism, and naturalized epistemology.

PHIL. 845.3 — 1/2(3S)  
Seminar in Metaphysics  
A seminar on the nature of metaphysics; topics may include existence, ontology, substance, universals, necessity, identity and change, time and space, causation, and free will.

PHIL. 846.3 — 1/2(3S)  
Seminar in Philosophy of Language  
A seminar on philosophical problems about language; topics may include how language represents reality, traditional accounts of meaning, reference, predication and expression.

PHIL. 851.3 — 1/2(3S)  
Seminar in History and Philosophy of Science  
A seminar on conceptual, epistemological and historical topics in the philosophy of the physical and biological sciences; topics may include the nature of scientific rationality, objectivity, explanation in science, and scientific realism.

PHIL. 862.3 — 1/2(3S)  
Seminar in Social and Political Philosophy  
Examines a recent topic, political philosopher, movement or theory. Topics studied will vary from year to year.

PHIL. 871.3 — 1/2(3S)  
Seminar in Aesthetics  
Examines the philosophical problems related to the arts; topics may include the nature of art, meaning and expression in art, and the nature of aesthetic value judgments.

PHIL. 898.3  
Special Topics  
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

PHIL. 899.6  
Special Topics  
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

PHIL. 990  
Seminar  
This seminar meets every two weeks throughout both terms of the regular academic year. Under the direction of a faculty member of the department, graduate students study current literature on selected topics and also present papers on their research projects. All graduate students in Philosophy are required to attend this seminar throughout their program and are expected to present at least one paper to the seminar every year.

PHIL. 994  
Research  
All Masters’ students must register in this course.

PHSI — PHYSIOLOGY  
Department of Physiology

PHSI. 835.3 — (3L)  
Gasotransmitter in Biology and Medicine  
Deals with the biology and medicine of gasotransmitters including nitric oxide, hydrogen sulfide and carbon monoxide. The role of gasotransmitters in cardiovascular and respiratory diseases will be specially dealt with. Environmental toxicological aspects and community health issues related to gasotransmitters will be discussed.

Prerequisite(s): Undergraduate degree courses in Biomedical Sciences. Permission from the program supervisor.

Note: Offered in alternate years.

PHSI. 837.3 — 1/2(3L)  
Cellular Basis of Physiological Function  
Cellular mechanisms underlying physiological functions in mammals. Topics include mechanisms of communication between cells, uptake and secretion of water, ions, nonelectrolytes and macromolecules, and integration of cell functional and metabolic activities.

Formerly: PHYSIO. 737.

Prerequisite(s): Permission of instructor.

Note: Contact the department for availability. Students with credit for PHYSIO. 335, 337, 425 or 737 may not take this course for credit.

PHSI. 845.3 — 1/2(2L and 1S)  
Ion Channels Principles and Methodology  
Explores ion channel mechanics and the role of a variety of ion channels in normal and pathological cellular functions. Students will become familiar with the methodologies used in the study of ion channels, with a special emphasis on patch-clamp technology.

Prerequisite(s): Permission of the instructor.

PHSI. 846.3 — 1/2(3L)  
Cardiovascular Physiology  
Review of the functions and control of the heart and blood vessels in humans and other mammals, and of the mechanisms regulating arterial pressure, blood volume and blood flow. Offered alternate years.

Formerly: PHYSIO. 826.

Note: Students with credit for PHYSIO. 346, 426 or 826 may not take this course for credit.

PHSI. 860.3 — 3L  
Advanced Seminar in Neuroscience  
The course offers an in-depth examination of essential topics in neuroscience. Areas selected may range from fundamental neurobiological processes to neuropathophysiology and the clinical neurosciences and may vary in different years. Students will undertake an advanced study of original research papers and techniques significant to the field. Discussions will emphasize current concepts and the student will gain a thorough understanding of the selected topic through critical review and analysis.

Permission of the Department is required.

PHSI. 898.3 — 1/2(3R/P)  
Special Topics  
Work in selected areas of physiology may be undertaken by advanced students with the consent of the department. This work may consist of essays, readings, and reports on assigned topics and/or a series of laboratory exercises.

PHSI. 899.6 — 1and2(3R/P)  
Special Topics  
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

PHSI. 990  
Seminar  
Throughout their program, graduate students in Physiology are required to attend department seminars and to participate in the presentation and discussion of papers in the journal club.

PHSI. 994  
Research  
Students writing a Master’s thesis must register for this course.

PHSI. 996  
Research  
Students writing a Ph.D. thesis must register for this course.

PHYS — PHYSICS  
Department of Physics and Engin Physics

PHYS. 811.3 — 1/2(3L)  
Classical Mechanics  
Lagrange’s equation of Motion, Hamilton formulation, Phase-space considerations, Liouville theorem, Poisson brackets, Action-angle variables, Hamilton-Jacobi Equation, Integrable systems, Canonical Perturbation theory, KAM theorem, Phase-space mapping, Henon, Standard and tangent Maps, Local and Global Chaos, Dissipative systems.

PHYS. 812.3 — 1/2(3L)  
Electromagnetic Theory  
Topics include boundary-value problems of electrostatics and magnetostatics, time varying fields, radiation and multipole fields.

Prerequisite(s): PHYS. 816.3 or equivalent.
PHYS 816.3
Electrodynamics
This course provides advanced treatment of electromagnetic waves in matter, radiation and relativistic electrodynamics.
Prerequisite(s): An undergraduate Electromagnetics course or equivalent.
Note(s): Students may receive credit for only one of PHYS 816 or PHYS 456.

PHYS 821.3 — 1(3L)
Introduction to Aeronomy
The structure and composition of the Earth’s atmosphere; mean circulation, tides and wave motions; the major photochemical processes and their implications; the physical processes of the ionosphere and the magnetosphere; and experimental methods.
Note: Instruction is given jointly by members of the Institute of Space and Atmospheric Studies.

PHYS 822.3 — 2(3L)
Radio Physics of Upper Atmosphere
Deals with the application of radio methods to studies of the upper atmosphere. Topics discussed include the magneto-ionic theory; scattering of radio waves by meteors and aurora, scattering, generation and absorption of radio waves in the solar and terrestrial atmospheres, solar-terrestrial-relations and the methods of radio astronomy applied to upper atmospheric measurements.

PHYS 824.3 — 1/2(3L)
Ionspheric and Magnetospheric Physics
The Earth’s ionosphere and magnetosphere, also for other planets. Techniques of investigation, physical processes, structure and models.
Prerequisite(s): PHYS 821, or permission if taken concurrently.

PHYS 827.3 — 1/2(3L)
Atmospheric Spectroscopy and Radiative Transfer
Solar and terrestrial radiation; absorption, emission and scattering in terrestrial and planetary atmospheres; radiative transfer; remote sensing of atmospheric properties; climate models (greenhouse effect, atmospheric evolution).
Prerequisite(s): PHYS 821 or permission of the instructor.

PHYS 831.3 — 1/2(3L)
Methods of Experimental Synchrotron Science
This is an interdisciplinary special topic course targeted for graduate students with interest in synchrotron radiation and synchrotron science. The following topics are normally covered: spectroscopy with microfocused beams of soft X-rays and infrared; X-ray diffraction studies of the electron and molecular structure of crystallizable proteins; near edge absorption spectroscopy; fine structure of extended X-ray absorption spectra.

PHYS 833.3 — 1/2(3L)
General Relativity and Gravitation
Development of the physical ideas and mathematical skills leading to general relativity as a theory of gravitation; solutions of the Einstein field equations and observational tests of general relativity; applications to black holes and cosmological models.

PHYS 851.3 — 1(3L)
Introductory Nuclear Physics
Introduction to electromagnetic and weak interactions as relevant to nuclear and particle physics. Symmetries in sub-atomic physics, weak decays, selection rules and electromagnetic processes.
Prerequisite(s): PHYS 482 and 452.

PHYS 856.3 — 2(4L-2S)
Radiation Therapy Physics
Interaction of x- and gamma rays with matter, interaction of particulate radiations with matter; radiotherapy linear accelerators; radiation quality, exposure; absorbed dose; dosimetry of high energy X-ray and electron beams; X-ray dose distribution parameters; electron dose distribution parameters; brachytherapy.
Prerequisite(s): Permission of the instructor.

PHYS 857.3 — 1(4L-15-1P)
Radiological Physics
Use of radioisotopes in medical imaging, devices and instrumentation for nuclear medicine imaging, principles of nuclear tomography, radiation protection, risk vs. benefit, facility design for radiation protection, radiobiology.
Prerequisite(s): Permission of the instructor.

PHYS 861.3 — 2(3L)
Plasma Physics
Discusses the basic concepts of plasma physics. Reading of assigned literature in plasma physics is required.

PHYS 862.3 — 1/2(3L)
Plasma Waves I
Dispersion relations are derived for small amplitude waves in plasmas, both in the presence and in the absence of magnetic fields. The topics treated in this course include the kinetic model of the plasma, Landau damping, instabilities, the effect of inhomogeneities or wave propagation, and the effect of oscillating external fields on waves and instabilities.
Prerequisite(s): PHYS 861.

PHYS 863.3 — 1/2(3L)
Plasma Waves II
Deals with nonlinear wave phenomena in plasma physics. Quasilinear theory, the theory of a single plasma mode and the equation of Korteweg-de Vries are covered. Other topics to be chosen from theDupree-Weinstock theory of plasma turbulence, fluctuations, wave scattering and applications to fusion plasmas.
Prerequisite(s): PHYS 861 and 862.

PHYS 865.3 — 1/2(3L)
Plasma Transport Properties and Diagnostic Techniques
Provides a kinetic theory treatment of plasma transport phenomena - conductivity, diffusion, heat flow - and the relaxation times for particle deflection, momentum transfer, energy relaxation. Various plasma measurement techniques are then discussed, including the use of microwave, probes, laser scattering and particle energy analyzers.
Prerequisite(s): PHYS 861.

PHYS 873.3 — 1/2(3L)
Statistical Mechanics
As part of basic training of graduate students, this core course aims to reinforce the student’s understanding of the fundamental concepts and techniques of statistical mechanics, and to advance the student’s general knowledge of phase transitions and critical phenomena. The course will not only broaden the student’s general knowledge of statistical physics, but will also expose the student to a variety of current research topics. In this course, three basic ensembles (microcanonical, canonical, grandcanonical) are first reviewed for both classical and quantum-mechanical statistical mechanics, and the classical limit of ideal gas is discussed. The quantum-mechanical collective phenomena in Fermi and Bose systems are examined. Finally, the techniques for analysing quantum critical phenomena and the Landau theory of phase transition are studied in detail, along with their applications to various physical systems.
Prerequisite(s): An undergraduate course in Statistical Mechanics and Quantum Mechanics.

PHYS 883.3 — 1/2(3L)
Quantum Mechanics
Concepts in advanced quantum mechanics. Topics include perturbation theory, relativistic corrections, scattering theory, second quantization, non-relativistic QED, and selected applications to subatomic, atomic, molecular, or solid-state systems.

PHYS 884.3 — 1/2(3L)
Quantum Field Theory
Fundamental concepts in quantum field theory. Topics include relativistic field equations; canonical and path integral quantization; symmetries, conservation laws, and symmetry breaking; interesting field theories relevant to condensed matter and subatomic physics; tree-level processes.

PHYS 886.3
Relativistic Quantum Mechanics
The course continues the study of topics in advanced quantum mechanics with a focus on relativistic quantum mechanics: Quantization of electromagnetic fields, photon emission and absorption, scattering of photons, Klein-Gordon equation, Dirac equation, non-relativistic limit of the Klein-Gordon and Dirac equations, relativistic corrections to the Schrodinger equation, quantization of the Klein-Gordon and Dirac fields, and scattering cross sections in quantum electrodynamics.
Prerequisite(s): PHYS 883 or PHYS 481 or equivalent.
Note(s): Students may receive credit for only one of PHYS 886 or PHYS 482.

PHYS 891.3
Selected Topics in Condensed Matter Physics
Advanced topics are selected to aid graduate students with their research. Depending on student interests the following subjects may be covered: electronic structure of advanced materials, high temperature superconductors, and biomaterials. Experimental methods in solid state physics and material science. Nanoscale physics, surface phenomena and soft condensed matter physics.
Prerequisite(s): Permission of instructor.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.
PHYS. 893.3 — 1/2(3L)
Selected Topics in Physics and Engineering Physics
Advanced topics in Physics and Engineering Physics selected to aid graduate students with their research. Consists of assigned readings in texts and/or scientific journals, related discussions, and additional lectures.
Prerequisite(s): Permission of the instructor.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

PHYS. 894.3 — 1/2(3L)
Selected Topics in Theoretical Physics
Advanced topics in theoretical physics selected to aid graduate students with their research. Consists of assigned readings in texts and/or scientific journals, related discussions, and additional lectures.
Prerequisite(s): Permission of the instructor.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

PHYS. 895.3 — 1/2(3L)
Selected Topics in Subatomic Physics
Advanced topics in subatomic physics selected to aid graduate students with their research. Consists of assigned readings in texts and/or scientific journals, related discussions, and additional lectures.
Prerequisite(s): Permission of the instructor.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

PHYS. 896.3 — 1/2(3L)
Advanced topics in plasma physics selected to aid graduate students with their research. Consists of assigned readings in texts and/or scientific journals, related discussions, and additional lectures.
Prerequisite(s): Permission of the instructor.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

PHYS. 897.3 — 1/2(3L)
Selected Topics in Space and Atmospheric Physics
Advanced topics in space and atmospheric physics selected to aid graduate students with their research. Consists of assigned readings in texts and/or scientific journals, related discussions, and additional lectures.
Prerequisite(s): Permission of the instructor.
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

PHYS. 898.3 — 1/2(3L)
Special Topics
Consists of assigned reading in texts and scientific journals on which the students report; additional lectures by the professor in charge are also given. Depending on the interests of the students, the topics are in the field of nuclear, or theoretical or upper atmospheric physics.

PHYS. 899.6
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

PHYS. 990
Seminar
Papers on recent developments in Physics and Engineering Physics are given. Candidates for the Master's degree and for the Ph.D. degree in this department are required to participate.

PHYS. 994
Research
Students writing a Master's thesis in physics must register for this course.

PHYS. 996
Research
Students writing a Ph.D. thesis in physics must register for this course.

PLSC — PLANT SCIENCE
Department of Plant Sciences
PLSC. 803.3 — 1(3L-2T)
Advanced Plant Breeding
Deals with important theoretical and applied issues related to crop improvement in both self-pollinated and cross-pollinated species. Theoretical aspects of artificial selection, genetic variability and population structure will be considered along with the practical implications of field testing, cultivar increase and release, and plant breeding regulations.
Prerequisite(s): PLSC. 411 or equivalent permission of the instructor.

PLSC. 804.3 — 2(3L-4P)
Processing and Analysis of Grain Crops
Grain and oilseed processing technologies and end-uses will be reviewed, as will the characteristics of grains and oilseeds which influence quality, utility and value. Laboratories will provide hands-on experience with current procedures for predicting grain quality.
Prerequisite(s): BIOL. 220.

PLSC. 812.3 — 1(3L-3P)
Physiological Plant Ecology
A study of the physiological basis for the interaction of the individual species with its environment. Included are discussions of the energy environment of the plant and how temperature, light, water status, soil conditions etc., affect plant function and distribution.
Prerequisite(s): Courses in plant ecology and plant physiology, or permission of the instructor.

PLSC. 813.3 — 2(3L)
Statistical Methods in Life Sciences
Some parametric statistical methods commonly used in agriculture and experimental biology. Introduction to factorial experiments and analysis of covariance. Emphasizes the principles and procedures of experimental designs.
Prerequisite(s): PLSC. 314.

PLSC. 814.3 — 1(3L)
Physiology and Yield Formation
Physiological processes involved in plant growth and development, with emphasis on yield formation in crops. Topics include growth stage systems, germination, phenology, seed set and seed growth, yield components, senescence and yield management.

PLSC. 815.3 — 1(3L-3P)
Applied Plant Cytogenetics
The application of cytogenetics to plant breeding. Topics include chromosomal aberrations, crop evolution, interspecific hybridization, gene transfer, euploidy and aneuploidy.

PLSC. 816.3 — 1(3L)
Quantitative Genetics
The genetic and statistical concepts of quantitative variation in crop plants. Emphasis will be on factors which affect direct and correlated response to artificial selection. Methods of quantitative genetic research will be considered.

PLSC. 822.3 — 1(3L-2T)
Ecology and Management of Rangeland Resources
Emphasizes the principles of managing rangeland to ensure sustained productivity. Plant morphology, physiology, palatability, nutritional value, energy flow, and nutrient cycling are integrated and emphasized in relation to the impacts of grazing on soil-plant-animal interactions. Inventory, evaluation, and manipulation of rangeland resources are also studied. Field trips are required.
Prerequisite(s): Permission of the instructor.

PLSC. 823.3 — 2(3L-2P)
Landscape Ecology and Vegetation Management
Current theories relating to structure, functioning and composition of landscapes and human impacts on natural ecosystems, landscape-level processes and patterns, and succession. Developing management plans for natural and remnant landscape elements, and inducing successional changes, and monitoring impacts will be covered.
Prerequisite(s): BIOL. 253, GEOG. 270, PLSC. 213 or permission of the instructor.

PLSC. 825.3 — 2(3L-6P)
Applied Plant Biotechnology
Examines the application of tissue culture to plant and plant product development, the principles of plant genetic engineering, the development of molecular markers and associated technologies, application of genomic technologies to plant breeding, and the regulatory and social issues associated with plant biotechnology. The laboratory allows students hands-on experience with different techniques in plant biotechnology.
Prerequisite(s): BIOL. 226 and PLSC. 240 or any 200-level BIOL, or permission of instructor or department.
PLSC. 827.3 — 2(3L)
Molecular Basis of Grain Quality
The physical and compositional qualities of cereal grains determine how they are processed and utilized. This course will present the biochemical and genetic basis of grain quality and the molecular strategies available to improve the quality characteristics of major grain crops.
Prerequisite(s): PLSC 416 or permission of the instructor.

PLSC. 833.3 — 1/2(3L)
Advanced Plant Ecology
An in-depth examination of recent developments in plant ecology. Current and emerging research interest in plant population, community, and ecosystem ecology will be studied. Use and practical application of analytical tools for synthesis of research results will be emphasized.
Restriction(s): This course is restricted to students enrolled in the College of Graduate Studies and Research.
Note: Students cannot receive credit for both PLSC. 833 and PLSC. 413.

PLSC. 841.3 — 2(3L-2P)
Advanced Fruit Growing
Fundamentals of commercial fruit production including environmental adaptation, breeding, site development, marketing, cultural management, tree fruits, small fruits, tropical fruits, harvesting, diseases and pests.
Note: Students with credit for PLSC. 441 may not take this course for credit.

PLSC. 865.3 — 2(3L-15)
Abiotic Stress in Plants
Students will be introduced to current concepts and recent advances in plant resistance mechanisms to freezing, moisture, salt and heat stress from the ecologic to molecular levels. Methods of stress application and viability testing will also be demonstrated. At the end of each stress section, guest scientists will be invited to present their research.
Prerequisite(s): PLSC 417 or PLSC 412 or permission of the department

PLSC. 880.3 — 1/2(2L-2S)
Introduction to Plant Disease Epidemiology
Principles and quantitative methods of plant disease epidemiology are presented. The role of host plants, the environment and the pathogen in the development of epidemics are discussed. The design of experiments, analysis of data generated from such experiments, as well as temporal and spatial development of disease are addressed. Disease forecasting and decision support systems are discussed.
Prerequisite(s): PLSC 813 or permission of the department

PLSC. 881.3 — 1/2(2L-2S)
Host-pathogen Interactions and Breeding for Disease Resistance in Plants
Will provide students with an understanding of host-pathogen interactions in plants and with the genetic basis of breeding for disease resistance. Recent concepts in host-pathogen genetics and trends in disease resistance breeding will be considered.
Prerequisite(s): Introductory plant pathology and plant breeding courses or permission of the instructor.

PLSC. 891.3 — 1/2(1and2(R)
Literature Survey
Reading will be assigned for the purpose of extending the student’s knowledge of chosen subjects.

PLSC. 898.3 — 1/2(1L-3P)
Special Topics
Assigned reading and tutorials in a specific field related to the student’s major interest. Students will be required to prepare reviews or seminars on specific topics.

PLSC. 899.6
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

PLSC. 990
Seminars
Reviews of literature and recent investigations. Graduate students are required to attend and present papers during the period of their candidacy.

PLSC. 994
Research
Students writing a Master’s thesis must register for this course.

PLSC. 996
Research
Students writing a Ph.D. thesis must register for this course.

POLS — POLITICAL STUDIES

Department of Political Studies

POLS. 807.3 — 1/2(3S)
Topics in Canadian Governance and Politics
An examination of selected aspects of Canadian governance and politics. Topics include the Canadian constitution, the prime minister and cabinet, Parliament, the courts, political parties, elections, public opinion, federalism, political culture, and provincial governance and politics.

POLS. 809.3 — 1/2(3S)
Theories of Canadian Governance and Politics
Provides an examination of some of the major theories employed in the modern study of Canadian governance and politics. It pays particular attention to the theoretical works and perspectives of scholars who are engaged in the study of institutions, processes and/or policies at the national level of Canadian politics.
Prerequisite(s): 8.8 in Political Studies.

POLS. 815.3 — 1/2(3S)
Research Design and Methods in Political Science
A required course for all graduate students in Political Science. Introduces students to conceptual, theoretical and methodological issues in the discipline of Political Science and teaches them skills that will prepare them to write their thesis. It also examines current themes in the political and policy discourse.
Formerly: First half of 818.6
Note: Students with credit for POLS. 818.6 may not take this course for credit.

POLS. 819.3 — 1/2(3S)
Theoretical Readings in Political Studies
A required course for all graduate students in Political Studies. Sub-disciplines are explored through an examination of theoretical and some attendant empirical literature by means of reading, student presentations, and seminar discussion. Seminars are led by faculty teaching and researching in the respective sub-disciplines.
Formerly: half of POLS. 818.3 and formerly POLS. 816.3
Prerequisite(s): Honours degree or its equivalent in Political Studies.
Note: Students with credit for POLS. 818 or POLS. 816 will not receive credit for this course.

POLS. 825.3 — 1/2(3S)
Topics in Northern Governance
An examination of selected topics in Northern Governance. Topics include issues of Northern governance, politics, and policies of selected circumpolar countries; such as regional governance, devolution, co-management, self-government and land claims, resource development, Arctic sovereignty, climate change, and international cooperation.

POLS. 826.3 — 1/2(3S)
Topics in Aboriginal Public Policy and Administration
An examination of selected topics in Aboriginal public policy and administration. Topics include Aboriginal policy in Canada, comparative Aboriginal-state relations, political theory and rights of Aboriginal peoples, and Aboriginal administrative and management systems.

POLS. 827.3 — 1/2(3S)
Topics in Public Policy and Administration
An examination of selected topics in public policy and administration. Topics include immigration, citizenship, and multiculturalism; health care and social policies; science, technology and innovation; the new public management; management of intergovernmental relations; and accountability in the public service.

POLS. 828.3 — 1/2(3S)
Policy Planning and Evaluation in Northern Communities
The objective of the course is twofold. The first objective is to provide students with an understanding of various conceptual, theoretical, methodological, ethical, and political issues of relevance for policy and program planning, analysis and evaluation. The second objective is to provide students with an opportunity to produce documents that are commonly used for policy and program planning, analysis and evaluation in the governmental and non-governmental sectors in northern communities.

Permission of the department is required
Restriction(s): Restricted to students in the College of Graduate Studies and Research.
Note: Students with credit for POLS 898 “Policy, Planning and Evaluation in Northern Communities” cannot receive credit for this course. Students in the M.N.G.D. program can only receive credit for one of POLS. 828 and POLS. 848. Students not in the M.N.G.D. program that would like to receive credit for both of POLS. 828 and POLS. 848 should consult the Head of the Department of Political Studies.
POLS. 837.3 — 1/2(3S)
Topics in Political Thought
Examines a topic or issue in political theory, or the work of a particular political theorist, through the examination of selected works in classic and/or contemporary political theory. Topics include problems in the philosophy of social sciences, natural rights, the public interest, justice, obligation, and freedom.

POLS. 839.3 — 1/2(3S)
Contemporary Political Philosophy
This course studies the scope of Political Theory and the methods of analysis and argument used in the area through an examination of selected classic and contemporary works in political theory.

POLS. 847.3 — 1/2(3S)
Topics in Comparative Government and Politics
An examination of selected topics in Comparative Government and Politics. Topics include Comparative Public Policy, Comparative Politics: Developing Countries, Comparative Politics: Industrialized and Post-Industrialized Countries, Comparative Federalism, and Political Parties and Voting Behaviour.

POLS. 848.3 — 1/2(3S)
Development Implementation at the Base Monitoring and Evaluation
Is designed to introduce students and practitioners to Monitoring and Evaluation models and techniques that can be applied to governmental programs and projects at the national, provincial/regional and local levels. The goal is to sensitize students to the challenges of MandE in different cultural settings. Local indigenous communities draw on different values, patterns of leadership and behavioral norms than is assumed within Western analytical frameworks. The course will draw on extensive field-based research to offer a more appropriate framework. The course will draw on extensive field-based research to offer a more appropriate framework for development.

Permission of the department is required
Restriction(s): Restricted to students in the College of Graduate Studies and Research
Note: Students in the M.N.G.D. program can only receive credit for one of POLS. 828 and POLS. 848. Students not in the M.N.G.D. program who would like to receive credit for both of POLS. 828 and POLS. 848 should consult the Head of the Department of Political Studies.

POLS. 849.3 — 1/2(3S)
Theory and Method in Comparative Government and Politics
Investigates the range of theories that are being used in contemporary Political Science to examine political phenomena from a cross-national perspective. Also examines the methodological issues that arise in approaching the study of politics and government in this way.

POLS. 867.3 — 1/2(3S)
Topics in International Relations
An examination of selected topics in International Relations. Topics include The Canadian Foreign Policy Process, Ethical Issues in International Relations, International Terrorism, Nationalism, International Political Economy, and International Trade.

POLS. 869.3 — 1/2(2.5S)
Theories of International Relations
Surveys and assesses major theories of international relations and examines the assumptions and methodological approaches that underlie them. While this is a survey course and many different theories are examined, the major emphasis is upon those that concern the nature, causes and significance of terrorism in contemporary international relations.

POLS. 898.3 — 1/2(3L)
Special Topics
Reading, essays, and discussion in an approved special field.

POLS. 899.6 — 1/2(3L)
Special Topics
Reading, essays, and discussion in an approved special field.

POLS. 990 Seminar
Papers and discussions on topics in political studies. Graduate students are required to attend and take part in these meetings.

POLS. 994 Research
Students writing a Master’s thesis must register for this course in each term before completion of their degree.

POLS. 996 Research
Students writing a Ph.D. thesis must register for this course.

PSIA — PSYCHIATRY

Department of Psychiatry

PSIA. 851.3 — 1/2(L)
Introductory Neuroscience
The topics covered are meant to provide an introduction to neuroscience and range from the molecular and cellular mechanisms underlying neural function to aspects of behaviour, neuroanatomy and neurophysiology. Given its broad nature, this course is also suitable for students who wish to learn something about neuroscience without majoring in the topic.

Prerequisite(s): PCOL. 350, BIOL. 220 (or 203) or equivalents, or permission of the instructor.

PSIA. 853.3 — 1/2(2L)
Neurobiology of Mental Illness
Our understanding of the neurobiology of psychiatric illness is constantly changing and has benefited greatly due to the development of new research approaches and their ability to identify new causative mechanisms. For example, circuit analysis has been advanced by new noninvasive optical methods and our understanding of the genome is clearly associated with the generation of mice transgenic for pathology-linked genes. This course integrates these approaches to present a new view of the causes of mental illnesses, including Schizophrenia, Depression, Anxiety, Alzheimer’s disease and other dementias, Attention deficit hyperactivity disorder, and Addiction.

Permission of the course coordinator (with the expectation that the students will have a good background in biology or biochemistry) is required.

PSIA. 898.3 — 1/2(3R/T)
Special Topics
Study in selected areas of neuroscience or neuropsychiatry may be undertaken by advanced students with the permission of the department head. Consists of supervised readings and discussion leading to the preparation of a term paper by the student.

Prerequisite(s): PSIA. 850.

PSIA. 899.6 — 1and2(3R/T)
Special Topics
Study in selected areas of neuroscience or neuropsychiatry may be undertaken by advanced students with the permission of the department head. Consists of supervised readings and discussion leading to the preparation of a term paper by the student.

PSIA. 990 Seminar
Students are required each year to attend the departmental seminar series and to present one formal seminar on an assigned topic and one informal seminar on their research activities.

PSIA. 994 Research
Students registered in a Master’s thesis program must register in this course.

PSIA. 996 Research
Students registered in a Ph.D. thesis program must register in this course.

PSY — PSYCHOLOGY

Department of Psychology

PSY. 801.3 — 1/2(3S)
Culture Mental Health and Illness
This advanced seminar examines the role of culture in understanding mental health and illness. Adopting a critical perspective, the course explores the meaning of culture, how disorders are constructed within the culture of biomedicine, how mental health and illness are configured cross-culturally, and how issues of culture are handled in research and treatment.

PSY. 802.3 — 1/2(3S)
Foundations of Research in Culture and Human Development
Introduces the philosophical, theoretical, and methodological bases of the social and behavioral sciences pertinent to the study of culture and human development.

Formerly: Part of PSY. 882
Prerequisite(s): Registration in the College of Graduate Studies and Research and permission of instructor.

Note: Students with credit for PSY. 882.6 cannot take this course for credit.
PSY. 803.3 — 1/2(3S)  
Culture and Human Development  
Explores concepts of human development, its cultural variations, and some of the basic and often unacknowledged assumptions that underlie these concepts and variations. Various theoretical and methodological approaches to the study of human development will be examined.  
Formerly: Part of PSY. 882  
Prerequisite(s): Registration in the College of Graduate Studies and Research and permission of instructor.  
Note: Students with credit for PSY. 882.6 cannot take this course for credit.

PSY. 805.3 — 1/2(3L)  
Statistics I Univariate General Linear Models  
A theoretical and practical examination of univariate statistical analyses. Topics will include: a review of basic concepts, hypothesis tests on means, power, correlation and regression (simple and multiple), ANOVA (simple, factorial, and repeated measures), multiple comparisons, ANCOVA, overview of general linear models, and chi-square tests. Through several computer assignments, students will develop the necessary experience to be competent at conducting and interpreting univariate statistical analyses.

PSY. 807.3 — 1/2(3L)  
Statistics III Multivariate Statistics  
The course objective is for graduate students to gain some knowledge of and experience with using multivariate statistics that are frequently used by psychologists dealing with non-experimental or quasi-experimental data. The course will cover multiple regression, factor analysis, multivariate analysis of variance, and structural equation modeling.

PSY. 809.3 — (3S)  
Qualitative Research  
This course is designed to introduce students to ways of doing research that are based in a constructionist epistemology and that focus on the generation and analysis of qualitative data. Coverage of specific methodologies (e.g., narrative research, grounded theory, discourse analysis) will be grounded in an understanding of their philosophical foundations.  
Prerequisite(s): Undergraduate degree.

PSY. 810.3 — 1/2(3S)  
Methods of Applied Social Research  
An advanced coverage of survey development (including question, wording, and format), research interview techniques, and psychometric properties of multi-item scales. The focus will be on methods typically used in social science research.

PSY. 811.3 — 1/2(3S)  
Program Evaluation  
An intensive analysis of the processes of developing and evaluating human service programs. Major topics will include the articulation of program goals, the development of measures, evaluation designs, and statistical techniques.

PSY. 815.6 — 1and2(2L-25-3P)  
Psychological Assessment  
This is a foundational course in the theoretical and practical issues in personality and ability assessment. The nature, history, and current controversies and problems related to objective personality and intellectual assessment are examined. A goal of this course is to become proficient in basic interviewing skills and in the administration and interpretation of basic objective personality and cognitive ability instruments.  
Note: Formerly: PSY. 820.6

PSY. 816.3 — 1/2(3S)  
Topics in Psychological Assessment  
A brief but intensive seminar on selected topics in psychological assessment. Topics may include: psychogeriatric assessment, diagnostic interviewing, neuropsychological assessment, projective techniques, assessment of psychological components of physical illness, behavioral assessment.

PSY. 822.3 — 1and2(1.5S)  
Pro-Seminar in Psychology  
A required course for psychology graduate students in the Clinical, CANDH and BBS streams. Students will attend a monthly seminar offered by a departmental or visiting faculty member. The seminars will offer students high-level exposure to the discipline of psychology, addressing current issues historical perspectives, and research methods in social, developmental, cognitive, cultural, physiological and neuropsychology.  
Formerly: Replaces PSY. 880.3 and . 881.3  
Note: This course will be offered 1.5 hours per month (4th Thursday) in Sept, Oct, Nov, Jan, Feb, and March. Students attend for four years to receive course credit.

PSY. 830.3 — 1/2(3S)  
Advanced Seminar in Personality  
This course will provide a survey of the major theories of personality. Several theories will be introduced and a critical evaluation of each perspective will be encouraged. The course will address questions such as: What is personality? What are the similarities and differences among different theories? What historical and cultural factors influence the development of different theories? What are the implications and uses of different personality theories? The research methods used to understand each of these theories will also be explored.

PSY. 831.3 — 1/2(3S)  
Advanced Behavioral Pathology  
An intensive study of current theory and research in the field of behavioral pathology designed to provide broad-based exposure to current issues, and to developmental and historical topics. Behavioral disorder in children and adults, including older adults, will be covered in this seminar.

PSY. 832.3 — 1/2(3S)  
Advanced Seminar in Social Psychology  
This course offers fundamental training in Social Psychology. Across a broad number of topics, students will be introduced to current theories, methodology, and research and will engage in critical review, analysis, and discussion of historical and contemporary issues within the discipline.

PSY. 834.3 — 1/2(3S)  
Advanced Seminar in Intercultural and Intergroup Relations  
A critical review of theory and research related to relations within and between groups. Students are exposed to a variety of theoretical and methodological perspectives within the areas of cross-cultural social psychology and intergroup relations with a special emphasis on acculturation and immigration issues.

PSY. 837.3 — 1/2(3S)  
Advanced Seminar in Human Memory  
Examines current issues in the field of human learning and memory. These will include 1) the cognitive architecture of human memory systems, 2) how information is represented and organized in memory, and 3) the role of consciousness in the storage, retrieval, and processing of information.

PSY. 838.3 — 1/2(3S)  
Advanced Seminar in Language Processing  
Critical presentation and discussion of recent research and theory on the psychology of language, from a cognitive and neuroscience perspective. Topics may include normal and impaired word recognition, speech perception, reading, language acquisition, and localization of function (e.g., fMRI). Different modeling perspectives on these topics will also be discussed.

PSY. 839.3 — 1/2(3S)  
Thinking and Reasoning  
Deals with cognitive approaches to issues of human rationality. We will address questions such as: When is a decision judged to be rational/ irrational? How do we interpret evidence to suggest that reasoners frequently fail to make normatively appropriate decisions? How is our decision-making ability limited by our cognitive resources?

PSY. 842.3 — 1/2(3S)  
Advanced Seminar in Physiological Psychology  
A critical review of basic research in physiological psychology. Research in classical and current problems is studied with a focus on neural coding, sensory, motor, motivational, affective, reward systems as well as learning and memory.

PSY. 844.3 — 1/2(3S)  
Advanced Seminar in Behavioral Pharmacology  
A critical review of research in the field of behavioral pharmacology. Deals with the main principles of drug action, behaviourally active drugs, and behavioral mechanisms of drug action. The experimental analysis of problems associated with drug dependence, drug-induced changes in the electrical activity of the brain, behavioral toxicology and the psychopharmacology of affective disorders is emphasized.
PSY. 846.3 — 1/2(1L‑2S)  
Advanced Seminar in Human Neuropsychology  
A critical review of theory, research and methodology in human neuropsychology. Using a combination of lectures and seminars, students will be exposed to the recent literature on topics such as brain localization and lateralization of functions, brain damage and recovery, and the neuropsychology of "higher-order" functions.

PSY. 850.3 — 1/2(3S)  
Topics in Psychological Therapy I  
Principles and procedures of individual psychological therapy and counselling. One or two specific systems of psychotherapy are studied. Historical development and empirical supports are examined.

PSY. 852.3 — 1/2(3S)  
Topics in Psychological Therapy II  
An intensive study of principles and procedures of individual psychological therapy and counselling. One or two specific systems of psychotherapy are studied.

PSY. 858.3 — 1/2(1.5S)  
Ethical and Professional Issues in Clinical Psychology  
Introduction to ethical principles, codes, and processes for ethical decision-making with a special focus on clinical psychology. Readings and discussion on confidentiality, informed consent, dual relationships, duties to clients, business practices, and other professional issues. Equips students to resolve ethical dilemmas in practice and in licenture examinations.

PSY. 860.3 — 1/2(3S)  
Seminar in Professional Skills  
The seminar is designed to develop professional competence in clinical psychology through the study and discussion of professional issues and problems in clinical and community practice. Both theoretical and practical issues will be considered, including topics such as forensic assessment and awareness of cultural factors in healing. Required for all PhD students in clinical psychology.

PSY. 862.3 — 1/2(3S)  
Foundations of Applied Social Psychology  
The major objective of this course is to explore how social psychological theory and research inform the analysis of social issues and social problems. Predominant social psychological theories and the current state of the research pertaining to these theories will be discussed and evaluated in terms of their relevance to applied research and social issues.

PSY. 864.3 — (2S)  
Theory and Applied Issues in Social Psychology  
This course will introduce students to specialized research areas in social psychology, with a focus on relevant theory and the application of research. A number of social psychological topics will be discussed, along with their applications to a broad range of social issues and interventions.

PSY. 865.3 — (3S)  
Applied Research Designs  
This course is an advanced seminar in applied research design from a post-positivist critical multiplemism perspective. Students will examine the validity and the applicability of randomized experimental designs, quasi-experimental designs, and single case and time series designs. The use of qualitative methods to complement and enrich quantitative methods will be discussed.  
Prerequisite(s): PSY. 805; PSY 807.

PSY. 873.3  
Cognition and Neuroscience Research  
Ph.D. students enrolled in the Cognition and Neuroscience training stream in the Department of Psychology develop a research project under the supervision of a faculty member other than the Ph.D. supervisor. The purpose is to acquire research experience with theory, methodology and data analysis in an area of cognition or neuroscience distinct from the dissertation research.

PSY. 898.3 — 1/2(1and2(R))  
Special Topics  
The student pursues a program of readings in selected research topics under the supervision of individual faculty members.

PSY. 900  
Directed Research in Psychology  
Under the supervision of faculty members, students will be involved in one or a combination of research seminars, group, or individualized research projects.

PSY. 901.0  
Individual Research  
This course consists of completing a supervised research project in a topic area distinct from the student's PhD dissertation research. Each student will be under the direct supervision of an individual faculty member. The student and faculty supervisor will meet weekly to discuss activities and progress. It is expected that the student will conceive of original research within the scope of the research activities being conducted within the faculty supervisor's lab and that the student will take the lead on the specified project. It is expected that any research outputs (published manuscripts, conference presentations, etc.) will be jointly authored by the student (senior author) and the faculty supervisor (junior author).  
Prerequisite(s): Restricted to Ph.D. students in the Applied Social Psychology concentration.

PSY. 902 — 1and2(3P‑2C)  
Practicum in Professional Psychology  
Consists of supervised field work in professional psychology under the direction of licensed clinical psychologists or individual faculty members.  
Note: Taken in conjunction with other courses in the clinical and applied social programs.

PSY. 903  
Clerkship or Internship in Professional Psychology  
The student is engaged for one term as an intern in a clinical, community, or organizational setting. Supervision is provided by departmental faculty members and psychologists in field settings.  
Note: Taken in conjunction with other courses in the clinical and applied social programs.

PSY. 904 — 1and2and3(31C)  
Internship in Clinical Psychology  
After completing four years of course based and practicum training, clinical psychology graduate students complete a full-time, one year internship in a health setting accredited by the Canadian Psychological Association. Supervision is provided by clinical psychologists affiliated with the internship setting.

PSY. 994  
Research  
Completion of original research and writing of Master's thesis.

PSY. 996  
Research  
Completion of original research and writing of Ph.D. dissertation.

PTH — PHYSICAL THERAPY

School of Physical Therapy

PTH. 805.3 — M2(2.5L)(12 weeks)  
Pathology for Physical Therapists  
General and special pathology for physiotherapists, with special emphasis on the musculoskeletal and central and peripheral nervous systems.

PTH. 808.3 — M1(2.5L‑.5P)(12 weeks)  
Lifespan I Development Aging and Pharmacological Issues across the Lifespan  
Will examine theories of human development, the physiology of aging and physical therapy management of older adults. Students will also be introduced to general principles of pharmacology and classes of drugs affecting body systems, and an overview of the interaction between nutrition and illness across the lifespan.

PTH. 815.4 — M1and2(2L‑2P)(24 weeks)  
Human Anatomy  
This regional approach to the study of human gross anatomy is especially designed for students of Physical Therapy. Although the entire body is studied, information pertaining to skeletal muscles is emphasized. The curriculum is supplemented with some systemic anatomy, as well as an introduction to cell biology and histology.
PTH. 820.3 Functional Neuroanatomy
This course will introduce students to the structure and function of the central and peripheral nervous systems, and will provide them with an anatomical basis for understanding the functional alterations that accompany neurological disorders.

Formerly: PTH 818.2
Note: Permission by the instructor is required for students not in the MPT program. Students with credit for PTH 818.2 may not take this course for credit.

Restriction(s): Restricted to students enrolled in the MPT program.

PTH. 822.5 — M1(4.5L-5P-1T)(12 weeks) Foundations I Functional Activities and Exercise Therapy
Topics include assessment of movement and functional activities, effects of prolonged immobilization and the theory and practical application of basic client handling skills, exercise prescription and rehabilitation of functional activities.

PTH. 823.3 — M2(2.5L-2P-2T)(12 weeks) Foundations III Movement Analysis
Examines the theory and application of biomechanics and pathomechanics to movement analysis considering body structures, functions (including gait), disabilities, activities and participation. Laboratory and tutorial sessions will focus on surface anatomy, palpation, observation and movement analysis with integration of human anatomy and applied physical therapy sciences.

PTH. 825.3 — M2(3L-0.5P)(12 weeks) Exercise Physiology for Physical Therapists
An examination of the physiological foundations of human movement with respect to the use of exercise as a therapeutic and preventative technique. Emphasis will be placed on using physiologic principles to describe the responses to aerobic, anaerobic, and strength training with reference to changes associated with disease or injury.

PTH. 829.3 — M7(2.5L-5P)(6 weeks) Lifespan II Pediatrics Obstetrics and Gynecology
Will examine components of physical therapy practice across the lifespan. The pediatric component will focus on assessment and treatment of cerebral palsy and muscular dystrophy. The component on obstetrics and gynecology will focus on physical therapy for the pregnant client and for female incontinence.

PTH. 830.7 — M4(5.5L-1.5P)(9 weeks) Musculoskeletal I
Discusses the epidemiology, pathology, assessment and clinical findings of common musculoskeletal conditions. Indicator conditions are used to examine the management of a full spectrum of musculoskeletal diseases. This course also introduces the theory and skills related to the manual therapy examination of the musculoskeletal system.

PTH. 831.3 — M4(3L-3P-2T)(9 weeks) Cardiorespiratory I
An introduction to the physiology, pathophysiology, assessment, and management of the cardiovascular and respiratory systems in a variety of physical therapy settings. Emphasis will be placed on critical thinking, problem solving, and clinical skills for the management of disorders that impact the oxygen transport system.

PTH. 832.3 — M5(3L-5P)(6 weeks) Musculoskeletal II
Introduces the theory and specialized skills needed for manual therapy of musculoskeletal conditions. Topics include evaluation of acuity and signs and symptoms, regional examination, differential diagnosis, safety screening, pre-treatment decisions, and treatment planning. Skills in manual biomechanical examination and manual treatment and select manipulation techniques of the upper quadrant will be developed.

PTH. 833.3 — M5(3L-2P-1T)(6 weeks) Cardiorespiratory II
This course will provide the theoretical and practical knowledge and skills related to the specialized physical therapy practice areas of acute medical, surgical, pediatric, critical, and intensive care management.

PTH. 834.4 — M7(3.5L-7P)(6 weeks) Musculoskeletal III
Focuses on the progression of manual therapy assessment and treatment including spinal and lower extremity examination, clinical reasoning, differential diagnosis, and treatment planning for common musculoskeletal conditions. Skills including mobilization and manipulation of lower extremity joints and mobilization of spinal joints will be developed. Management of acute pain, chronic non-malignant pain and chronic malignant pain with musculoskeletal disorders will be addressed.

PTH. 835.2 — M9(2L-2P)(11 weeks) Cardiorespiratory III
Examines the management of selected chronic cardiopulmonary conditions, including cardiopulmonary rehabilitation, chronic disease management, and the prevention/treatment of lifestyle-related diseases. In addition, the cardiopulmonary sequelae and management of severe heart or lung disease, selected neuromuscular conditions, and spinal cord injuries will be explored.

PTH. 838.5 — M9(5.5L-4P)(11 weeks) Musculoskeletal IV
Addresses sport physical therapy, ergonomics, and physical therapy management of burns and frostbite. The sports physical therapy component includes field assessment, acute and return to activity, and the rehabilitation of common sport injuries. Student will develop skills in manual therapy including manipulation for lumbo-sacral and thoracic spine joints. The course will include the principles and practices of prevention, perioperative and prosthetic management of lower extremity amputations.

PTH. 839.4 — M7(6L)(6 weeks) Advanced Clinical Exercise Physiology
Will prepare students to appropriately design, administer, and critique comprehensive exercise testing and training programs for healthy individuals and various clinical populations. Emphasis will be placed on developing and evidence-based approach to the proper periodization of endurance, strength, flexibility, and neuromuscular training for multiple system adaptations.

PTH. 840.3 — M1(2.5L-3P)(12 weeks) Foundations II Introductory Treatment Methods
Includes the theory and practice of basic physical therapy treatment methods including thermal modalities, ultrasound, compression therapy, laser, massage, wound dressings, orthotics, bandaging and taping and relaxation training. Theoretical topics include the neurophysiology of pain, soft tissue healing and the use of support personnel.

PTH. 841.2 — M7(2L-2.5P)(6 weeks) Foundations IV Electrophysical Agents
Focuses on the decision-making and application for adjunctive treatment methods, including modalities such as electrical stimulation, biofeedback, iontophoresis, high voltage and acupuncture.

PTH. 845.6 — M4(6L-2P)(9 weeks) Neurology I
Presents a conceptual framework for neurological practice built upon foundations of best evidence, rehabilitation sciences, motor control/learning theories, neuroanatomy, neuropsychology and neuro-regenerative science. Introduces assessment and management of impairments, activity limitations and participation restrictions common to neurological conditions. Course theory is applied to management of adult hemiplegia (cerebral vascular accident).

PTH. 847.6 — M5(5.5L-1.5P)(6 weeks) Neurology II
Presents a framework for management of gait dysfunction using adult hemiplegia as a model. Other conditions of the central and peripheral nervous system that are studied include traumatic brain injury, multiple sclerosis, post-polio syndrome and Guillain-Barre syndrome. Physical therapy management in acute care, rehabilitation and community settings are explored.

PTH. 848.2 — M9(2L-1P)(11 weeks) Neurology III
Considers presentation and management of spinal cord injury (acquired and congenital), Parkinson’s Disease and Amyotrophic Lateral Sclerosis; complex conditions each with neuropsychology, clinical presentation, and management that differ significantly from conditions studied in preceding courses. Quality of life, end of life, and ethical issues associated with these conditions are explored.
A full-time course of clinical education in Saskatchewan facilities. This course is designed to provide the opportunity to apply theory from Professional Practice I to practical experience in health care facilities with limited case load management.

P.851.1 — M125T(1 week)

Case Integration I

Case Integration I is the first of a three-course series that emphasizes critical thinking, clinical decision-making and problem solving. Module one content is synthesized; and, foundational and theoretical knowledge, professional and lifespan issues, and evidence-based practice are explored and integrated through case analyses.

P.852.4 — M337.5C(4 weeks)

Clinical Practice II

A full-time course of clinical education in Saskatchewan health care facilities. With special permission, the clinical experience may be arranged in another Canadian province. Is designed to advance clinical skills application as a progression from Clinical Practice I and to specifically apply theory from Modules One and Two.

P.853.1 — M225T(1 week)

Case Integration II

Case Integration II, the second of a three-course series, synthesizes Module I and II content. Foundational and theoretical knowledge, professional and lifespan issues, and evidence-based practice are further explored and integrated through case analyses. Critical thinking, clinical decision-making and problem solving related to various physical therapy practice areas are emphasized.

P.854.4 — M637.5C(4 weeks)

Clinical Practice III

A full-time course of clinical education in Saskatchewan facilities. Some students may elect to complete this clinical practicum in another Canadian province. This course is designed to provide diversity of experience and advance clinical skills with a more complex caseload relevant to the content in Modules four and five.

P.855.1 — M925T(1 week)

Case Integration III

The last course of a three-course series, this course emphasizes critical thinking, clinical decision-making and problem solving related to a variety of areas of physical therapy practice. This week-long capstone course synthesizes Modules I to VIII content in a case-based format.

P.856.15 — M837.5C(15 weeks)

Clinical Practice IV

A full-time clinical education course, normally three clinical placements of five weeks duration each, anywhere in Canada. With special permission, students may participate in a structured interprofessional international clinical practicum. A clinical caseload of advancing complexity and amount is assigned, incorporating the theory from the previous modules.

P.858.6 — M1037.5C(6 weeks)

Clinical Practice V

A full-time clinical education course in facilities anywhere in Canada. With special permission, a student may request an international practicum. A complex clinical caseload and enhanced workload assignment, will be provided for each student consistent with advancing clinical skills from previous clinical practice courses and incorporating theory in Module Nine.

P.860.2 — M1212(12 weeks)

Evidence Based Practice I

Designed to build confidence as an evidence-based practitioner and to complete components of the Major Project. Focusses on evidence based practice, literature search strategies, measurement issues and critical appraisal of different quantitative research designs used in health care research.

P.861.2 — M110L9T-6C(2 weeks)

Professional Practice I

An introduction to the physical therapy profession and scope of practice, health and health systems, the International Classification of Functioning, Disability and Health (ICF), learning styles, communication, inter-professional teamwork, sensitive practice, reflective practice, global determinants of health, clinical decision-making, physical therapy subjective and objective assessment planning and diagnosis.

P.862.2 — M416L6P(9 weeks)

Evidence Based Practice II

Focuses on theory and skills of research needed to gain competence in evidence-based practice and to complete components of the Major Project. Two main components are emphasized: use and interpretation of statistical analyses used in health care research and integration of evidence-based practice concepts into clinical practice.

P.863.5 — M245L(12 weeks)

Professional Practice II

Students explore the role of Physical Therapist as educator–health promoter in this theoretical and practical course. Educating patients/families/caregivers; design, implementation and evaluation of patient education programs; collegial teaching of health care professional peers; community education; and, application to clinical teaching and practice will be emphasized.

P.864.3 — M93T(11 weeks)

Evidence Based Practice III

Through readings, student -led seminars, and project meetings, students will explore a variety of research related topics including: research design, research issues, and research methods and develop their major project.

P.865.2 — M515L1.5T(6 weeks)

Professional Practice III

Emphasizes the application of physical therapy scope of practice, cultural competence, legal aspects of professional practice, funding of health care, sensitive practice, inter-professional practice, client-centered care and the application of an ethical decision-making framework in professional practice. It is specific preparation for Clinical Practice III and IV.

P.867.6 — M96L(11 weeks)

Professional Practice IV

This course encompasses the professional, ethical, legal, regulatory, social economic, financial, business, and management aspects of autonomous public and private PT practice in a multidimensional Canadian health care environment. Topics include: quality improvement; risk management; business management; information management systems; human resources; marketing; program planning/ evaluation; health care policy/delivery; advocacy.

P.868.3 — 135S

Physical Therapy Theory and Practice Advanced

Musculoskeletal I

Advanced course in Physical Therapy designed to enhance knowledge and practical skills in patient centred interprofessional and primary care in the area of Musculoskeletal conditions. A practicum or internship may be one of the learning methods used.

Permission of instructor is required.

P.899.6 — 2.5L-4P

Special Topics

This special topics course has been individually tailored to provide the MPT student with the opportunity to remediate theoretical, practical, and/or clinical learning contract consisting of specific objectives, a detailed learning plan outlining learning strategies and resources and evaluation plan will be developed by faculty in consultation with the student.

P.992.6

Major Project

The Major Project is a supervised, group experience spanning the entire MPT program. It involves the disciplined investigation of topics related to the practice of physical therapy and has been designed to develop inquiry, reflection, critical thinking, critical appraisal of the literature, writing and presentation skills.

PUBH — PUBLIC HEALTH

Department of SPH Executive Director Office

PUBH. 800.3 — 1.5L-1.5P

Epidemiology for Public Health

Will introduce students to the concepts and basic methods used in epidemiology to evaluate the distribution and determinants of disease and health interventions in public health. It is a core course for students in the Master of Public Health program, but open to other health science students.

Formerly: CHEP 800

Note: Students with credit for CHEP 800 will not receive credit for this course.

PUBH. 803.3 — 3S

Health Promotion

An introduction to theory, research, and practice in health promotion. Topics include: empowerment and community, health promotion strategies at the individual, group, community and policy levels.

Formerly: CHEP 803

Prerequisite(s): Must have permission of the instructor.
**PUBH. 804.3 — (1‑2L‑S)**

**Foundations of Public Health**

Provides an overview of the field of community health, including health care organization and community-based approaches to health promotion and disease prevention.

**Formerly:** CHEP 804

**PUBH. 805.3 — 1(3L‑3T)**

**Biostatistics for Public Health**

Designed for students who wish to understand basic biostatistical methods and principles as they apply to public health data. The methods include descriptive statistics, confidence intervals and hypothesis testing, analysis of variance, non-parametric methods, multiple regression and logistic regression. The emphasis of the course is on applications of these methods to public health data, on correct interpretations of the resulting analyses as to be presented to both public health professionals and general lay audiences, and on the critical appraisal of these methods as used in the public health literature. The course also introduces the computer software program SPSS as it applies to the statistical topics discussed in the course.

**Formerly:** CHEP 805

**Prerequisite(s):** 70% or higher on the Biostatistics portion of PUBH. 804.3

**Note:** Students may receive credit for only one of NURS. 818, CHEP 805, and PUBH. 805.

**PUBH. 806.3 — 1(1.5L‑1.5S)**

**Public Health Pathology**

Will introduce students to the biological and molecular basis of health so they are able to incorporate this knowledge into their practice of public health. The course is intended for those students in the Master of Public Health program who do not have training in one of the health sciences.

**PUBH. 807.3 — (35)**

**Health Program Planning and Evaluation**

Covers basic concepts and principles of the cycle of health program planning, which includes needs assessment, program development and implementation, process, impact, and outcome evaluation. Both qualitative and quantitative data collection will be addressed. Guest speakers, case studies, and assignments will link conceptual material with concrete applications.

**Formerly:** CHEP 807

**Prerequisite(s):** CHEP 804 or PUBH. 804 or permission of the instructor.

**Note(s):** Students with credit for CHEP 807 may not take this course for credit.

**PUBH. 808.3 — 1(3L)**

**Introduction to Health Care Management**

Meant to serve as an introduction to management for students in the School of Public Health with little or no management education or work experience. Students will learn management principles applied to health care systems; skills of critical reading; computational competence; and presentation and discussion skills at a graduate level. It will prepare them for more advanced classes in health management.

**Prerequisite(s):** Permission of the Master of Public Health Program.

**Restriction(s):** Registration in the College of Graduate Studies and Research

**PUBH. 809.3 — 1(1L‑1P‑1.5S)**

**Field Epidemiology**

Links the underlying theory to the practical application of epidemiological methods in the investigation and control of disease outbreaks. Case examples will be drawn from communicable and non-communicable diseases in both humans and animals.

**Formerly:** CHEP 809

**Prerequisite(s):** PUBH. 800 or equivalent.

**Note(s):** Students with credit for CHEP 809 may not take this course for credit.

**PUBH. 810.3 — (3L)**

**Environmental Public Health I**

This course is an introduction to and an overview of the key areas of environmental public health practice. Using the perspectives of the population and community, the course will cover factors associated with the development of environmental health problems. Students will gain an understanding of the interaction of individuals and communities with the environment, the potential impact on health of environmental agents, and specific applications of concepts of environmental public health practice.

**Note:** Students who received credit for AGMD. 801 in Spring and Summer of 2012 may not take this course for credit. Students taking this course in September of 2012 and beyond may receive credit for both AGMD. 801 and PUBH. 810.

**PUBH. 811.3 — 1/2(3L‑1.5T)**

**Biostatistics for Public Health II**

This course is a continuation of PUBH. 805.3 and includes several multivariate biostatistical methods and principles that are commonly used in public health research. The course topics include logistical regression, analysis of variance and covariance, experimental design and inference for Epidemiology, observational data analysis, categorical data analysis, person-time data analysis, and reliability. The course also introduces SAS programming as it applies to the course topics.

**Prerequisite:** PUBH. 805.3, CHEP 805.3, STAT. 845.3 or another graduate course in statistics and permission of the instructor.

**PUBH. 812.3 — 2(3L)**

**Emergency Management for Public Safety**

This course takes a One Health/All Hazards approach to health emergency management (encompassing risk analysis, preparedness, detection, response, and recovery). We will explore special considerations for disease outbreaks, natural disasters, and bioterrorism through scenario-based exercises. Students will have the opportunity to become certified in the Incident Command System (ICS. 100).

**PUBH. 832.3 — 1/2(2L‑1.5S)**

**Infectious Disease Epidemiology**

Lectures and exercises will provide an introduction to epidemiology of infectious disease including issues in diagnosis and surveillance, disease ecology and transmission, options for control, discussion of diseases important to public health, emerging diseases, and reporting.

**Formerly:** VTMC 832

**Prerequisite(s):** PUBH. 800.3 or equivalent and an introductory course in microbiology or by permission of the instructor.

**Note:** Students with credit for VTMC. 832 will not receive credit for PUBH. 832.

**PUBH. 840.3 — 1(3S)**

**Interdisciplinary Public Health Practice**

Designed to be the culminating experience for the MPH program. As such, it integrates content and theory of public health practice as experienced by students through previous course work and practice. It recognizes the 7 core competency domains in public health as defined by the Public Health Agency of Canada and provides opportunities for students to acquire skills in all these domains. The course is taught by a team of instructors comprised of faculty, public health practitioners and professionals, and uses interactive methods including case studies, seminars, and class presentations. Students register in the capstone course after completion of their practical (PUBH. 992.9)

**Prerequisite(s):** PUBH. 992, PUBH. 800, PUBH. 803, PUBH. 805, PUBH. 807, PUBH. 810.

**PUBH. 842.3 — 2.25L‑0.75P**

**Current Biostatistical Methods and Computer Applications**

Will introduce statistical methods commonly used by biostatisticians and their application in current research problems. The emphasis will be on the analysis of discrete outcomes and time-to-event data in observational and experimental designs. Class participants will develop skills in applying statistical models using existing software.

**Prerequisite(s):** PUBH. 805 or equivalent.

**PUBH. 843.3 — (1.5L‑1.5S)**

**Advanced Topics in Analytical Epidemiology Level III**

Introduces students to advanced epidemiological tools and analytical concepts including complex data management, exposure analysis, generalize linear mixed models, GEE, survival analysis, detection of clusters, spatial models, and Bayesian analysis. Emphasis is placed on the correct application and interpretation of techniques presented as they apply to observational epidemiology.

**Prerequisite(s):** PUBH. 846.3 and, either PUBH. 842.3 or CHEP 806.3, or by permission of the instructor.

**PUBH. 844.3 — (1.5L‑1.5S)**

**Chronic Disease Epidemiology**

An advanced course that examines the theory, methods and applications of epidemiology in chronic disease and health conditions. The course identifies conceptual approaches and methods in survey research, the use of administrative health data, biomarkers, and the control of bias. Students apply this foundational knowledge to the leading chronic health conditions through presentations and a critical review of research protocols.

**Prerequisite(s):** PUBH. 800.3 or equivalent.
PUBH. 845.3 — (1.5L-1.5S)  
Clinical Epidemiology  
Clinical epidemiology is the science of applying the best available research evidence to clinical care. This is an advanced course which emphasizes the principles and methods used in clinical decision analysis, screening and diagnostic testing, intervention studies, and the preparation of systemic reviews and clinical practice guidelines.  
Prerequisite(s): PUBH. 800.3 or equivalent.

PUBH. 846.3 — (2L-1T)  
Analytic Methods in Epidemiological Research Level II  
Will give students an advanced and comprehensive understanding of the principles of design and statistical analysis of epidemiologic research. Students will learn the strengths and weaknesses of established methods of epidemiologic research and will also achieve the ability to independently design, perform, analyse and critique observational health research.  
Prerequisite(s): Epidemiology for Public Health (PUBH. 800.3) or equivalent, Biostatistics for Public Health (PUBH. 803.3) or equivalent, Current Biostatistical Methods and Computer Applications (PUBH. 842.3)

PUBH. 847.3 — (2SL)  
Studies in Addictions  
An introduction to the study of addictions, with a specific focus on problematic alcohol and illicit drug use. Introduces students to concepts and debates in the addictions field concerning causes, consequences and interventions from four standpoints: the user, society/culture, service providers, and decision/policy makers.  
Prerequisite(s): Registration in the M.P.H. program or Departmental permission.

PUBH. 852.3 — (2SL)  
Comparative Health Systems  
Reviews the Canadian health system using a comparative approach with health systems in several other countries that have similar social economic characteristics and share similar values with Canada. Examines the organization, governance and financing; economics, public/private mix and system performance; health human resources and resource management; primary health care; pharmaceutical policy and public health strategies.

PUBH. 853.3  
Seminar in Health Care Organizational Regulation and Policy  
Explores management issues unique to health care organizations. It includes an examination of the regulation of health care organizations. Also covered are such topics as cost benefit/cost-effectiveness/ cost-efficiency analysis, managerial accounting as it relates to the health care environment, health care finance and the management of case mix systems.

PUBH. 861.3 — (2SL)  
Health Post Secondary Education and Social Programs Funding Structure and Reform  
The course will establish the foundations for the current funding of health care, post-secondary education and Canadian social programs. The course will also consider the main elements of a budget. The major for the class will involve students working together to compile a provincial budget. Every province faces the same budgetary challenge: how continue to fund the rapidly increasing costs of health care while at the same time maintaining the quality of other programs and services.  
Prerequisite(s): PUBH. 867 or departmental permission.  
Restriction(s): Restricted to students in the College of Graduate Studies and Research  
Note: Students with credit for JSGS. 861 may not take this course for credit.

PUBH. 864.3 — (2SL)  
Health Care Ethics and Law  
Provides a brief overview of the Canadian legal system and the legal framework for health care, including the regulation of health professions. It will discuss legal aspects of the relationship between patients and health care providers, such as negligence, informed consent, and confidentiality. Ethical issues that arise in health care will be explored in both a theoretical and practical context.

PUBH. 867.3 — (2SL)  
Health Policy and Politics  
Deals with program and service planning for health care at the institutional, community, regional and provincial, national and international levels. The course takes a macro approach to broad health policy and planning goals and follows these policies through to the level of institutional implementation. Policy analysis is an important component and much class time is spent analysing real life policy documents.

PUBH. 898.3  
Special Topics  
Offered occasionally by visiting faculty and in other special situations. Students interested in these courses should contact the department for more information.

PUBH. 899.6  
Special Topics  
Offered occasionally by visiting faculty and in other special situations. Students interested in these courses should contact the department for more information.

PUBH. 990.0 — 1and2(S)  
Public Health Seminar  
This non-credit course will expose students to important and timely issues in public health and current methods used to examine research questions relevant to public health. The class will feature seminars in public health, epidemiology, vaccinology and immunotherapeutics, global health, and health serves research.  
Note: All MPH and Epidemiology students must register in both the fall and winter terms for this course.

PUBH. 992.6 — SP(3SP)  
Public Health Practicum  
Public health practice is a central feature of the MPH degree. The practicum provides the opportunity to integrate classroom learning with practice in a public health work environment. Working in a partner agency in the community, the student addresses a public health problem while developing personal confidence and skills as a public health professional.  
Prerequisite(s): CHEP. 800 or PUBH. 800, PUBH. 803, CHEP. 805 or PUBH. 805, PUBH. 867, AGMD. 801 or PUBH. 810.

PUBH. 994  
Research  
Students writing a Master’s of Public Health thesis in the MPH-S program must register for this course.  
Restriction(s): Students must be registered in the MPH-S program in order to register in this course.

PUBH. 996  
PhD Research in Epidemiology  
Students enrolled in the PhD Program in Epidemiology who are writing a thesis must register in this course.  
Restriction(s): Must be enrolled in the PhD program in Epidemiology.

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**RLST — RELIGIOUS STUDIES**

**Department of Religion and Culture**

**RLST. 801.3 — (3S)**  
Seminar in Jewish and Christian Origins  
A seminar focusing on select issues relevant to the critical study of the origins and development of Judaism and Christianity.  
Restriction(s): Restricted to Graduate Students.

**RLST. 802.3 — (3S)**  
Seminar in Western Religious History  
A seminar focusing on select issues relevant to the history of western religious traditions, such as the origins and development of sectarian groups, the study of key figures and movements in the history of western religions, or the historical context of developments in western religions.  
Restriction(s): Restricted to Graduate Students.

**RLST. 803.3 — (3S)**  
Seminar in Western Religious Literature  
A seminar focusing on select texts from the western religious history, such as early Jewish/Christian apocalyptic writings, Jewish midrashim, or contemporary Islamic writings.  
Restriction(s): Restricted to Graduate Students.

**RLST. 804.3 — (3S)**  
Seminar in Western Religious Thought  
This seminar will investigate the work of a select group of Western thinkers and their reflections on the relationship between hermeneutics, culture, and religiosity. The seminar will focus on hermeneutical questions, questions of cultural studies, and/or issues of theological anthropology.  
Restriction(s): Restricted to Graduate Students.
RLST. 805.3 — (3S)
Issues in Contemporary Western Religions
A seminar focusing on select issues relevant to contemporary western religions, such as the relationship between religion and culture, religion and leadership, and religion and social trends.
Restriction(s): Restricted to Graduate Students.

RLST. 821.3 — (3S)
Seminar in Eastern Religious History
This seminar offers a critical study of the role of religion in Asian cultural history. The seminar gives attention to the analysis of historical contexts, the evolution of religious doctrines, and the influence of religious values and institutions on social, political and economic systems.
Restriction(s): Restricted to Graduate Students.

RLST. 822.3 — (3S)
Seminar in Eastern Religious Literature
This seminar will examine selected textual materials from one or more of the Asian religions. Issues surrounding form, content and interpretation will be studied in relation to the text's role and purpose(s) in contextual environments.
Restriction(s): Restricted to Graduate Students.

RLST. 823.3 — (3S)
Seminar in Eastern Religious Thought
This seminar will investigate a body of Eastern religious and philosophical thought with reflection on the relationship between hermeneutics, culture, and religiosity. The seminar will focus on hermeneutical questions, questions of cultural studies, and/or ontological issues.
Restriction(s): Restricted to Graduate Students.

RLST. 824.3 — (3S)
Seminar in Eastern Religions and Society
This seminar explores the interaction between religion and society in modern Asia. Through the course the students will assess popular religious practices within their respective historical and religious contexts.
Restriction(s): Restricted to Graduate Students.

RLST. 825.3 — (3S)
Issues in Contemporary Eastern Religions
A critical examination of important contemporary developments in Eastern Religions and including new religious movements, environmental issues, developments of religious fundamentalism and religious right, issues of gender and equality.
Restriction(s): Restricted to Graduate Students.

RLST. 898.3
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

RLST. 899.0
Seminar
The graduate seminar involves paper presentations and discussions of issues in research methodology arising from current research by graduate students, department and cognate faculty, and visiting scholars. Graduate students must register in and attend the seminar on a continuous basis for the residency period, and will receive credit when they have successfully presented a seminar.
Restriction(s): Open only to graduate level students in Religion and Culture.
Note: This course is a mandatory component of a graduate degree in Religion and Culture.

RLST. 994
Research
Students writing a Master's thesis must register for this course.

SCP — SCHOOL AND COUNSELLING PSYCH

SCP. 810.3 — (3L)
Ethics in Counselling and School Psychology
Addresses ethical issues in school and counselling psychology as related to practice, research, and teaching. The course assists students in preparing to meet the requirements for licensure in psychology.

SCP. 811.3 — (3L)
Psychopathology Assessing Developmental Risk
Focuses on those variables that increase the vulnerability of children and youth to psychopathology and on the ways in which protective factors combine and interact to promote resilience.

SCP. 812.3 — (3L-3P)
Assessment of Intelligence and Cognitive Abilities
Focuses on an in-depth and critical study of intelligence, as well as the acquisition of assessment skills as they relate to both understanding and assessing psychopathology and wellness.

SCP. 813.3
Academic Achievement and Language Assessment and Intervention
Designed to provide students with a basic knowledge of the assessment of academic achievement, language development and the psychological processes that enhance academic performance. Emphasis is placed on early identification, formal and informal assessment procedures, and intervention design.
Prerequisite(s): Completion of Term 1 of the Master's program in School and Counselling Psychology, including SCP 811 and 812.

SCP. 814.3 — (1L-3P)
Individual Interventions
Explores human change theories and the application of corresponding interventions within the practice of school and counselling psychology.
Prerequisite(s): EPSE. 417 and enrolment in the School and Counselling Psychology program.

SCP. 815.3 — (3L)
Family Interventions
Based in a risk and resiliency perspective, this course will provide a balanced presentation of family systems theory, research, and practice for graduate students preparing to work with families in both school and community settings.
Prerequisite(s): SCP 812 and enrolment in the School and Counselling Psychology program.

SCP. 816.3 — 1/2(2L/1P)
Group Interventions in Schools and Communities
Provides students with the understanding of group dynamics and the development of group process and the competencies to facilitate both process and psychoeducational groups.
Prerequisite(s): SCP 812 and admission to the Master's program in School and Counselling Psychology.

SCP. 817.3 — (3L)
Career and Transition Planning
Explores the systemic nature of career within the context of demographic, labour market, and global economic trends. The primary objective is to develop the understandings and competencies required to provide career services, from a resiliency/wellness perspective, to a wide range of clients.
Prerequisite(s): Enrolment in the Master's program in School and Counselling Psychology or permission of the instructor.

SCP. 818.3
Practicum I
Under the supervision of faculty members working in coordinated teams, students provide integrated school and counselling psychology services to children and youth in a university clinic setting.
Prerequisite(s): Completion of year 1 of the Master's program in School and Counselling Psychology.

SCP. 819.3
Practicum II
Under the direct and regular supervision of school and agency-based psychologists and therapists in consultation with faculty, students provide school and/or counselling psychology services to children and youth.
Prerequisite(s): Successful completion of SCP 818 and admission to the Master's program in School and Counselling.

SCP. 898.3
Special Topics
Topics for individual study are selected by the student in consultation with a faculty advisor. The study may take the form of an extensive report or a project which is evaluated by the faculty member. The area must be one which is not covered by an existing graduate course.
Prerequisite(s): Permission of instructor and head of department.

SCP. 899
Special Topics
Offered occasionally by visiting faculty and in other special situations to cover, in depth, topics that are not thoroughly covered in regularly offered courses.
SCP. 990
Professional Identity Seminar
This seminar, which occurs during the first three weeks of year 1, Term 1 and involves a set of classroom and community experience, introduces each new cohort of students to the profession of Psychology and the practice of School and Counselling Psychology.
Prerequisite(s): Admission to the Master’s program in School and Counselling Psychology.

SCP. 991
Professional Practice Seminar
Provides a forum in which students are supported in their practicum placements through team collaboration and supervision and in which they benefit from the experiences of their colleagues in a variety of practice settings.
Prerequisite(s): Completion of Year 1 of the Master’s program in School and Counselling Psychology.
Corequisite(s): SCP 818 and 819

SCP. 994
Research
A student undertaking research leading to a Master’s thesis must register in this course each year until the thesis is completed. This applies to thesis work done extramurally as well as intramurally.
Prerequisite(s): Admission to the Master’s program in School and Counselling Psychology.

SCP. 996.0
Research
A student undertaking research leading to a Ph.D. thesis must register for this course each year until the thesis is completed.

SLSC — SOIL SCIENCE

Department of Soil Science

SLSC. 802
Experimental Topics in Soil Science
Allows tutorial, reading and research in a specific area of Soil Science other than the thesis project. The student working under faculty guidance may perform specific experiments and write their data in the format of a published paper. Enrolment permitted with the approval of the Chair and the instructor concerned.

SLSC. 803.3 — 1and2(2L-4P)
Research Approaches in Soil Element Biogeochemistry
The theory and application of instrumental measurement techniques to the study of soil. Measurement of gases and water, elemental composition, and characterization of microbial, humic and mineral constituents using advanced instrumentation are covered in the form of modules given over two terms.

SLSC. 810.3 — 2(3L-2T)
Agricultural Production Systems
The goal of this course is to provide the student with an overview of the scientific basis of agricultural production systems and a thorough understanding of the application of these scientific principles to plant production in western Canada. The emphasis is on plant production system including forage production. The course includes a large component of independent research using current on-line resources and decision support software used in crop and soil planning.
Permission of the department is required.
Restriction(s): This course is a required course in the Aboriginal Agriculture and Land Management P.G.D. and an open elective for other graduate programs in the college.

SLSC. 812.3 — 1(3L)
Plant Root System and Nutrient Uptake
Principles of nutrient movement in soils and absorption by plant roots. Examines root sampling and measurement techniques, with possible afternoon field trip, weather permitting. Considers ways of expressing soil and plant factors and mechanisms of nutrient movement and uptake quantitatively, and identifies parameters needed to mathematically model nutrient uptake. Simulation models for nutrient uptake will be utilized.

SLSC. 813.3 — 1(3L)
Soil Chemistry
A general graduate course that discusses chemical reactions in the soil solution and at the soil/water interface. Fundamentals of surface charge, solution speciation, absorption, precipitation, and redox chemistry are covered. Case studies and current research projects are used to reinforce fundamental concepts and show their relevance to environmental issues.
Prerequisite(s): One of the following: an undergraduate degree in chemistry, an undergraduate course in soil chemistry, an undergraduate course in aqueous geochemistry, or permission of the instructor.

SLSC. 816.3 — 1(3L)
Soil Organic Matters
An advanced study of soil organic matter and the factors influencing organic matter development and stabilization. Current research topics, including the impact of a changing environment on soil organic matter and the role of soil organic matter in soil quality development, will be emphasized.

SLSC. 817.3 — 1(3L)
Soil Organic Chemistry
Lectures and reading on recent advances in soil organic chemistry. Discussions of transformations of plant nutrients and soil humic compounds by microorganisms in soil, microbial growth, and plant-microbe interactions.
Prerequisite(s): Permission of Instructor.

SLSC. 818.3 — 1(3L)
Soil Physics
The physical principles involved in water and solute/contaminant transport in soils. Examination of a variety of current methods for determination of soil hydraulic and transport properties. Influence of spatial variability in soil hydraulic properties on water and chemical transport in soils. Practical applications of these principles and measurement methods in agricultural, hydrological and environmental sciences.

SLSC. 834.3 — 1(2L)
Field Studies of Saskatchewan Soils
Provides students with in-depth training in the classification and interpretation of the major soils of Saskatchewan. The course involves extensive field work followed by coverage of key concepts in lecture and seminars.
Prerequisite(s): Soil genesis or surficial geology course or permission of Instructor.
Note: There are additional non-refundable costs in addition to tuition fees.

SLSC. 841.3 — 2(3L)
Biochemistry of Soil
Lectures and laboratory studies on recent advances in soil biochemistry. A discussion of the nature and activity of enzymes in soil and their influence on the cycling of organic matter and other nutrient elements. Of particular interest is the relationship between biochemical processes and soil quality and fertility.

SLSC. 842.3 — 2(3L)
Soil Microbiology
Lectures and reading on recent advances in soil microbiology. Discussions of transformations of plant nutrients and soil humic compounds by microorganisms in soil, microbial growth, and plant-microbe interactions.

SLSC. 843.3 — 1(3L)
Soil Nitrogen in the Environment
An advanced study of organic and inorganic nitrogen (N) in soils and the impact of soil N on the environment. The soil N-cycle will be examined and biological and chemical transformations will be studied with an emphasis on research techniques used to detect and monitor soil N and soil N transformations.
Prerequisite(s): Permission of Instructor.

SLSC. 898.3 — 1and2(3S)
Special Topics
Special Topics
Provides for a program of reading and discussion under faculty guidance. Students will prepare a series of essays in an area of concentration different from that of their thesis. Enrolment permitted with the approval of the Chair of the department and the instructor concerned.

SLSC. 899.6
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.
SOC. 992.0 — Project
Students undertaking the project Master’s degree (M.Agr.) must complete this course as part of the requirements for the degree.

SLSC. 994 — Research
Students writing a M.Sc. thesis must register for this course.

SLSC. 996 — Research
Students writing a Ph.D. thesis must register for this course.

SOC — SOCIOLOGY

Department of Sociology

SOC. 802.3 — 1/2(3S) or 1and2(1.5S)
Advanced Seminar in Sociology of Agriculture
Theoretical and research approaches to the political and social economy of agriculture. Emphasis is given to contemporary works on agro-industrial reorganization, agro-food technology, sustainability, state intervention, international trade, aid, and agrarian reform.

SOC. 809.3 — 1/2(3S) or 1and2(1.5S)
Sociology of Development
Review of present theories of development. Emphasis will be on the search for missing variables in theories of development produced by western social scientists. Considers development as a function of mobilization of resources and commitment of local people to the process of social change.

SOC. 811.3 — 1/2(3S) or 1and2(1.5S)
Family II Marriage
Study and discussion of the recent developments in research and theory in selected aspects of the area of marriage and the family behaviour.

SOC. 812.3 — 1/2(3S) or 1and2(1.5S)
Advanced Seminar in Ethnic Relations
Theoretical aspects of interethnic processes; comparative analysis of empirical research on ethnic minorities within Canada and selected other societies.

SOC. 813.3 — 1/2(3S) or 1and2(1.5S)
Seminar in Sociology of Religion
Advanced Seminar in Sociological Theories of Religious Behaviour.

SOC. 815.3 — 1/2(3S) or 1and2(1.5S)
Selected Problems in Social Control
Classical and contemporary theoretical debates on issues of social control with a specific focus in judicial and therapeutic forms of control.

SOC. 818.3 — 1/2(3S) or 1and2(1.5S)
Advanced Seminar in Criminology
An in-depth examination of historical developments leading to contemporary criminological discourse in Western societies. An analysis and critique of theory and method which characterizes different schools of criminological inquiry and their relationship to research in an international context.

SOC. 820.3 — 1/2(3S) or 1and2(1.5S)
Medical Sociology
Comparative study of Health-Care Systems, Medical Institutions, and the relationships between Medical and Allied Health Professions, Society, the State, and the delivery of health-care.

SOC. 821.3 — 1/2(3L)
Advanced Interpretive Studies in Health
Will focus on interpretive studies of health and illness, with an emphasis on understanding social structure and theory vs embodied experiences situated in everyday life. Reflexivescholarship will be a central area of inquiry.

SOC. 826.3 — 1/2(3S)
Advanced Seminar in Social Policy
The formulation, development, management and impact of social policies. Includes analysis and evaluation of social policies in income security, social services, employment, housing and other areas concerned.

SOC. 829.3 — 1/2(3L)
Advanced Studies in Gender and Health
Selected issues emerging from sociology of gender and sociology of health and illness. Building from an introduction and overview of key issues related to gender and health, as well as a discussion of sociological theory and methodology pertaining to these domains, in-depth focus will follow on selected topics related to gender and health.

SOC. 830.3 — 1/2(3S)
Sociology of Science and Knowledge
The social conditions and consequences of the production, distribution and consumption of scientific and other forms of knowledge are examined in this course. Deploying classical and contemporary theories, specific institutional settings and ongoing debates over concepts and issues such as knowledge society, indigenous knowledge, corporatization of the university, gendered knowledge etc. are critically examined.

SOC. 840.6 — 1and2(3S)
Advanced Theory
Recent developments, current trends, and future prospects in sociological theory. Also introduction to formalization of theory; survey of evaluative criteria in Theory Building and methodological problems involved in this process.

SOC. 841.6 — 1and2(3S)
Advanced Methodology
An advanced review of the logic, concepts and components of scientific research designs and methods and to quantitative statistical methods for the analysis and interpretation of sociological data.

SOC. 891.3 — 1/2(3S) or 1and2(1.5S)
Theory and Method of Social Analysis
An advanced seminar which integrates theory and method in social analysis. Various types of social analysis will be discussed, including theory driven research, policy research, action oriented research and evaluation research. The focus is to develop sound analytical frameworks in conducting social analysis and in assessing research results. Students will develop a theoretically-grounded research problem on the basis of an existing body of literature, design a method, and obtain and analyze data.

SOC. 898.3 — 1/2(3S) or 1and2(1.5S)
Special Topics
Concentrated reading in special areas of sociology culminating in a written report. Area of concentration must be different from regularly scheduled courses.

SOC. 910.0 — 1and2
Research Internship (China)
Full-time formal or practical contributions to a research program in an unfamiliar environment. Students in dual M.A. in Globalization and Development will register for this course in lieu of SOC. 994 during required terms in China.

Prerequisite(s): Restricted to students registered in the Dual M.A. in Globalization and Development (University of Saskatchewan and Xi’an Jiaotong University).

SOC. 990 — Seminar
The seminar involves presentations of papers and discussion by graduate students, department and cognate faculty, and visiting scholars. Each graduate student must register in and attend the seminar on a continuous basis, receiving credit when they have successfully presented a seminar.

SOC. 992.0 — Project
A research paper on a topic approved by the candidate’s Advisory Committee is required. The paper should be concerned with discussing a meaningful sociological question and may be empirical in nature, a critical review of the literature or a critical analysis of a substantive problem. The paper will be supervised and evaluated by the Advisory Committee.

Prerequisite(s): Restricted to students registered in the project option.
STAT. 845.3 — 1/2(3L)
Statistical Methods for Research
Statistical methods as they apply to scientific research, including: Experimental design, blocking and confounding, analysis of multifactor experiments, multiple regression and model building.
Prerequisite(s): STAT. 242 or 245 or permission of the department.

STAT. 846.3 — 1/2(3L)
Special Topics in Probability and Statistics
Topics will be related to recent developments in statistics and probability (multivariate statistics, time series, experimental design, non-parametric statistics, etc.) of interest to the instructor and students.
Note: Students may take this course more than once for credit; provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

STAT. 848.3 — 1/2(3L)
Multivariate Data Analysis
Prerequisite(s): COMM. 395, STAT. 345 and STAT. 845 or permission of the department.

STAT. 850.3 — 1/3L-1S
Mathematical Statistics and Inference
An overview of mathematical methods used in theoretical statistics with particular emphasis on inference. Will cover general probability distributions, generating functions, limit theorems, likelihood concepts, exponential families, decision theory, Bayesian and frequentist paradigms for estimation and testing, asymptotic theory.
Prerequisite(s): Undergraduate courses in mathematical statistics and inference, such as STAT. 342 and STAT. 442.

STAT. 851.3 — 1/2(3L-1S)
Linear Models
A rigorous development of the general linear model, using vector space theory. Generalized inverses, orthogonal projections, quadratic forms, Gauss-Markov theorem, estimability.
Prerequisite(s): An undergraduate course in mathematical statistics (STAT. 342), linear algebra (MATH. 266), and STAT. 344 or 345.

STAT. 898.3
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

STAT. 899.6
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

SYNC — SYNCHROTRON SCIENCES

SYNC. 801.3 — 2(3L)
Introduction to Health Research Using Synchrotron Techniques
Provides a broad overview of major synchrotron-based health research techniques with reference to Canadian Light Source facilities. Techniques covered include biomedical imaging, X-ray fluorescence imaging, macromolecular crystallography and X-ray absorption spectroscopy. Gives students information on strengths, limitations and applicability of each technique. Health research case studies are integrated.
Instructor approval is required.

SYNC. 898.3
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.
TOX — TOXICOLOGY

Department of Toxicology Graduate Program

TOX. 810.3 — 1/2(3L)
Radiation and Radionuclide Toxicology
Describes the basic properties of ionizing radiation, the interaction of radiation with matter, radiation detection, units and dosimetry. Discusses the natural radiation environment, radioactivity and its distribution and accumulation by chemical and biological processes. Presents the biological effects of radiation, particularly carcinogenesis, both at the epidemiological and molecular level.
Prerequisite(s): Minimum of one university-level course in any four of physics, chemistry, microbiology, statistics, cell biology, or ecology.

TOX. 820.3 — 1/2(3L)
Advanced Multimedia Environmental Fate Models
Students will gain a detailed understanding of multi-media (water, soil, atmosphere) environmental fate models and hands-on use of current fugacity models. Topics covered include the incorporation of snow, environmental feedback, and bioaccumulation assessments into environmental fugacity fate models. Students will develop a detailed environmental fate model of an inorganic and organic compound of interest to them.

TOX. 821.3 — 1(5L)
Human Health Chemical Risk Assessment
Human health risk assessment is now playing a major role in the environmental management of chemicals, from both operational and regulatory perspectives. The overall objective of this course is to provide the basic knowledge to conduct, evaluate and interpret human health risk assessment of chemicals present in the natural and built environments.

TOX. 840.3 — 2(3L)
Wildlife Toxicology and Ecological Risk Assessment
Provides students with an understanding of the processes that control the movement of organic and inorganic contaminants in the atmosphere, hydrosphere and lithosphere and will also provide an understanding of the methods used to monitor environmental behavior of potentially toxic contaminants in biotic and abiotic matrices.
Prerequisite(s): One course in ecology or environmental biology and one course in general or environmental chemistry, or permission of the instructor and student's advisor/advisory committee.

TOX. 843.3 — 2(3L)
Environmental Chemodynamics
Provides students with an understanding of the processes that control the movement of organic and inorganic contaminants in the atmosphere, hydrosphere and lithosphere and will also provide an understanding of the methods used to monitor environmental behavior of potentially toxic contaminants in biotic and abiotic matrices.

TOX. 844.3 — 1/2(3L)
Toxicology Techniques
Provides theoretical background and hands-on experience in methods and techniques typically applied by toxicology professionals in academia, industry, and government. It is a modular course that covers a broad spectrum of procedures, ranging from proper handling of field equipment to biological test methods and analytical processing of samples.
Permission of course coordinator required.
Prerequisite(s): Successful completion of Laboratory Safety course and GSR. 962.

TOX. 850.3 — 1(3L-2P)
Aquatic Toxicology
A comprehensive overview of the technical aspects of predicting, monitoring, and evaluating the effects of toxic substances in aquatic systems. The class will cover levels of biological organization from sub-cellular to ecosystem. It is designed as an in-depth coverage of aquatic toxicology for students pursuing graduate degrees in the aquatic sciences. Students will be exposed to materials that will be useful in setting exposure standards and assessing hazards to aquatic ecosystems due to point or non-point releases of toxic substances.
Prerequisite(s): Permission of the instructor.

TOX. 860.3 — 1and2(1L-S/T)
Applied Toxicology
Provides students an opportunity to evaluate practical problems associated with various aspects of biomedical and veterinary toxicology. Students will be presented with specific toxicological questions or concerns which will be examined outside the classroom using research data and scientific literature.
Prerequisite(s): Registration in the Toxicology Graduate Program or permission of the instructor.
Note: Recommended additional credit units in TOX.

TOX. 898.3
Special Topics
Offered occasionally by existing and visiting faculty, and in other special situations to cover, in depth, topics that are not thoroughly covered in regularly offered courses.

TOX. 990
Seminar
Weekly seminars presented by graduate students and invited speakers. Graduate students are required to attend and to present seminars.

TOX. 994
Research
Students writing a Master's thesis must register for this course.

TOX. 996
Research
Students writing a Ph.D. thesis must register for this course.

UKR — UKRAINIAN

Department of Lang, Lit and Cultural Studies

UKR. 899.6
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

VACC — VACCINE AND IMMUNOTHERAPEUTICS

Department of SPH Executive Director Office

VACC. 801.3 — 1(3L)
A Multidisciplinary Approach to Vaccinology and Immunotherapeutics
Provides an introduction to the scientific basis of vaccination, the pathobiology of infectious diseases, vaccine manufacturing, production and commercialization, as well as socio-ethical aspects of vaccines such as risk perception and public acceptance. Other topics will include legal issues such as intellectual property law, public health aspects of vaccines, national and international immunization programs and the use of vaccines in disease outbreaks. The course will be taught by recognized experts in the field with guest lectures given by experts from both industry and regulatory authorities.
Prerequisite(s): Admission to the College of Graduate Studies and Research and permission of the School of Public Health.

VACC. 990.0
Seminars in Vaccinology and Immunotherapeutics
A required, non-credit seminar-based course where the seminar topics will cover the broad range of vaccinology and immunotherapeutics topics. Invited speakers will present as well as graduate students. Graduate students will be required to present one seminar per year on their research and attend and participate in the Vaccinology and Immunotherapeutics Seminar Series throughout the year. Guest lecturers and special workshops designed to train students in good laboratory practices, good manufacturing practices, and intellectual property management, etc. will be a component of the seminar program. Yearly registration throughout the entire graduate program is required.
Prerequisite(s): Admission to the College of Graduate Studies and Research and permission of the School of Public Health.
VACC. 994.0  
Research  
Students registered in a Master's thesis program must register for this course annually throughout their entire M.Sc. graduate program.  
Prerequisite(s): Admission to the College of Graduate Studies and Research and permission of the School of Public Health.

VACC. 996.0  
Research  
Students registered in Ph.D. dissertation program must register for this course annually throughout their entire Ph.D. research graduate program.  
Prerequisite(s): Admission to the College of Graduate Studies and Research and permission of the School of Public Health.

**VBMS — VETERINARY BIOMEDICAL SCIENCES**

Department of Veterinary Biomedical Sciences

**VBMS. 821.3 — 1/2(4T)**  
Ultrasound Cytology  
A survey of cytoarchitecture drawing heavily on examples from mammalian species. Emphasis will be on interpretation of electron micrographs, but technical problems will also be considered. Students will be encouraged to present their own micrographs for discussion.  
Prerequisite(s): Permission of the instructor.

**VBMS. 827.3 — 2(2L‑4P)**  
Advanced Neurophysiology  
An advanced lecture and laboratory course in neurophysiology with special emphasis on current methods of investigation utilized in this field.

**VBMS. 828.3 — 1(3L)**  
Gastrointestinal Physiology  
Provides an in-depth coverage of monogastric gastrointestinal physiology, stressing those aspects related to the understanding of gastroenteric disease.

**VBMS. 830.3 — 1(3L)**  
Physiology and Endocrinology of Reproduction in Mammals  
Topics will be hormones of reproduction, sexual differentiation and maturation, physiology and endocrinology of male reproductive system, reproductive cyclicity in the female, gestation and parturition, reproductive behaviour, and the seasonality of reproductive activity.

**VBMS. 833.3 — 1/2(3L‑15)**  
Subclinical Toxicology  
Discusses subclinical manifestations to toxic agents. The emphasis will be on immunological and behavioral alterations produced by a variety of chemical agents. Animal models and testing methods used to evaluate the effects will be discussed, along with various public health considerations and significance.  
Prerequisite(s): VBMS. 836 and PSY. 110 or permission of the instructor.

**VBMS. 838.3 — 1/2(3P)**  
Research Techniques in Endocrinology and Reproduction I  
An advanced course in research techniques in the field of endocrinology and reproduction. Students will spend time in three different research laboratories learning techniques of value to their research work and future career. The course aims to diversify and strengthen the student's preparation in modern research approaches.  
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

**VBMS. 839.6 — 1and2(3P)**  
Research Techniques in Endocrinology and Reproduction II  
An advanced course in research techniques in the field of endocrinology and reproduction. Students will spend time in six different research laboratories learning techniques of value to their research work and future career. The course aims to diversify and strengthen the student's preparation in modern research approaches.  
Note: Students may take this course more than once for credit, provided the topic covered in each offering differs substantially. Students must consult the Department to ensure that the topics covered are different.

**VBMS. 840.3 — 2(3L)**  
Vascular Biology and Toxicology  
Examines the physiology of the blood vessels at the tissue, cellular and molecular level. The interaction of blood vessels with blood, the pathophysiology of common vascular diseases, and the effect of toxicants on the circulation are discussed.  
Formerly: VBMS. 898.

**VBMS. 850.3 — 1/2(3L)**  
Lung Cell and Molecular Biology  
Designed for in-depth study of lung morphology and physiology as well as mechanisms of lung inflammation.  
Formerly: VBMS. 898.

**VBMS. 851.3 — 1/2(3L)**  
Inflammation and Repair  
This advanced course provides the latest concepts and advances in cell and molecular mechanisms of inflammation and subsequent repair.

**VBMS. 855.3**  
Integrative Cardiovascular Physiology and Toxicology  
The objectives of this course are to first examine multi-organ integration in the control of cardiovascular physiology. Specifically, ventricular/arterial coupling as well as how cardiac, pulmonary, renal, endocrine and/or neural systems integrate with cardiovascular responses for homeostatic control of blood pressure will be examined. This course will also explore how these homeostatic mechanisms are altered in pathological processes associated with major human diseases and toxic agents encountered by humans.  
Note: VBMS. 840 is suggested as a prerequisite, but not required.

**VBMS. 880.3 — (3L‑2P)**  
Experimental Design and Statistical Analysis for the Natural Sciences  
This course is designed to provide students with a working knowledge of experimental design, data analysis and data reporting. The course will cover major univariate parametric and non-parametric tools, including more complex ANOVA designs (nested, repeated-measures, ANCOVAs), as well as a few multivariate ones (MANOVA, PCA).  
Prerequisite(s): Any undergraduate statistics course.

**VBMS. 898.3 — 1/2(35)**  
Special Problems in Veterinary Biomedical Sciences  
Study of a special topic in the biomedical sciences for which no formal course exists and pertinent to the candidate and their goals. This is general enough to cover the goals of the old courses from the two old departments.

**VBMS. 899.6 — 1and2(35)**  
Special Topics  
Study of a special topic in the biomedical sciences for which no formal course exists and pertinent to the candidate and their goals. This is general enough to cover the goals of the old courses from the two old departments.

**VBMS. 990**  
Seminar  
Graduate students in the department are required to attend and participate. The staff and visiting scientists also contribute to the course. Interested undergraduates may be invited to attend and participate.

**VBMS. 992.0**  
Project  
Students undertaking the project Master's degree (M.Vet.Sc.) must register in this course.

**VBMS. 994**  
Research  
Students writing a Master's thesis must register for this course.

**VBMS. 996**  
Research  
Students writing a Ph.D. thesis must register for this course.
VLAC — LARGE ANIMAL CLINICAL SCIENCES

Department of Large Animal Clinical Sciences

VLAC. 801.3 — 1/2(1L-1S)and1and2and3(2P)
Principles of Embryo Transfer
Covers background information on embryo transfer with special emphasis on bovine embryo transfer. Specialized techniques e.g. embryo freezing, sexing, and splitting will be reviewed and in some cases form parts of laboratory exercises. Laboratory exercises will be conducted primarily on cattle. These will include superovulation, artificial insemination, embryo collection and transfer, and embryo handling techniques. Designed to provide the student with sufficient knowledge and laboratory experience to conduct the entire procedure in one species.
Prerequisite(s): Permission of the instructor.

VLAC. 803.6 — 1/2(8P, 4 weeks)
Special Field Experiences
Total immersion in the area of study pertinent to the graduate student. A complete report is required and should come from a daily log of activities and be organized from a protocol set up by the student’s advisory committee prior to going out on this experience.

VLAC. 808.3
Introduction to Veterinary Epidemiology
This course will introduce students to the concepts and basic methods of epidemiology used to evaluate the distribution and determinants of disease and health interventions. The course will have a specific focus on epidemiology, as it pertains to animal health issues.
Note: Students with credit for PUBH. 800 or CHEP. 800 will not receive credit for this course.

VLAC. 840.3 — 2(3L)
Zoonoses and Food Safety
Will focus on the characterization and distribution of diseases common to animals and man. A selection of important zoonoses and food safety issues will be specifically covered with an emphasis on the principles of zoonotic disease transmission and control, risk factors to humans, and surveillance methods.

VLAC. 851.6 — 1and2(2.5S)
Advanced Equine Surgery I
The anatomy, pathophysiology and surgery of the equine species will be studied with respect to the basic principles of wound healing, tissue response to trauma and the related physiologic responses. Regular seminars based on current literature reviews of selected topics will be required of candidates. Weekly case-based discussions will be used to bridge from the classroom to the clinical patient. Advanced equine surgery I will focus on general surgery in the horse.

VLAC. 852.6 — 1and2(2.5S)
Advanced Equine Surgery II
The anatomy, pathophysiology and surgery of the equine species will be studied with respect to the basic principles of wound healing, tissue response to trauma and the related physiologic responses. Regular seminars based on current literature reviews of selected topics will be required of candidates. Weekly case-based discussions will be used to bridge from the classroom to the clinical patient. Advanced Equine Surgery II will focus on orthopedic conditions of the horse.

VLAC. 853.6 — 1and2(2.5S)
Advanced Equine Surgery III
The anatomy, pathophysiology and surgery of the equine species will be studied with respect to the basic principles of wound healing, tissue response to trauma and the related physiologic responses. Regular seminars based on current literature reviews of selected topics will be required of candidates. Weekly case-based discussions will be used to bridge from the classroom to the clinical patient. Advanced Equine Surgery III will focus on orthopedic conditions of the horse.

VLAC. 860.3 — 1/2(L-P)
Advanced Equine Reproduction
Consists of lectures, laboratories and seminars on equine reproduction. Candidates will attend lectures and present seminars on selected topics covering reproductive biology of the brood mare and stallion, reproductive diseases and management of brood mare farms. Laboratories include demonstrations of assisted reproductive procedures and practical techniques.
Prerequisite(s): VLAC. 460 or equivalent and permission of the instructor.

VLAC. 861.3 — 1/2(R-P)
Advanced Bovine Reproduction
Clinical aspects of male and female breeding soundness evaluation. Laboratory exercises in embryo transfer, and semenology.
Prerequisite(s): VLAC. 460 or equivalent and permission of the instructor.

VLAC. 872.6 — 1and2(1S-1R)
Advanced Bovine Medicine
The clinical aspects of diseases of cattle in Canada. Reading and Study assignments of cattle diseases on a systems basis. Candidates required to critically discuss current literature on the subject and offer weekly seminars with emphasis given to clinical case presentations.

VLAC. 874.6 — 1and2(1L-1S)
Advanced Equine Medicine
Lectures and seminars on equine medicine. Each candidate will prepare and present a critical review of the current literature on selected medical diseases of the horse. The emphasis will be on the common medical diseases of horses in North America plus those exotic diseases which pose a threat to the horse industry. Weekly seminars will be given by the candidates with emphasis on clinical case presentations.

VLAC. 878.3 — 1/2(2L-1S-2P)
Spermatology
An advanced course in normal and abnormal spermatogenesis and spermatology with emphasis on the bovine species. It includes prenatal and postnatal development of the testis, pubertal changes, detailed study of the cycle of the seminiferous epithelium, semen collection, evaluation and cryopreservation.
Prerequisite(s): Permission of the instructor.

VLAC. 881.3 — 1/2(2L-1P)
Clinical Trial Design and Analysis
A course for veterinary graduate students who need an understanding of clinical trial design, statistics and clinical epidemiology in order to carry out their research and to evaluate themselves as clinicians. The course will cover areas of clinical trial design, applied medical statistics, diagnostic test evaluation and writing research grants.
Prerequisite(s): Permission of instructor.

VLAC. 883.6 — 1and2(20C)
Advanced Clinical Practice
Enhances student clinical education and experience under guidance of supervisor or senior clinician. Emphasizes clinical practice in student’s field of specialization. Procedures in diagnostics, therapeutics and disease control are stressed. Involves student contribution to the veterinary teaching hospital routine practice and emergency work during normal hours and on the out-of-hours duty roster.

VLAC. 889.3 — 1and2(3R)
Special Topics
To be defined and described each time it is offered. A thorough study of a special topic pertinent to the specific goals of the candidate and their program.

VLAC. 899.6 — 1and2(6R)
Special Topics
To be defined and described each time it is offered. A thorough study of a special topic pertinent to the specific goals of the candidate and their program.

VLAC. 980.0
Clinical Practice
Serves to maintain full-time student status in the M. Vet. Sc program.

VLAC. 990
Seminar
Discussion on research plans, protocols, and results by graduate students and faculty. Graduate students are required to attend and participate. Faculty and visiting scientists may also contribute to the course.

VLAC. 992.0
Project
Students enrolled in the non-thesis Master’s degree (M.Vet.Sc.) must register in this course when they begin their project.
VSAC — SMALL ANIMAL CLINICAL SCIENCES

Department of Small Animal Clinical Sciences

VSAC. 800.6 — 1/2(2L/2S)
Advanced Veterinary Internal Medicine
Deals with the pathophysiology of animal disease on a body system or organ basis. The pathophysiologic mechanisms of disease, the rational approach to diagnosis and therapy, and a review of common medical disorders affecting each organ system will be emphasized.

Note: This course will be offered every third year.

VSAC. 802.3 — 1 — (40P, 2 weeks)
Special Field Experiences
Total immersion in the area of study pertinent to the graduate student. A complete report is required and should come from a daily log of activities and be organized from a protocol set up by the student’s advisory committee prior to going out on this experience.

Note: Requires 40 hours of practicum over a period of 2 or 4 weeks.

VSAC. 803.6 — 1/2(40P, 4 weeks)
Special Field Experiences
Total immersion in the area of study pertinent to the graduate student. A complete report is required and should come from a daily log of activities and be organized from a protocol set up by the student’s advisory committee prior to going out on this experience.

VSAC. 810.3 — 1(1.5L-1.5S)
Veterinary Ocular Pathology
To develop a thorough understanding of ocular pathology in domestic animals and to understand ocular fixation and processing. These will be viewed in a live electronic classroom where the congenital, developmental, and acquired diseases of the cornea, sclera, conjunctiva, orbit, eyelids, glaucoma, uvea, lens, vitreous, retina, optic nerve and ocular neoplasia are presented. Participants will be expected to describe the ocular findings on a variety of glass slides provided at random during the interactive session at the end of each week.

Prerequisite(s): DVM degree or equivalent.

Note: Pre-recorded lectures with slides are viewed online prior to weekly Internet Chat.

VSAC. 860.6 — 1and2(2R-25)
Advanced Soft Tissue Surgery
The anatomy, pathophysiology and surgery of the urinary, hemopoietic, endocrine and alimentary systems will be studied with respect to the basic principles of wound healing, shock, tissue response to trauma and biochemical parameters. Regular seminars based on current literature reviews will be required of the candidates.

Prerequisite(s): DVM or equivalent.

VSAC. 865.3 — 1/2(15-1R)
Advanced Medical Imaging of Small Animals
A seminar course covering the medical imaging of diseases in small animals. Emphasizes discussion of veterinary radiology and ultrasonography with review of normal anatomy and typical abnormal conditions, plus exposure to more challenging case material. Additional discussions will focus on other imaging modalities such as CT and MRI. This course includes a hands-on laboratory in abdominal ultrasonography.

VSAC. 868.6 — 1and2(2L-5/C)
Advanced Veterinary Anesthesiology
Advanced veterinary anesthesiology. Subjects include anesthetic equipment, pain control, pharmacology of anesthetic agents, mechanisms of anesthesia and the effects of anesthetic agents on the various body systems. Anesthetic techniques for specific body systems and disease conditions will also be discussed.

VSAC. 869.6 — 1/2(2L)
Veterinary Critical Care
Designed to familiarize the student with intensive care of the veterinary patient. The course is multidisciplinary in nature and uses a body systems approach to discuss pathophysiology, pharmacology, diagnostics, supportive care, and treatment of the critically ill veterinary patient. The major focus is on small animals, but the principles discussed apply to all species.

VSAC. 870.6 — 1and2(2.5S)
Topics in Advanced Small Animal Internal Medicine
A discussion course covering the pathophysiology, diagnosis and therapy of selected important medical diseases in small animals. The emphasis will be on critical review of the current literature and discussion of the implications for management of small animal patients. Note: This course will be offered every 3rd year.

Prerequisite(s): DVM degree.

VSAC. 871.3 — 1(1L-1S)
Advanced Large Animal Ophthalmology
Provides students with formal instruction in large animal (equine and food animal) ophthalmology. Students will learn to critically review classic and current literature on large animal ophthalmology topics. Students will acquire the ability to diagnose and discuss pathogenesis and design treatment plans for ophthalmic diseases of the horse and food and fiber producing species.

Prerequisite(s): DVM or equivalent.

VSAC. 872.3 — 1(1L-1S)
Advanced Small Animal Ophthalmology
Provides an in-depth review of the current literature on canine and feline ophthalmic diseases. It will review the anatomy and physiology, pathophysiology, pathology, diagnosis, differential diagnosis, and medical and surgical therapy of diseases of the orbit, eyelids, conjunctiva, cornea, sclera, uvea, lens, vitreous, retina, and optic nerve of both the dog and cat.

Prerequisite(s): DVM or equivalent.

VSAC. 873.6 — 1and2(20C)
Advanced Small Animal Clinical Sciences
Procedures in diagnostic and therapeutics as applied to the daily clinical case load.

Prerequisite(s): Completion of DVM degree and registration in a MVetSc program.

VSAC. 874.6 — 1and2(1.5L-1.5P)
Diagnostic Endoscopy in Small Animal Internal Medicine
A lecture and laboratory course that will familiarize students with the use of endoscopy as a diagnostic and research technique in small animal practice and will allow students hands-on practice sufficient to become proficient at a wide variety of endoscopic techniques.

Prerequisite(s): DVM degree, enrolment in MVetSc degree program in the Department of Small Animal Clinical Sciences.

Note: This course will be offered every third year.

VSAC. 890.3 — 1/2(3R)
Clinical Practice
Recognizes the many clinical activities of students in the program that may not be otherwise credited. Students are required to make satisfactory progress in this course to maintain full-time status in the program.

VSAC. 980.0
Seminar
Discussion on research plans, protocols, and results by graduate students and faculty. Graduate students are required to attend and participate. Faculty and visiting scientists may also contribute to the course.

VSAC. 990
Project
Students undertaking the project Master’s degree (MVetSc) must register in this course.

VSAC. 992.0
Research
Students writing a Master’s thesis must register for this course.

VSAC. 994
Research
Students writing a PhD thesis must register for this course.
VTMC — VETERINARY MICROBIOLOGY

Department of Veterinary Microbiology

VTMC. 830.3 — 2(1S-2T)
Recent Advances in Microbiology
A requisite for students in Veterinary Microbiology. Partly tutorial, consisting of assigned reviews of recent advances in selected areas of microbiology, including bacteriology, epidemiology, immunology, parasitology and virology. These discussions are student-driven and facilitated by individual faculty members with expertise in the areas of discussion. Training is also given in the writing of grant applications, such that a major part of the course comprises each student writing a full-scale, mock Canadian Institutes of Health Research (CIHR) application that addresses their proposed dissertation research.

VTMC. 831.3 — 5P(5L-30P)
Techniques in Molecular Biology
A “hands-on” laboratory course designed to familiarize students with a wide variety of techniques in molecular biology: manipulation of DNA for cloning and analysis, detection and quantitation of nucleic acids, sequencing of DNA, site directed mutagenesis, purification and detection of proteins, detection of rare nucleic acids by polymerase chain reaction, monitoring gene expression by cDNA microarrays and 2D-protein analysis, nucleic acid-based techniques for identifying organisms.

Prerequisite(s): Graduate or upper undergraduate level course on molecular biology; permission of instructor.

Note: 5 week course beginning in May.

VTMC. 833.3 — 1/2(25-1T)
Advanced Virology
Students, in discussion groups and seminars, explore current topics in virology. Some areas discussed in previous years are: interferon response and viral strategies for evading it, viral oncogenesis, viruses and cancer therapy, antiviral agents and viral strategies for resistance, viruses as tools for nanotechnology. Reviews prepared by students will be considered for publication in Student Reviews in Current Virology, an on-line publication.

VTMC. 835.3 — 2(3L-1.5P)
Diagnostic Veterinary Bacteriology
Devoted to the culture, biochemical reactions and identification of pathogenic, aerobic and anaerobic bacteria and fungi from domestic, exotic and “alternate species” including birds. Emphasis will be on interpretation of findings in agreement with information gathered from clinical history/lesion(s) provided in different cases. Other responsibilities include familiarization with culture media; some new diagnostic techniques; completion by each student of 20-30 cases.

VTMC. 840.3
Molecular Diagnostics in Veterinary Medicine
An introduction to molecular diagnostic methods including the concepts underlying nucleic acid sequencing, manipulation, detection, quantification and genomics and bioinformatics. Concepts will be illustrated by drawing on specific applications of these techniques in veterinary medicine with an emphasis on infectious disease diagnosis and research.

Prerequisite(s): An undergraduate degree in health or biological sciences or permission of the instructor.

VTMC. 841.6 — SP(5L-35P)
Research Methods in Cellular and Molecular Immunology
This is an intensive “hands-on” course designed to teach graduate students basic and advanced cellular and molecular methods commonly employed in studying the host’s immunoinflammatory system: cell purification and characterization, antibody production, purification and characterization, T cell assays, ELISA, ELISPOT, bioassays, purification of cells using magnetically-labeled antibodies, immunohistochemistry, in situ hybridization, Northern blotting, and real-time RT-PCR, among others.

Prerequisite(s): Permission of instructor.

Note: 6 week course beginning in June.

VTMC. 898.3 — 1/2(2L-1.5-6P)
Special Topics
A thorough study on a selected topic in veterinary microbiology will be undertaken for which no formal course exists and specific to the candidate and their goals. To be defined and described each time it is offered.

VTMC. 899.6 — 1and2(2L-1.5-6P)
Special Topics
A thorough study on a selected topic in veterinary microbiology will be undertaken for which no formal course exists and specific to the candidate and their goals. To be defined and described each time it is offered.

VTMC. 990
Seminar
Graduate students are required to attend and take part in the seminar throughout their program. Faculty and visiting scientists may also contribute to the course.

VTMC. 992.0
Project
Students undertaking the project Master’s degree (M.Vet.Sc.) must register in this course.

VTMC. 994.6
Research
Students writing a M.Sc. thesis must register for this course.

VTMC. 996
Research
Students writing a Ph.D. thesis must register for this course.

VTPA — VETERINARY PATHOLOGY

Department of Veterinary Pathology

VTPA. 810.3 — 1/2(1L-2S)
Clinical Hematology
Presented biennially in lecture and seminar format and utilizing current literature. Assigned reading, and presentation of selected hematology topics are integral to this course. Case material may be used to emphasize pathophysiologic mechanisms.

Prerequisite(s): Permission of the instructor.

VTPA. 811.3 — 1/2(1L-2S)
Clinical Chemistry
Presented biennially in lecture and seminar format and utilizing current literature. Assigned reading and presentation of selected clinical chemistry topics are integral to this course. Methodology and quality assurance are important components of this course. Case material may be used to emphasize pathophysiologic mechanisms.

Prerequisite(s): Permission of the instructor.

VTPA. 820.3 — 1/2(2S-6C)
Mammalian Pathology I
Introduces students to the gross and microscopic postmortem examination of animals and tissues submitted for diagnosis. Pathogenesis and diagnostic procedures, including a variety of ancillary tests, are emphasized. Students will participate in the prosecution of submitted specimens and discussion of a set of histologic slides. Selected cases are discussed at weekly conferences and students are expected to present seminars based on case material.

Prerequisite(s): Permission of the instructor.

Note: Students take VTPA. 820 to 823 as a series from I through IV.

VTPA. 821.3 — 1/2(2S-6C)
Mammalian Pathology II
Students will spend four months on the diagnostic necropsy service duty roster. Student are expected to complete as many cases as the supervisor deems appropriate, however, a minimum of 30 cases is required for this course. Specific readings will also be assigned. Students are expected to present seminars based on case material.

Prerequisite(s): Permission of the instructor.

Note: Students take VTPA. 820 to 823 as a series from I through IV.

VTPA. 822.3 — 1/2(1S-8/10P)
Mammalian Pathology III
Students will spend four months on the diagnostic necropsy service duty roster. Student are expected to complete as many cases as the supervisor deems appropriate, however, a minimum of 40 cases is required for this course. Specific readings will also be assigned. Students are expected to present seminars based on case material.

Prerequisite(s): Permission of the instructor.

Note: Students take VTPA. 820 to 823 as a series from I through IV.
VTPA. 823.3 — 1/2(1/25-8/10P)
Mammalian Pathology IV

Students will spend four months on the diagnostic necropsy service duty roster. Student are expected to complete as many cases as the supervisor deems appropriate, however, a minimum of 50 cases is required for this course. Specific readings will also be assigned. Students are expected to present seminars based on case material.

Prerequisite(s): Permission of the instructor.
Note: Students take VTPA. 820 to 823 as a series from I through IV.

VTPA. 830.3 — 1/2(15-6C)
Surgical Pathology I

An introductory course in examination of biopsy material. Goals will be achieved through study of a set of histologic slides that represent the most common conditions encountered in Surgical Pathology and attendance at the Surgical Pathology rounds. There is limited participation in the biopsy roster.

Prerequisite(s): Permission of the instructor.
Note: Students take VTPA. 830 to 833 as a series from I through IV.

VTPA. 831.3 — 1/2(15-6C)
Surgical Pathology II

A course to acquire greater experience and knowledge through participation in the surgical pathology duty roster. The requirements are 4 months on the duty roster, completion of a minimum of 100 cases and participation in Surgical Pathology rounds.

Prerequisite(s): Permission of the instructor.
Note: Students take VTPA. 830 to 833 as a series from I through IV.

VTPA. 832.3 — 1/2(1/25-2/3P)
Surgical Pathology III

The requirements for Surgical Pathology III are 4 months on the duty roster, completion of a minimum of 100 cases and participation in Surgical Pathology rounds. This may be supplemented by study of case material.

Prerequisite(s): Permission of the instructor.
Note: Students take VTPA. 830 to 833 as a series from I through IV.

VTPA. 833.3 — 1/2(1/25-2/3P)
Surgical Pathology IV

The requirements for Surgical Pathology IV are 4 months on the duty roster, completion of a minimum of 100 cases and participation in Surgical Pathology rounds. This may be supplemented by study of case material.

Prerequisite(s): Permission of the instructor.
Note: Students take VTPA. 830 to 833 as a series from I through IV.

VTPA. 841.3 — 2(1L-15-1P)
Toxicologic Pathology

Covers mechanisms of toxicology as well as basic pathology, focusing on several major organ systems. The students’ understanding of how clinical, environmental or pharmacological toxicants damage specific organs will be supported through didactic instruction, case studies, directed readings and structured group discussion.

Prerequisite(s): VTPA. 342 and 343 or equivalent, or TOX. 402 and PATH. 205, or permission of the instructor.
Note: Offered biennially.

VTPA. 850.3 — 1/2(2/35-10/12P)
Diagnostic Clinical Pathology I

The diagnostic clinical pathology courses, VTPA. 850.3 through 853.3, involve interpretation of laboratory tests performed on blood, serum and urine specimens, and examination of blood, urine and cytology smears in order to assist in making a clinical diagnosis. Case material is supplemented with presentations, interactive discussions and directed reading.

Prerequisite(s): Permission of the instructor.

VTPA. 851.3 — 1/2(2/35-10/12P)
Diagnostic Clinical Pathology II

The diagnostic clinical pathology courses, VTPA. 850.3 through 853.3, involve interpretation of laboratory tests performed on blood, serum and urine specimens, and examination of blood, urine and cytology smears in order to assist in making a clinical diagnosis. Case material is supplemented with presentations, interactive discussions and directed reading. The student is expected to be able to work with increasing independence in the diagnostic laboratory over the length of this course.

Prerequisite(s): VTPA. 850 or permission of the instructor.

VTPA. 852.3 — 1/2(2/35-10/12P)
Diagnostic Clinical Pathology III

The diagnostic clinical pathology courses, VTPA. 850.3 through 853.3, involve interpretation of laboratory tests performed on blood, serum and urine specimens, and examination of blood, urine and cytology smears in order to assist in making a clinical diagnosis. Case material is supplemented with presentations, interactive discussions and directed reading. The student is expected to be able to work independently in the diagnostic laboratory over the length of this course.

Prerequisite(s): VTPA. 850 and VTPA. 851 or permission of the instructor.

VTPA. 853.3 — 1/2(2/35-10/12P)
Diagnostic Clinical Pathology IV

The diagnostic clinical pathology courses, VTPA. 850.3 through 853.3, involve interpretation of laboratory tests performed on blood, serum and urine specimens, and examination of blood, urine and cytology smears in order to assist in making a clinical diagnosis. Case material is supplemented with presentations, interactive discussions and directed reading. The student is expected to be able to work independently in the diagnostic laboratory over the length of this course.

Prerequisite(s): VTPA. 850, VTPA. 851 and VTPA. 852 or permission of the instructor.
Note: The student is expected to be able to work as an entry-level clinical pathologist in the diagnostic laboratory, with appropriate supervisory support, in order to take this course.

VTPA. 869.3 — 1/2(1L-2P)
Avian Pathology I

Reviews the pathology of the avian species by systems emphasizing histopathology. Lectures will be supplemented by slide study sets and selected reading material.

Prerequisite(s): Permission of the instructor.
Note: May be offered biennially.

VTPA. 871.3 — 1/2(4C)
Avian Necropsy I

Necropsy technique of birds submitted for diagnosis of flock diseases. Suitable laboratory procedures following necropsy examination are emphasized. Treatment and control of flock diseases encountered are discussed. Selected cases are presented and discussed by students at the weekly necropsy conferences of the department. To obtain 3 credit units the student will be required to complete approximately 30 cases.

Prerequisite(s): Permission of the instructor.

VTPA. 872.3 — 1/2(4C)
Avian Necropsy II

Necropsy technique of birds submitted for diagnosis of flock diseases. Suitable laboratory procedures following necropsy examination are emphasized. Treatment and control of flock diseases encountered are discussed. Selected cases are presented and discussed by students at the weekly necropsy conferences of the department. To obtain 3 credit units the student will be required to complete approximately 30 cases.

Permission of the instructor is required.

VTPA. 873.3 — 1/2(2L-1S-1T)
Wildlife Diseases

Deals with the ecology of infectious and non-infectious diseases of free-living mammals and birds. The etiology, epizootiology, pathogenesis and ecological significance of the conditions are considered. Emphasizes diseases occurring in Western Canada.

Prerequisite(s): VTPA. 343 or permission of the instructor.

VTPA. 875.3 — 1/2(15-3C)
Diagnosis of Wildlife Diseases I

Introduces students to the necropsy and investigative techniques for the diagnosis of disease in wild mammals and birds. Under supervision, students will interpret and integrate gross and histological findings along with ancillary tests to provide diagnoses on a minimum of 25 cases. They are required to present one seminar on wildlife disease. The students will be given access to case material for self-study, in order to become familiar with common wildlife diseases.

Prerequisite(s): Permission of the instructor.

VTPA. 876.3 — 1/2(15-3C)
Diagnosis of Wildlife Diseases II

Introduces students to the necropsy and investigative techniques for the diagnosis of disease in wild mammals, birds, amphibians, reptiles and fish. Under supervision, students will interpret and integrate gross and histological findings along with ancillary tests to provide diagnoses on a minimum of 35 cases. They are required to present one seminar on wildlife disease. The students will be given access to case material for self-study, in order to become familiar with common wildlife diseases.

Prerequisite(s): Permission of the instructor.
**VTPA. 898.3 — 1/2(2C-R)**
Special Problems in Veterinary Pathology
A thorough study on a selected topic in veterinary pathology will be undertaken. May include examination of pathological material, tutorial sessions, collateral reading and presentation of a seminar.

**VTPA. 899.6 — 1and2(2C-R)**
Special Problems in Veterinary Pathology
A thorough study on a selected topic in veterinary pathology will be undertaken. May include examination of pathological material, tutorial sessions, collateral reading and presentation of a seminar.

**VTPA. 980.0**
Clinical Practice
Recognizes the many clinical activities of students in the program that may not be otherwise credited. Students are required to make satisfactory progress in this course to maintain full-time student status in the program.

**VTPA. 990**
Seminar
A weekly noon-hour seminar in which proposed and ongoing research, interesting cases in diagnostic veterinary pathology, wildlife disease, and topics of special interest will be presented. All graduate students are required to register and present a research seminar annually. Graduate students registered in diagnostic courses are also required to present brief case reports.

**VTPA. 991 — 1and2(1S‑1R)**
Seminar in Pathology
A weekly mystery case-based seminar in anatomic and clinical pathology. All graduate students enrolled in diagnostic courses are required to register and attend on a regular basis. All other members of the Department are encouraged to review the case materials, attend, and participate in the discussion.

**VTPA. 992.0**
Project
Students undertaking the M.Vet.Sc. must register in this course.

**VTPA. 994**
Research
Students writing a M.Sc. thesis must register for this course.

**VTPA. 996**
Research
Students writing a Ph.D. thesis must register for this course.

**WGST — WOMEN’S AND GENDER STUDIES**

**WGST. 800.3 — 1/2(2S)**
Feminist Theories
The body of work which comprises feminist theory, confounds disciplinary, linguistic, national, cultural, historical, thematic, and indeed ipotitical categorization. Therefore, this multi-sited interdisciplinary seminar will foreground idoing theory as a critical activity and an imaginative mode of thought that questions existing meanings, inheritances and social phenomena, while articulating new possibilities and forms of knowledge. This course introduces students to theoretical approaches, vocabulary and key texts which have influenced feminist research, activism and practice in local and global arenas, in order to prepare them for advanced courses in our areas of specialization.

Restriction(s): Students must be enrolled in the College of Graduate Studies and Research.

**WGST. 810.3 — 1/2(2S)**
Gender Representation and Cultural Studies
This course will explore intersections between feminist theory, cultural studies and cultural production. In particular, the course presents culture as a dynamic arena of social struggle and possibility and aims to introduce students to some of the key thinkers and critical frameworks in the field of feminist cultural studies. The course examines how meaning is generated and mediated through various cultural practices, products, archives and phenomena and engages students in the analysis of a range of cultural texts which may include digital and social media, film and television, art, advertising, visual and popular culture, print culture and literature, performance, material culture and archives. The course is divided into four units of study including a foundational unit in cultural studies theory and three additional units each of which focuses on a unique cultural text, product, phenomena, practice or archive. Each unit will examine relationships between cultural texts/ cultural phenomena and their ideological and socio-historical contexts.

Restriction(s): Students must be enrolled in the College of Graduate Studies and Research.

**WGST. 811.3 — 1/2(2S)**
Gender and Sexualities Studies
This interdisciplinary seminar includes discussions on research projects, papers, and professional development activities in Women’s, Gender and Sexualities Studies. The proposed course provides a spotlight on world views that emerge at sites of resistance to colonial/imperialisms and racialization processes. Emphasizing womenís self-determination in social movements ranging from the interpersonal to the international, this class will introduce students to intersecting gendered struggles involving: environmental sustainability, food and water sovereignty, the feminization of poverty and migration, women in politics, anti-militarization and conflict resolution, reproductive, labour, human and childrenís rights.

Restriction(s): Students must be enrolled in the College of Graduate Studies and Research.

**WGST. 812.3 — 1/2(2S)**
Indigenous Transnational International Gender Justice
Beginning with a focus on Indigenous cultures in local, regional and international contexts, this course examines potentials for and challenges to achieving gender justice across borders and within communities. Centered on womenís contextual relationships with the land, each other, the nation state, identity systems and other resources, the course provides a spotlight on world views that emerge at sites of resistance to colonial/imperialisms and racialization processes. Emphasizing womenís self-determination in social movements ranging from the interpersonal to the international, this class will introduce students to intersecting gendered struggles involving: environmental sustainability, food and water sovereignty, the feminization of poverty and migration, women in politics, anti-militarization and conflict resolution, reproductive, labour, human and childrenís rights.

Restriction(s): Students must be enrolled in the College of Graduate Studies and Research.

**WGST. 898.3**
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

**WGST. 899.6**
Special Topics
Offered occasionally in special situations. Students interested in these courses should contact the department for more information.

**WGST. 990**
Research Development Seminar
This interdisciplinary seminar includes discussions on research projects, papers, and professional development activities in Women’s, Gender and Sexualities Studies.

**WGST. 994**
Master’s Thesis
The topic must propose an original study and critical discussion of a meaningful question in Womenís, Gender and Sexualities Studies. The proposed research will include a critical review of the literature and, depending on the subject matter and focus of the thesis, is likely to require some combination of the following: i analysis of a range of possible texts or other media (literature/s, cultural representations or practices, popular culture, archives, etc.) i critical analysis of a theoretical problem i empirical research i cultural production (example: feminist documentary film, exhibition, interactive digital theoretical model, performance Each student will produce a substantive written thesis which critically engages historical and/or contemporary socio-cultural issues and/or knowledge production.
WRIT — WRITING

Department of Interdisc Cntr Culture Creat

WRIT. 800.3 — 1(3S)
The Craft of Writing Fiction
This course focuses on how to write dynamic and engaging fiction. The course will focus on compositional strategies related to writing short stories and novels. The course is an intensive workshop consisting of peer critiques, a craft seminar, and discussion of assigned readings. Students will meet weekly and will be required, every week, to produce writing of their own and submit it for analysis by the rest of the class and the instructor.

Permission of the Program Coordinator is required
Restriction(s): Entry in the M.F.A. in Writing program is required.

WRIT. 801.3 — 1(3S)
Poetry Workshop
Discussion of contemporary writings on the making of poetry initiates a workshop in which concepts and techniques are practised and refined.

Permission of the Program Coordinator is required
Restriction(s): Entry in the M.F.A. in Writing program is required.

WRIT. 802.3 — 1(3S)
Nonfiction Workshop
Discussing the theory and practice of creative nonfiction and participating in workshop discussions of their essays and articles, students gain experience in an expanding dimension of the profession of writing.

Permission of the Program Coordinator is required
Restriction(s): Entry in the M.F.A. in Writing program is required.

WRIT. 803.3 — 2(3S)
Extended Forms Capstone Workshop
This course focuses on the conceptualizing of a book-length manuscript of prose (fiction or creative nonfiction) or poetry. It is also a course meant to sharpen editing skills and the ability to construct a theoretical basis for a writing project as well as situating that writing project within its broader literary context. The theory and informing aesthetic of beyond the writing project will be articulated in an Artist’s Statement. Each student will also be required to present a graduating craft talk, based on their writing project and open to other MFA students in the program. The student presenting the craft talk will be, in essence, teaching craft, using his or her own writing as a basis.

Permission of the Program Coordinator is required
Restriction(s): Entry in the M.F.A. in Writing program is required.
Prerequisite(s): WRIT. 800, WRIT. 801, WRIT. 802.

WRIT. 990.0 — 25
The Profession of Writing
In a series of monthly seminars, student in both years of the program will discuss the legal, financial, technical, and other professional aspects of authorship.

Permission of the Program Coordinator is required
Restriction(s): Entry in the M.F.A. in Writing program is required.

WRIT. 994.0 — 25
Thesis
The Major Work culminates the MFA in Writing. The single most substantial component of the program, the Major Work has as its successful outcome an extended work of fiction, poetry, or nonfiction that is judged to be of publishable quality.

Permission of the Program Coordinator is required
Restriction(s): Entry in the M.F.A. in Writing program is required.