

S C LIT 363 Introduction to Comparative Latin American and Caribbean Literature

★3 (*fi 6*) (either term, 3-0-0). An introduction to Hispanic-American, Brazilian and Caribbean (Dutch, English, French) Literature (in translation when necessary) focusing primarily on the 19th and 20th centuries. Prerequisite: C LIT 100, or ENGL 101, or equivalent.

S C LIT 372 Introduction to the Comparative Study of Canadian Prose

★3 (*fi 6*) (either term, 3-0-0). A systematic introduction to narrative and other forms of prose of Canadian literatures, chiefly French and English, examined on a comparative basis within an international framework. Prerequisite: C LIT 100, or ENGL 101, or equivalent.

S C LIT 415 East Asian and European Literary Relations

★3 (*fi 6*) (either term, 3-0-0). A comparative examination of East Asian and European literary relations from the time of the decline of ancient civilization and the early middle ages to modern times. Prerequisite: ★6 in Comparative Literature at the 300-level or consent of Department.

S C LIT 440 Comparative Studies in Paraliterature

★3 (*fi 6*) (either term, 3-0-0). An historical and typological introduction to the main kinds of paraliterature in their changing status in society and literature, as well as their interaction with the mainstream tradition. Prerequisite: ★6 in Comparative Literature at the 300-level or consent of Department.

S C LIT 447 Principles of Literary Interpretation

★3 (*fi 6*) (either term, 3-0-0). An introduction to the principles, problems, and practices of the interpretation of literary texts. (e.g. Barthes, Eco, Todorov, Iser) Prerequisite: ★6 in Comparative Literature at the 300-level or consent of Department.

S C LIT 448 Topics in Critical Discourse

★3 (*fi 6*) (either term, 3-0-0). The focus of this course will vary from year to year. Topics may include: Feminism, Marxism and Pragmatics. Prerequisite: ★6 in Comparative Literature at the 300-level.

S C LIT 450 Introduction to the Western Tradition in Literary Criticism III

★3 (*fi 6*) (either term, 3-0-0). An international survey of the major developments in Western literary criticism from the later 19th century to the present. Prerequisite: C LIT 349, or consent of Department. Formerly C LIT 350.

S C LIT 455 The History of Comparative Literature

★3 (*fi 6*) (either term, 3-0-0). An introduction to the major theories and definitions of comparative literature viewed in a historical perspective. Prerequisites: Reading knowledge of one relevant language other than English; C LIT 100, or ENGL 101 and C LIT 348, or 349, or ENGL 315 or 317, or equivalent.

S C LIT 464 Studies in the Concept of Genre

★3 (*fi 6*) (either term, 3-0-0). An introduction to the study of 'genre' in an international and historical context examining the development of a specific genre (e.g. the novel) within a theoretical framework. Prerequisite: ★6 in Comparative Literature at the 300-level or consent of Department.

S C LIT 465 Literature and Society

★3 (*fi 6*) (either term, 3-0-0). International comparative studies on the interrelationship of literature and society, from the point of view of literature. Prerequisite: ★6 in Comparative Literature at the 300-level or consent of Department.

S C LIT 470 Psychological Theories in the Explication of Literature

★3 (*fi 6*) (either term, 3-0-0). The use of theories, such as those of Freud and Jung, to explicate literary text with examples drawn from a variety of literatures. Prerequisite: ★6 in Comparative Literature at the 300-level or consent of Department.

S C LIT 472 Advanced Comparative Studies in Canadian Literatures I

★3 (*fi 6*) (either term, 3-0-0). The study of problems in Canadian literatures involving material from more than one literature. Prerequisites: C LIT 100, or ENGL 101, or equivalent, and ★6 at the 300-level in Comparative Literature; reading knowledge of one relevant language other than English. Note: Not to be taken by students with credit in C LIT 471.

S C LIT 474 Studies in the Relationship of Literature and the Visual Arts

★3 (*fi 6*) (either term, 3-0-0). An introduction to the comparative study of the influence of art on literature (individual works, movements, forms, and styles) taught from a literary perspective. Prerequisites: ★6 in Comparative Literature at the 300-level, reading knowledge of one relevant language other than English, or consent of Department.

S C LIT 475 Advanced Studies in Medieval Literature

★3 (*fi 6*) (either term, 3-0-0). The study of the major kinds of medieval literature within a European context. Prerequisite: C LIT 320, or consent of Department.

C LIT 497 Special Studies in Comparative Literature I

★3 (*fi 6*) (either term, 0-3s-0). Prerequisite: ★6 in Comparative Literature at the 300-level or consent of Department.

S C LIT 499 Honors Tutorial and Essay

★3 (*fi 6*) (second term, 0-3s-0). Preparation of the Honors Essay.

211.44.2 Graduate Courses

S C LIT 501 Studies in World Literature I

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 502 Studies in World Literature II

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 504 Studies in the Relationship of Literature with the Visual Arts

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: One senior-level course in art history, one senior-level course in literature, and reading knowledge of one relevant language other than English. Corequisite: ART H 504.

S C LIT 505 The Theory of the Study of Literature

★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 506 Topics in Critical Discourse

★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 509 Topics in Marginalized Literature

★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 510 Poetics: The Nature and Forms of Poetry

★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 511 Comparative Studies in "Formalistic" Approaches to Literature

★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 513 Poststructuralist Theory

★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 514 Literature and Oral Tradition

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Reading knowledge of any relevant ancient or modern language other than English.

S C LIT 519 Comparative Studies in the Asian and Western Tradition

★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English (e.g. German, French).

S C LIT 521 Directed Reading Course I

★3 (*fi 6*) (either term, 0-3s-0). Prerequisite: consent of Department.

S C LIT 522 Directed Reading Course II

★3 (*fi 6*) (either term, 0-3s-0). Prerequisite: consent of Department.

S C LIT 523 Studies in Foundational Texts

★3 (*fi 6*) (either term, 3-0-0). Advanced studies in religious and literary texts which are the foundation of different cultures. The syllabus of the course will vary from year to year and reflect religious, literary, and cultural perspectives; the modular teaching units will include selected texts in the original language and in translation. Prerequisite: consent of Department.

S C LIT 545 Comparative Studies in 18th-Century Literature

★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 547 Studies in Western Tradition in Literary Criticism I

★3 (*fi 6*) (either term, 3-1s-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 548 Studies in Western Tradition in Literary Criticism II

★3 (*fi 6*) (either term, 3-1s-0). Prerequisite: C LIT 547 or consent of Department.

S C LIT 549 Studies in Western Tradition in Literary Criticism III

★3 (*fi 6*) (either term, 3-1s-0). Prerequisite: C LIT 548 or consent of Department.

S C LIT 550 Comparative Studies in Romantic Literature

★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 552 Comparative Studies in Realistic Literature

★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 553 Comparative Studies in Naturalistic Literature
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 554 Comparative Studies in the Novel
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 556 Advanced Studies in Comparative Third-World Literature
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English, or consent of Department.

S C LIT 557 Symbolism as an International Movement
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 560 Comparative Studies in Canadian Literature
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 575 Tragedy: A Theoretical Approach
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 585 Studies of Forms and Genres
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 590 Studies of Motifs and Themes
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one language other than English.

S C LIT 595 Special Topics in Comparative Literary History
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 609 Special Topics in Asian Literary Theory and Criticism
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 610 Special Topics in Literary Theory and Criticism
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 630 Cross-Cultural Studies in Literature
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). The focus of this course will vary from year to year. Topics may include: immigrant literature, literature of the diaspora. Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 641 Surrealism: Theory and Practice
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 642 Literary Existentialism: Theory and Practice
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 645 Comparative Studies in 20th-Century Literature
★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Prerequisite: Reading knowledge of one relevant language other than English.

S C LIT 696 Seminar Course
★3 (*fi 6*) (either term, 0-3s-0) or ★6 (*fi 12*) (full session, 0-3s-0). Prerequisite: Reading knowledge of two languages other than English.

S C LIT 697 Special Reading Course I
★3 (*fi 6*) (either term, 0-3s-0) or ★6 (*fi 12*) (full session, 0-3s-0).

S C LIT 698 Special Reading Course II
★3 (*fi 6*) (either term, 0-3s-0) or ★6 (*fi 12*) (full session, 0-3s-0).

S C LIT 699 Conference Course
★3 (*fi 6*) (either term, 0-3s-0) or ★6 (*fi 12*) (full session, 0-3s-0).

211.45 Computer Engineering

Division of Computer Engineering, Department of Electrical and Computer Engineering, Faculty of Engineering; and Department of Computing Science, Faculty of Science

CMPE 313 Software Engineering

□4.5 (*fi 6*) (second term, 3-0-3). The software crisis. The software lifecycle and the design process. Properties of quality software. Requirements, analysis and software specification techniques. Software design techniques including data flow and data structure methods. Implementation and quality assurance techniques. Features of programming languages and programming environments which support good software engineering practice. Software project management. Prerequisite: CMPUT 204. (★3)

CMPE 382 Computer Organization and Architecture

□3.0 (*fi 6*) (second term, 3-0-0). Survey of the organization of various micro,

mini- and mainframe computers. Design of the CPU control unit. Memory organization including virtual and cache memories. Parallelism in computers. Prerequisite: E E 380. (★3)

CMPE 401 Computer Interfacing

□3.8 (*fi 6*) (first term, 3-0-3/2). The design and use of digital interfaces, including memory, serial, parallel, synchronous and asynchronous interfaces. Hardware implementations of interrupts, buses, input/output devices. Prerequisites: E E 350, 380, 480; and E E 316 or 317. (★3)

CMPE 498 Special Topics in Computer Engineering

□3.0 (*fi 6*) (first term, 3-0-0). This course is intended to enable individuals or a small group of students to study topics in their particular field of interest under the supervision of a member of the Department of Electrical and Computing Engineering or the Department of Computing Science or other appropriate departments. (★3)

CMPE 499 Special Topics in Computer Engineering

□3.0 (*fi 6*) (second term, 3-0-0). This course is intended to enable individuals or a small group of students to study topics in their particular field of interest under the supervision of a member of the Department of Electrical and Computing Engineering or the Department of Computing Science, or other appropriate departments. (★3)

211.46 Computing Science

Department of Computing Science
Faculty of Science

Notes

- (1) Students with appropriate academic standing, and who are enrolled in any Faculty of Science Honors or Specialization program, will be given preference in registering for computing science courses required in these four-year programs.
- (2) Students with no previous computing experience should enrol in CMPUT 101 instead of CMPUT 114. Recommendation for either CMPUT 101 or CMPUT 114 will be made on the basis of a department-administered evaluation procedure. Credit will be granted for only one of CMPUT 101, CMPUT 114 or ENCMP 100.
- (3) Students who enrol in CMPUT 101 must complete CMPUT 102 in order to apply to Specialization or Honors programs.

The following is a list of courses which, for the most part, are open to any student who satisfies the prerequisite and corequisite requirements. Any special restrictions are specified within the course description.

211.46.1 Undergraduate Courses

S CMPUT 101 Introduction to Computing

★3 (*fi 6*) (either term, 3-0-3). This course provides an introduction to computing science for students with minimal background. It introduces the breadth of computer applications and provides sufficient technical basis to understand the creation, storage, and manipulation of text, image, and sound data. Topics include basic concepts of computer architecture, introductory programming, and societal issues such as privacy, security, and ethics. Intended both for students who do not anticipate further studies in computing, and for students with no computing background who intend to pursue further studies in computing. See Notes (2) and (3) above.

S CMPUT 102 Structured Programming and Data Structures

★3 (*fi 6*) (either term, 3-3s-3). Introduction to basic software engineering principles and the concepts of specification, implementation, and testing. Syntax of a high-level procedural programming language and introduction to procedural abstraction, including data abstraction, module definition, and re-use. Iterative and recursive control, static and dynamic data structures (e.g. lists, strings, queues, tables), and their associated algorithms (e.g. traversal, sorting, searching, retrieval). For students who have completed CMPUT 101 and intend to pursue further studies in computing science. Credit will be given for only one of CMPUT 102 or CMPUT 115. Prerequisite: CMPUT 101. See Notes (2) and (3) above.

S CMPUT 114 Introduction to Computing Science

★3 (*fi 6*) (either term, 3-0-3). An introduction to the modern tools of computing, including e-mail and networking; solving problems by writing small computer programs in a high-level programming language. Students are introduced to static data typing, iterative control structures, and procedural abstraction. Discussion of elementary algorithms and well-established software engineering techniques for constructing elegant and robust solutions to simple problems. Prerequisites: Math 30 and Computing Science 30 or equivalent. See Note (2).

S CMPUT 115 Programming with Data Structures

★3 (*fi 6*) (either term, 3-0-3). A review of basic software engineering principles with an introduction to concepts of specification, implementation, and testing. The extension of procedural abstraction from CMPUT 114, including data abstraction and module definition and re-use. Introduction to recursive control,

dynamic data structures (e.g. lists, strings, queues, tables) and their associated algorithms (e.g. traversal, sorting, searching, retrieval). Credit will be given for only one of CMPUT 102 or CMPUT 115. Prerequisite: CMPUT 114 or ENCOMP 100.

CMPUT 201 Practical Programming Methodology

★3 (fi 6) (either term, 3-0-3). Introduction to the principles, methods, tools, and practices of the professional programmer. The lectures focus on the fundamental principles of software engineering based on abstract data types and their implementations. The laboratories offer an intensive apprenticeship to the aspiring software developer. Students use C and C++ and software development tools of the UNIX environment. Prerequisite: CMPUT 102 or 115. Corequisite: CMPUT 272.

CMPUT 204 Algorithms I

★3 (fi 6) (either term, 3-0-1). The first of two courses on algorithm design and analysis, with emphasis on fundamentals of searching, sorting, and graph algorithms. Examples include divide and conquer, dynamic programming, greedy methods, backtracking, and local search methods, together with analysis techniques to estimate program efficiency. Prerequisites: CMPUT 102 or 115, CMPUT 272 and MATH 113, 114, or 117.

CMPUT 272 Formal Systems and Logic In Computing Science

★3 (fi 6) (either term, 3-1s-3). An introduction to the tools of set theory, logic, and induction, and their use in the practice of reasoning about algorithms and programs. Basic set theory. The notion of a function. Counting. Propositional and predicate logic and their proof systems. Inductive definitions and proofs by induction. Program specification and correctness. Prerequisite: CMPUT 101 or 114 or equivalent. See Note (2).

CMPUT 280 Computer Organization and Architecture I

★3 (fi 6) (either term, 3-0-3). An introduction to logic design and central processor architecture including addressing, shifters, decoders, multiplexors, registers, clocks, data representation, basic computer organization, CPU design; introduction to low-level programming concepts. Prerequisite: CMPUT 102 or 115. Corequisite: CMPUT 272.

CMPUT 285 Computer Organization and Architecture II

★3 (fi 6) (either term, 3-0-3). The second of two courses dealing with the fundamentals of computer architecture. A methodical discussion of number systems and arithmetic and basic computer organization including: assembly language programming, addressing, operations, subroutines and parameters input/output, DMA, and an analysis of specific architectures. Prerequisite: CMPUT 280.

CMPUT 291 Introduction to File and Database Management

★3 (fi 6) (either term, 3-0-3). Basic concepts in computer data organization and information processing; hardware devices, physical organization, and access methods for file storage; file I/O; introduction to database systems. Prerequisite: CMPUT 201.

CMPUT 301 User Interfaces and Software Design

★3 (fi 6) (either term, 3-0-3). Object-oriented design and analysis, with user-interfaces as the primary example. Architectural design patterns; Basic 2-D graphics; Human performance models; User-interface architectures; User-interface software tools. Prerequisite: CMPUT 201. Credit may be obtained in only one of CMPUT 301 and CMPUT 311.

CMPUT 304 Algorithms II

★3 (fi 6) (first term, 3-0-0). The second course of a two-course sequence on algorithm design. Emphasis on principles of algorithm design. Categories of algorithms such as divide-and-conquer, greedy algorithms, dynamic programming; analysis of algorithms; limits of algorithm design; NP-completeness; heuristic algorithms. Prerequisites: CMPUT 204, 280 and 291; STAT 221; one of MATH 121, 128, 214, 215 or 223.

CMPUT 306 Introduction to Image Processing

★3 (fi 6) (second term, 3-0-3). Introduction, history, and applications; scanning and quantization; visual perception; output devices; pattern recognition; feature extraction, decision theory, classification rules; data representation and formats; image enhancement and restoration; edge detection, segmentation and texture; correlation and registration. Prerequisites: CMPUT 201; MATH 215 and STAT 222.

CMPUT 313 Telecommunications and Computers

★3 (fi 6) (either term, 3-0-3). Introduction to computer communication networks. Digital data and voice transmission. Protocols for error and flow control, media access for LANs and MANs, routing and congestion control, interconnection of networks. Introduction to recent advances in networks. Prerequisites: CMPUT 201, 280, STAT 221. Recommended: STAT 222.

CMPUT 325 Non-Procedural Programming Languages

★3 (fi 6) (either term, 3-0-3). A study of the theory, run-time structure, and implementation of selected non-procedural programming languages. Languages will be selected from the domains of functional, logic-based, and object-oriented languages. Prerequisites: CMPUT 201, 204, 285, MATH 120.

CMPUT 340 Introduction to Numerical Methods

★3 (fi 6) (first term, 3-1s-3). Computer arithmetic and errors. The study of

computational methods for solving problems in linear algebra, non-linear equations, interpolation and approximation, and integration. The aim is to teach the student the proper use of mathematical subroutine packages currently available in computer libraries. Prerequisites: CMPUT 204, MATH 120 and 214. Credit cannot be obtained for more than one of CMPUT 252, 340, 418, MATH 280 or 486.

CMPUT 379 Operating System Concepts

★3 (fi 6) (either term, 3-0-3). Definition of a process; process states and state transitions; process control block; operations on processes; interrupt processing; parallel processing; resource allocation; shared and unshared allocation; critical sections; semaphores; deadlock; deadlock prevention, avoidance, detection, and recovery; memory management; memory allocation schemes; virtual memory; paging and segmentation; page replacement strategies; working sets; demand paging; job and processor scheduling; scheduling levels, objectives, and criteria; various scheduling algorithms; multi-processor considerations; file system functions; file organization; tree structured file systems; space allocation; file catalogs; file access control mechanisms; operating systems security. Prerequisites: CMPUT 204, 285, 291.

CMPUT 391 Database Management Systems

★3 (fi 6) (either term, 3-0-3). Logical data modeling process, relational database design (normalization), query processing, transaction management, new technological trends (distributed databases, object-orientation, knowledge base systems). Prerequisites: CMPUT 204, 285, 291.

CMPUT 400 Industrial Internship Practicum

★3 (fi 6) (first term, 0-3s-0). Required by all students who have just completed a Computing Science Industrial Internship Program. Must be completed during the first academic term following return to full-time studies. Note: A Grade of 1 to 9 will be determined by the student's job performance as evaluated by the employer, by the student's performance in the completion of an internship practicum report, and by the student's ability to learn from the experiences of the internship as demonstrated in an oral presentation. This course cannot be used in place of a senior-level CMPUT option. Prerequisites: WKEXP 922.

CMPUT 401 Software Engineering

★3 (fi 6) (either term, 3-0-3). The software lifecycle: specifications, design, coding, testing, documentation and maintenance. Project organization including development tools, resource estimation, team organization and review. The class will organize and implement a complete software project. Prerequisites: CMPUT 325 and CMPUT 311 or 379.

CMPUT 411 Introduction to Computer Graphics

★3 (fi 6) (either term, 3-0-3). 2-D and 3-D transformation; 3-D modeling and viewing; illumination models and shading methods; texture mapping; ray tracing. Prerequisites: CMPUT 204, 301 and MATH 120. Credit may be obtained in only one of CMPUT 311 and 411.

CMPUT 412 Experimental Mobile Robotics

★3 (fi 6) (second term, 3-0-3). A project-based course dealing with the design and implementation of behavior-based robots to accomplish specific tasks. Students work in groups and are introduced to concepts in sensor technologies, sensor data processing, motion control, embedded system design, real-time programming, and behavior arbitration. Prerequisite: CMPUT 285 and a 300-level Computing Science course or consent of Instructor.

CMPUT 415 Compiler Design

★3 (fi 6) (either term, 3-0-3). Compilers, interpreters, lexical analysis, syntax analysis, syntax directed translation, code generation, code optimization. Prerequisites: CMPUT 285 and a 300-level Computing Science course or consent of Instructor.

CMPUT 418 Numerical Analysis: Numerical Algebra

★3 (fi 6) (either term, 3-0-2). An introduction to selected topics in numerical linear and nonlinear algebra. Areas covered will include floating point arithmetic and error analysis, systems of linear equations, roots of nonlinear equations, overdetermined systems, eigenvalues and eigenvectors. Prerequisites: CMPUT 304, MATH 214. Credit cannot be obtained for more than one of CMPUT 340, 418, MATH 280 or 486. Offered in alternate years.

CMPUT 419 Numerical Analysis: Numerical Approximation

★3 (fi 6) (second term, 3-0-2). An introduction to measurement, simulation and analytical techniques for studying the performance of computer systems; including operating systems and communication networks. Topics include: workload modeling; introduction to simulation, measurement and analysis techniques; analysis of results; data presentation. Prerequisites: CMPUT 313 and 329; STAT 222. Offered in alternate years.

CMPUT 422 Analysis of Computer Systems I

★3 (fi 6) (either term, 3-0-3). An introduction to measurement, simulation and analytical techniques for studying the performance of computer systems; including operating systems and communication networks. Topics include: workload modeling; introduction to simulation, measurement and analysis techniques; analysis of results; data presentation. Prerequisites: CMPUT 313 or 329; STAT 222. Offered in alternate years.

CMPUT 425 Object-Oriented Programming Languages

★3 (fi 6) (either term, 3-0-3). This course will study the computational model and runtime structure of object-oriented programming languages including objects, classes, object creation, initialization, inheritance, polymorphism, message passing, methods, binding, and dispatch. Throughout the course, the object-oriented computing model will be introduced and contrasted with the imperative model. A detailed study of Smalltalk will provide an example of a pure object-oriented programming language. Prerequisite: CMPUT 325.

CMPUT 429 Computer Systems and Architecture

★3 (fi 6) (either term, 3-0-3). An investigation of computer system design concepts including requirements, specifications, implementation and modification. Instruction sets, arithmetic/logic unit design, bus structures, I/O structures, control organization and implementation. Discussion and use of hardware description languages. Prerequisite: One of CMPUT 304, 329, or 379; MATH 215 and STAT 222. Offered in alternate years.

CMPUT 451 Introduction to Artificial Intelligence

★3 (fi 6) (either term, 3-0-3). Problem representation, search, inference, and learning in intelligent systems; systems for general problem solving, game playing, deduction, expert consultation, computer vision, concept formation, and natural language understanding. Prerequisite: CMPUT 325.

CMPUT 474 Formal Languages, Automata, and Computability

★3 (fi 6) (second term, 3-0-0). Formal grammars; normal forms; relationship between grammars and automata; regular expressions; finite state machines; state minimization; pushdown automata; Turing machines; computability; the halting problem; introduction to recursive function theory. Prerequisite: CMPUT 325.

CMPUT 485 System and Network Administration

★3 (fi 6) (either term, 3-0-3). Structure of an operating system (Linux); organization of system directories; system installation and maintenance; system implementation; kernel configuration; system interface to the network; basics of TCP/IP (the Internet); services across networks (daemons); system and network security; organization of selected software packages (case studies). Prerequisite: CMPUT 379. Offered in alternate years.

CMPUT 495 Honors Seminar

★0 (fi 2) (either term, 0-1s-0). Prerequisite: A 300-level Computing Science course. Note: Required of all Honors Computing Science students during their degree program.

CMPUT 496 Topics in Computing Science

★3 (fi 6) (first term, 3-0-0). Prerequisite: A 300-level CMPUT course.

CMPUT 497 Topics in Computing Science

★3 (fi 6) (second term, 3-0-0). Prerequisite: A 300-level CMPUT course.

CMPUT 498 Topics in Computing Science

★3 (fi 6) (first term, 3-0-3). Prerequisite: A 300-level CMPUT course.

CMPUT 499 Topics in Computing Science

★3 (fi 6) (second term, 3-0-3). Prerequisite: A 300-level CMPUT course.

211.46.2 Graduate Courses

Students entering the graduate program are expected to have an adequate background in computing science. Students lacking adequate background may be required to take one or more of the following undergraduate courses in addition to their regular graduate program: CMPUT 304, 311, 340, 379, 391, 401, 418, 429, 451, 474, 485 (see §211.46.1).

Note: In all cases where prerequisite courses are specified, the phrase "or equivalent courses taken at the University of Alberta or at another university" is understood. Where students are uncertain whether they meet prerequisite requirements, they should consult with their program advisor, and if necessary, with the instructor of the graduate course.

CMPUT 501 Topics in Programming Languages

★3 (fi 6) (either term, 3-0-0).

CMPUT 504 Topics in Networks

★3 (fi 6) (either term, 3-0-0).

CMPUT 505 Efficient and Optimal Algorithms

★3 (fi 6) (either term, 3-0-0). Models of computation. Upper and lower bounds on time and storage requirements. Problems from: sorting and order statistics, graph and combinatorial geometry, algebraic computation, cryptography, pattern matching and decision problems. P vs NP and related questions, and provably intractable problems. Prerequisite: CMPUT 304.

CMPUT 506 Topics in Graph Theory

★3 (fi 6) (either term, 3-0-0).

CMPUT 507 Topics in Parallel Computing

★3 (fi 6) (either term, 3-0-0).

CMPUT 508 Topics in Computing Science

★3 (fi 6) (either term, 3-0-0).

CMPUT 509 Topics in Image Processing or Vision

★3 (fi 6) (either term, 3-0-0).

CMPUT 510 Topics in Computing Science

★3 (fi 6) (either term, 3-0-0).

CMPUT 511 Computer Graphics

★3 (fi 6) (either term, 3-0-3). Graphics hardware and software, 3D geometry, modelling, user interface, data structures, image generation, illumination models, scan conversion, paint programs. Prerequisite: CMPUT 311.

CMPUT 512 Topics in Robotics

★3 (fi 6) (either term, 3-0-0).

CMPUT 513 Computer Networks

★3 (fi 6) (either term, 3-0-3). A thorough understanding of the protocol design process is provided through the study of Local and Metropolitan Area Networks (architectures, topologies, protocols). Some aspects of Wide Area Networks are also discussed. Most problems (e.g. implementation issues, performance, reliability) are approached from the practical point of view. An emulator (e.g. SMURPH) is used to model networks and protocols, providing an environment for building and investigating realistic systems. Prerequisites: CMPUT 313 and a knowledge of statistical methods.

CMPUT 514 Topics in Adaptive Systems

★3 (fi 6) (either term, 3-0-0).

CMPUT 516 Operating Systems

★3 (fi 6) (either term, 3-0-0). Structure of operating systems. Concurrency control, process and memory management. Interprocess communication, local and remote. Issues in distributed operating systems. Numerous case studies. Hands-on work is part of the course. Prerequisite: CMPUT 379 or equivalent.

CMPUT 518 Topics in Numerical Analysis

★3 (fi 6) (either term, 3-0-0). Prerequisite: CMPUT 419.

CMPUT 522 Topics in Performance Evaluation

★3 (fi 6) (either term, 3-0-0). Prerequisites: CMPUT 340 or 418; and a knowledge of statistical methods.

CMPUT 525 Object-Oriented Computing

★3 (fi 6) (either term, 3-0-0). A study of the object-oriented computing model and its application to software design and programming. An examination of object-oriented programming language with respect to features, design, runtime structure, and implementation. Prerequisite: CMPUT 325.

CMPUT 535 Parallel and Multiprocessor Architectures

★3 (fi 6) (either term, 3-0-3). Advanced multiprocessor architecture projects course, emphasizing parallel and non-von Neumann architectures, storage hierarchies, pipeline and vector processors, parallel algorithms, inter-connection structures, control mechanisms. Prerequisites: CMPUT 379, 429.

CMPUT 551 Artificial Intelligence: Reasoning

★3 (fi 6) (either term, 3-0-0). Review and analysis of general problems solving methods; advanced theorem proving methods, planning, skill acquisition, and knowledge representation and organization. Prerequisite: CMPUT 451.

CMPUT 552 Topics in Knowledge Representation

★3 (fi 6) (either term, 3-0-0).

CMPUT 566 Algebraic and Symbolic Computation

★3 (fi 6) (either term, 3-0-0). Symbolic and algebraic languages, representation and simplification of expressions. Transformation of representation: Chinese remainder, Hensel constructs, Padé fractions. Fast arithmetic. Greatest common division and factorization. Algebraic algorithms. Prerequisite: CMPUT 304. Corequisite: MATH 423 or 425.

CMPUT 572 Topics in the Theory of Computation

★3 (fi 6) (either term, 3-0-0). An introduction to foundations and research topics in the theory of computation. Prerequisite: CMPUT 474.

CMPUT 592 Topics in Deductive Databases

★3 (fi 6) (either term, 3-0-0). Prerequisite: CMPUT 391.

CMPUT 593 Distributed Database Systems

★3 (fi 6) (either term, 3-0-3). Architecture and management of distributed database systems; technical issues (design, query processing, concurrency control); overview of existing systems. Prerequisites: CMPUT 313 and 391.

CMPUT 601 Seminar

★3 (fi 6) (first term, 0-2s-0). Required of all graduate students.

CMPUT 602 Seminar

★1 (fi 2) (either term, 0-2s-0).

CMPUT 618 Topics in Computing Science

★3 (fi 6) (either term, 3-0-0).

CMPUT 622 Research Methods

★3 (fi 6) (either term, 2-1s-0). A description of Computing Science research, with emphasis on research methodology. Included are techniques and conventions that are employed in various subareas of Computing Science,

both for doing research and presenting results. The research tools available on campus will be assessed (e.g. library collections, writing resources, and computer hardware/software facilities). Required of all graduate students. Prerequisite: CMPUT 601 (seminar).

CMPUT 651 Topics in Computing Science

★3 (fi 6) (either term, 3-0-0).

CMPUT 652 Topics in Computing Science

★3 (fi 6) (either term, 3-0-0).

CMPUT 665 Seminar in Artificial Intelligence

★3 (fi 6) (either term, 0-3s-0).

CMPUT 701 Essay in Computing Science I

★6 (fi 12) (either term, 0-1s-5). A major essay on an agreed topic.

211.47 Consumer Studies

Department of Human Ecology
Faculty of Agriculture, Forestry and Home Economics

Note: See also Family Studies; Human Ecology; and Textiles, Clothing, and Culture listings for related courses.

211.47.1 Undergraduate Courses

D **CONS 220 Fundamentals of Consumer Behavior**

★3 (fi 6) (either term, 3-0-0). The study of the factors affecting the consumer decision process, analysis of consumer behavior models, and their application to consumer policy, consumer education, and marketing. Prerequisite: ECON 101 or completion of an approved economics module available from the Department of Human Ecology. Not open to students with credit in MARK 422.

CONS 330 Family Finance

★3 (fi 6) (either term, 3-0-1.5). Principles of money management applied to family income and expenditure. Special emphasis will be placed on the management of credit, savings, investment, insurance, and pre-retirement planning. Prerequisites: ECON 101 and ECON 102, or completion of an approved economics module available from the Department of Human Ecology.

CONS 340 Family Economic Issues

★3 (fi 6) (either term, 3-0-0). An examination of current issues affecting the economic well-being of Canadian families and of government programs and policies which address those issues. Issues explored will include poverty, work and family, the economics of aging, children and money, and intrafamily allocation of resources. Prerequisites: FAM 110 and either ECON 101 and ECON 102, or completion of an approved economics module available from the Department of Human Ecology.

CONS 420 Advanced topics in Consumer Behavior

★3 (fi 6) (either term, 3-0-0). Advanced study of consumer behavior theories and their application to consumer research that informs marketing, consumer policy, and consumer education. Prerequisite: CONS 220 or MARK 422. Not open to students with credit in MARK 423.

CONS 430 Consumer Issues and Policies

★3 (fi 6) (either term, 2-2s-0). Principles and processes of policy development, implementation and analysis; analysis of current issues faced by Canadian consumers; examination of government programs and policies regarding protection of consumers in the marketplace. Prerequisite: CONS 220 or MARK 422.

211.47.2 Graduate Course

CONS 630 Seminar in Consumer Studies

★3 (fi 6) (either term, 0-3s-0). Examination of the research and theory related to consumer behavior, the application of these to consumer problems and the implications for consumer education. Prerequisite: CONS 220 or MARK 422 or consent of Instructor.

211.48 Curriculum et méthodologie

Faculté Saint-Jean

CU ME 301 Introduction à l'éducation physique au niveau élémentaire

★3 (fi 6) (l'un ou l'autre semestre, 0-3L-0). L'étude de l'enfant dans ses expériences de mouvement. La terminologie spécifique à l'enseignement de l'éducation physique en français. Le développement des habiletés motrices et psychomotrices de l'enfant. Les programmes d'éducation physique à l'élémentaire.

CU ME 308 Introduction à la didactique de la langue (élémentaire/secondaire)

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Les caractéristiques de l'approche

communicative. Les caractéristiques des discours. Evolution historique de l'enseignement des langues. Les principes de base pour l'enseignement du français en immersion et en milieu minoritaire. Etude du programme d'études et analyse du matériel didactique. Ce cours n'est pas accessible aux étudiants ayant des crédits en CU ME 307, 310, 311, 334, 335.

CU ME 309 Didactique de la communication orale et écrite à l'élémentaire

★3 (fi 6) (l'un ou l'autre semestre, 3-0-2). Etude des quatre habiletés langagières. Stratégies d'enseignement et application pratique. Moyens d'intervention, correction et évaluation. Ce cours n'est pas accessible aux étudiants ayant des crédits en CU ME 310, 311, 336, 337. Prerequisite: CU ME 308.

CU ME 326 Enseignement de l'éducation physique au niveau élémentaire

★3 (fi 6) (l'un ou l'autre semestre, 0-3L-0). Les approches pédagogiques pour l'enseignement en français de l'éducation physique à l'élémentaire. La programmation; les diverses méthodologies et stratégies d'enseignement; les systèmes d'évaluation de l'enfant et du programme.

CU ME 331 Didactique des mathématiques au niveau élémentaire

★1,5 (fi 3) (l'un ou l'autre semestre, 1,5-0-0). Initiation à l'enseignement des mathématiques à l'élémentaire. Selon les stades de développement de l'enfant de 5 à 11 ans. Etude et interprétation des exigences du programme du ministère de l'Éducation. Stratégies et techniques d'enseignement. Mises en situation. Ce cours n'est pas accessible aux étudiants ayant des crédits en CU ME 316.

CU ME 332 Didactique des sciences au niveau élémentaire

★1,5 (fi 3) (l'un ou l'autre semestre, 1,5-0-0). Initiation à l'enseignement des sciences à l'élémentaire. Etude et interprétation des exigences du programme du ministère de l'Éducation. Se sensibiliser au rôle que joue la science dans la société. Comment encourager les élèves à explorer et à étudier les sciences. Mises en situation. Ce cours n'est pas accessible aux étudiants ayant des crédits en CU ME 320 ainsi qu'en CU ME 405 offert avant septembre 1995.

CU ME 333 Didactique des études sociales à l'élémentaire

★1,5 (fi 3) (l'un ou l'autre semestre, 1,5-0-0). Analyse des programmes d'études sociales pour les francophones en milieu minoritaire et pour le milieu d'immersion française; et étude des ressources prescrites par le ministère de l'Éducation. La planification de l'enseignement des études sociales et stratégies d'enseignement. Ce cours n'est pas accessible aux étudiants ayant des crédits en CU ME 312 ainsi qu'en CU ME 405 offert avant septembre 1995.

CU ME 338 L'enseignant et le programme d'études à l'élémentaire

★1,5 (fi 3) (l'un ou l'autre semestre, 1,5-0-0). Examen des programmes d'études du ministère et du rôle de l'enseignant à l'élémentaire. Étude critique et interprétation des exigences. L'enseignant face à l'étendue des programmes d'études. Etude des diverses matières et de leur contribution au développement intégral de l'enfant. Exploration des stratégies et des modalités d'intervention pédagogique, en fonction d'une exploitation intégrée des apprentissages.

CU ME 339 Enseignement de la musique au niveau élémentaire I

★3 (fi 6) (l'un ou l'autre semestre, 0-3L-0). Prerequisite: MUSIQ 103 ou l'équivalent, ou MUSIQ 151 et 155/156 ou l'équivalent.

CU ME 343 Introduction à l'enseignement des beaux-arts à l'élémentaire

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Intégration des beaux-arts dans la vie quotidienne de l'enfant à l'école. Une partie du cours sera consacrée aux ateliers pratiques.

CU ME 347 Utilisation de l'ordinateur en éducation

★3 (fi 6) (l'un ou l'autre semestre, 3-0-2). Les principales composantes. Le fonctionnement. Programmation utile pour la salle de classe. Initiation aux principales applications. Internet comme outil indispensable pour l'apprentissage. Réflexion sur le rôle de l'ordinateur en éducation.

CU ME 357 L'enseignement dans les écoles françaises en milieu minoritaire

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Cours de pédagogie et de méthodologie à l'intention des futurs enseignants qui se dirigent vers l'enseignement dans les écoles françaises en milieu minoritaire. Les thèmes suivants seront étudiés: le rôle et les responsabilités de l'enseignant face à l'élève minoritaire et à sa communauté; les attitudes et les actions de l'enseignant qui vont permettre à l'étudiant de s'approprier ses réalités culturelles; la pédagogie de l'interaction; l'éducation communautaire; le développement de programmes et de matériel pédagogique; la programmation culturelle.

CU ME 358 Enseignement du français au niveau secondaire

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Cours de méthodologie pour l'enseignement du français en immersion et en milieu francophone minoritaire. Etudes des nouvelles tendances dans la didactique de l'écriture et de la lecture. Comparaison de l'approche traditionnelle et de l'approche fonctionnelle dans l'enseignement de la grammaire. Démarche pour la

planification d'une unité en production écrite et pour l'enseignement de la grammaire en contexte communicatif.

CU ME 359 Enseignement de la littérature au niveau secondaire

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Pédagogie générale et pratique de la littérature; méthodes d'enseignement et d'analyse du roman, de la poésie et de la pièce de théâtre. Les étudiants sont invités à faire l'expérience des méthodes suggérées.

CU ME 360 Enseignement des études sociales au 1er cycle du secondaire

★3 (fi 6) (premier semestre, 3-0-0). Pédagogie générale et pratique de l'enseignement des études sociales; analyse des programmes d'études sociales pour les francophones en milieu minoritaire et pour le milieu d'immersion française; étude des ressources prescrites par le ministère de l'Éducation; étude des méthodes d'enseignement et d'évaluation, des objectifs d'apprentissage, et le rôle et les responsabilités de l'enseignant des études sociales. Prérequis: Deux cours complets dans la spécialisation.

CU ME 361 Enseignement des études sociales au 2e cycle du secondaire

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Pédagogie générale et pratique de l'enseignement des études sociales; analyse des programmes d'études sociales et des ressources prescrites par le ministère de l'Éducation; étude de l'histoire des études sociales et des conceptions d'études sociales; étude des méthodes d'enseignement et d'évaluation des études sociales; et intégration des actualités aux objectifs des programmes d'études sociales. Prérequis ou co-requis: CU ME 360.

CU ME 363 L'enseignement des mathématiques au niveau secondaire

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Ce cours a pour but de préparer les étudiants à enseigner les mathématiques à tous les niveaux du secondaire; à faire acquérir quelques principes fondamentaux nécessaires à une conception adéquate des mathématiques et de leur didactique. Ce cours propose diverses stratégies pour encourager l'apprentissage des mathématiques d'une façon concrète. Prérequis: un cours complet dans la spécialisation.

CU ME 367 L'enseignement des sciences au niveau secondaire

★3 (fi 6) (l'un ou l'autre semestre, 0-3L-0). Ce cours permettra à l'étudiant de connaître à fond le contenu et les objectifs du curriculum de science à tous les niveaux du secondaire; les différentes méthodes de présenter un concept en science; les nouvelles applications technologiques dans l'enseignement de la science; et l'équipement existant pour faciliter l'enseignement de la science. Prérequis: un cours complet dans la spécialisation.

CU ME 387 Enseignement de la musique au niveau secondaire I

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Prérequis ou corequis: deux cours complets dans la spécialisation.

CU ME 388 Enseignement de la musique au niveau secondaire II

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Prérequis ou corequis: CU ME 387.

CU ME 389 Enseignement de l'art dramatique au niveau secondaire I

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Prérequis ou corequis: deux cours complets dans la spécialisation.

CU ME 405 Séminaire en enseignement élémentaire

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Etude de sujets propres à l'enseignement élémentaire.

CU ME 410 Enseignement de la littérature enfantine

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Familiarisation avec la littérature enfantine. Cours centré sur la création et l'interaction avec le discours littéraire. Sensibilisation au processus de la lecture esthétique.

CU ME 444 Etude personnelle dirigée dans le domaine de l'enseignement au niveau élémentaire

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Prérequis: accord du professeur et du Vice-doyen aux affaires académiques.

CU ME 458 Grands courants dans l'enseignement de la langue

★3 (fi 6) (l'un ou l'autre semestre, 0-3L-0). Principes d'acquisition de langue (langue maternelle et langue seconde). Le cours invitera les participants à réfléchir sur la dimension communicative de la langue, et leur permettra de se familiariser tant au niveau théorique que pratique avec la méthodologie de l'approche communicative. Les participants seront invités à partager leurs idées et leurs expériences. Ce cours est réservé aux enseignants.

CU ME 459 Séminaire dans le domaine de l'enseignement au niveau élémentaire

★3 (fi 6) (l'un ou l'autre semestre, 0-3s-0). Le contenu du cours varie d'une année à l'autre. Les sujets sont annoncés avant la période d'inscription. Le titre du cours figurera sur le relevé de notes de l'étudiant.

CU ME 494 Enseignement de l'éducation physique au niveau secondaire

★3 (fi 6) (l'un ou l'autre semestre, 0-3L-0). Les approches pédagogiques pour l'enseignement en français de l'éducation physique au secondaire, la

programmation; les diverses méthodologies et stratégies d'enseignement; les systèmes d'évaluation de l'élève et du programme.

CU ME 496 L'enseignement religieux et l'éducation morale

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0).

CU ME 498 Séminaire dans le domaine de l'enseignement au niveau secondaire

★3 (fi 6) (l'un ou l'autre semestre, 0-3s-0). Le contenu du cours varie d'une année à l'autre. Les sujets sont annoncés avant la période d'inscription. Le titre du cours figurera sur le relevé de notes de l'étudiant.

CU ME 499 Etude personnelle dirigée dans le domaine de l'enseignement au niveau secondaire

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Prérequis: accord du professeur et du Doyen.

CU ME 500 Théorie générale de curriculum: contexte écoles françaises en milieu minoritaire et écoles d'immersion

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Analyse approfondie des définitions et théories du curriculum, de ses composantes et de ses bases idéologiques et de leurs applications dans les écoles françaises en milieu minoritaire et en immersion. Limité aux détenteurs d'un baccalauréat en éducation ou l'équivalent.

211.49 Dairy Science

Department of Agricultural, Food, and Nutritional Sciences
Faculty of Agriculture, Forestry and Home Economics

Note: See also Animal Science, Nutrition, and Nutrition and Food Sciences listings for related courses.

211.49.1 Undergraduate Courses

DAIRY 300 Fundamentals of Dairy Science

★3 (fi 6) (second term, 3-2s-0). Physiology of lactation. Biosynthesis and properties of milk components. Physical, chemical, microbiological, technological and nutritional aspects of milk. Prerequisite: ★6 in biochemistry.

DAIRY 393 Dairy Product Analysis

★3 (fi 6) (second term, 1-0-3). Biochemical, chemical, and microbiological analyses of milk and dairy products. Prerequisites: DAIRY 300, NU FS 361, and 372.

DAIRY 403 Processing of Milk and Dairy Products

★3 (fi 6) (first term, 3-1s-0). Technological principles of milk treatment and processes for fluid milk products: concentrated, dried, sterilized, and fermented dairy products, cheese, butter, and ice-cream. Prerequisite: DAIRY 300.

DAIRY 413 Advanced Dairy Technology

★3 (fi 6) (second term, 3-2s-0). Special topics in dairy processing and microbiology of cultured dairy products. Alternate year offerings of in-depth studies of either cheese, membrane technology and dairy ingredients, or genetics of lactic culture bacteria and dairy fermentations. Prerequisites: DAIRY 403 and 393 or consent of Instructor.

DAIRY 440 Dairy Science and Nutrition

★3 (fi 6) (either term, 0-3s-0). Integrated final project including laboratory or field work. Exploration of dairy systems, technological processes or issues pertaining to quality and nutritive value of dairy products. Open to fourth year students only. Prerequisite or corequisite: DAIRY 413.

211.49.2 Graduate Courses

Note: The following undergraduate courses may be taken for credit by graduate students: DAIRY 300, 403, 413.

211.50 Reserved

211.51 Dance

Faculty of Physical Education and Recreation

Note: See also INT D 439 for a course which is offered by more than one department or Faculty and which may be taken as an option or as a course in this discipline.

DANCE 100 The Spectrum of Dance in Society

★3 (fi 6) (either term, 2-0-2). The theory and practice of dance as a human physical activity. Focus will be on the aesthetic, expressive, rhythmical dimensions of movement in a culture's artistic and social life. The study will include movement content, techniques, improvisation, composition and performance in a variety of dance forms including modern/creative, social, jazz, and folk dance. For BPE students only.

DANCE 300 Dance History and Philosophy

★3 (*fi 6*) (either term, 3-0-0). The history and philosophy of dance from primitive times to the present. Special emphasis will be on major forms of dance in the 20th century, dance in Canadian culture and personalities who have influenced dance in art and culture.

DANCE 340 Modern Dance

★3 (*fi 6*) (either term, 3-0-0). The study of creative dance techniques, improvisation, composition, and performance through theory and practical experience.

DANCE 345 Modern Dance Techniques

★3 (*fi 6*) (either term, 3-0-0). Development of personal movement skills in a variety of modern dance techniques combined with knowledge of movement and dance principles.

DANCE 350 International Folk Dance

★3 (*fi 6*) (either term, 3-0-0). The study of folk dances in selected cultures through theory and practical experience. Theory will focus on costume, music, history, geography, and other elements which influence the dances.

DANCE 431 Study of Dance for Children

★3 (*fi 6*) (either term, 1-2s-0). Children's dance from the perspective of the child as creator, performer and spectator. Opportunities to observe, work with and perform for children will be provided. Prerequisite: PEDS 292, 293, 338, or consent of Faculty.

DANCE 446 Modern Dance Composition

★3 (*fi 6*) (either term, 3-0-0). Theory and practice of modern dance improvisation and composition, principles of form and design, individual and group choreography, evaluation. Prerequisite: One of DANCE 100, 340, 431, or consent of Faculty.

DANCE 499 Directed Studies

★3 (*fi 6*) (either term, 0-3s-0). An individualized course designed to offer an in-depth study in a dance area not covered by regular courses. Prerequisite: consent of Faculty.

211.52 Dance Activity

Faculty of Physical Education and Recreation

Goal of DAC Level I:

- (1) Acquisition of basic skills required in the activity and an appreciation of how these skills are used in combination in performance situations.
- (2) Development of the specific theoretical knowledge associated with terminology, history, sociocultural context, rules and organizational aspects, basic strategies and tactics, technique and other concepts relevant to the activity.

Note: Activity-course dress requirement for first class. Students are expected to attend the first class of any activity course appropriately dressed for activity participation.

DAC 155 Social Dance

★1.5 (*fi 3*) (either term, 0-3L-0). Acquisition of theoretical knowledge and personal skill in several variations and sequences of the foxtrot, waltz, tango, jive, rumba, and cha cha. Integral to this will be the development of good partnering and rhythmic abilities.

DAC 160 Jazz Dance

★1.5 (*fi 3*) (either term, 0-3L-0). Acquisition of theoretical knowledge and personal skill in body awareness and placement, locomotion and choreographed jazz dance.

DAC 165 Ballet

★1.5 (*fi 3*) (either term, 0-3L-0). Acquisition of theoretical knowledge and personal skill in either RAD or Cecchetti syllabus, including barre and centre floor work such as positions, port de bras, elevation and travelling.

DAC 399 Selected Topics in Dance

★3 (*fi 6*) (either term, 3-0-0). Theory and practice of selected dance forms. Refer to the Registration Procedures Book for information on specific sections. Prerequisite: consent of Faculty.

211.53 Dental Hygiene

Division of Dental Hygiene
Faculty of Medicine and Oral Health Sciences

D HYG 200 Anatomy

★3.5 (*fi 7*) (first term, 47 hours). To provide a sound theoretical and practical knowledge of detailed head and neck anatomy for the clinical practice of dental hygiene. Emphasis will be placed on radiological skeletal anatomy and neural anatomy for local anesthetic purposes.

D HYG 211 Concepts in Dental Hygiene Practice

★5.5 (*fi 11*) (full session, 84 hours). A lecture course integrating the knowledge and practice of clinical dental hygiene. This course is structured around the four key areas of responsibility for the clinical dental hygienist, namely oral assessment, treatment planning, disease prevention and health maintenance and dental hygiene therapy.

D HYG 212 Preclinical Dental Hygiene

★6 (*fi 12*) (first term, 180 hours). An introduction to fundamental techniques in disease control, instrumentation, assessment techniques, and related clinical procedures are presented and discussed.

D HYG 213 Introduction to Clinical Practice I

★3 (*fi 6*) (second term, 90 hours). A clinical course integrating the knowledge, practice, and skills of dental hygiene practice.

D HYG 214 Clinical Practice I

★7.5 (*fi 15*) (Intersession, 216 hours). A clinical course integrating the knowledge, practice and skills of dental hygiene practice. Included will be instruction in nutritional assessment and counselling procedures.

D HYG 215 Biomaterials

★2 (*fi 4*) (full session, 28 hours). The course is designed to give the dental hygiene students a general knowledge of dental materials, to allow them to recognize the various dental materials and to have some knowledge of their manipulation and application, and to be able to intelligently discuss the clinical applications and problems associated with the materials with both the dentist and patient.

D HYG 216 Management of special Needs Patients

★1 (*fi 2*) (second term, 14 hours). A lecture course that emphasizes the clinical care and management techniques required for patients with special needs; the physically and/or mentally disabled patient, the sensory disabled patient, and the medically compromised patient. Students will be responsible for completing relevant projects for course evaluations.

D HYG 217 Professional Ethics and Communication

★1 (*fi 2*) (Intersession, 20 hours). This is a team instructed course that will provide a range of skills: an experience in the development of interpersonal and critical thinking skills through simulation exercises; a knowledge of professional ethics with moral reasoning and ethical decision making. Emphasis is placed on how these topics and related skills impact on a dental hygienist's ability to successfully practise in today's health care delivery system.

D HYG 220 Oral Health Education

★3 (*fi 6*) (second term, 54 hours). An introduction to the principles of dental health education, construction and utilization of audiovisual materials, the operation of audiovisual equipment and instructional preparation for group education is included.

D HYG 222 Population Health and Health Promotion

★2 (*fi 4*) (second term, 34 hours). Population Health and Health Promotion is that portion of the dental hygiene curriculum which prepares students with a broad understanding of the factors that affect the health and well-being of the total population. It will provide students with an understanding of the determinants of health and suggest strategies for working with other disciplines and community agencies to affect health outcomes. It will also provide students with the knowledge and skills to assess the need for a plan and deliver appropriate services to meet oral health needs on a community basis.

D HYG 230 Dental Anatomy

★1.5 (*fi 3*) (first term, 20 hours). A self-study course that is concerned with nomenclature, biologic considerations of tooth form and function; permanent and deciduous teeth are studied in detail.

D HYG 231 Office Emergencies

★1 (*fi 2*) (Intersession, 14 hours). This is a lecture course that will include the etiology, symptoms, and primary treatment methods associated with disease entries that have the potential of constituting a dental office emergency.

D HYG 232 Dental Specialties

★1 (*fi 2*) (second term, 14 hours). Introduction to specialties in dental practice and the role of the dental hygienist in each area. A clinical rotation in each specialty is included.

D HYG 240 Radiology

★2 (*fi 4*) (full session, 34 hours). An introductory course covering the history of dental radiography as well as lectures in radiation physics, radiobiology, radiation control and radiation hygiene. Common types of radiographic films and film characteristics will be discussed as well as photographic chemistry and methods of processing. Projection geometry, principles of dental radiography and normal radiographic anatomy as it relates to identification and mounting of radiographs will be stressed. Each student will also rotate through the clinics in the Second Term and Intersession for preclinical experience.

D HYG 241 Radiology★1 (*fi 2*) (Intersession, 12 hours).**D HYG 313 Clinical Practice II**★16 (*fi 32*) (full session, 471 hours) (second term, 216 hours). This is an advanced clinical course that integrates the knowledge and practice of dental hygiene skills, dental assisting skills, dental practice management and administration.**D HYG 316 Management of Special Needs Patients**★2 (*fi 4*) (full session, 28 hours). A lecture course that emphasizes the clinical care and management techniques required for patients with special needs; the physically and/or mentally disabled patient, the sensory disabled patient, and the medically compromised patient. Students will be responsible for completing relevant projects for course evaluation.**D HYG 317 Ethics, Practice, and Leadership**★2 (*fi 4*) (full session, 28 hours). A team instructed course that will provide the student with a knowledge of professional ethics with moral reasoning and ethical decision making, an experience with conducting a research study and presenting the findings at professional meetings, a further development of their interpersonal and critical thinking skills through simulation exercises, and a variety of other professional practice related topics.**D HYG 320 Oral Health Education I**★2 (*fi 4*) (first term, 39 hours). An introduction to the principles of dental health education. Construction and utilization of audiovisual materials, the operation of audiovisual equipment and instructional preparation for group education is included.**D HYG 321 Oral Health Education II**★2 (*fi 4*) (second term, 52 hours). A continuation of D HYG 320. The application of Educational theory to teaching is provided by field experience in a variety of community settings.**D HYG 322 Community and Preventive Dentistry**★2 (*fi 4*) (full session, 37 hours). Focus on the dental hygienist's role in promoting health in the community, with an emphasis on epidemiology, research methodologies, program planning and delivery. Students will plan a model community dental health program using a systems approach.**D HYG 325 Dental Hygiene Hospital Dentistry**★0.5 (*fi 1*) (full session, 12 hours). Students are provided with experience in the utilization of an integrated health care approach to hospitalized special populations through rotations at Alberta Hospital and the University of Alberta Hospital.**D HYG 326 Periodontology for the Dental Hygienist**★2 (*fi 4*) (full session, 34 hours). A lecture and demonstration course designed to introduce the student to those procedures that are commonly associated with the practice of periodontics. Lectures on the classification of periodontal disease, the objectives of periodontal therapy and on how to assess periodontal conditions are also included. A periodontal clinical association with dental students will also take place on a clinic rotation basis.**D HYG 329 External Rotation**★2.5 (*fi 5*) (full session, 75 hours). Each student spends two weeks at an external dental clinic. During this period, students will provide a broad range of health promotional activities including preventive dental hygiene therapies, classroom education and oral health instruction. The aim of this program is to provide a private practice clinical experience or a community focused opportunity to provide primary and secondary oral health interventions.**D HYG 340 Dental Radiography**★2 (*fi 4*) (full session, 48 hours). Clinical experience in intraoral examinations on patients as well as processing and mounting radiographs.**D HYG 345 Geriatrics**★1 (*fi 2*) (second term, 14 hours). An introductory course describing the needs of the elderly. The course will examine the changing population balance in Canada involving both medical and dental aspects of people over sixty years of age.**D HYG 386 Anesthesia**★1 (*fi 2*) (first term, 15 hours). A didactic course to provide students with the ability to evaluate and use the specific local anesthetic for a given patient. Students will also be able to describe the techniques, drug reactions and complications involving the use of local anesthetics and have practical experience in the administration of local anesthetics.**D HYG 387 Anesthesia**★.5 (*fi 1*) (first term, 15 hours). A lab course to provide students with the ability to evaluate and use the specific local anesthetic for a given patient. They will also be able to describe the techniques, drug reactions and complications involving the use of local anesthetics and have practical experience in the administration of local anesthetics. Prerequisite: Departmental approval.**211.54 Dentistry**Department of Oral Health Sciences
Faculty of Medicine and Oral Health Sciences**211.54.1 Undergraduate Courses****DENT 300 Clinical Informatics for Oral Health Sciences**★0 (*fi 1*) (either term, 8 hours). Introduction to searching clinical literature relevant to dentistry, including Medline, EMBASE, Current Contents, Internet/WWW sources.**DENT 309 Material Sciences**★1 (*fi 2*) (first term, 15 hours). This course provides a background for the study of materials used in the health professions. The following topics are introduced: atomic structure, bonding, material properties, metals, polymers, ceramics, multiphase materials, and corrosion.**DENT 310 Dental Anatomy**★2 (*fi 4*) (first term, 60 hours). Coronal, radicular and pulpal morphology of the primary and permanent dentitions.**DENT 311 Occlusion**★1 (*fi 2*) (Intersession, 15 hours). A multidisciplinary didactic program of biomechanical principles of occlusion.**DENT 312 Occlusion**★1.5 (*fi 3*) (Intersession, 45 hours). A laboratory program in occlusal relationships and instrumentation.**DENT 317 Operative Dentistry**★2.5 (*fi 5*) (Intersession, 30 hours). Included will be discussions of basic operating principles; cutting instruments; principles of cavity nomenclature and classification; the principles of cavity preparations along with the manipulation requirements of amalgam and Class V composite resins.**DENT 318 Operative Dentistry**★4.5 (*fi 9*) (Intersession, 135 hours). Cavity preparations will be cut in artificial and extracted natural teeth and manipulation of both silver amalgam and gold foil will be practised. Students are responsible for supplying both anterior and posterior natural teeth for their own use.**DENT 326 Periodontics**★1 (*fi 2*) (second term, 15 hours). Students will be presented with detailed information and instructions pertaining to the etiology, pathogenesis, microscopic and clinical characteristics of diseased and healthy periodontium. An introduction to the fundamental concepts of diagnosis, prevention and treatment of the early periodontal lesion will also be given.**DENT 327 Periodontics**★1.5 (*fi 3*) (second term, 45 hours). Introduction to the periodontal examination and charting procedures. The student will also learn to identify and record the primary etiological factors in the initiation and progression of periodontal disease and preventive oral hygiene procedures to control these etiological agents. A great portion of the clinical experience will emphasize the use of scalers and curettes.**DENT 332 Diagnosis**★1 (*fi 2*) (first term, 21 hours). An introduction to the fundamental principles involved in the patient's historical and clinical data, and the clinical study of disease in order to arrive at a diagnosis and a treatment plan based on the needs of the patient.**DENT 334 Radiology**★1 (*fi 2*) (Intersession, 15 hours). The elementary principles of radiology including the basic electronics, physics and geometry of image formation as well as the photographic basis of image production on film.**DENT 340 Community and Preventive Dentistry**★2 (*fi 4*) (second term, 30 hours). Students will be introduced to current issues in dentistry and public health, history of dentistry in Alberta and Canada, public health programs including visitations to public health clinics, biostatistical applications, and the epidemiology and aetiology of dental diseases and preventive method of control.**DENT 352 Anaesthesia**★1.5 (*fi 3*) (Intersession, 30 hours). This course deals in didactic form with local anaesthesia covering anatomy, physiology and pharmacology of different local anaesthetics. Discussion of different armamentarium and techniques forms the major part of the course. Complications which can arise from their use including prevention and treatment are also covered. Local anaesthetic techniques covering all types of infiltration and intraoral blocks form the major component of the lab component. Students practise anaesthetic techniques by using each other as patients. Emphasis is on mandibular block and Gow-Gates techniques.**DENT 359 Dental Materials**★2 (*fi 4*) (Intersession, 30 hours). This course provides in depth discussions

of the materials used in dentistry. Topics include: gypsum products, impression materials, polymers, restorative resins, dental amalgam, gold casting alloys, waxes, investment materials, casting, porcelain, cements, nonprecious casting alloys, steels, high speed instrumentation and materials research methodology.

DENT 363 Fixed Prosthodontics

★3 (fi 4) (full session, 30 hours). A didactic course of the biomechanical considerations in providing extracoronal restorations and fixed prosthesis. Emphasis is placed on problem-solving and development of clinical judgement.

DENT 364 Fixed Prosthodontics

★3 (fi 6) (full session, 90 hours). A preclinical laboratory course in the principles of tooth preparation, temporization, impressions and cementation correlated with laboratory fabrications of extracoronal restorations.

DENT 365 Endodontics

★1 (fi 2) (first term, 15 hours). The conservation of pulp-involved and pulpless teeth. Procedures for diagnosis and treatment described, demonstrated and correlated with the related dental and basic sciences.

DENT 366 Endodontics

★2 (fi 4) (second term, 66 hours). Laboratory practise on mannequins under simulated clinical conditions.

DENT 367 Operative Dentistry

★2 (fi 4) (full session, 30 hours). A continuation of DENT 317 with emphasis being given to the use of gold inlays, a continuation of the use of white restoratives, and the use of amalgam with retentive pins.

DENT 368 Operative Dentistry

★3 (fi 6) (full session, 90 hours). Both natural (extracted) teeth and artificial teeth will be used in practising the techniques related to gold inlays, white restoratives, and large pin amalgams. The second term will be an introduction to the clinic where students will prepare and place silver amalgam restorations in patients.

DENT 371 Removable Prosthodontics

★2 (fi 4) (full session, 30 hours). A lecture/audiovisual series that relates to the DENT 372 laboratory and clinical experience.

DENT 372 Removable Prosthodontics

★4.5 (fi 9) (full session, 138 hours). A laboratory/clinical experience emphasizing the technical aspects and a clinical experience in treating an edentulous patient requiring complete dentures.

DENT 373 Removable Prosthodontics

★1 (fi 2) (Intersession, 15 hours). A lecture series relating to the DENT 374 course; an introduction to removable partial dentures specific to related macroanatomy, biomechanics, classification and component parts.

DENT 374 Removable Prosthodontics

★3 (fi 6) (first term, 84 hours). A lecture/audiovisual series introducing diagnosis, treatment planning, impression principles; a laboratory clinical-simulation treating a partially edentulous mannequin.

DENT 376 Periodontics

★2 (fi 4) (full session, 30 hours). Detailed information will be presented pertaining to the fundamental concepts of diagnosis, prevention and treatment of periodontal disease. Material will cover a more in depth view of periodontal disease and the therapies which are available. The role of occlusion as it relates to periodontal tissue will be covered in more depth. Emphasis is placed on procedural techniques, their indications and contraindications.

DENT 377 Periodontics

★2.5 (fi 5) (full session, 67 hours). Students will be introduced to periodontal treatments of patients. Emphasis is placed on application of skills learned in lecture and pre-clinic exercises from DENT 327. The student will develop the skills to diagnose and treat early forms of periodontal disease.

DENT 378 Pediatric Dentistry

★1 (fi 2) (second term, 15 hours). The lectures are designed to acquaint the student with examination and treatment planning for the child patient, as well as aspects of child behavior management techniques, restorative dentistry and pulp therapy.

DENT 379 Pediatric Dentistry

★1.5 (fi 3) (second term, 45 hours). This lab technique course stresses basic clinical skills performed on dentofoms. Procedures performed include a variety of cavity designs for amalgam, stainless steel crown restorations, the pulpotomy procedure and the fabrication of space maintainers.

DENT 380 Orthodontics

★2 (fi 4) (full session, 30 hours). Growth and development of the craniofacial complex, etiology and diagnosis of malocclusion, biological and mechanical principles of tooth movement, orthodontic examination and records.

DENT 382 Diagnosis

★1.5 (fi 3) (full session, 27 hours). Students will be assigned patients throughout the year for clinical examination to gain experience in gathering

patient data, making the diagnosis, formulating treatment plans, and practising communicative skills in case presentation. The didactic portion will be a continuation of the study of diagnosis and treatment of local and systemic disease with emphasis upon treatment planning approaches as they relate to specific disciplines, leading to the integration of the various disciplines in the treatment plan. Students will be exposed to a number of mock cases for further experience in diagnosis and treatment planning.

DENT 383 Diagnosis

★1 (fi 2) (Intersession, 10 hours). This didactic portion will be a continuation of DENT 382.

DENT 384 Radiology

★1 (fi 2) (first term, 15 hours). The fundamentals in the interpretation of normal and radiologic signs of disease in the jaws. A systematic review of the radiologic evidence of disease in the jaws will also be presented.

DENT 385 Radiology

★1 (fi 2) (full session, 24 hours). A laboratory course involving two segments: an introductory experience in production of x-ray films on mannequins and in patients; an introduction to the interpretation and reporting of dental x-ray films.

DENT 396 Ethics and Dentistry

★1 (fi 2) (Intersession, 15 hours). To raise the student's level of consciousness concerning the ethics of dental health care and to provide information that will assist them in moral reasoning.

DENT 400 Introduction to Diagnosis and Treatment Planning

★1.5 (fi 3) (Intersession, 33 hours). Introduction to the process of diagnosis and treatment planning of comprehensive dental treatment cases. Students will collect data and formulate treatment plans for a varied assortment of clinical patients. Included will be instruction in the nutritional assessment and counselling procedures that form part of patient diagnosis and treatment planning.

DENT 401 Introduction to Clinical Practice

★6.5 (fi 13) (Intersession, 198 hours). Students will be introduced to the concept of clinical dental treatment beginning with information gathering and organization and progressing to actual treatment delivery as part of a clinical team. A two-week rotation to an external clinic may also occur.

DENT 404 Sedation and Pain Control

★2 (fi 4) (Intersession, 40 hours). The control of pain in a dental practice. Lectures and labs review the physiology, pharmacology, and clinical practice of providing analgesia and sedation to the dental patient. The primary course content is the safe administration of N₂O/O₂ conscious-sedation with an emphasis on patient monitoring. Intravenous access techniques are taught, and both intravenous sedation and general anesthesia are discussed.

DENT 413 Fixed Prosthodontics

★2 (fi 4) (full session, 30 hours). A didactic course of the biological considerations in providing extracoronal restorations and fixed prosthesis. Emphasis is placed on treatment planning.

DENT 414 Fixed Prosthodontics

★4 (fi 8) (full session, 120 hours). Laboratory instruction in esthetic considerations of ceramic veneers. The clinical component requires a designated number of extracoronal restorations to be completed.

DENT 415 Endodontics

★1 (fi 2) (first term, 15 hours). A continuation of DENT 365 with advanced endodontic considerations.

DENT 416 Endodontics

★2 (fi 4) (full session, 60 hours). An introduction to clinical procedures with treatment carried out on selected patients.

DENT 417 Operative Dentistry

★1 (fi 2) (first term, 15 hours). The principles and procedures necessary to successful clinical practice will be emphasized. This is a continuation of DENT 367 in which the material will be covered in more depth and oriented specifically to dealing with patients rather than just in a laboratory situation. All the materials used in operative dentistry will be included in the discussions but special emphasis will be given to white restoratives.

DENT 418 Operative Dentistry

★5 (fi 10) (full session, 150 hours). A continuation of DENT 368 which will involve both laboratory and clinical components. The majority of the time will be clinical practice on patients to allow the student to further develop operative skills. All appropriate materials including silver amalgam, gold, and tooth colored materials will be used within a properly maintained operating environment. The laboratory portion will include exercises in posterior composites and anterior veneers.

DENT 421 Removable Prosthodontics

★2 (fi 4) (first term, 30 hours). A lecture/audiovisual series emphasizing the biological principles of complete denture construction. Prosthodontic pathology, relines, resilient liners, partial dentures, overdentures, immediate dentures and related nutritional concerns are presented.

DENT 422 Removable Prosthodontics

★5 (*fi 10*) (full session, 150 hours). A clinical experience in all treatment phases of basic removable prosthodontics.

DENT 423 Introduction to Dental Implants

★1 (*fi 2*) (second term, 15 hours). To develop a scientific understanding of the biological basis of implant dentistry and provide a description of its history and current status.

DENT 424 Endodontics

★0.5 (*fi 1*) (full session, 4 hours). Endodontic cases treated by the student will be presented to a small group in a seminar setting for discussion and evaluation.

DENT 426 Periodontics

★2 (*fi 4*) (full session, 30 hours). A continuation of the previous year which expands and gives a more in-depth view of periodontal disease and available therapies. Emphasis is on the surgical techniques as methods for treating periodontal disease.

DENT 427 Periodontics

★3.5 (*fi 7*) (full session, 105 hours). Continues to involve the treatment of patients. Emphasis is on the initial preparatory phase of therapy, showing more versatility in the types of periodontal treatments and how these are interrelated with other dental disciplines. The student will develop the skills to diagnose and to treat moderate forms of periodontal disease and be able to learn how to integrate these treatments into a general dentistry practice.

DENT 428 Pediatric Dentistry

★1 (*fi 2*) (first term, 15 hours). The lecture course deals with treatment and management of the adolescent patient as well as space maintainers, preventive and interceptive orthodontics, fluorides in caries prevention and management of traumatic tooth injuries.

DENT 429 Pediatric Dentistry

★2.5 (*fi 5*) (full session, 75 hours). Introduction to clinical dental diagnosis and treatment of children and adolescents.

DENT 430 Orthodontics

★2 (*fi 4*) (full session, 30 hours). Diagnosis and treatment options, cephalometric eruption guidance and interceptive procedures, introduction to bonding/banding techniques.

DENT 431 Orthodontics

★3.5 (*fi 7*) (full session, 99 hours). Lab/clinic split. Fabrication of some common orthodontic appliances, clinical cases for treatment planning and care, orthodontic screening cases, molar uprighting cases if available, some functional appliance cases.

DENT 432 Diagnosis

★1 (*fi 2*) (first term, 15 hours). The fundamental principles involved in dental management of the diagnosed medically compromised patient will be discussed by lectures and audiovisual presentation of case examples.

DENT 433 Diagnosis and Treatment Planning

★1 (*fi 2*) (full session, 27 hours). Students are assigned to a diagnosis/treatment clinic in order to further refine skills in collecting and interpreting the dental patient's medical treatment, formulating an accurate diagnosis and rational treatment plan under the supervision and instruction of dentistry staff from various divisions and specialties. Each student will be responsible for personally treating or managing the treatment of assigned patients, one of which will be a medically compromised patient.

DENT 435 Radiology

★0.5 (*fi 1*) (full session, 12 hours). Ongoing clinical experience in radiographic film production and the reporting of radiographs on clinical patients.

DENT 438 Oral Surgery

★2 (*fi 4*) (full session, 30 hours). This course covers the diagnosis and treatment of basic principles of oral surgery. The student is introduced to the science of exodontia and related subjects. This course also covers other minor oral surgery procedures, e.g. biopsy technique, preprosthetic surgery.

DENT 439 Oral Surgery

★1 (*fi 2*) (full session, 30 hours). Clinical practice of exodontia with assisting introduced. Use of different instruments for oral surgery are emphasized. Suturing techniques and use of different forceps for extraction is taught in this course.

DENT 442 Practice Management

★1 (*fi 2*) (either term, 15 hours). This course introduces the third-year dental students to practice management topics and concepts necessary for today's successful practice of dentistry. These topics include: financial planning, banking, dental office records, different modes of practice, marketing, and time management. The emphasis is to achieve an awareness of how these topics impact on a dentist in today's society.

DENT 443 Patient Management

★2 (*fi 4*) (full session, 59 hours). This course provides experience in the comprehensive care and management of assigned dental patients. Students

are expected to plan, prioritize, and coordinate the delivery of dental care for their patients while practising proper infection control techniques.

DENT 445 Geriatrics

★1 (*fi 2*) (second term, 15 hours). An introductory course describing the needs of the elderly. The course will examine the changing population balance in Canada involving both medical and dental aspects of people over sixty years of age. Course requirements include an additional one day hospital program at the Youville Memorial Hospital for fourth-year Dentistry students.

DENT 451 Introduction to Clinical Practice II

★11 (*fi 22*) (Interession, 350 hours). Students will be introduced to the concept of dental care delivery in a multidisciplinary team setting. Comprehensive treatment will be provided to patients, involving disciplines of operative dentistry, prosthodontics, endodontics, and periodontics. Patient and practice management strategies will be reinforced. A two-week rotation to an external clinic may also occur.

DENT 466 Endodontics

★1 (*fi 2*) (full session, 36 hours). A continuation of DENT 416 with application to clinical practice. Endodontic treatment will be carried out on selected patients.

DENT 467 Restorative Dentistry

★1 (*fi 2*) (second term, 15 hours). Advanced topics in fixed prosthodontics, endodontics, and operative dentistry will be described and discussed.

DENT 473 Dental Implants

★1 (*fi 2*) (first term, 15 hours). To understand the factors involved in patient selection, referral, diagnosis and treatment planning in dental implantology and to understand the stages and methods of treatment, the complications and remedies as well as maintenance procedures.

DENT 474 Endodontics

★0.5 (*fi 1*) (full session, 4 hours). Endodontics cases treated by the student will be presented to a small group in a seminar setting for discussion and evaluation.

DENT 475 Hospital Dentistry

★2 (*fi 4*) (full session, 60 hours). A two week period of hospital training for senior students where they become familiar with hospital protocol and operating room procedures, observe oral surgery and anesthesia, attend other medical and dental clinics, perform physical evaluation of patients and provide emergency dental care and patient treatment services. An experience in a Geriatric Treatment Hospital will be provided.

DENT 477 Periodontics

★2 (*fi 4*) (full session, 60 hours). Students will further expand their skills in diagnosis and treatment of advanced cases of periodontal disease by means of periodontal surgery. Patients treatment progress will be assessed by recall checks. Emphasis will be placed on interdisciplinary treatment approaches for handling patients' dental problems.

DENT 478 Paediatric Dentistry

★1 (*fi 2*) (first term, 15 hours). A seminar format course in which current and/or significant dental literature in paediatric dentistry will be presented and discussed by students and moderated by the instructor. Two to four guest lecture hours may also be included on topics of interest.

DENT 479 Paediatric Dentistry

★1.5 (*fi 3*) (full session, 45 hours). A clinical course designed to provide the student with the diagnosis, treatment and management of children and adolescents with more complex dental needs. The use of nitrous oxide analgesia is demonstrated on select cases.

DENT 480 Orthodontics

★1 (*fi 2*) (first term, 15 hours). Treatment planning, treatment options and appliance mechanisms for a variety of clinical situations and malocclusions.

DENT 481 Orthodontics

★2 (*fi 4*) (full session, 60 hours). Clinical experience, involving preventive, interceptive and simple treatment of orthodontic problems of particular concern to the general practitioner, is designed to enable the student to apply knowledge acquired in the lectures and laboratory.

DENT 482 Oral Medicine and Pathology

★2.5 (*fi 5*) (full session, 54 hours). The oral manifestations of local and systemic diseases are presented in a conference setting. Students are given specific teaching cases to which they apply a rational approach to clinical differential diagnosis and case management. They further apply their skills in assessing and managing patients through rotations in the Screening and Emergency Clinic.

DENT 483 Diagnosis and Treatment Planning

★3 (*fi 6*) (full session, 45 hours). Each student will present to a committee of examiners a Faculty-approved clinical treatment case for the purpose of demonstrating competence in case-history taking including demographic, medical, and dental components; development and implementation of a comprehensive treatment plan; and, a critical evaluation of the actual and proposed treatment outcomes. The evaluation will be influenced by the

student's ability to draw on knowledge acquired in all years of the undergraduate program. Appropriate guidelines will be made available to the students.

DENT 485 Radiology

★0.5 (*fi 1*) (full session, 18 hours). (a) Clinical experience in radiologic interpretation and supervision of auxiliaries in the performance of radiographic film production. (b) Clinical experience in reporting of radiographs in conjunction with diagnosis.

DENT 488 Oral Surgery

★2 (*fi 4*) (full session, 30 hours). Minor oral surgery leads to teaching of other aspects of oral surgery. Most aspects of oral and maxillofacial surgery are taught in lecture form. Student is also taught to diagnose and refer difficult procedures to the specialist.

DENT 489 Oral Surgery

★1 (*fi 2*) (full session, 30 hours). Clinical practice of oral surgery continues in fourth year. Student is taught more difficult procedures, e.g. complicated exodontia. Student also gains experience in simple impactions and other minor oral surgery procedures.

DENT 490 Professional Practice Issues

★2 (*fi 4*) (full session, 30 hours). An introduction to all aspects of ethics, jurisprudence, forensic dentistry, and professional responsibilities and conduct. The legal aspects are presented by members of the Faculty of Law. The forensic dentistry component is based on actual case presentations for the identification of individuals and criminal suspects.

DENT 492 Practice Management

★2 (*fi 4*) (full session, 30 hours). This course expands on the topics introduced in DENT 442. The fourth-year dental students are given an opportunity to work with practice management concepts such as planning, financial security, monitoring the business profile of a dental practice, analysing contractual agreements, preparing a business plan, maintaining a bookkeeping system, developing a rationale for insurance coverage and investment of surplus funds. Emphasis and evaluation is directed to the degree of skill students will develop in these projects.

DENT 493 Patient Management

★2 (*fi 4*) (full session, 59 hours). This course provides experience in the comprehensive care and management of all assigned dental patients. Students are expected to plan, prioritize, and coordinate total dental care. Emphasis is placed on infection control, professionalism, booking practices, and documentation skills.

DENT 495 Clinical Practice II

★14 (*fi 28*) (full session, 420 hours). Students provide clinical dental treatment in a setting that integrates this component into the overall care and management of the patient.

DENT 496 Geriatric Dentistry

★1 (*fi 2*) (full session, 18 hours). The student will be treating patients in the Youville dental clinic and other hospital departments. The primary objective is to give the student additional experience in providing dental care to well and unwell elderly patients.

DENT 499 Satellite Dental Clinic

★3 (*fi 6*) (full session, 75 hours). Each student is required to rotate to a dental clinic in Alberta. During this period, students provide comprehensive care to patients attending the clinic. This program provides an environment for students to bridge the gap between private practice and the discipline-oriented educational experience in the Department's dental clinics.

211.54.2 Graduate Courses

DENT 532 Growth and Development

★2 (*fi 4*) (second term, 2-0-0). A detailed review of the postnatal growth and development of human craniofacial structures. Longitudinal and cross sectional growth data are presented.

DENT 540 Orthodontic Seminars

★4 (*fi 8*) (full session, 175 hours). Selected orthodontically related theoretical and practical topics along with orthodontic case management presentations are discussed in both seminar and preclinical formats.

DENT 541 Orthodontic Clinics

★2 (*fi 4*) (full session, 525 hours). Applied clinical education and experience is obtained through supervised management of selected orthodontic cases.

DENT 542 Research Methodology

★1 (*fi 2*) (full session, 30 hours). Review of scientific methodology and direction of students in technic of evaluating dental literature. A research proposal or literature review is required as part of this course.

DENT 551 Statistics and Epidemiology

★1 (*fi 2*) (full session, 30 hours). This course will develop principles of scientific methodology of problem solving, statistical terms and the qualitative and quantitative evaluation of oral disease. (Course offered in alternate years.)

DENT 562 Occlusion

★2 (*fi 4*) (second term, 75 hours). Seminars in the diagnosis and treatment of temporomandibular joint problems. Includes a comprehensive literature review. Emphasis placed on orthodontic considerations in the prevention and management of mandibular dysfunction. (Course offered in alternate years.)

DENT 640 Orthodontic Seminars

★3 (*fi 6*) (full session, 145 hours). Second year seminar and preclinical presentations. Requires successful completion of DENT 520.

DENT 641 Orthodontic Clinics

★8 (*fi 16*) (full session, 840 hours). Second year applied clinical educational program. Requires successful completion of DENT 530.

DENT 741 Orthodontic Clinics

★1 (*fi 2*) (first term, 90 hours). Third year applied clinical educational program. Patient treatment needs may require more than the 90 clinical hour minimum for course completion. Requires successful completion of DENT 630.

DENT 800 Special Registration

★0 (*fi 0*) (either term, unassigned). Dentistry undergraduate students registered in universities other than the University of Alberta and who have been admitted to the University of Alberta Faculty of Medicine and Oral Health Sciences as a "Visiting Student" in accordance with the Faculty guidelines may be required to register in this course for the purpose of entitlement to the University library and registration in the Alberta Dental Association Education Register.

211.55 Design

Department of Art and Design
Faculty of Arts

Note: Since presence at lectures and seminars, participation in classroom discussion, and the completion of assignments are important components of most courses, students will serve their best interest by regular attendance.

This particularly applies to studio courses where attendance will be a factor in grading.

211.55.1 Undergraduate Courses

DES 268 Introduction to Studio

★3 (*fi 6*) (first term, 0-6L-0). Directed study in one subject embraced by DES 372 or DES 392. Prerequisites: ART 131, or 132, and consent of Department. Note: Restricted to students in the Faculty of Education only. Formerly DES 368.

DES 337 Special Projects in Studio Disciplines

★6 (*fi 12*) (full session, 0-6L-0). Special projects in studio disciplines by special arrangement with the Department. Prerequisites: ART 131 or 132 and consent of Department. Formerly DES 339.

DES 338 Special Projects in Studio Disciplines

★3 (*fi 6*) (either term, 0-6L-0). An introductory design course intended to meet special teaching needs not otherwise satisfied under existing course offerings. Prerequisites: ART 131 or 132 and consent of Department.

DES 370 Foundations of Industrial Design

★6 (*fi 12*) (full session, 0-6L-0). Introduction to the principles, methods and techniques of industrial design. Studies of three dimensional design address concept, form and function in a social/environmental context and involve practical, hands-on projects combining theory and practice in two and three dimensions. Prerequisites: ART 131 or ART 132 and consent of Department. Formerly DES 372.

DES 375 Introduction to Visual Presentation (Non-Electronic)

★3 (*fi 6*) (first term 0-6L-0). Introductory studies in model and graphic-based projects implementing the materials and processes of traditional visualization methods and media. Prerequisites or corequisites: DES 370 and consent of Department.

DES 376 Introduction to Visual Presentation (Electronic)

★3 (*fi 6*) (second term, 0-6L-0). Introductory studies in computer-aided design in 2-D and 3-D provide exposure to state-of-the-art hardware and software for design development. Projects will be linked to studio-based actual material models. Prerequisites or corequisites: DES 370 and consent of Department.

DES 390 Foundations of Visual Communication Design

★6 (*fi 12*) (full session, 0-6L-0). Introduction to the principles, methods and techniques of visual communication design. Study of communication concerns through the integration of photography and typography. Emphasis on appropriateness, clarity, expression and description. Introduction to information and publication design problems. Prerequisites: ART 131 or ART 132 and consent of Department. Formerly DES 392.

DES 395 Introduction to Form, Visual Elements and Systems

★3 (*fi 6*) (second term, 0-6L-0). Structure, representation and expression. Creation, observation and categorization. Form, color and tone systems in contemporary and historical design, and in the environment. Prerequisites or corequisites: DES 390 and consent of Department.

DES 396 Introduction to Research and Theory in Design

★3 (*fi 6*) (either term, 0-6L-0). Introduction to information gathering methods, literature search and empirical research. Problem identification and definition. Purposes, goals, design and evaluation methods. Communication theory. Prerequisites or corequisites: DES 390 and consent of Department.

DES 425 Word and Image: Intermediate Projects in Printmaking for Designers and Artists

★6 (*fi 12*) (full session, 0-6L-0). Exploration of the multiple relationships between word and image generated through consideration of text. Prerequisites: ART 322 and DES 392. Note: Registration priority will be given to BDesign Printmaking Route students. Not open to students who have successfully completed ART 425.

DES 437 Special Projects in Studio Disciplines

★6 (*fi 12*) (full session, 0-6L-0). Special projects in studio disciplines by special arrangement with the Department. Prerequisite: consent of Department. Formerly DES 439.

DES 438 Special Projects in Studio Disciplines

★3 (*fi 6*) (either term, 0-4s-2). An intermediate design course intended to meet special teaching needs not otherwise satisfied under existing course offerings. Prerequisites: Three 300-level studio courses in Art and Design and consent of Department.

DES 470 Intermediate Industrial Design Principles and Practices

★6 (*fi 12*) (full session, 0-6L-0). Subject areas include research methods and the design process; communication skills and collaborative dynamics; human factors; the psychology of design; material properties and applications for fabrication and production; market considerations. Projects are 2-D, 3-D, and computer based. Prerequisites: DES 370 and consent of Department.

DES 475 Product Design Principles and Practices I

★3 (*fi 6*) (either term, 0-6L-0). A studio-based course which implements design principles and practices with a focus on their application to product design for batch production and mass production. Experimentation and concept development with computer technology, 2-D media, and 3-D models and mock-ups. Prerequisites or corequisites: DES 470 and consent of Department.

DES 476 Product Design Principles and Practices II

★3 (*fi 6*) (either term, 0-6L-0). A studio-based course which implements design principles and practices with a focus on their application to product design for batch production and mass production. Experimentation and concept development with computer technology, 2-D media, and 3-D models and mock-ups. Prerequisites or corequisites: DES 470 and consent of Department.

DES 477 Furniture Design Principles and Practices I

★3 (*fi 6*) (either term, 0-6L-0). A studio-based course which implements design principles and practices with a focus on their application to furniture design for batch production and mass production. Experimentation and concept development with computer technology, 2-D media, and 3-D models and prototypes. Prerequisite or corequisite: DES 470 and consent of Department.

DES 478 Furniture Design Principles and Practices II

★3 (*fi 6*) (either term, 0-6L-0). A studio-based course which implements design principles and practices with a focus on their application to furniture design for batch production and mass production. Experimentation and concept development with computer technology, 2-D media, and 3-D models and prototypes. Prerequisites or corequisites: DES 470 and consent of Department.

DES 483 Seminar on Design Issues

★3 (*fi 6*) (either term, 0-3s-0). Contemporary design issues in the fields of theory, criticism, history, professional practice and social concerns. Restricted to third-year Bachelor of Design students with consent of Department.

DES 484 Integrative Design Principles and Practices I

★3 (*fi 6*) (first term, 0-6L-0). Studio-based course which integrates Foundations of Visual Communication Design and Foundations of Industrial Design. Individual and group projects address subjects including: sign, symbol, and communication; and product, packaging, and graphics. Prerequisites: DES 370 and DES 390 and consent of Department. Note: Not open to students with credit in DES 482.

DES 485 Integrative Design Principles and Practices II

★3 (*fi 6*) (second term, 0-6L-0). Studio-based course which integrates Foundations of Visual Communication Design and Foundations of Industrial Design. Individual and group projects address subjects including: point of purchase displays and retail environs; combining 2-D and 3-D considerations.

Prerequisites: DES 370 and DES 390 and consent of Department. Note: Not open to students with credit in DES 482.

DES 490 Concepts and Systems in Visual Communication Design

★6 (*fi 12*) (full session, 0-6L-0). Systematic approaches to typographic, graphic and diagrammatic communication, image creation and manipulation. Introduction to the computer as a tool for language and visual communication. Black and white photography. Project management and research. Prerequisites: DES 390 and consent of Department. Formerly DES 492.

DES 495 The Image I

★3 (*fi 6*) (first term, 0-6L-0). Further studies in the use of the photographic image in the design context. The communicative function of the image. Representation, description, expression and persuasion. History and theory of the use of images. Prerequisites or corequisites: DES 490 and consent of Department.

DES 496 The Image II

★3 (*fi 6*) (second term, 0-6L-0). Complex image creation for communicational purposes mainly in electronic media. Introduction to criticism. Prerequisites or corequisites: DES 490 and consent of Department.

DES 497 Advanced Typography

★3 (*fi 6*) (either term, 0-6L-0). Typography in the context of language communication. Design of letterforms. The study of notation schemes. The history of letterforms, history of printing and book design. Prerequisite or corequisite: DES 490 and consent of Department.

DES 498 Information Design

★3 (*fi 6*) (either term, 0-6L-0). Text, tables, charts, diagrams and electronic displays. User-machine interaction: perception and cognition. Visual presentation of abstract and quantitative information. Prerequisite or corequisite: DES 490.

DES 525 Word and Image: Advanced Projects in Printmaking for Designers and Artists

★6 (*fi 12*) (full session, 0-6L-0). Exploration of the multiple relationships between word and image generated through consideration of text. Prerequisite: DES 425 or ART 425. Note: Registration priority will be given to BDesign Printmaking Route students. Not open to students who have successfully completed ART 525.

DES 537 Special Projects in Studio Disciplines

★6 (*fi 12*) (full session, 0-6L-0). Special projects in studio disciplines by special arrangement with the Department. Prerequisite: consent of Department. Formerly DES 539.

DES 538 Special Projects in Studio Disciplines

★3 (*fi 6*) (either term, 0-4s-2). An advanced design course intended to meet special teaching needs not otherwise satisfied under existing course offerings. Prerequisites: Three 400-level studio courses in Art and Design and consent of Department.

DES 570 The Practice of Industrial Design

★6 (*fi 12*) (full session, 0-6L-0). Subject areas include design and culture; human factors; social, environmental and economic implications of design; appropriate technologies; production considerations; product marketing and case studies; design and project management; professional, business and legal implications. Projects may be realized in any or all available media. Prerequisites: DES 470 and consent of Department.

DES 575 Product Design Applications and Product Technologies

★3 (*fi 6*) (either term, 0-6L-0). A studio-based course in which projects address the requirements of special user groups and specific markets with special consideration of the production capabilities of western Canada. Computer Aided Design and Computer Aided Manufacturing will be the focus of at least one project. Prerequisites or corequisites: DES 570 and consent of Department.

DES 576 Furniture Design Applications and Production Technologies

★3 (*fi 6*) (either term, 0-6L-0). A studio-based course in which projects address the requirements of special user groups and specific markets with special consideration of the production capabilities of western Canada. Computer Aided Design and Computer Aided Manufacturing will be the focus of at least one project. Prerequisites or corequisites: DES 570 and consent of Department.

DES 577 Product and Furniture Design Systems

★3 (*fi 6*) (either term, 0-6L-0). A seminar/studio based course that focuses on systems analysis and application in product and furniture design. With a special regard for the economics of manufacture and marketing. Prerequisite or corequisite: DES 570 and consent of Department.

DES 582 Portfolio for BDes Students

★3 (*fi 6*) (either term, 0-6L-0). Graduation requirement for BDes students. In a tutorial arrangement between the student and one or more instructors, portfolio objectives are determined and met in the form of a professional portfolio. Prerequisites or corequisites: DES 570 or DES 590 and consent of Department.

DES 584 Integrative Design Applications I

★3 (*fi 6*) (either term, 0-6L-0). A 2-D/3-D studio-based course in which projects address the research, development and fabrication requirements of didactic and interpretive design, with special consideration of the western Canadian context. Prerequisites: DES 484 and/or DES 485 and consent of Department.

DES 585 Integrative Design Applications II

★3 (*fi 6*) (either term, 0-6L-0). A 2-D/3-D studio-based course in which projects address the research, development and fabrication requirements of commercial applications of design in an environmental setting (e.g. trade shows), with special consideration of the western Canadian context. Prerequisites: DES 484 and/or DES 485 and consent of Department.

DES 586 Design Practicum I

★3 (*fi 6*) (first term, 0-6L-0). By arrangement with design offices, industry, museums and other appropriate professional hosts and venues, the design student engages in an internship which is a bridge between a formal education and its application. Prerequisite: Consent of Department.

DES 587 Design Practicum II

★3 (*fi 6*) (second term, 0-6L-0). By arrangement with design offices, industry, museums and other appropriate professional hosts and venues, the design student engages in an internship which is a bridge between a formal education and its application. Prerequisite: Consent of Department.

DES 590 The Practice of Graphic Design

★6 (*fi 12*) (full session, 0-6L-0). Applied practical projects and complex design systems. Problem definition, strategic planning, project management and design evaluation. Project brief and production specifications, professional practice, procedures, codes of ethics, pricing and intellectual property. Prerequisites: DES 490 and consent of Department. Formerly DES 592.

DES 595 Communication Design for Interactive Media I

★3 (*fi 6*) (first term, 0-6L-0). Design for information, education and instruction using multimedia, Navigation, interface design in the context of human-machine interaction. Complex information systems, project planning and development strategies. Prerequisites or corequisites: DES 590 and consent of department.

DES 596 Communication Design for Interactive Media II

★3 (*fi 6*) (second term, 0-6L-0). Design issues in new communication media. Open information structures and networks as complex hierarchical systems. Internet as an information resource, research tool and mass communication media. Navigation, interaction and interface design in hypermedia. Prerequisites: DES 592 and consent of Department. Corequisite: DES 590.

DES 597 Design Management

★3 (*fi 6*) (either term, 0-6L-0). Project and office management. Design methods and evaluation, systems theory, writing for design. Introduction to marketing and social marketing, motivational and audience studies. Prerequisite or corequisite: DES 590 and consent of Department.

211.55.2 Graduate Courses**DES 672 Industrial Design: Concepts, Analysis and Criticism**

★10 (*fi 20*) (first term, 0-18L-0).

DES 673 Industrial Design: Conceptual Analysis and Practical Applications

★10 (*fi 20*) (second term, 0-18L-0).

DES 675 Industrial Design: Directed Readings

★3 (*fi 6*) (either term, 0-3s-0).

DES 692 Visual Communication Design: Concepts, Analysis and Criticism

★10 (*fi 20*) (first term, 0-18L-0).

DES 693 Visual Communication Design: Conceptual Analysis and Practical Applications

★10 (*fi 20*) (second term, 0-18L-0).

DES 695 Visual Communication Design: Directed Readings

★3 (*fi 6*) (either term, 0-3s-0).

211.56 Drama

Department of Drama
Faculty of Arts

211.56.1 Undergraduate Courses**☒ DRAMA 101 Introduction to Theatre Art**

★3 (*fi 6*) (either term, 3-0-0). The origins and development of theatre art; introduction to theatre aesthetics. This course requires the payment of additional miscellaneous fees. See §22.2.3 for details. Formerly DRAMA 202.

DRAMA 102 Play Analysis

★3 (*fi 6*) (either term, 3-0-0). Understanding of Drama through critical analysis of plays and its application to creative solutions in their production. Formerly DRAMA 201.

DRAMA 149 Introduction to Dramatic Process

★3 (*fi 6*) (either term, 0-6L-0). Speech and movement improvisation with an emphasis on imaginative development; introduction to the process of acting and to dramatic form. Note: Designed for students with little or no previous background in Drama. Not to be taken by BA Drama majors or students with credit in DRAMA 391. Formerly DRAMA 249.

DRAMA 150 Introduction to Dramatic Process

★3 (*fi 6*) (first term, 0-6L-0). Dramatic improvisation as an introduction to the process of acting and to dramatic form. Prerequisite: consent of Department. Note: Restricted to BA Drama majors and BFA (Technical Production—Stage Management). Not to be taken by students with credit in DRAMA 149, 249, or 350.

DRAMA 191 Production Lab I

★3 (*fi 6*) (either term, 0-8L-0). Technical theatre practice. Preparation and running of the production aspects of departmental plays. Prerequisite: consent of Department. Note: Formerly DRAMA 291. Not to be taken by BA Drama majors or by students with credit in 291.

DRAMA 247 Introduction to Oral Communication

★3 (*fi 6*) (either term, 0-6L-0). Exploration of basic techniques of oral communication and oral interpretation drawing from various forms of literature. Not normally to be taken by BA Drama majors. Note: Not open to students with credit in DRAMA 243, 245, 341 and 342. Formerly DRAMA 347.

☒ DRAMA 303 History of Canadian Theatre from its Origin to 1967

★3 (*fi 6*) (either term, 3-0-0). A survey of the evolution of theatre art in French and English Canada with reference to the actors, directors, playwrights, spaces and major trends in the Canadian theatre, from the 17th century until 1967.

☒ DRAMA 304 History of the Theatre

★6 (*fi 12*) (full session, 3-0-0). The development of the styles and crafts of the *mise-en-scène*, and of the relationship between the playing space and the audience, from the ancient Greek theatre to the end of the nineteenth century.

DRAMA 325 Creative Process and the Theatre Artist

★3 (*fi 6*) (either term, 0-4L-0). Theory and practice of the creative process of theatre arts emphasizing its interdisciplinary nature and the development of human resources. Note: Not open to students with credit in DRAMA 321. Prerequisite: DRAMA 149 or 350 or consent of Department.

DRAMA 327 Community-Based Theatre

★3 (*fi 6*) (either term, 0-4L-0). A study of the theory, practice and development of popular, community and collective theatre. Recommended for students who intend to enrol in DRAMA 459.

DRAMA 335 Movement in Rehearsal and Performance

★2 (*fi 4*) (full session, 0-0-1). Restricted to BFA (Acting) students. This is a credit-fail course.

DRAMA 336 Beginning Movement I

★3 (*fi 6*) (first term, 0-8L-0). Beginning techniques in ballet for the actor; initial exploration of creative forms of movement. Note: Restricted to BFA (Acting) students.

DRAMA 338 Beginning Movement II

★3 (*fi 6*) (second term, 0-8L-0). Development of posture, flexibility and strength of body; investigation of the physical self in characterization. Prerequisite: DRAMA 336. Note: Restricted to BFA (Acting) students.

DRAMA 345 Speech in Rehearsal and Performance

★2 (*fi 4*) (full session, 0-0-1). Note: Restricted to BFA Acting students. This is a credit-fail course.

DRAMA 346 Voice and Speech I

★3 (*fi 6*) (first term, 0-6L-0). Introduction to voice and speech improvement; oral interpretation; singing. Note: Restricted to BFA (Acting) students.

DRAMA 348 Voice and Speech II

★3 (*fi 6*) (second term, 0-6L-0). Exploration of the voice for characterization; oral interpretation of forms of literature; singing. Prerequisite: DRAMA 346. Note: Restricted to BFA (Acting) students.

DRAMA 353 Scene Study I

★3 (*fi 6*) (either term, 0-6L-0). The study of acting, including the analysis and enactment of scripted scenes, and characterization. Prerequisites: DRAMA 149 or 150 with consent.

DRAMA 355 Acting in Rehearsal and Performance

★2 (*fi 4*) (full session, 0-0-3). Note: Restricted to BFA Acting students.

DRAMA 356 Beginning Acting Technique I

★3 (*fi 6*) (first term, 0-10L-0). Development of the self as the fundamental

instrument of the actor. Introduction to script analysis and scene study. Note: Restricted to BFA (Acting) students.

DRAMA 358 Beginning Acting Technique II

★3 (fi 6) (second term, 0-10L-0). Script analysis, characterization, and the laboratory exploration of scenes and/or plays drawn from Realism. Prerequisite: DRAMA 356. Note: Restricted to BFA (Acting) students.

DRAMA 359 Improvisational Workshop

★3 (fi 6) (either term, 0-6L-0). Practice in the preparation and application of improvisation to the exploration and creation of dramatic form. Prerequisites: DRAMA 149, 150 or 350, and consent of Department.

DRAMA 360 Elements of Playwriting

★6 (fi 12) (full session, 0-4L-0). Study of and practice in creating the elements of a play. Prerequisites: ENGL 101 or its equivalent, and consent of Department.

DRAMA 370 Theatre Design I

★6 (fi 12) (full session, 0-10L-0). Study and practice of design for the theatre. Restricted to BFA (Design) students.

DRAMA 371 Studio Techniques for Theatre Design

★6 (fi 12) (full session, 0-6L-0). Study and practice of the studio techniques employed in theatre design. Note: Formerly DRAMA 271. Not open to students with credit in DRAMA 271. Prerequisite: consent of Department.

DRAMA 372 Production Techniques—Lighting

★6 (fi 12) (full session, 0-6L-0). Foundation studies in the planning and practice of lighting design. Prerequisite: consent of Department.

DRAMA 375 History of Decor and Dress

★6 (fi 12) (full session, 3-0-0). A survey of style in western civilization. Prerequisite: consent of Department. Note: Not open to students with credit in CL TX 304 and 403.

DRAMA 378 Basic Design

★6 (fi 12) (full session, 0-10L-0). A studio course in design to obtain a basic grasp of design techniques for setting and costume. Prerequisite: consent of Department. Note: Formerly DRAMA 373 and 377. Not to be taken by students with credit in DRAMA 272 or 373 or 377.

DRAMA 379 Introduction to Stagecraft and Design

★3 (fi 6) (either term, 3-0-0). Introductory lectures in production techniques, construction, mechanics, lighting and design. Prerequisite: consent of Department. Note: Not to be taken by students with credit in DRAMA 376. Formerly DRAMA 376.

DRAMA 383 Introduction to Directing

★3 (fi 6) (either term, 0-6L-0). Fundamentals of directing explored through practical exercises. Prerequisite: DRAMA 353, 370, or 378 and consent of the Department.

DRAMA 391 Production Lab I

★3 (fi 6) (either term, 0-8L-0). Technical theatre practice. Preparation and running of the production aspects of Departmental plays. Prerequisite: DRAMA 379 or consent of Department. Note: Not to be taken by students with credit in DRAMA 191, 291, or 378. Formerly DRAMA 378.

DRAMA 392 Production Lab II

★3 (fi 6) (either term, 0-0-6). Production experience in stage managing and/or technical theatre with qualified technical experts. Prerequisites: DRAMA 191, 378, 391, and/or consent of Department.

DRAMA 393 Production Lab II B

★2 (fi 4) (first term, 0-0-2). Production organization; experience in running of a play in performance. Restricted to BFA (Acting) students. A required non-credit course.

DRAMA 396 Stage Management I

★6 (fi 12) (full session, 0-6L-0). Introduction to the fundamentals of stage management addressing the preparation, rehearsal, and running stages of production. Note: Restricted to BFA. (Technical Theatre—Stage Management) students.

DRAMA 397 Stagecraft

★6 (fi 12) (full session, 0-4L-0). The study of theatrical production techniques, construction, and mechanics. Note: Restricted to BFA (Technical Theatre—Technical Production) students.

DRAMA 398 Basic Costume Construction and Fabric Properties

★6 (fi 12) (full session, 0-6L-0). The study of basic costume construction techniques, flat pattern drafting, draping, and fabric properties. Note: Restricted to BFA (Technical Theatre—Costume) students.

DRAMA 399 Explorations in Acting I

★3 (fi 6) (full session, 0-3L-0). Exploration of dramatic text using exercises devoted to the coordination of the actor's voice, speech and movement. Restricted to BFA (Acting) students. Course grading criterion is in terms of 'credit/non-credit' only.

DRAMA 403 Modern Canadian Theatre

★3 (fi 6) (either term, 3-0-0). Survey of modern Canadian theatre.

DRAMA 405 Third Year Honors Seminar

★2 (fi 4) (either term, 0-1s-0). Offered over a full session.

DRAMA 407 Practical Studies in Drama

★3 (fi 6) (either term, 0-6L-0). Prerequisite: consent of Department.

DRAMA 408 Modern Theatre

★3 (fi 6) (first term, 3-0-0). Survey of major plays and theatre artists of the 20th Century particularly those of Europe and North America. Formerly part of DRAMA 400. Not to be taken by students with credit in DRAMA 400.

DRAMA 409 Contemporary Theatre

★3 (fi 6) (second term, 3-0-0). Exploration of issues and trends of theatre movements which form the mosaic of contemporary theatre. Formerly part of DRAMA 400. Not to be taken by students with credit in DRAMA 400.

DRAMA 425 Theatre for Young Audiences

★3 (fi 6) (either term, 0-6L-0). Theory and practice of theatre for young audiences including participatory techniques. Prerequisites: DRAMA 323 or 353, and consent of Department.

DRAMA 435 Movement in Rehearsal and Performance

★2 (fi 4) (full session, 0-0-2). Note: Restricted to BFA Acting students. This is a credit-fail course.

DRAMA 436 Theatre Movement I

★3 (fi 6) (first term, 0-8L-0). Study of, and practice in, styles of movement and dance, both period and contemporary. Prerequisite: DRAMA 338. Note: Restricted to BFA (Acting) students.

DRAMA 438 Theatre Movement II

★3 (fi 6) (second term, 0-8L-0). Projects in styles and choreography. Prerequisite: DRAMA 436. Note: Restricted to BFA (Acting) students.

DRAMA 442 Studies in Oral Interpretation

★3 (fi 6) (either term, 0-6L-0). Intensive work in the oral expression of poetry, prose and dramatic literature. Prerequisites: DRAMA 247 or DRAMA 342 and consent of Department.

DRAMA 445 Speech in Rehearsal and Performance

★2 (fi 4) (full session, 0-0-2). Note: Restricted to BFA (Acting) students. This is a credit-fail course.

DRAMA 446 Advanced Voice and Speech I

★3 (fi 6) (first term, 0-6.5L-0). Extension of the voice; vocal characterization; sight reading; singing. Prerequisite: DRAMA 348. Note: Restricted to BFA (Acting) students.

DRAMA 448 Advanced Voice and Speech II

★3 (fi 6) (second term, 0-6.5L-0). Oral interpretation of period dramatic forms; singing. Prerequisite: DRAMA 446. Note: Restricted to BFA (Acting) students.

DRAMA 451 Make-up for the Stage

★2 (fi 4) (first term, 0-3L-0). Practice in use of basic and special materials in creating character make-up for the stage. Note: Restricted to BFA (Drama) and BMus (Voice) students. Not open to students with credit in DRAMA 351 or 551.

DRAMA 453 Scene Study I

★3 (fi 6) (either term, 0-6L-0). Acting exercises based on the study of plays emphasizing complexity of language and characterization. Prerequisites: DRAMA 353 and consent of Department.

DRAMA 455 Acting in Rehearsal and Performance

★3 (fi 6) (full session, 0-4L-0). Note: Restricted to BFA Acting students.

DRAMA 456 Advanced Acting Technique I

★3 (fi 6) (first term, 0-10L-0). Studies in characterization leading to laboratory performance. Prerequisite: DRAMA 358. Note: Restricted to BFA (Acting) students.

DRAMA 457 Production/Performance

★3 (fi 6) (either term, 0-8L-0). Research, rehearsal, design, staging and presentation of a play by an acting ensemble. Prerequisite: DRAMA 453 and/or consent of Department.

DRAMA 458 Advanced Acting Technique II

★3 (fi 6) (second term, 0-10L-0). Study of, and practice in, the main period styles of acting. Prerequisite: DRAMA 456. Note: Restricted to BFA (Acting) students.

DRAMA 459 Collective Creation

★3 (fi 6) (either term, 0-6L-0). Practice in the preparation and presentation of collective creation. Prerequisite: DRAMA 359, and/or consent of Department. DRAMA 327 recommended.

DRAMA 460 Playwriting

★6 (fi 12) (full session, 0-4L-0). The theory and practice of writing for dramatic

media: stage, film, radio, and television. Prerequisite: DRAMA 360 and/or consent of Department.

DRAMA 470 Theatre Design II

★6 (*fi 12*) (full session, 0-10L-0). Further study and practice of design for the theatre. Prerequisite: DRAMA 370. Note: Restricted to BFA (Design) students.

DRAMA 471 Technical Drawing for Theatre Design

★6 (*fi 12*) (full session, 2-0-1). Studies in drafting and perspective drawing for the stage. Note: Restricted to BFA (Design) and BFA (Technical Production) students. Note: Not open to students with credit in DRAMA 270.

DRAMA 472 Production Techniques—Costume

★6 (*fi 12*) (full session, 0-6L-0). Theory and techniques of stage costuming. Prerequisite: consent of Department.

DRAMA 473 Design Assistantship I

★3 (*fi 6*) (full session, 0-0-6). Practical experience in assisting the designer. Corequisite: DRAMA 470. Note: Restricted to BFA (Design) students. Formerly DRAMA 493. Not to be taken by students with credit in DRAMA 493.

DRAMA 476 Production Design I

★3 (*fi 6*) (full session, 0-0-6). Practical experience in designing an element or elements of a production. Restricted to BFA (Design) students. Not open to students with credit in DRAMA 470.

DRAMA 483 Elements of Directing

★3 (*fi 6*) (either term, 0-6L-0). Developing the director's creative use of the elements of directing through practical exercises in scripted scenes. Prerequisites: DRAMA 383 and consent of Department.

DRAMA 492 Running Crew Projects

★3 (*fi 6*) (either term, 0-0-6). Production organization: experience in preparing and running of a play in performance. Prerequisites: DRAMA 191, 378, or 391 and/or consent of Department.

DRAMA 496 Stage Management II

★6 (*fi 12*) (full session, 0-6L-0). Study of stage management practice as it applies to different types of production (i.e., Children's Theatre, Legitimate Theatre, Collective, Musical Theatre, Opera, Ballet, etc.). Prerequisite: DRAMA 396. Note: Restricted to BFA (Technical Theatre—Stage Management) students. Repeatable.

DRAMA 497 Workshops in Technical Theatre

★6 (*fi 12*) (full session, 0-10L-0). Workshops in technical production techniques and practice (i.e., health and safety, rigging, flying, rolling stock and tracked stages, hydraulics, pneumatics, plastics and metal fabrication, etc.). Prerequisite: DRAMA 397. Note: Restricted to BFA (Technical Theatre—Technical Production) students. Repeatable (to be taken two years in succession).

DRAMA 498 Costume Workshops

★6 (*fi 12*) (full session, 0-10L-0). Workshops in costume production techniques and practice (i.e., health and safety, fabric dyeing and painting, distressing, millinery, body padding, leather work, corset construction, wigs, masks tailoring, decorative techniques, etc.). Prerequisite: DRAMA 398. Note: Restricted to BFA (Technical Theatre—Costume) students. Repeatable (to be taken two years in succession.)

DRAMA 499 Explorations in Acting II

★3 (*fi 6*) (full session, 0-3L-0). Exploration of dramatic text related to period style with emphasis on characterization, and special problems. Prerequisite: DRAMA 399. Restricted to BFA (Acting) students. Course grading criterion is in terms of 'credit/no credit' only.

DRAMA 502 Seminar in Modern Canadian Theatre

★3 (*fi 6*) (either term, 0-3s-0). Exploration of developments in Modern Canadian drama and theatre production.

DRAMA 503 Fourth Year Honors Seminar

★2 (*fi 4*) (full session, 0-1s-0). Note: Formerly part of DRAMA 505.

DRAMA 505 Tutorial Fourth-Year Honors Essay

★6 (*fi 12*) (full session) Preparation of the Honors essay under the guidance of a member of the Department.

DRAMA 507 Senior Projects

★3 (*fi 6*) (either term, 0-5L-0). Prerequisite: consent of Department.

DRAMA 508 Historical Approaches to Dramatic and Theatrical Critical Theory

★3 (*fi 6*) (first term, 3-0-0). A survey of the major critical aesthetic theories as they relate to theatre and drama from Aristotle to Modernism. Prerequisite: consent of Department. Formerly part of DRAMA 500. Not to be taken by students with credit in DRAMA 500.

DRAMA 509 Contemporary Approaches to Dramatic and Theatrical Critical Theory

★3 (*fi 6*) (second term, 0-3s-0). Exploration of selected contemporary approaches to dramatic and theatrical critical theory. Prerequisite: DRAMA

508 or consent of Department. Formerly part of DRAMA 500. Not to be taken by students with credit in DRAMA 500.

DRAMA 534 Advanced Movement

★6 (*fi 12*) (full session, 0-6L-0). Instruction and projects for individual growth in movement expression. Prerequisite: DRAMA 438. Note: Restricted to BFA (Drama) students.

DRAMA 535 Movement in Rehearsal and Performance

★3 (*fi 6*) (full session, 0-0-3). Note: Restricted to BFA Acting students. This is a credit-fail course.

DRAMA 544 Dialects and Accents/Language Styles

★6 (*fi 12*) (full session, 0-7L-0). Survey of dialects and accents; intensive practice in representative examples from the British Isles, Europe and North America; tutorial instruction to suit the actor's vocal needs; singing. Prerequisite: DRAMA 448. Note: Restricted to BFA (Drama) students.

DRAMA 545 Speech in Rehearsal and Performance

★3 (*fi 6*) (full session, 0-0-3). Note: Restricted to BFA Acting students. This is a credit-fail course.

DRAMA 554 Rehearsal and Performance

★6 (*fi 12*) (full session, 0-25L-0). Rehearsal and performance of roles in public production. Workshops in acting for film and radio. Prerequisite: DRAMA 458. Note: Restricted to BFA (Acting) students.

DRAMA 570 Theatre Design III

★6 (*fi 12*) (full session, 0-8.5L-0). A specialized course for advanced students, designed to meet the needs of the individual. Prerequisite: DRAMA 470. Note: Restricted to BFA and qualifying graduate (Design) students.

DRAMA 571 Portfolio

★6 (*fi 12*) (full session, 0-4L-0). Presentation, audition, director/designer dialogue and the business nature of the design profession.

DRAMA 572 Production Techniques—Scenery

★6 (*fi 12*) (full session, 0-6L-0). Theory and techniques of the texturing and painting of scenery. Prerequisite: consent of Department. Note: Not to be taken by students with credit in DRAMA 575. Formerly DRAMA 575.

DRAMA 573 Design Assistantship II

★6 (*fi 12*) (full session, 0-0-6). Practical experience in assistant designing. Corequisite: DRAMA 570. Note: Restricted to BFA and qualifying graduate (Design) students. Not to be taken by students with credit in DRAMA 593. Formerly DRAMA 593.

DRAMA 574 Practicum

★6 (*fi 12*) (full session, 0-9L-0). A practical extension of the production techniques courses, involving the student in the production process of main stage shows. Prerequisites or corequisites: DRAMA 372, 472, or 572. This course may be taken more than once for credit.

DRAMA 576 Production Design II

★3 (*fi 6*) (full session, 0-0-6). Practical experience in designing an element or elements of a production. Restricted to BFA (Design) and graduate students.

DRAMA 577 Special Projects

★3 (*fi 6*) (either term, 0-6L-0). Special projects in design and production. Formerly part of DRAMA 507.

DRAMA 592 Production Crew

★6 (*fi 12*) (full session, 0-15L-0). Production experience in preparation and/or running of a production for performance. Prerequisite: DRAMA 492. Note: Restricted to BFA (Technical Theatre) students. Repeatable.

DRAMA 595 Professional and Critical Orientation

★0 (*fi 4*) (full session, 2-0-0). A non-credit course required for graduation. Note: Restricted to BFA (Drama) students.

DRAMA 599 Explorations in Acting III

★2 (*fi 4*) (full session, 0-2L-0). Prerequisite: DRAMA 499. Restricted to BFA (Acting) students. Course grading criterion is in terms of 'credit/no credit' only.

211.56.2 Graduate Courses

DRAMA 601 Methods and Tools of Research

★0 (*fi 2*) (either term, 1-0-0).

DRAMA 604 Research in Theatre History

★3 (*fi 6*) (either term, 3-0-0) or ★6 (*fi 12*) (full session, 3-0-0). Research in aspects of physical theatre and production.

DRAMA 605 Special Projects in Theatre

★3 (*fi 6*) (either term, 0-3L-0). Prerequisite: consent of Department.

DRAMA 607 Dramaturgy I

★3 (*fi 6*) (either term, 3-0-0).

DRAMA 610 Applied Criticism

★3 (fi 6) (either term, 3-0-0). Critical analysis of theatre practice.

DRAMA 621 Research Seminar I

★3 (fi 6) (first term, 0-3s-0). Selected topics in Theory and Criticism. Note: Not to be taken by students with credit in DRAMA 608.

DRAMA 622 Research Seminar II

★3 (fi 6) (second term, 0-3s-0). Selected topics in Theory and Criticism. Note: Not to be taken by students with credit in DRAMA 608.

DRAMA 623 Research Seminar III

★3 (fi 6) (first term, 0-3s-0). Selected topics in Theatre History and Theatrical Theory. Note: Not to be taken by students with credit in DRAMA 618.

DRAMA 624 Research Seminar IV

★3 (fi 6) (second term, 0-3s-0). Selected topics in Theatre History and Theatrical Theory. Note: Not to be taken by students with credit in DRAMA 618.

DRAMA 625 Research in Canadian Drama I

★3 (fi 6) (first term, 0-3s-0). Research in selected topics related to Canadian Drama. Note: Not to be taken by students with credit in DRAMA 616.

DRAMA 626 Research in Canadian Drama II

★3 (fi 6) (second term, 0-3s-0). Research in selected topics related to Canadian Drama. Note: Not to be taken by students with credit in DRAMA 616.

DRAMA 659 Popular Theatre: Theory and Methodology

★3 (fi 6) (either term, 0-9L-0). This course will examine the principles on which popular theatre rests, the objectives of popular theatre, various approaches to popular theatre, and evaluation of popular theatre. Students will examine these topics through a mix of academic study, practical introduction of specific popular theatre techniques, and an experience in a popular theatre process. Prerequisite: consent of Department.

DRAMA 660 Playwriting Projects

★6 (fi 12) (full session, 0-0-3). Prerequisite: consent of Department.

DRAMA 661 Advanced Playwriting Projects

★6 (fi 12) (full session, 0-0-3).

DRAMA 665 Special Projects in Dramatic Writing

★3 (fi 6) (either term, 0-3L-0). Prerequisite: consent of Department

DRAMA 670 Advanced Theatre Design I

★6 (fi 12) (full session, 0-6L-0). Note: Restricted to MFA (Drama) students.

DRAMA 671 Advanced Theatre Design II

★6 (fi 12) (full session, 0-6L-0). Note: Restricted to MFA (Drama) students.

DRAMA 672 Theatre Design III

★3 (fi 6) (full session, 0-4L-0). Corequisites: DRAMA 660, 661, 680 or 681. Note: Restricted to MA (Drama) students (with consent of department) and MFA (Drama) students.

DRAMA 673 Advanced Lighting Design

★3 (fi 6) (full session, 0-6L-0). Restricted to MFA (Drama) students.

DRAMA 674 Advanced Costume Techniques

★3 (fi 6) (full session, 0-6L-0). Restricted to MFA (Drama) students.

DRAMA 680 Styles of Directing

★6 (fi 12) (full session, 0-3s-6). Note: Restricted to MFA (Drama) students.

DRAMA 681 Advanced Projects in Directing

★6 (fi 12) (full session, 0-3s-6). Note: Restricted to MFA (Drama) students.

DRAMA 690 Topics in Applied Theatre Aesthetics

★3 (fi 6) (either term, 0-3s-0). Prerequisite: consent of Department.

211.57 Earth and Atmospheric Sciences

Department of Earth and Atmospheric Sciences
Faculty of Science

211.57.1 Undergraduate Courses**211.57.1.1 Faculty of Arts Courses**

Note: See Also INT D 451 for courses which are offered by more than one department or Faculty and which may be taken as options or as a course in this discipline.

The following table lists courses renumbered effective 1997/98:

Old	New	Old	New
GEOG 150	EAS 190	GEOG 322	EAS 392
GEOG 151	EAS 191	GEOG 359	EAS 292

S EAS 190 Spatial Organization of Human Activity

★3 (fi 6) (either term, 3-0-0). Introduction to the concepts of relative location,

spatial interaction and spatial organization of human activity in both rural and urban settings; geographical theories and techniques. Not available to students with credit in GEOG 150.

S EAS 191 Cultures, Landscapes and Societies

★3 (fi 6) (either term, 3-0-0). The significance of human distribution on the earth. People's relationship to the physical environment and development of cultural landscapes. Population issues, settlements, cultural patterns, and processes. Not available to students with credit in GEOG 151.

S EAS 290 Human Impacts on the Environment

★3 (fi 6) (either term, 3-0-0). Introduction to geographical concepts concerning global aspects of environmental impacts and problems affecting human-environmental relations. Prerequisite: One of EAS 101, 102, 190, 191, 201 or 210. Not available to students with credit in GEOG 264.

S EAS 291 Human Use of Resources

★3 (fi 6) (either term, 3-0-0). Geographic perspective on components and characteristics of renewable and non-renewable natural resources, including their physical and spatial aspects, transportation, environmental impacts, use, conservation, and depletion. Prerequisite: One of EAS 101, 102, 190, 191, 201 or 210. Not available to students with credit in GEOG 262.

S EAS 292 Behavioral Geography

★3 (fi 6) (either term, 3-0-0). Decision making in a spatial context. Responses to perceived social and physical environments. Prerequisite: EAS 190 or 191. Not available to students with credit in GEOG 359.

S EAS 390 Environmental Impact Assessment

★3 (fi 6) (either term, 3-0-0). Techniques of environmental impact assessment. Applications to selected environmental issues at local and regional scales. Policies and practices in Canada, the United States and elsewhere. Prerequisite: EAS 290.

S EAS 391 Introduction to Environmental Planning

★3 (fi 6) (either term, 3-0-0). Introduction to issues in policy making, planning and management related to human interaction with the physical environment. Prerequisite: EAS 292.

S EAS 392 Research Methods in Human Geography

★3 (fi 6) (either term, 3-0-0). Collection and analysis of data for research in human geography. Research design and sampling procedures. Special emphasis on social surveys, analysis and interpretation of quantitative data, and report writing. Field work required. Prerequisites: EAS 292 and one of EAS 220, PSYCHO 211, SOC 210 or STAT 141. Not available to students with credit in GEOG 322.

S EAS 491 Resource Management and Environmental Policy

★3 (fi 6) (either term, 3-0-0). Roles of governmental and nongovernmental organizations, industry and private enterprise, and advocacy organizations in addressing issues of resource scarcity and environmental policy. Institutions, policies, and strategies for resource and environmental management at the provincial/state, national, and international levels. Prerequisites: EAS 292 and 390.

S EAS 492 Geographical Information Systems for Social Science

★3 (fi 6) (either term, 3-0-1). This course provides spatial analytic tools to social geographers and provides a social science perspective to geoprocessing students. Examples arise from marketing, operations research, sociology, and urban and economic geography. Labs impart technical aspects through hands-on experience with commercial and in-house spatial analysis software. Prerequisite: EAS 221. Not available to students with credit in GEOG 428.

S EAS 493 Human Dimensions of Global Change

★3 (fi 6) (either term, 3-0-0). Investigation of issues of values, attitudes, perceptions, uses, and policies related to the human use of resources and impacts on the environment at continental and global scales. Critical review of alternative frameworks for assessing, managing, and coping with global environmental change. Prerequisite: EAS 390.

211.57.1.2 Faculty of Science Courses

The following table lists courses renumbered effective 1997/98:

Old	New	Old	New
GEOG 130/102	EAS 101	GEOL 442	EAS 422
GEOG 131	EAS 102	GEOL 421	EAS 424
GEOL 103	EAS 103	GEOL 424	EAS 430
GEOL 119	EAS 110	GEOL 427	EAS 431
GEOL 200	EAS 200	GEOL 428	EAS 432
GEOL 201	EAS 201	GEOL 432	EAS 433
GEOL 204	EAS 203	GEOL 433	EAS 434
GEOG 236	EAS 204	GEOL 470	EAS 435
GEOL 207	EAS 205	GEOL 443	EAS 436
GEOL 208	EAS 206	GEOG 427	EAS 451
GEOL 209	EAS 207	GEOG 445	EAS 453
GEOL 205	EAS 209	GEOG 437	EAS 454
GEOL 290/292	EAS 210	GEOG 438	EAS 455
GEOG 220	EAS 220	METEO 430	EAS 470

Old	New	Old	New
GEOL 221	EAS 222	METEO 434	EAS 471
GEOL 230	EAS 224	GEOG 502/503	EAS 520
GEOG 330/ GEOL 282	EAS 225	GEOL 506	EAS 521
GEOL 210	EAS 230	GEOL 513	EAS 530
GEOL 220	EAS 231	GEOL 514	EAS 531
GEOL 231	EAS 232	GEOL 515	EAS 532
GEOL 262	EAS 233	GEOL 516	EAS 533
GEOL 219	EAS 234	GEOL 522	EAS 534
GEOG 331	EAS 250	GEOL 544	EAS 535
METEO 230	EAS 270	GEOL 549	EAS 536
GEOG 333	EAS 271	GEOL 550	EAS 537
GEOL 352	EAS 320	GEOL 551	EAS 538
GEOL 360	EAS 321	GEOL 554	EAS 539
GEOL 346	EAS 322	GEOL 555	EAS 540
GEOG 223	EAS 324	GEOL 560	EAS 541
GEOG 327	EAS 325	GEOL 583	EAS 542
GEOG 420	EAS 326	GEOL 585	EAS 543
METEO 220	EAS 327	GEOL 586	EAS 544
GEOL 323	EAS 330	GEOL 587	EAS 545
GEOL 345	EAS 331	GEOG 530	EAS 550
GEOL 347	EAS 332	GEOG 531	EAS 551
GEOL 319	EAS 333	GEOG 532	EAS 552
GEOG 430	EAS 352	GEOG 535	EAS 553
GEOG 221/465	EAS 354	GEOG 537	EAS 554
METEO 330	EAS 370	GEOG 540	EAS 555
METEO 331	EAS 371	GEOG 533	EAS 570
GEOL 454	EAS 420	METEO 530	EAS 571
GEOL 463	EAS 421	METEO 425	EAS 572

Notes

- (1) Students are responsible for their own accommodation and meal expenses on all Earth and Atmospheric Sciences field trips.
- (2) Certain courses will normally be offered in alternate years when indicated by the symbol †. If sufficient demand exists, however, exceptions may be made and courses offered in off-cycle years. Students should contact the Department office.
- (3) A list of paleontology courses and course descriptions may be found under Paleontology.
- (4) The successful completion of the curriculum does not necessarily qualify the student for membership in APEGGA. See §183.9.1.

EAS 101 Introduction to Physical Earth Science

★3 (fi 6) (either term, 3-0-3). Introduction to the origin of the earth and solar system, minerals and rocks, geological time, plate tectonics, and structural geology. Geomorphic environments and surface processes, groundwater, and mineral and energy resources. Not available to students with credit in GEOL 102, 201, 290, 292, or GEOG 130.

S EAS 102 Introduction to Environmental Earth Science

★3 (fi 6) (either term, 3-0-3). The global energy budget and major energy pathways; the earth's patterns of weather systems and their impact on temperature, precipitation, moisture, and winds; circulation systems of the atmosphere and oceans; the global environmental system—evolution of the atmosphere, the oceans, the hydrosphere, the cryosphere, and the biosphere (including soils); climate change and the evolution of the earth's climate patterns. Not available to students with credit in GEOG 131.

S EAS 103 Earth and Life Through Time

★3 (fi 6) (second term, 3-0-3). Geologic and biological processes relevant for historical geology; structural geology and plate tectonics, relative and numerical dating, facies analysis and correlations, fossils, origin and evolution of life. Historical geology from the origin of the solar system to the recent planetary beginnings, generation and development of continents, mountains, and sedimentary basins; main sedimentary and mineral deposits of economic value; main fossil groups, index fossils, mass extinctions, and adaptive radiations. Not available to students with credit in GEOL 103 or 204.

S EAS 110 Earth Science Field School

★3 (fi 6) (second term, 10 days). This excursion through the mountains and prairies of Alberta is designed to demonstrate the diverse geomorphology and landscape of the province and to observe the various rock types that make up the geological column from the Precambrian to the Recent, including the widespread glacial deposits. In addition, the structure of the rocks will be observed and discussed, fossils will be identified, and tours to various mines and damsites will be conducted. Prerequisite: EAS 101 or 201 or 210. Not available to students with credit in GEOL 119.

S EAS 200 Introductory Studies in Earth Science

★3 (fi 6) (full session, 0-0-3). Minerals, rocks, fossils, topographic and geologic maps. EAS 200, 201, and 203 together are considered to be equivalent to EAS 101 and 103 for prerequisite purposes. Not available to students with credit in EAS 101 and 103, or GEOL 200. Corequisites: EAS 201, 203.

S EAS 201 Earth Science I

★3 (fi 6) (either term, 3-0-0). Origin of the earth and solar system, minerals and igneous, metamorphic and sedimentary rocks, geological time, plate tectonics, the formation of ocean basins and mountain building. Surface processes and landforms, groundwater, and mineral and energy resources. Prerequisite: Any 100-level Science course. Not available to students with credit in EAS 101, GEOL 201, 290, or 292.

S EAS 203 Earth Science II

★3 (fi 6) (either term, 3-0-0). Measurement of geologic time; history of life on earth and the geological evolution of North America; nature and origin of mineral deposits; geology of coal, oil and gas. Prerequisite: Any 100-level Science course. Not available to students with credit in EAS 103 or GEOL 204.

S EAS 204 Environment Alberta

★3 (fi 6) (either term, 3-0-0). The physical environment of Alberta. Regional variation in the patterns of climate, landforms, water, soils, vegetation and wildlife; the geographic synthesis of these patterns to give a broad understanding and appreciation of the province and its environmental problems. Prerequisite: One of EAS 101, 102, 201 or 210. Not available to students with credit in GEOG 236.

S EAS 205 Environment Earth

★3 (fi 6) (either term, 3-0-0). General introduction to interactions between people and their natural environment, with an emphasis on geological processes. Topics include: soil resources and degradation; earthquakes and volcanoes; streams and flooding; landslides, mass movement and subsidence, shoreline development and coastal processes; surface water and groundwater resources; air and water pollution; waste management and disposal; and global change. Prerequisite: Any 100-level Science course. Not available to students with credit in EAS 102 and GEOL 207.

S EAS 206 Geology of the Solar System

★3 (fi 6) (either term, 3-0-0). Origin of the elements and the solar system, origin and evolution of the planets. Geologic and atmospheric properties of the planets, the nature of meteorites and comets. Results of recent space exploration. Prerequisite: One of EAS 101, 201 or 210. Not available to students with credit in GEOL 208.

S EAS 207 Mass Extinctions: Dinosaurs, Mammoths and Man?

★3 (fi 6) (either term, 3-0-0). A discussion of theories about the evolution and extinction of dinosaurs and Pleistocene mammals. The possible impact of catastrophic events on the geologic record. The evidence for asteroid impacts, their frequency, and their effects on biological evolution, as evidenced by the geologic record. Implications for future catastrophic events. Prerequisite: Any 100-level Science course. Not available to students with credit in GEOL 209.

S EAS 208 Introduction to Global Change

★3 (fi 6) (either term, 3-0-0). Natural and anthropogenic causes of global scale environmental change; the role of the atmosphere, oceans, biosphere and cryosphere in the processes of environmental change; relationships between levels of technology and development and the character of environmental change associated with human activity. Prerequisite: EAS 102.

S EAS 209 Geology of Western Canada and the National and Provincial Parks

★3 (fi 6) (either term, 3-0-0). An overview of the geology and landscapes of Western Canada. The spectacularly exposed rocks of the prairie and mountain parks of Alberta and British Columbia will be fitted into a regional geological framework and examples from parks such as Yoho, Banff, Jasper, Dinosaur, and Kananaskis will be highlighted. Geological processes of mountain building and past and present landscape evolution will be emphasized. Prerequisite: One of EAS 101, 103, 201, 203 or 210. Not available to students with credit in GEOL 205.

EAS 210 Engineering Earth Science

★3 (fi 6) (first term, 3-0-3). Rock-forming minerals, origins of igneous, metamorphic and sedimentary rocks; economic minerals and ore deposits; rock weathering and soil formation, mass-wasting, groundwater, deformation of the earth's crust. Laboratories on identification of minerals and rocks and the interpretation of topographic and geologic maps and aerial photography. Prerequisite: Any 100-level Science course. Not available to students with credit in EAS 101, 201, GEOL 102, 290, or 292. Intended for students in Engineering programs.

S EAS 220 Introduction to Computational Techniques in Earth and Atmospheric Sciences

★3 (fi 6) (first term, 3-0-2). Introduction to computational methods and software for earth scientists and human geographers. Lectures emphasize the application of conventional descriptive and inferential analytical methods to spatial problems and their extensions to spatial analysis. Labs provide a hands-on introduction to the department's computational resources. Prerequisite: EAS 101 or 102. Not available to students with credit in GEOG 220.

S EAS 221 Introduction to Geographical Information Systems and Remote Sensing

★3 (fi 6) (second term, 3-0-3). Background to the principles of Geographic Information Systems and Remote Sensing. Lectures emphasize the theoretical and methodological underpinnings, labs impart the technical aspects through hands-on experience with appropriate software. Prerequisite: Any 100-level Science course. Not available to students with credit in GEOG 328.

S EAS 222 Stratigraphy and Sedimentation

★3 (fi 6) (either term, 3-0-3). Sedimentary processes, environments and facies; properties and classification of sedimentary rocks; stratigraphic nomenclature and the stratigraphic column; principles of stratigraphic paleontology. Prerequisite: One of EAS 101, 103 or 210. Not available to students with credit in EAS 231 or GEOL 221.

S EAS 223 Introduction to Hydrogeology

★3 (fi 6) (either term, 3-0-3). An introduction to groundwater in the hydrologic cycle, the principles of groundwater flow, hydraulic properties of geologic materials, flow net analyses, regional groundwater flow, and well hydraulics. Groundwater as a geologic agent and groundwater resource evaluation. Prerequisites: One of EAS 101, 102, 201 or 210 and MATH 113. Not available to students with credit in GEOL 488.

S EAS 224 Mineralogy I

★3 (fi 6) (first term, 3-0-3). Principles of crystallography, physical and chemical properties of minerals, determinative mineralogy. Prerequisite: EAS 101 or 210. Not available to students with credit in GEOL 230.

S EAS 225 Earth Surface Processes and Landforms

★3 (fi 6) (either term, 3-0-3). Geomorphological processes and landform analysis with special reference to the landscape of Alberta. Fieldwork required. Prerequisite: One of EAS 101, 102, 201 or 210. Not available to students with credit in GEOG 330.

S EAS 230 Introduction to Invertebrate Paleontology

★3 (fi 6) (either term, 3-0-3). Systematics of important groups of invertebrate fossils. Introduction to biostratigraphy, paleoecology, and the study of mass extinctions and faunal radiations. Mechanisms and patterns of evolution. Groups covered include: Porifera, Cnidaria, Brachiopoda, Mollusca, Trilobita, Echinodermata, and some microfossil groups. Prerequisite: EAS 103. Not available to students with credit in GEOL 210.

S EAS 231 Principles of Sedimentation

★3 (fi 6) (either term, 3-0-3). Properties and classification of siliciclastic and carbonate rocks; weathering; transportation; recognition of facies, depositional processes; depositional models; contrasts between the siliciclastic and carbonate depositional regimes. Prerequisites: One of EAS 101, 103, or 210. Not available to students with credit in EAS 222 or GEOL 220.

S EAS 232 Mineralogy II

★3 (fi 6) (second term, 3-0-3). Optical techniques in determinative mineralogy with particular emphasis on transmitted-light microscopy and its application to common rock-forming minerals. Mineral associations, textures and elementary ideas on the origin of igneous, metamorphic and sedimentary rocks. Prerequisite: EAS 224. Not available to students with credit in GEOL 231.

S EAS 233 Geologic Maps and Cross-Sections

★3 (fi 6) (either term, 3-0-3). The construction and analysis of geologic maps and cross-sections, from surface and subsurface data. Introduction to procedures for collecting basic field information, aerial photograph interpretation, and the principles of geologic mapping. Prerequisite: One of EAS 101, 103, 201 or 210. Not available to students with credit in GEOL 262.

EAS 234 Geology Field School

★3 (fi 6) (second term, 12 days). A geological investigation of the Jasper area with emphasis on stratigraphy and properties of sedimentary rocks, paleontology, structural and Quaternary mapping, and Cordilleran tectonics. Field exercises teach the fundamentals of recording field data, aerial photograph interpretation, reconstructing depositional environments, and tectonic syntheses. This field school is run immediately following the second term examination period. Prerequisites: EAS 231 and 233. Not available to students with credit in GEOL 219.

S EAS 250 Biogeography

★3 (fi 6) (either term, 3-0-3). The links between geomorphology and plant-animal environments will be covered through a biogeographical approach to ecological studies. Studies of the winter environment and the ecological role of snow. Plains and alpine field trips. Prerequisite: EAS 102 or BIOL 108. Not available to students with credit in GEOG 331.

S EAS 270 The Atmosphere

★3 (fi 6) (first term, 3-0-0). An introduction to weather and climate, with emphasis on conceptual rather than mathematical treatment. Atmospheric composition, temperature, humidity, wind, clouds; air masses, fronts, storms; weather forecasting. Regular weather map discussions, optional weather office visit. Prerequisite: Any 100-level Science course or consent of Instructor. Not available to students with credit in METEO 230.

S EAS 271 The Climate System

★3 (fi 6) (second term, 3-0-0). An examination of the physical processes influencing global climate. Radiation and energy in the climate system, the hydrological cycle, general circulation of the atmosphere and ocean, climate feedback mechanisms, climate history and climate change, introduction to climate models. Prerequisite: Any 100-level Science course or consent of Instructor. Not available to students with credit in GEOG 333.

S EAS 320 Geochemistry I

★3 (fi 6) (either term, 3-0-3). A survey of chemical processes occurring in geological settings with emphasis on the principles governing the migration and distribution of the elements and isotopes in the earth. Thermodynamics applied to sedimentary chemistry in the exogenic cycle. Prerequisite: EAS 224. Not available to students with credit in GEOL 352.

S EAS 321 Structural Geology

★3 (fi 6) (either term, 3-0-3). Fundamentals of stress and strain in rocks; geometric, kinematic, dynamic analysis; nature, orientation, measurement, representation, and description of planar and linear penetrative and discrete structures, and of faults, joints and folds; stereographic and other projections and their applications; regional structure and the study of orogens. Prerequisite: EAS 233. Not available to students with credit in GEOL 360.

S EAS 322 Petrology of Sedimentary Rocks

★3 (fi 6) (either term, 3-0-3). Methods for examining sedimentary rocks; composition and classification of siliciclastic and carbonate rocks; recognition and classification of textures in sedimentary rocks; analysis of original constituents; analysis of cements; recognition and understanding of diagenetic fabrics. Prerequisite: EAS 232 and 222 or 231. Not available to students with credit in GEOL 346.

S EAS 324 Analysis of Aerial Photographs and Satellite Imagery

★3 (fi 6) (either term, 1-0-6). The interpretation and mapping of topography, surficial geology and geomorphology from aerial photographs and satellite images. Some field work may be required. Prerequisite: EAS 221 or 225. Not available to students with credit in GEOG 223.

S EAS 325 Digital Mapping and Terrain Modelling

★3 (fi 6) (either term, 3-0-3). Introduction to computerized mapping using gridded databases. The production and analysis of digital terrain models. Methods for the display of data derived from digital terrain models and for overlaying environmental information on them. Introduction to graphic output devices and to techniques of photographic and cartographic reproduction. Prerequisite: EAS 221. Not available to students with credit in GEOG 327.

S EAS 326 Multivariate Statistical Methods for the Earth and Atmospheric Sciences

★3 (fi 6) (either term, 3-0-0). The application of multivariate statistical methods to geoprocessing. Prerequisite: EAS 220. Not available to students with credit in GEOG 420.

EAS 327 Environmental Instrumentation

★3 (fi 6) (either term, 3-0-2). Laboratory work and lectures to develop skills in environmental measurement through comprehension of first principles. Instrumentation (basic electronics; matching signal sources and receivers; noise; frequency response). Sensor-environment coupling (heat and mass transfer). Sampling theory. Principles will be applied to selected environmental monitoring instruments. Field trip. Prerequisites: EAS 102 and MATH 113. Not available to students with credit in METEO 220.

S EAS 330 Stratigraphy

★3 (fi 6) (either term, 3-0-3). Principles of stratigraphy and stratigraphic paleontology, historical geology of North America from the Cambrian to the Cenozoic with emphasis on Western Canada. Prerequisite: EAS 222 or 231. Not available to students with credit in GEOL 323.

S EAS 331 Igneous Petrology

★3 (fi 6) (first term, 3-0-3). A survey of igneous rocks from the ocean basins and the continents; their field settings, classification, petrography, mineralogy and chemistry; magmatic processes and petrogenesis; problem solving and laboratory work on major rock suites. Prerequisite: EAS 232. Not available to students with credit in GEOL 345.

S EAS 332 Metamorphic Petrology

★3 (fi 6) (second term, 3-0-3). An introduction to the classification and genesis of metamorphic rocks in light of field, petrographic and geochemical data. Prerequisite: EAS 232. Not available to students with credit in GEOL 347.

EAS 333 Advanced Geology Field School

★3 (fi 6) (second term, 12 days). The study and mapping of deformed sedimentary, igneous, and metamorphic rocks and of macroscopic and mesoscopic structures in the field. 12 days of field exercises following second term examination period. Co-/Prerequisites: EAS 321, 322, 331 and 332. Not available to students with credit in GEOL 319.

S EAS 351 Environmental Applications of Geographical Information Systems

★3 (fi 6) (either term, 3-0-3). This course emphasizes the applications of

Geographic Information Systems to the environmental sciences. Examples from resource management and the earth and biological sciences. Labs impart technical experience with commercial and in-house software. Prerequisites: EAS 220 and 221. Not available to students with credit in GEOG 328.

S EAS 352 Hydrology and Fluvial Landforms

★3 (fi 6) (either term, 3-0-0). The generation of surface runoff and sediment yields in drainage basins. Flow in channels. Landforms and sedimentary sequences resulting from river erosion, sediment transport and deposition. Evolution of river valleys through time. Applied aspects of fluvial geomorphology. Fieldwork required. Prerequisite: EAS 225. Not available to students with credit in GEOG 430.

EAS 354 Environmental Earth Science Field School

★3 (fi 6) (first term, 10 days). Introduction to fieldwork in geomorphology, biogeography and microclimatology. Elementary field mapping, the use of electronic field instrumentation for hydrological, water quality and microclimatological monitoring, mapping and analysis of vegetation patterns, and techniques for the field description and laboratory analysis of soils and sediments. Introductory lectures and ten days of fieldwork prior to first term classes. Prerequisites: EAS 223, 225, 250 and 270 or 271. Not available to students with credit in GEOG 221 or GEOG 465.

S EAS 370 Atmospheric Physics

★3 (fi 6) (first term, 3-0-0). Thermodynamics applied to the atmosphere; water vapor and its phase changes; the tephigram; vertical instability; transfer of solar and terrestrial radiation through the atmosphere; meteorological optics - the rainbow, haloes and mirages. Prerequisites: EAS 270, MATH 214. Not available to students with credit in METEO 330.

S EAS 371 Atmospheric Dynamics

★3 (fi 6) (either term, 3-0-0). An introduction to fluid dynamics on the rotating earth with reference to current weather; equations of motion and their simplification; vorticity; the atmospheric boundary layer; waves in the atmosphere; synoptic-scale weather; baroclinic instability; the general circulation. Prerequisites: EAS 270, MATH 214. Not available to students with credit in METEO 331.

EAS 401 Industrial Internship Practicum

★3 (fi 6) (first term, 3-0-0). Required of all students who have recently completed an EAS Industrial Internship Placement. This course must be completed during the first academic year following their return to full-time studies in order to graduate in the Industrial Internship Program. Grade will be determined on the basis of the employer evaluation of the student's job performance and the performance on written assignments and oral presentations during the course. Prerequisites: WKEXP 401 and 402.

S EAS 420 Geochemistry II

★3 (fi 6) (either term, 3-0-3). Applications of geochemistry to rock- and ore-forming processes. Geochronology. Significance and use of minor elements and isotopes as tracers of major geological processes. Prerequisite: EAS 320. Not available to students with credit in GEOL 454.

S EAS 421 Advanced Structural Geology

★3 (fi 6) (either term, 3-0-3). Brittle and ductile deformation; stress; mechanics of natural fractures; strain and kinematic models for the formation of ductile structures; strain rate and rheology; structural associations; and the anatomy of orogenic belts. Lab exercises introduce techniques of manual or computer-assisted stress and strain analysis, cross-section balancing, structural map interpretation, the recognition of shear-sense indicators in hand specimen and in thin section, and their applications in subsurface mineral and hydrocarbon exploration. Prerequisite: EAS 321. Not available to students with credit in GEOL 463.

S EAS 422 Basin Analysis

★3 (fi 6) (first term, 3-0-3). Classification and evolution of sedimentary basins; tectonics and sedimentation; clastic and carbonate depositional systems in a sequence stratigraphic framework. Prerequisite: EAS 322. Not available to students with credit in GEOL 442.

S EAS 423 Analytical Methods for Geochemistry and Mineralogy

★3 (fi 6) (either term, 3-0-3). Analytical techniques and procedures employed in the analysis of geological materials. Determination of the major- and trace-element content, and radiogenic and stable isotope compositions of geological materials. Mineral analysis with X-Ray diffraction and electron microprobe techniques. Applications of scanning electron microscopy for imaging spatial relationships of mineral assemblages and for modal analysis. Prerequisite: EAS 320.

S EAS 424 Subsurface Geological Methods

★3 (fi 6) (first term, 3-0-3). Methods of acquiring geologic data from beneath the surface by remote means; drilling, sampling, coring, logging; significance of geophysical techniques; presentation of subsurface information. Prerequisite: EAS 222 or 231. Not available to students with credit in GEOL 421.

S EAS 425 Contaminant Hydrogeology

★3 (fi 6) (either term, 3-0-3). An introduction to the principles of groundwater

chemistry, the chemical evolution of natural groundwater flow systems, sources of contamination, and mass transport processes. Hydrogeologic aspects of waste disposal and groundwater remediation. Prerequisite: EAS 223.

EAS 426 Honors Thesis

★3 (fi 6) (either term, 3-0-0). Required for Honors students in their final year. Restricted to honors students in EAS. Prerequisite: Any 300-level EAS course.

EAS 427 Directed Study I

★3 (fi 6) (either term, or over both terms, 3-0-0). EAS 427 and 428 provide a means whereby Specialization and Honors students in their fourth year of the EAS program may undertake a research project supervised by a faculty member. Prerequisite: Any 300-level EAS course.

EAS 428 Directed Study II

★3 (fi 6) (either term, 3-0-0). Prerequisite: EAS 427.

S EAS 430 Petroleum Geology

★3 (fi 6) (either term, 3-0-3). Origin, maturation, and degradation of petroleum; conventional and unconventional source rocks; principles of migration; reservoir rocks; traps. Exploration and development of hydrocarbon plays using seismic, core and wire line logging, thin section petrography, correlation, mapping, and geochemistry. Prerequisite: EAS 320 and 322. Not available to students with credit in GEOL 424.

S EAS 431 Regional and Petroleum Hydrogeology

★3 (fi 6) (either term, 3-0-3). Principles of hydrogeology, subsurface hydrodynamics and basinal fluid flow; evaluation and interpretation of subsurface hydrodynamic data of extended regions; hydraulics and hydrodynamics of petroleum entrapment; review of migration and accumulation theories; hydrogeologic indicators of petroleum accumulations; field examples. Prerequisite: EAS 430. Not available to students with credit in GEOL 427.

S EAS 432 Precambrian Geology

★3 (fi 6) (either term, 3-0-0). Precambrian geological evolution of Earth focusing on development of the continental lithosphere. Geochemical evolution of the crust and mantle as well as the atmosphere and hydrosphere. Special reference to the evolution, stratigraphy, petrology and geochronology of the Canadian Shield. Prerequisite: EAS 320 and 331. Not available to students with credit in GEOL 428.

S EAS 433 Metalliferous Mineral Deposits

★3 (fi 6) (first term, 3-0-3). Geological characteristics of metallic ore deposits. Genetic relations to igneous, metamorphic and sedimentary processes, tectonics, and structure. Basic mineral economics and exploration strategies are also incorporated. Prerequisite: EAS 331. Not available to students with credit in GEOL 432.

S EAS 434 Geochemistry of Ore Deposits

★3 (fi 6) (second term, 3-0-0). Geochemical processes involved in ore formation. Applications of stable isotope, fluid inclusions, radiogenic isotopes and modern geothermal analogs to the understanding of ore formation. Prerequisite: EAS 433. Not available to students with credit in GEOL 433.

S EAS 435 Geotectonics

★3 (fi 6) (either term, 3-0-0). Fundamentals of plate tectonic theory and the evolution of the Earth. Application of plate tectonics to the theory of sedimentary basins and orogenic belts. Tectonics of western North America. Prerequisite: EAS 321. Not available to students with credit in GEOL 470.

S EAS 436 Petrogenesis of Igneous and Metamorphic Rocks

★3 (fi 6) (either term, 3-0-3). Origin and formation of igneous and metamorphic rocks in the light of field, mineralogical, chemical and experimental evidence. Prerequisite: EAS 331 and 332. Not available to students with credit in GEOL 443.

S EAS 451 Digital Remote Sensing

★3 (fi 6) (either term, 3-0-3). Digital image processing of multispectral remotely sensed information with emphasis on image enhancement and image classification. Applications include land use mapping, urban change detection, resource exploration, and environmental monitoring. Prerequisite: EAS 220, 221 and one of EAS 324 or 325 or LDRES 410. Not available to students with credit in GEOG 427.

S EAS 453 Arctic Environments

★3 (fi 6) (either term, 3-0-0). The course is designed to provide a better understanding of high latitude environments from an interdisciplinary perspective. Topics include: Quaternary glaciations, periglacial geomorphology, regional climatology, the Arctic Ocean basin; sea ice dynamics, and northern ecosystems. These themes are also related to global climatic change and environmental issues. Prerequisite: EAS 225 or 250. Not available to students with credit in GEOG 445. Offered in alternate years with EAS 455.

S EAS 454 Arid and Semiarid Environments

★3 (fi 6) (either term, 3-0-0). Study of the geomorphological processes and landforms in the dry zones of the low and the mid-latitudes including the

effects of environmental change. Prerequisite: EAS 225 or 250. Not available to students with credit in GEOG 437.

S EAS 455 Alpine Environments

★3 (fi 6) (either term, 3-0-3). A holistic approach to environments and environmental change in the world's high mountain areas, emphasizing interactions between climate, vegetation, surface processes and geology. Issues addressed include mountain building and its role in Cenozoic climate change; mountain climates and geocology; snow and its role in alpine hydrology, surface water acidification and avalanche activity; rock slope stability, mass movements and associated hazards; glaciers and their impact on alpine hydrology and geomorphology; problems of resource utilization in high mountains. A field trip may be required. Prerequisite: EAS 225 or 250. Not available to students with credit in GEOG 438. Offered in alternate years with EAS 453.

S EAS 457 Global Change

★3 (fi 6) (either term, 3-0-0). Major processes of change in the contemporary environment, their history and their interrelationships (climate and sea level change, changes in atmospheric composition, deforestation, desertification, water resource depletion, soil erosion, atmospheric and aquatic pollution); global biogeochemical cycles and their role in environmental change. Prerequisite: One of EAS 208, 223, 225 or 250.

S EAS 470 Clouds and Storms

★3 (fi 6) (either term, 3-0-0). Cloud properties; Formation and growth of cloud droplets and ice crystals, rain and snow; Weather radar; Doppler radar analysis; Precipitation processes; Severe convective storms. Weather modification; Numerical cloud models; Precipitation forecasting. Prerequisite: EAS 371. Not available to students with credit in METEO 430.

S EAS 471 Atmospheric Modelling

★3 (fi 6) (either term, 3-0-3). Numerical Weather Prediction: dynamics; physics (e.g. influence of unresolved motion); operational models. Atmospheric modelling on other scales. Computing assignments: Advection-diffusion problems; simple dynamical models of the atmosphere. Prerequisites: EAS 371, MATH 215. Not available to students with credit in METEO 434.

S EAS 472 Earth and Climate System Modelling

★3 (fi 6) (either term, 3-0-3). An introduction to numerical analysis and prediction of climate. Radiative transfer and simple climate models, global climate models, coupled ocean-atmosphere-cryosphere models, land surface processes and biological influences, geo-cycling of climatically-active chemicals. Computing assignments: simple climate models, calculation of atmospheric radiative transfer. Prerequisites: EAS 371, MATH 215.

211.57.2 Graduate Courses

EAS 520 Reading and Seminar Course

★3 (fi 6) (either term, 0-3s-0). Not available to students with credit in GEOG 502 or GEOG 503.

EAS 521 Earth and Atmospheric Science Research

★3 (fi 6) (either term, 0-0-8). Not available to students with credit in GEOL 506.

S EAS 530 Principles of Ichthyology

★3 (fi 6) (first term, 3-0-0). Introduction to animal-sediment relationships in both modern and ancient environments; principles of classification and taxonomy, environmental significance of trace fossils in facies analysis. Prerequisites EAS 230 and 422. Not available to students with credit in GEOL 513.

S EAS 531 Process Sedimentology

★3 (fi 6) (second term, 3-0-0). Concepts and applications of process sedimentology with emphasis on shallow marine processes of sedimentation and facies relationships for modern and ancient continental margin depositional systems. Prerequisite: EAS 422 or equivalent or consent of Instructor. Not available to students with credit in GEOL 514.

S EAS 532 Advanced Carbonate Sedimentology

★3 (fi 6) (full session, 3/2-0-0). Course will cover aspects of carbonate mineralogy, formation of carbonates, role of biological activity, classification of carbonates, depositional environments of carbonates, diagenesis (including dolomitization) and reefs. Practical part of course consists of a 10-day field trip in an area of modern carbonate deposition. Not available to students with credit in GEOL 515.

S EAS 533 Advanced Petroleum Geology

★3 (fi 6) (first term, 1-2s-1). Selected topics of petroleum geology, such as origin of oil, gas, bitumen; thermal maturation and microbial alterations; migration and trapping; reservoir diagenesis; basin analysis. Prerequisite: EAS 430 or consent of Instructor. Not available to students with credit in GEOL 516.

S EAS 534 Historical Geology Seminar

★3 (fi 6) (full session, 0-1s/2-0). Selected topics in historical geology and stratigraphy.

S EAS 535 Selected Topics in Petrology

★3 (fi 6) (either term, 0-3s-0). Not available to students with credit in GEOL 544.

S EAS 536 Mineralogy - Petrology - Geochemistry Seminar

★3 (fi 6) (either term, 0-3s-0). Selected topics in mineralogy, petrology and geochemistry presented and discussed by students and staff.

S EAS 537 Low Temperature Geochemistry

★3 (fi 6) (first term, 3-0-0). Theories of transport in geological systems with a description of the major physical, chemical and biological processes. Equilibrium and non-equilibrium fluid-rock interactions with emphasis on solubility relationships, carbonate equilibria, ion complexes, and clay-dominated systems. Characterization of low temperature environments. Eh-pH diagrams, and sampling and analyses of fluids. Prerequisite: EAS 320 or equivalent. Not available to students with credit in GEOL 550.

S EAS 538 High Temperature Geochemistry

★3 (fi 6) (either term, 3-0-0). Geometrical, thermodynamical and kinetical treatment of solid-liquid-gas equilibria and their application to metamorphic and igneous processes. Properties of silicate melts, crystallization, element partitioning, solutions. Geothermometry and geobarometry. Isotopes as tracers in petrogenesis. Prerequisites: EAS 320 and 436 or equivalent. Not available to students with credit in GEOL 551.

S EAS 539 Isotope Geology: Radioactive Systems

★3 (fi 6) (first term, 3-0-0). Theory and systematics of radioactive decay, geochronology using K-Ar, Rb-Sr, U-Pb, Pb-Pb, Fission track; carbon-14, U-series disequilibrium and Sm-Nd systems; applications of natural radioactive isotope variation to geologic problems such as basalt genesis, formation of the crust, calibration of the Phanerozoic time scale and the nature of meteorites. Prerequisite: EAS 320 or equivalent. Not available to students with credit in GEOL 554.

S EAS 540 Isotope Geology: Stable Isotope

★3 (fi 6) (second term, 3-0-0). Theory of light isotope fractionation, D and ^{18}O fractionation in the hydrologic cycle; carbonate paleothermometry; δD and $\delta^{18}\text{O}$ variations in igneous, metamorphic and sedimentary rocks; $\delta^{34}\text{S}$, δD and $\delta^{18}\text{O}$ variations in ore deposits; Biogeochemistry. Prerequisite: EAS 320 or equivalent. Not available to students with credit in GEOL 555.

S EAS 541 Selected Topics in Structural Geology and Tectonics

★3 (fi 6) (second term, 3-0-0). Current topics in structural geology and tectonics, from mesoscopic strain and vorticity indicators to orogenic belts; terrane analysis and comparative tectonics, with emphasis on the contribution of North American Phanerozoic orogens to current theory; lectures by instructor, and student research and seminar presentations. Prerequisite: consent of Department.

S EAS 542 Selected Topics in Quaternary Geology

★3 (fi 6) (second term, 0-3s-0). Prerequisite: INT D 594.

S EAS 543 Contaminant Hydrology

★3 (fi 6) (second term, 3-0-3). Overview of contaminant hydrology with emphasis on the theory of contaminant migration and dispersion, field methodologies, and transport models. Exercises will involve problem solving and case histories. Prerequisite: EAS 223 or consent of Instructor. Not available to students with credit in GEOL 585.

S EAS 544 Quantitative Hydrogeology

★3 (fi 6) (second term, 3-0-3). Detailed examination of the theory and application of computer simulation techniques. Finite difference and finite element techniques as applied to groundwater flow and transport. Familiarization with computer codes and problem solving. Prerequisites: EAS 223 and an introductory computer programming course, or consent of Instructor. Not available to students with credit in GEOL 586.

S EAS 545 The Geologic Agency of Groundwater Flow

★3 (fi 6) (second term, 1-3s-0). A comprehensive review of the diverse geologic and environmental effects and manifestations of regional groundwater flow including genesis of ore deposits, petroleum migration, soil salination, wet land hydrology, slope stability, contaminant transport, and so on. Topics of special interest to individual participants will be researched individually and discussed collectively in the form of seminars. Prerequisite: EAS 223 or consent of Instructor. Not available to students with credit in GEOL 587.

S EAS 550 Advanced Fluvial Geomorphology

★3 (fi 6) (either term, 3-0-0). The study of alluvial terrace development and alluvial stratigraphies in a variety of river and stream environments. Strong emphasis is placed on local fieldwork. Prerequisite: A 300-level EAS course. It is recommended that students audit EAS 352 if it, or equivalent, has not been taken. Not available to students with credit in GEOG 530.

S EAS 551 Advanced Glacial Geomorphology

★3 (fi 6) (first term, 3-0-0). Selected aspects of alpine-glacier and ice-sheet landform developments. Strong emphasis is placed on fieldwork. Prerequisite: A 300-level EAS course. Not available to students with credit in GEOG 531.

S EAS 552 Periglacial Geomorphology

★3 (*fi 6*) (either term, 3-0-0). A study of cold-climate landforms and their genesis. Contemporary theories and studies of periglacial phenomena will be critically evaluated. Prerequisite: A 300-level EAS course. Not available to students with credit in GEOG 532.

S EAS 553 Ice Dynamics and Glacier Hydrology

★3 (*fi 6*) (either term, 3-0-0). Introduction to the mechanics and hydrology of ice masses with an emphasis on how they can be modelled and investigated in the field. The management of ice masses as sources of water and energy. Not available to students with credit in GEOG 535.

S EAS 554 Circumpolar Quaternary Environments

★3 (*fi 6*) (either term, 3-0-0). Past activity of high latitude ice sheets with particular emphasis on the development of field research conducted on northern mainland Canada and the adjacent Arctic islands. Similar research in Greenland, Spitzbergen and the USSR is also presented. The understanding of late Cenozoic environments is highly interdisciplinary and topics include: glacial and marine stratigraphy, glacio-isostasy, sea level fluctuations, biological refugia and theories of climatic change. The course is designed to provide a thorough understanding of environmental change in high latitudes and students from different disciplines are encouraged to participate. Prerequisite: EAS 225 or EAS 453. Not available to students with credit in GEOG 537.

S EAS 555 Advanced Topics in Geomorphology

★3 (*fi 6*) (second term, 3-0-0). Prerequisite: A 300-level course in geomorphology. Not available to students with credit in GEOG 540.

S EAS 570 Advanced Climatology

★3 (*fi 6*) (first term, 3-0-0). A study of recent developments in climatology. Climate models and their use in examining past and future climates. Interactions between the atmosphere and terrestrial systems. Prerequisite: EAS 472. Not available to students with credit in GEOG 533.

S EAS 571 Cloud and Precipitation Physics

★3 (*fi 6*) (second term, 3-0-0). Research methods in atmospheric physics. Analysis of measurements of cloud microphysical data sampled by research aircraft. Dynamics of cumulus clouds and severe storms. Formation of precipitation. Numerical cloud modelling. Analysis of radar data. Not available to students with credit in METEO 530.

S EAS 572 The Atmospheric Boundary Layer

★3 (*fi 6*) (either term, 3-0-0). Dimensional analysis and similarity principles. Resolved ("mean") and unresolved ("fluctuating, turbulent") scales of motion, and the closure problem for the dynamical equations. Similarity theories for wind and turbulence over uniform terrain. Dynamics of disturbed windflows (hills, forests, clearings, etc.). Turbulent transport and dispersion models. Not available to students with credit in METEO 425.

211.58 Economics

Department of Economics
Faculty of Arts

Note: See also INT D 257, 302, 303, 346, and 369 for courses which are offered by more than one department or Faculty and which may be taken as options or as a course in this discipline.

211.58.1 Undergraduate Courses**S ECON 101 Introduction to Microeconomics**

★3 (*fi 6*) (either term, 3-0-0). How markets and governments determine which products are produced and how income is distributed in the Canadian economy.

S ECON 102 Introduction to Macroeconomics

★3 (*fi 6*) (either term, 3-0-0). Employment, inflation, international payments, monetary policy, and fiscal policy, all in the Canadian economy. Prerequisite: ECON 101 or consent of Department.

ECON 204 Principles of Economics

★3 (*fi 6*) (either term, 3-0-0). An introduction to economic principles as applied to business organization and finance; price determination; enterprise costs and output optimization; commercial and central banking; national income analysis. For students enrolled in the Faculty of Engineering only. Formerly ECON 304.

S ECON 205 Introduction to Economic Ideas

★3 (*fi 6*) (either term, 3-0-0). An introduction to the principles of economics which stresses the development of these ideas through time and their relevance to society. Note: A student may not receive credit in more than two of ECON 101, 102 (or the former ECON 306, 307), and 205, nor may ECON 205 be used to replace ECON 101 or 102 as a prerequisite to senior courses. Formerly ECON 305.

D ECON 210 Japanese Economic Development

★3 (*fi 6*) (either term, 3-0-0). An analytical survey of economic factors leading

to Japan's present position in world trade. Prerequisite: ECON 101 or equivalent. Formerly ECON 310.

S ECON 211 Chinese Economic Development

★3 (*fi 6*) (either term, 3-0-0). A survey of the characteristics of and recent developments in the Chinese economy emphasizing the nature and consequences of China's economic reforms and Canada's economic relations with China. Prerequisite: ECON 101 or equivalent. Formerly ECON 311.

S ECON 212 European Economic Development

★3 (*fi 6*) (either term, 3-0-0). A survey of economic changes in Western Europe from the Industrial Revolution to the present. Note: Not to be taken by students with credit in HIST 337. Prerequisite: ECON 101 or equivalent. Formerly ECON 312.

S ECON 213 An Introduction to the Economics of Developing Countries

★3 (*fi 6*) (first term, 3-0-0). A survey of the major approaches to and problems of economic development in the less developed countries with particular emphasis on issues relating to savings and investment, income distribution, employment and population growth, and trade and aid. Prerequisite: ECON 101 or equivalent. Formerly ECON 313.

S ECON 218 The Canadian Economy to 1945

★3 (*fi 6*) (first term, 3-0-0). Analysis of Canadian economic development to 1945 with particular emphasis on Confederation, the National Policy and western settlement, industrialization, and the Depression. Prerequisite: ECON 101 or equivalent. Formerly ECON 318.

S ECON 219 The Canadian Economy since 1945

★3 (*fi 6*) (second term, 3-0-0). Analysis of Canadian economic development since 1945, with particular emphasis on recurrent policy issues such as macroeconomic performance, trade liberalization, industrial policies, intergovernmental fiscal arrangements, and regional development. Prerequisite: ECON 101 or equivalent. Formerly ECON 319.

S ECON 281 Intermediate Microeconomic Theory I

★3 (*fi 6*) (either term, 3-0-0). The theory of consumer behavior; theory of production and cost; price and output determination under competition, monopoly and other market structures. Prerequisite: ECON 101 or equivalent. Formerly ECON 381. Not open to students with credit in MANEC 301 or ECON 383.

S ECON 282 Intermediate Macroeconomic Theory I

★3 (*fi 6*) (either term, 3-0-0). An introduction to analytical macroeconomic modelling. Flexible and fixed wage models of price, interest rate, output, and employment determination with emphasis on the relationship between the labor market and aggregate supply; the impact of fiscal, monetary, and supply shocks; open economy macroeconomics with fixed and flexible exchange rates, and prices as well as international capital mobility. Prerequisite: ECON 101/102 or consent of Department. Note: Not open to students with credit in MANEC 333 or 402. Formerly ECON 382.

S ECON 291 Economic Institutions and Ideologies

★3 (*fi 6*) (either term, 3-0-0). Pre-capitalist Europe; the rise of individualism and the individualistic ethic; industrial capitalism; economics of Marx and Socialism; the rise of corporate capitalism; the consolidation of monopoly power; economic imperialism; Keynesian economics and economic policies; contemporary capitalism and its critics. Prerequisite: ECON 101 or equivalent. Formerly ECON 391.

S ECON 293 The Soviet Economy

★3 (*fi 6*) (either term, 3-0-0). The development and institutional arrangements of the Soviet economy, Soviet experience with central planning. Economic performance and its evaluation. Soviet economic reforms. Prerequisite: ECON 101 or equivalent. Formerly ECON 393.

ECON 299 Quantitative Methods in Economics

★3 (*fi 6*) (either term, 3-0-1). Introduction to the use of statistical and mathematical methods in economics with computer applications. Prerequisites: ECON 101 and 102, STAT 141 or 151 or 255 or equivalent, and MATH 113. Note: Designed for students taking Economics as a major subject of concentration. Department permission must be obtained by other students wishing to take this course. ECON 299 or equivalent must be taken before ECON 399.

ECON 323 International Economics

★3 (*fi 6*) (either term, 3-0-0). A survey of the principles of international economics and the applications to economic policy. The topics are foreign trade, foreign investment, and the balance of payments. Note: Not open to students with credit in ECON 421 or 422. Prerequisite: ECON 101 or 102 or equivalent.

ECON 331 Labor Economics

★3 (*fi 6*) (first term, 3-0-0). Theory and empirical evidence concerning the supply of and demand for labor services, wage differentials, and the impact of unions. Some of the policy issues to be discussed are income maintenance, unemployment insurance, and minimum wage legislation. Prerequisite: ECON 101 or equivalent.

ECON 332 Labor Market Policy

★3 (fi 6) (second term, 3-0-0). Analytical and policy issues relating to human resource development and manpower utilization with particular reference to Canadian contemporary issues. Prerequisite: ECON 331 or consent of Department.

ECON 341 Money and Banking

★3 (fi 6) (either term, 3-0-0). Analysis of money and credit in the exchange process. Financial intermediation, commercial banking, central banking, and regulation of the banking and financial sectors. The money supply process and elementary issues of monetary control. Prerequisites: ECON 101 and 102 or equivalent.

ECON 350 The Economics of Public Expenditures

★3 (fi 6) (either term, 3-0-0). Analysis of public sector expenditures in Canada. The rationale for government spending and the problems in the provision of public services. Prerequisite: ECON 101 or equivalent. Not open to students with credit in ECON 351.

ECON 353 Taxation Policy and Structure

★3 (fi 6) (either term, 3-0-0). Analysis of the Canadian tax structure and its role in attaining certain goals of society; requirements for an optimal tax structure. Prerequisite or corequisite: ECON 281 or consent of Department.

ECON 355 Economics of Project Evaluation

★3 (fi 6) (either term, 3-0-0). The use of cost-benefit analysis and other economic methods in evaluating public investment projects with examples from transportation, river basin management, electrical generation, oil and gas, and pollution control. Prerequisite: ECON 101 or equivalent.

ECON 363 Introduction to Regional Economics

★3 (fi 6) (either term, 3-0-0). An appraisal of the historical and current pattern of regional income disparities in Canada, with analysis emphasizing the causes of regional variations in employment and economic growth levels. An assessment of present federal and provincial policies designed to alleviate regional disparities will be made, combined with new policy programs that may be relevant. Prerequisite: ECON 101 or equivalent.

ECON 365 Resource Economics

★3 (fi 6) (either term, 3-0-0). Problems of allocation and development of natural resources, including contemporary Canadian resource policy issues; nature and types of resources; the economics of conservation and resource scarcity; and the role of resources in growth. Not open to students with credit in INT D 365. Prerequisite: ECON 101 or equivalent.

ECON 366 Energy Economics

★3 (fi 6) (either term, 3-0-0). Types of energy resources, substitutability, conversion. The relevance of energy to economic growth. Energy as input and as a consumers' good. An overview of quantities available and used. The problems of measuring energy, the energy balance, the energy industries. The role of energy in Canadian economic development. World energy markets. Energy policy problems. Prerequisite: ECON 101 or equivalent.

ECON 373 Industrial Organization

★3 (fi 6) (either term, 3-0-0). A survey of the behavior and performance of firms in different market structures and discussion of public policy toward the different structures. Note: Not open to students with credit in ECON 471. Prerequisite: ECON 101 or equivalent.

ECON 378 Law and Economics

★3 (fi 6) (either term, 3-0-0). Analysis of the economic implications of property, contract, tort, criminal, and corporate law; examination of economic logic underlying different areas of law, and illustrations of the law as an economic institution; analysis of externality, risk, deterrence, and other leading issues in economics and law. Prerequisite: ECON 101 or equivalent.

ECON 383 Microeconomics for Canadian Business Management

★3 (fi 6) (either term, 3-0-0). Theories of choice as applied to consumer behavior and business decisions; production and price determination in alternative market forms; interrelatedness of firm decisions and of market outcomes; the impact of uncertainty. Prerequisites: ECON 101/102, MATH 113 or equivalent. Note: For students enrolled in the Faculty of Business only. Students cannot receive credit in both ECON 281 and ECON 383. ECON 383 may be used as a prerequisite to 400-level economics courses instead of ECON 281.

ECON 384 Intermediate Microeconomic Theory II

★3 (fi 6) (either term, 3-0-0). Designed for majors and Honors students in Economics. Extensions and applications of microeconomic theory with emphasis on general equilibrium analysis. The following topics are examined: intertemporal choice, risk, uncertainty and expected utility; oligopoly and game theory; Walrasian models and models with entry; welfare, externalities, public goods and social choice; adverse selection, moral hazard and asymmetric information. Prerequisites: ECON 281 and MATH 113 or equivalent.

ECON 385 Intermediate Macroeconomic Theory II

★3 (fi 6) (either term, 3-0-0). Designed for majors and Honors students in Economics. The impact of expectations on price, output, and employment determination; theories of stabilization policy; the government budget

constraint; inflation and unemployment; business cycles and growth; theories of aggregate consumption, investment, money demand, and money supply. Prerequisites: ECON 281 and 282.

ECON 386 Applications of Mathematics to Economics I

★3 (fi 6) (first term, 3-0-0). Elements of logic and set theory, linear algebra, differential calculus and their conjunction, as used in classical and modern economic analysis. Prerequisites: ECON 281/282; MATH 113/120 or equivalent.

ECON 387 Applications of Mathematics to Economics II

★3 (fi 6) (second term, 3-0-0). Difference and differential equations, linear inequalities, convexity, programming; assorted theorems of special use in modern economic analysis. Prerequisite: ECON 386.

ECON 399 Introductory Econometrics

★3 (fi 6) (either term, 3-0-1). An elementary treatment of the major topics in econometrics with emphasis on applied regression methods. Prerequisites: ECON 281/282 and STAT 255 or STAT 141/ ECON 299 or equivalent. Note: Not open to students with credit in AG EC 416 or ECON 408 or MGTS 413 or 414 or 417 or 419 or STAT 341.

ECON 400 Honors Essay: Fourth-Year Honors Economics

★3 (fi 6) (second term, 3-0-0). Preparation of the honors essay, required for fourth-year honors students choosing the honors essay route. Prerequisite: consent of Department.

ECON 401 History of Economic Thought I

★3 (fi 6) (either term, 3-0-0). A survey of economic opinion and theories from Mercantilism to the Marginal Revolution. Emphasis on both theoretical and socioeconomic structures at various epochs of economic thinking. Prerequisite: ECON 281.

ECON 402 History of Economic Thought II

★3 (fi 6) (either term, 3-0-0). A survey of the economic opinions and theories from the rise of Neoclassical Economics to contemporary Macroeconomics. Emphasis will be on both theoretical and socioeconomic structures at various epochs of economic thinking. Prerequisite: ECON 281/282.

ECON 407 Econometric Methods I

★3 (fi 6) (first term, 3-0-0). Statistical inference in economics. Topics in statistical theory with emphasis on estimation and tests of hypotheses. The general linear regression model. Prerequisites: ECON 299 or STAT 255 or equivalent, and ECON 386/387 or consent of Department. Corequisite: ECON 481/482 or consent of Department.

ECON 408 Econometric Methods II

★3 (fi 6) (second term, 3-0-0). Econometric problems and techniques with emphasis on regression methods. Single equation techniques and introduction to simultaneous equation systems. Prerequisite: ECON 407 or equivalent.

ECON 410 Pacific Rim Economic Development

★3 (fi 6) (either term, 3-0-0). This course uses economic theory to analyze the role of particular markets and institutions in selected Pacific Rim economies. Special emphasis will be given to either China or Japan; students should consult the Department of Economics to find which country is being emphasized in a given year. Prerequisites: ECON 384 or consent of Department.

ECON 412 European Economic Development

★3 (fi 6) (either term, 3-0-0). The application of economic theory and research methodology to selected topics in European economic development. Prerequisite: ECON 281.

ECON 414 Economics of Developing Countries

★3 (fi 6) (either term, 3-0-0). An introduction to models of growth and development; the role of agriculture, industry, finance, and trade in structural transformation of developing countries; approaches to development planning. Prerequisite: ECON 281 or consent of Department.

ECON 418 Canadian Economic Development

★3 (fi 6) (either term, 3-0-0). Introduction to 'new economic history,' emphasizing the methodology of quantitative economic history research. Prerequisite: ECON 281 or consent of Department.

ECON 421 International Trade

★3 (fi 6) (first term, 3-0-0). Nature and relevance of international trade; early trade doctrines; the theory of comparative advantage, classical and modern approaches and empirical evidence for them; new approaches to the pure theory of international trade; economic growth and international trade; market imperfections and trade; commercial policy; economic integration and the gains from trade. Prerequisites: ECON 281 and MATH 113 or consent of Department.

ECON 422 International Payments

★3 (fi 6) (second term, 3-0-0). Types of international transactions, macroeconomics in an open economy, exchange rates, balance of payments adjustments, and other issues in the international monetary system. Prerequisites: ECON 281/282 and MATH 113 or consent of Department.

ECON 431 Labor Economics

★3 (*fi 6*) (either term, 3-0-0). An advanced treatment of demand for labor, supply of labor, wage differentials, trade union behavior, and related topics. Prerequisites: ECON 331 and ECON 281 and MATH 113 or consent of Department.

ECON 441 Monetary Theory and Policy

★3 (*fi 6*) (either term, 3-0-0). The theory of the demand for money; money, inflation and economic activity; monetary policy. Prerequisites: MATH 113 and ECON 385 or consent of Department.

ECON 442 The Economics of Financial Markets

★3 (*fi 6*) (either term, 3-0-0). The meaning and measurement of risk; portfolio analysis—individual choice and market equilibrium; interest rates and the term structure; inter-temporal and macro-policy issues; debt management. Prerequisites: ECON 282, 384, and STAT 141 or equivalent, or consent of Department.

ECON 453 Economics of Taxation

★3 (*fi 6*) (either term, 3-0-0). Analysis of the effects of taxation on the economic decisions of households and firms as reflected in the allocation of resources in the economy and the distribution of the tax burden. Measurement of the efficiency and incidence of the tax system. Prerequisite: ECON 384 or consent of Department. Not open to students with credit in ECON 352.

ECON 455 Welfare Economics and Public Sector Policies

★3 (*fi 6*) (either term, 3-0-0). Theoretical welfare economics applied to the analysis of public policies, including such topics as the measurement of economic inequality, cost-benefit analysis, and public sector pricing. Prerequisite: ECON 384 or consent of Department.

ECON 461 Transportation Economics

★3 (*fi 6*) (either term, 3-0-0). Economic analysis of alternative transportation systems (water, air, road, and rail, for both freight and passengers). Role of transportation in urban, regional, and national economic development. Public policy toward transportation. Prerequisite: ECON 384 or consent of Department.

ECON 462 Urban Economics

★3 (*fi 6*) (either term, 3-0-0). An examination and analysis of the economic aspects of urban spatial organization (e.g. residential land use, firm location strategy), housing, transportation, and urban public finance. Prerequisites: ECON 281 and MATH 113 or consent of Department.

ECON 466 The Economics of Non-Renewable Natural Resources

★3 (*fi 6*) (either term, 3-0-0). The economic theory of non-renewable natural resources, resource allocation and resource policies with a focus on petroleum and natural gas supply and demand. Prerequisites: ECON 365 or 366 or 384 and MATH 113 or consent of Department. Note: ECON 365 and/or 366 are recommended as additional prerequisites.

ECON 471 Industrial Organization Theory and Evidence

★3 (*fi 6*) (first term, 3-0-0). Theories of the firm. Determinants and measures of market structure. Oligopoly theory, cartel formation, horizontal product differentiation and advertising. Entry and strategic entry deterrence. Innovation and Research and Development. Prerequisites: ECON 281 and MATH 113 or consent of Department.

ECON 472 Industrial Behavior and Regulation

★3 (*fi 6*) (second term, 3-0-0). An economic analysis of firm behavior under alternative market structures and its implications for competitive policy, including: price discrimination, tie-in sales, horizontal pricing arrangements, mergers, predation, and vertical market restrictions. Economic analysis of public utility regulation and regulation of industries with competitive market structures. Prerequisites: ECON 281 and MATH 113 or consent of Department.

ECON 475 The Economics of Professional Sport

★3 (*fi 6*) (either term, 3-0-0). An economic analysis of professional sport leagues, franchises and labor markets. Topics will include the economic structure of leagues, franchise value, profit maximization versus winning, pay and performance, free versus restricted agency, and discrimination. Prerequisite: ECON 281.

ECON 481 Advanced Microeconomic Theory

★3 (*fi 6*) (either term, 3-0-0). Advanced treatment of preference, utility, and consumer demand; of production, cost, and supply; of market structure and market equilibrium. Introduction to general equilibrium analysis and welfare economics. Prerequisites: ECON 384 and 386 or consent of Department.

ECON 482 Advanced Macroeconomic Theory

★3 (*fi 6*) (either term, 3-0-0). An advanced treatment of aggregate economic behavior. Topics include basic macroeconomic analysis using calculus, business cycle theory, microfoundations of macro models, government budget constraints, expectations formation, the open economy, and representative agent optimizing models. Prerequisites: ECON 385 and 386.

ECON 485 Macroeconomic Policy

★3 (*fi 6*) (either term, 3-0-0). Identification and evaluation of the objectives

and instruments of macroeconomic policy, drawing upon contemporary macroeconomic theory as a basis for policy evaluation, and using examples from the policy experiences of Canada and other nations. Prerequisites: MATH 113 and ECON 385 or consent of Department.

ECON 498 Directed Readings I

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

ECON 499 Directed Readings II

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

211.58.2 Graduate Courses

Note: See also INT D 566 for a course which is offered by more than one department or Faculty and which may be taken as an option or as a course in this discipline.

ECON 500 Applications of Economic Theory and Analysis

★3 (*fi 6*) (either term, 0-3s-0). The application of economic theory and analysis to selected issues, institutions, and applied problems through the use of case studies and research exercises.

ECON 501 History of Economic Thought

★3 (*fi 6*) (either term, 3-0-0). A survey of economic thought from Adam Smith to modern times, with particular attention to the theories of economic development and growth.

ECON 503 Microeconomic Theory I

★3 (*fi 6*) (either term, 3-0-0). Producer and consumer behavior; partial equilibrium models of perfectly and imperfectly competitive markets; Walrasian general equilibrium; welfare economics. Prerequisites: ECON 386/387, 481/482.

ECON 505 Microeconomic Theory II

★3 (*fi 6*) (either term, 3-0-0). Choice under uncertainty; contingent claims and models of general equilibrium under uncertainty; markets with information asymmetries; non-cooperative game theory, games of incomplete information, repeated games, and bargaining theory. Prerequisite: ECON 503.

ECON 506 Applied Econometrics

★4 (*fi 8*) (full session, 2-0-1). The role of economic theory in the specification and estimation of models. Interpretation and critical evaluation of applied work by means of selected topics in econometric theory.

ECON 507 Econometrics I

★3 (*fi 6*) (first term, 3-0-0). Topics in statistical theory; distribution theory including transformation of random variables, the multivariate normal and associated quadratic forms, maximum likelihood estimation and associated asymptotic tests. Estimation and inference in the general linear model. Prerequisite: ECON 407/408 or equivalent.

ECON 508 Econometrics II

★3 (*fi 6*) (second term, 3-0-0). Single equation methods and problems. Estimation and inference in the simultaneous equations model. Prerequisite: ECON 507 or equivalent.

ECON 512 Economic Development I

★3 (*fi 6*) (either term, 3-0-0). The techniques of development planning; qualitative and quantitative problems associated with the drafting and implementation of plans and programs; assessment of internal and external resources available for development and problems of measurement and mobilization of resources.

ECON 513 Economic Development II

★3 (*fi 6*) (either term, 3-0-0). Economic policy alternatives in a context of growth and development; problems of inflation, balance of payments, disequilibrium, concentration of growth effects; the role of international aid and other external measures.

ECON 514 Economic Development of North America

★3 (*fi 6*) (either term, 3-0-0). A selective analysis of historical factors involved in the economic growth and development of North America. Particular attention is given to Canadian experience, and to the use of economic theory and statistical techniques in historical research.

ECON 516 European Economic Development

★3 (*fi 6*) (either term, 3-0-0). The application of economic theory and research methodology to selected topics in European economic development.

ECON 521 International Economics I

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: ECON 481/482, ECON 421/422 recommended.

ECON 522 International Economics II

★3 (*fi 6*) (either term, 3-0-0).

ECON 531 Labor Economics I

★3 (*fi 6*) (either term, 3-0-0). Factors influencing the supply of, and demand for, labor services and the process of relative wage determination in the long and short run. Determination of money wage levels, aggregate labor-force participation, and the level and structure of aggregate employment and unemployment.

ECON 540 Monetary Economics I

★3 (fi 6) (either term, 3-0-0). Prerequisites: ECON 481/482.

ECON 541 Monetary Economics II

★3 (fi 6) (either term, 3-0-0). Activities of financial intermediaries; evaluation of the effectiveness and the impact of monetary policy in both closed and open systems.

ECON 550 Public Expenditure

★3 (fi 6) (either term, 3-0-0). The theory of the role of the public sector in a market economy; market failures, income redistribution, public choice, and fiscal federalism.

ECON 552 Urban Economics

★3 (fi 6) (either term, 3-0-0). Prerequisites: ECON 481/482.

ECON 553 Economics of Taxation

★3 (fi 6) (either term, 3-0-0). Effects of taxes on allocation, distribution and stabilization objectives. Evaluation of major taxes with particular attention paid to efficiency and incidence considerations.

ECON 555 Applied Welfare Economics

★3 (fi 6) (either term, 3-0-0). Theoretical welfare economics, aspects of cost-benefit analysis, and policy evaluation.

ECON 558 Finance in the Public Sector

★3 (fi 6) (either term, 3-0-0). Note: Restricted to students in the MPM Program.

ECON 561 Transportation Economics

★3 (fi 6) (either term, 3-0-0). Economic analysis of alternative transportation systems.

ECON 563 Regional Economics

★3 (fi 6) (either term, 3-0-0). Methodology of regional analysis including structural studies, location theory, input-output application, aggregative models and impact studies; regional development policy issues within a context of senior government policy objectives.

ECON 565 Resource Economics I: The Economics of Conservation and Resource Scarcity

★3 (fi 6) (either term, 3-0-0). Economic analysis of quantitative aspects of natural resource use and development; the economics of conservation; the role of resources in growth; resource scarcity; quantitative tools (benefit-cost and input-output analysis) in resources management; selected Canadian resource management; selected Canadian resource issues.

ECON 570 Industrial Economics I

★3 (fi 6) (either term, 3-0-0). Contemporary industrial structure, conduct and performance—Canadian and foreign; related public policies.

ECON 571 Industrial Economics II

★3 (fi 6) (either term, 3-0-0). Government enterprise, public regulation of private enterprise, and specific public policies concerning particular market elements, such as advertising, delivered pricing and patents.

ECON 581 Macroeconomic Theory I

★3 (fi 6) (either term, 3-0-0). An examination of the core topics in macroeconomic theory. These will generally include methods of modelling output, employment, prices, business cycles, and macroeconomic policy. Prerequisite or corequisite: ECON 481/482 or equivalent.

ECON 582 Macroeconomic Theory II

★3 (fi 6) (either term, 3-0-0). This course extends the analysis of ECON 581 and introduces students to more advanced issues. Prerequisite: ECON 581 or equivalent.

ECON 599 Applied Econometrics

★3 (fi 6) (either term, 3-0-0). The role of economic theory in the process of specification and estimation of models. Interpretation and critical evaluation of applied work by means of selected topics in econometric theory. Prerequisites: ECON 407/408 or equivalent, and ECON 481/482 or equivalent.

ECON 608 Topics in Econometrics

★3 (fi 6) (either term, 3-0-0).

ECON 612 Topics in Economic Development

★3 (fi 6) (either term, 3-0-0).

ECON 614 Topics in European and North American Economic Development

★3 (fi 6) (either term, 3-0-0).

ECON 620 Topics in International Economics

★3 (fi 6) (either term, 3-0-0).

ECON 630 Topics in Labor Economics

★3 (fi 6) (either term, 3-0-0).

ECON 640 Topics in Monetary Economics

★3 (fi 6) (either term, 3-0-0).

ECON 652 Topics in Public Economics

★3 (fi 6) (either term, 3-0-0). Topics available include local public finance,

project evaluation, theory of public choice, public enterprise pricing policies, health care economics, and fiscal systems.

ECON 664 Topics in Regional Economics

★3 (fi 6) (either term, 3-0-0).

ECON 672 Topics in Industrial Economics

★3 (fi 6) (either term, 3-0-0).

ECON 693 Topics in Comparative Economics

★3 (fi 6) (either term, 3-0-0).

ECON 699 Selected Research Topics in Economics

★3 (fi 6) (either term, 3-0-0).

ECON 900 Directed Research Project

★3 (fi 6) (variable).

211.59 Economie

Faculté Saint-Jean

ECONE 101 Introduction à la micro-économie

★3 (fi 6) (premier semestre, 3-0-0). Analyse économique, problèmes et politiques avec accent sur l'économie canadienne; le rôle des consommateurs et des compagnies dans les marchés à compétition et à monopole; le capital étranger dans l'économie canadienne; distribution des revenus, inégalité et pauvreté; utilisation du milieu; politiques économiques gouvernementales. Prérequis: Mathématiques 30 ou l'accord du Doyen. Anciennement ECONE 201.

ECONE 102 Introduction à la macro-économie

★3 (fi 6) (deuxième semestre, 3-0-0). Analyses, problèmes et politiques économiques avec accent sur l'économie canadienne; revenu national et théorie monétaire; problèmes du chômage et de l'inflation; politiques gouvernementales monétaires et fiscales: théorie du commerce international, problèmes et politiques gouvernementales. Prérequis: Mathématiques 30 ou l'accord du Doyen. Anciennement ECONE 202.

ECONE 281 Théorie micro-économique intermédiaire

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Théorie du comportement des consommateurs; théorie de la production; coûts de production; équilibre en situation de concurrence parfaite, de concurrence monopolistique, de monopole pur et d'oligopole. Prérequis: ECONE 101/102 ou l'accord du Doyen. Ce cours n'est pas accessible aux étudiants ayant ou postulant des crédits pour ECON 383, ou MANEC 301.

ECONE 282 Théorie macro-économique intermédiaire

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Les thèmes majeurs de ce cours sont le revenu national (théorie et applications), la théorie de la consommation globale, la théorie de l'investissement, la théorie de l'emploi, la politique monétaire et fiscale. Prérequis: ECONE 101/102 ou l'accord du Doyen. Ce cours n'est pas accessible aux étudiants ayant ou postulant des crédits pour MANEC 333 ou MANEC 402. Anciennement ECONE 382.

ECONE 318 Introduction au développement économique du Canada I

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Analyse du développement économique au Canada avant la première guerre mondiale. Ce cours met l'accent particulièrement sur la Confédération, la politique nationale et le peuplement de l'Ouest. Prérequis: ECONE 101/102 ou l'accord du Doyen. Remarque: un étudiant ne peut cumuler les crédits de ECONE 316 et ECONE 318.

ECONE 319 Introduction au développement économique du Canada II

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Analyse du développement économique au Canada depuis la première guerre mondiale. Ce cours s'intéresse spécialement aux questions de politique qui réapparaissent périodiquement telles que la libération du commerce, l'investissement étranger, les disparités régionales et la performance macro-économique. Prérequis: ECONE 318. Remarque: un étudiant ne peut cumuler les crédits de ECONE 317 et ECONE 319.

ECONE 341 Monnaie et Banque

★3 (fi 6) (l'un ou l'autre semestre, 3-0-0). Dans ce cours l'accent est mis principalement sur l'offre de monnaie et le contrôle monétaire. Y seront abordées des questions telles le rôle de la monnaie et du crédit dans le processus de l'échange, les intermédiaires financiers, les banques commerciales et les banques centrales. Prérequis: ECONE 101/102 ou l'accord du Doyen.

ECONE 399 Introduction à l'économétrie

★3 (fi 6) (l'un ou l'autre semestre, 3-0-1). Etude élémentaire des sujets majeurs de l'économétrie avec insistance sur les méthodes de régression appliquée. Prérequis: ECONE 281/282, ECON 395/396, ou STAT 255 ou l'équivalent. Remarque: ce cours n'est pas accessible aux étudiants ayant ou postulant des crédits en AG EC 416, ECON 408, MGTSC 413, 414, 417, 419, ou STAT 341. Les étudiants s'inscrivent au Certificat d'équivalence

après avoir terminé un BA (Général) peuvent remplacer ECON 395/396 par STATQ 141 ou STAT 236 avec l'accord du Doyen.

ECONE 401 Histoire de la pensée économique I

★3 (*fi 6*) (premier semestre, 3-0-0). Survol de la pensée et des théories économiques depuis le mercantilisme jusqu'à la révolution marginaliste. L'accent sera mis sur les structures tant théoriques que socio-économiques à diverses époques de la pensée économique. Prérequis: ECONE 281.

ECONE 402 Histoire de la pensée économique II

★3 (*fi 6*) (deuxième semestre, 3-0-0). Survol de la pensée et des théories économiques depuis l'avènement des théories économiques néo-classiques jusqu'aux théories macro-économiques contemporaines. L'accent sera mis sur les structures tant théoriques que socio-économiques à diverses époques de la pensée économique. Prérequis: ECONE 281/282.

211.60 Reserved

211.61 Education

Faculté Saint-Jean

EDUC 200 Introduction générale à l'éducation

★3 (*fi 7*) (l'un ou l'autre semestre, 1-0-4). Ce cours comprend deux parties. Une partie est centrée sur l'étude des thèmes tels que le monde dans lequel nous vivons, le rôle de l'école, les élèves et les objectifs éducatifs. L'autre partie du cours est une expérience pratique d'observation participante vécue dans le milieu scolaire. Co-requis: EDUC 201. Ce cours n'est pas accessible aux étudiants ayant des crédits en ENPRQ 200 ou ENPRQ 251. Note: Des frais de placement seront exigés pour ce cours. Veuillez consulter §22.2.1 pour de plus amples détails.

EDUC 201 Stratégies générales d'enseignement

★3 (*fi 6*) (l'un ou l'autre semestre, 3-0-2). Cours pratique de stratégies d'enseignement qui vise à outiller l'apprenant dans les domaines tels que la planification, le questionnement, la participation active, la vérification de la compréhension, les directives, les explications, et le travail de groupe. Ateliers de micro-enseignement. Co-requis: EDUC 200

EDUC 302 Evaluation des apprentissages en milieu scolaire

★1,5 (*fi 3*) (l'un ou l'autre semestre, 1,5-0-0). Etudes des notions fondamentales de la mesure et de l'évaluation des apprentissages en milieu scolaire. Exploration de l'acte d'évaluation et de sa place dans le processus d'enseignement et d'apprentissage. Examen des pratiques évaluatives. Analyse et conception d'instruments de mesure du rendement scolaire. Grilles d'observation.

EDUC 303 La gestion de classe

★1,5 (*fi 3*) (l'un ou l'autre semestre, 1,5-0-0). Ce cours a pour objectif d'étudier différents modèles de gestion et de voir leurs applications en salle de classe.

211.62 Education

Faculty of Education

EDU 102 Special Topics in Elementary Education

★variable, (*fi variable*) (variable, variable). This course is designed to address timely topics in Education. Note: Not available for credit for students registered in the BEd, BEd/BSc, or BPE/BEEd program.

EDU 103 Special Topics in Secondary Education

★variable, (*fi variable*) (variable, variable). This course is designed to address timely topics in Education. Note: Not available for credit for students registered in the BEd, BEd/BSc, or BPE/BEEd program.

EDU 104 Special Topics in Educational Psychology

★variable, (*fi variable*) (variable, variable). This course is designed to address timely topics in Education. Note: Not available for credit for students registered in the BEd, BEd/BSc, or BPE/BEEd program.

EDU 105 Special Topics in Educational Policy Studies

★variable, (*fi variable*) (variable, variable). This course is designed to address timely topics in Education. Note: Not available for credit for students registered in the BEd, BEd/BSc, or BPE/BEEd program.

211.63 Education—Administration

Department of Educational Policy Studies
Faculty of Education

211.63.1 Undergraduate Courses

EDAL 401 The Role of the Teacher

★3 (*fi 6*) (either term, 3-0-0). Note: Offered for the last time in 1997/98. Restricted to students in Year 4 of the old program.

211.63.2 Graduate Courses

EDAL 501 Evolving Concepts in Educational Administration and Leadership

★3 (*fi 6*) (either term, 3-0-0).

EDAL 502 Administrative and Leadership Processes in Education

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: EDAL 501

EDAL 511 Research Design and Data Analysis I

★3 (*fi 6*) (either term, 3-0-1).

EDAL 512 Research Design and Data Analysis II

★3 (*fi 6*) (either term, 3-0-1). Prerequisite: EDAL 511.

EDAL 521 Supervision of Educational Personnel

★3 (*fi 6*) (either term, 3-0-0).

EDAL 522 Selected Topics in Educational Supervision

★3 (*fi 6*) (either term, 3-0-0).

EDAL 527 Orientations to Administrator-Student Relationships

★3 (*fi 6*) (either term, 3-0-0).

EDAL 528 Administration of Postsecondary Student Personnel Services

★3 (*fi 6*) (either term, 3-0-0).

EDAL 531 Administration of Schools

★3 (*fi 6*) (either term, 3-0-1).

EDAL 532 Administration of School Jurisdictions

★3 (*fi 6*) (either term, 3-0-0).

EDAL 533 Principalship Practicum I

★3 (*fi 6*) (first term, 3-0-1). This practicum course in the principalship specialization provides opportunities to examine issues of educational leadership in a variety of school settings. Students are engaged in exploring these issues through readings, seminars, and school-based activities. Students will develop skills in observation, shadowing, interviewing, group facilitation, and reflection through data gathering at specific school sites. Pre-/corequisites: EDAL 501 and 502.

EDAL 534 Principalship Practicum II

★3 (*fi 6*) (second term, 3-0-1). Normally, students take this course in the term following their enrolment in EDAL 533. This course is designed to continue the exploration, begun in EDAL 533, of issues in educational leadership. As in EDAL 533, students are engaged in exploring these issues through readings, seminars, and school-based activities. Corequisites or prerequisites: EDAL 501 and 502.

EDAL 535 Mentorship in the Principalship

★3 (*fi 6*) (either term, 3-0-1) or ★6 (*fi 12*) (full session, 6-0-2). This practicum course in the principalship specialization provides opportunities to examine personal leadership qualities and styles as well as issues in educational leadership. Students participate in school-based mentorship activities, seminars, scholarly reading, and reflective journaling.

EDAL 541 Planned Change in Educational Organizations

★3 (*fi 6*) (either term, 3-0-0).

EDAL 546 Educational Planning Processes

★3 (*fi 6*) (either term, 3-0-0).

EDAL 547 Administrative Applications of Computing

★3 (*fi 6*) (either term, 3-0-0).

EDAL 548 Management of Information Systems

★3 (*fi 6*) (either term, 3-0-0).

EDAL 551 Governance and Administration of Education in Canada

★3 (*fi 6*) (either term, 3-0-0).

EDAL 553 Legal Aspects of Educational Administration

★3 (*fi 6*) (either term, 3-0-0).

EDAL 557 Administration of Education Across Cultures

★3 (*fi 6*) (either term, 3-0-0).

EDAL 565 Educational Finance

★3 (*fi 6*) (either term, 3-0-0).

EDAL 571 The Organization of Postsecondary Education

★3 (*fi 6*) (either term, 3-0-0).

EDAL 572 Administration of Postsecondary Institutions

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: EDAL 571 or consent of Department.

EDAL 594 Seminar and Practicum in Administrative Behavior II

★3 (*fi 6*) (either term, 3-0-1). Prerequisite: consent of Department.

EDAL 595 The School Principalship: Seminars and Simulations

★3 (*fi 6*) (either term, 3-0-1). Applied activities and academic studies which

enable the student to learn skills and knowledge pertinent to the responsibilities of the principal, by disciplined reflection on their performance in simulated administrative situations. Prerequisites: EDAL 501 and 502 or consent of department.

EDAL 605 Selected Topics in Educational Administration I

★3 (fi 6) (either term, 3-0-0).

EDAL 606 Problems in Educational Administration II

★3 (fi 6) (either term, 3-0-0).

EDAL 611 Research Methods I

★3 (fi 6) (either term, 3-0-0).

EDAL 612 Research Methods II

★3 (fi 6) (either term, 3-0-0).

EDAL 625 Administrative Behavior I

★3 (fi 6) (either term, 3-0-0).

EDAL 626 Administrative Behavior II

★3 (fi 6) (either term, 3-0-0).

EDAL 635 Organization Theory I

★3 (fi 6) (either term, 3-0-0).

EDAL 645 Policy Analysis in Education I

★3 (fi 6) (either term, 3-0-0).

EDAL 655 Politics of Education I

★3 (fi 6) (either term, 3-0-0).

EDAL 656 Politics of Education II

★3 (fi 6) (either term, 3-0-0).

EDAL 665 Economic Environment of Education I

★3 (fi 6) (either term, 3-0-0).

EDAL 671 Issues in Administration of Postsecondary Education I

★3 (fi 6) (first term, 3-0-0). Prerequisite: consent of Department.

211.64 Education—Adult

Department of Educational Policy Studies
Faculty of Education

211.64.1 Undergraduate Courses

EDAE 223 Adult Education Major

★3 (fi 6) (either term, 3-0-0).

EDAE 243 Adult Education Major

★3 (fi 6) (either term, 3-0-0).

EDAE 323 Adult Education Major

★3 (fi 6) (either term, 3-0-0).

EDAE 343 Adult Education Major

★3 (fi 6) (either term, 3-0-0).

EDAE 345 Introduction to Adult Education

★3 (fi 6) (either term, 3-0-0). This course includes selected aspects of the nature and scope of adult education important to instructors of adults who specialize in various fields of adult education. Various aspects of the broad field of adult education are considered.

EDAE 390 Introduction to Adult Curriculum and Instruction

★3 (fi 6) (either term, 3-0-0). This course focuses on the following topics as they relate to adult education: mastery learning, program goals, and objectives, long range curriculum planning, content analysis processes, and writing performance objectives.

EDAE 404 Developmental Course

★3 (fi 6) (either term, 3-0-0). Content varies as new courses are developed. Topics announced prior to registration. The student's transcript carries title descriptive of content. May be repeated. Prerequisite: consent of Department.

EDAE 423 Adult Education Major

★3 (fi 6) (either term, 3-0-0).

EDAE 443 Adult Education Major

★3 (fi 6) (either term, 3-0-0).

EDAE 460 Planning for Adult Education

★3 (fi 6) (either term, 3-0-0). This course includes selected aspects of planning important to instructors of adults who specialize in various fields of adult education. Various aspects of planning for adult instruction are considered. The course provides instructors of adults with advanced information about program goals and objectives, instructional objectives, unit planning, lesson planning, modular planning, planning and integrating higher level thinking skills, and planning for the use of instructional technology.

Principles and techniques of planning are considered from the perspective of an instructor of adults. Prerequisite: EDAE 345.

EDAE 461 Developing Programs for Adults

★3 (fi 6) (either term, 3-0-0). This course will examine theoretical and conceptual principles of developing programs for adult learners. Emphasis will be on the application of these principles both credit and non-credit programs offered in a variety of settings. Prerequisite: EDAE 390.

EDAE 485 Evaluating Adult Learning

★3 (fi 6) (either term, 3-0-0). This course includes selected aspects of evaluation important to instructors of adults who specialize in various fields of adult education. Various techniques of assessing learning in the cognitive, affective, and psychomotor domains are considered. The course provides instructors of adults with advanced information about evaluation and testing as well information on how to evaluate adult learners using an applications approach. Constructs, principles and techniques of measurement and evaluation are considered from the perspective of an instructor of adults. Prerequisite: EDAE 390.

EDAE 496 Individual Directed Study

★3 (fi 6) (either term, 3-0-0). Prerequisite: consent of Department.

EDAE 498 Individual Directed Laboratory Study

★3 (fi 6) (either term, 0-6L-0). Prerequisite: consent of Department.

211.64.2 Graduate Courses

EDAE 511 Instructional Design in Postsecondary Education

★3 (fi 6) (either term, 3-0-0).

EDAE 521 Psychology of Learning and Teaching at the Adult Level

★3 (fi 6) (either term, 3-0-0). [Offered by the Department of Educational Psychology]

EDAE 523 Administration of Further Education

★3 (fi 6) (either term, 3-0-0).

EDAE 530 Literacy in Adult Education

★3 (fi 6) (either term, 3-0-0). Coordinated by the Department of Elementary Education.

EDAE 535 Program Development in the Teaching of English as a Second or Other Language

★3 (fi 6) (either term, 3-0-0). Prerequisite: EDPY 416.

EDAE 537 Issues in the Teaching of English as a Second or Other Language

★3 (fi 6) (either term, 3-0-0). Prerequisite: EDPY 416.

EDAE 540 Introduction to Human Resource Development

★3 (fi 6) (either term, 3-0-0). This course focuses on concepts and strategies for the development of human resources within organizational contexts.

EDAE 541 Topics in Adult Basic Education

★3 (fi 6) (either term, 3-0-0). This course examines the policies and philosophies which characterize a variety of ABE programs. Characteristics of learners and approaches to curriculum are emphasized.

EDAE 545 Adult Education in the Workplace

★3 (fi 6) (either term, 3-0-0). Designed for trainers and developers, community-based adult educators, counsellors and planners, this course will focus on informal learning and critical analysis of issues in the workplace.

EDAE 560 Instructional Methods in Adult and Higher Education

★3 (fi 6) (either term, 3-0-0).

EDAE 561 Curriculum Planning in Adult and Higher Education

★3 (fi 6) (either term, 3-0-0).

EDAE 577 Foundations of Adult and Higher Education

★3 (fi 6) (either term, 3-0-0). This survey course examines the various interpretations and paradigms of adult and higher education. Ways of studying adult and higher education are presented using concepts, analysis, theories, and methodologies from the various foundational disciplines.

EDAE 579 Sociology of Adult and Continuing Education

★3 (fi 6) (either term, 3-0-0). This course studies from a sociological perspective the role and function of adult education in industrial societies and in the Third World, the relationships between adult education, social stratification, and the workplace, and adult education as a profession.

EDAE 585 Needs Assessment and Program Evaluation

★3 (fi 6) (either term, 3-0-0).

EDAE 593 Introduction to Research

★3 (fi 6) (either term, 3-0-0).

EDAE 595 Research Design and Data Analysis

★3 (fi 6) (either term, 3-0-0).

211.65 Education—Business

Department of Secondary Education
Faculty of Education

EDBU 341 Teaching of Keyboarding/Typewriting

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Typing 20 or the equivalent.

EDBU 355 Business Computer Processing

★3 (*fi 6*) (either term, 0-4L-0). Commercial applications, and the teaching of computer processing in the secondary school.

EDBU 357 Teaching of Accounting in Automated Data Processing and Accounting

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ACCTG 311.

211.66 Education—Career Technology Studies

Department of Secondary Education
Faculty of Education

EDCT 223 Career Studies

★6 (*fi 12*) (variable).

EDCT 243 Career Studies

★6 (*fi 12*) (variable).

EDCT 300 Conference Seminar

★3 (*fi 6*) (either term, 2-0-4). Content varies. Topics are announced prior to registration. The transcript will carry a title descriptive of content. Prerequisite: consent of Department.

EDCT 310 Career Education Systems Laboratory

★3 (*fi 6*) (either term, 2-1s-4) Study of the interrelationship of career field in the context of equipment and facilities representative of the school environment.

EDCT 321 Career Education Instruction Laboratory

★3 (*fi 6*) (either term, 2-1s-4) Instruction, unit planning, and facility management. The laboratory part of this course will require students to offer instruction to public school students in an on-campus laboratory or shop environment. Prerequisite: EDCT 310.

EDCT 323 Career Studies

★6 (*fi 12*) (variable).

EDCT 343 Career Studies

★3 (*fi 6*) (variable).

EDCT 344 Career Studies

★3 (*fi 6*) (variable).

EDCT 400 Conference Seminar

★1 (*fi 2*), ★2 (*fi 4*), or ★3 (*fi 6*) (either term, variable). Content varies. Topics are announced prior to registration. The transcript will carry a title descriptive of content. Prerequisite: consent of Department.

EDCT 423 Career Studies

★3 (*fi 6*) (variable).

EDCT 443 Career Studies

★3 (*fi 6*) (variable).

EDCT 477 Technology and Society

★3 (*fi 6*) (either term, 2-1s-4). Study of the teaching of the interrelationship of man and technology.

EDCT 500 Conference Seminar

★1 (*fi 2*), ★2 (*fi 4*), or ★3 (*fi 6*) (either term, variable). Content varies. Topics are announced prior to registration. The transcript will carry a title descriptive of content. Prerequisite: consent of Department.

211.67 Education—Elementary (Curriculum and Instruction)

Department of Elementary Education
Faculty of Education

211.67.1 Undergraduate Courses**EDEL 300 Introduction to Teaching in the Elementary School**

★3 (*fi 6*) (either term, 3-0-0).

EDEL 302 Curriculum and Instruction in Elementary School Art

★3 (*fi 6*) (either term, 3-0-0). Formerly ED EL 200.

EDEL 305 Communication Through Language Learning

★3 (*fi 6*) (either term, 3-0-0).

EDEL 316 Communication Through Mathematics Education

★3 (*fi 6*) (either term, 3-0-0).

EDEL 321 Introduction to Curriculum and Instruction in Elementary School Physical Education

★3 (*fi 6*) (either term, 3-0-0).

EDEL 325 Curriculum and Instruction in Elementary School Music

★3 (*fi 6*) (either term, 3-0-0).

EDEL 330 Curriculum and Instruction in Elementary School Science

★3 (*fi 6*) (either term, 3-0-0).

EDEL 335 Curriculum and Instruction in Elementary School Social Studies

★3 (*fi 6*) (either term, 3-0-0).

EDEL 355 Program Environments in Early Childhood Education

★3 (*fi 6*) (either term, 3-0-3). Restricted to students in the Early Childhood Education.

EDEL 390 Supervised Independent Study in Elementary Education I

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDEL 395 Group Project I Elementary Education

★variable (*fi variable*) (either term, variable). Prerequisite: consent of Department.

EDEL 400 Design of Elementary Art Curriculum

★3 (*fi 6*) (either term, 1-0-2). Prerequisite: An introductory curriculum and instruction course in Art Education, or consent of Department.

EDEL 405 Theoretical Perspectives of Language Learning

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: An introductory curriculum and instruction course in language learning; or consent of Department.

EDEL 406 Diagnostic Teaching of Reading and Writing

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: An introductory curriculum and instruction course in language learning; or consent of Department.

EDEL 407 Reading in the Elementary School

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: An introductory curriculum and instruction course in language learning; or consent of Department.

EDEL 408 Writing in the Elementary School

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: An introductory curriculum and instruction course in language learning; or consent of Department.

EDEL 409 Teaching Literature in Elementary Schools

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: An introductory curriculum and instruction course in language learning; or consent of Department.

EDEL 410 Language Learning in the Elementary School

★6 (*fi 12*) (either term, 6-0-2). Prerequisite: An introductory curriculum and instruction course in language learning; or consent of Department.

EDEL 411 Drama in the Elementary School

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: An introductory curriculum and instruction course in language learning; or consent of Department.

EDEL 413 Diagnostic Teaching of Speech and Oral Language

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: An introductory curriculum and instruction course in language learning; or consent of Department.

EDEL 415 Teaching Mathematics in the Elementary School

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: An introductory curriculum and instruction course in mathematics education; or consent of Department.

EDEL 416 Assessing Children's Understanding of Mathematics

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: An introductory curriculum and instruction course in mathematics education; or consent of Department.

EDEL 420 Curriculum and Instruction in Elementary School Physical Education

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: Element VII and an introductory curriculum and instruction course in elementary school physical education; or consent of Department.

EDEL 425 The Child's Voice: Techniques for the Children's Choir

★3 (*fi 6*) (either term, 3-0-0). Pre- or corequisite: MUSIC 230; or consent of Department. Note: Priority given to students in the Music Education Minor.

EDEL 426 Music Literacy: The Child

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: MUSIC 151 and 156; or consent of Department. Note: Priority given to students in the Music Education Minor.

EDEL 427 Music Creativity: Teaching and Learning

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: MUSIC 151 and 156. Pre-/corequisite: MUSIC 207. Note: Priority given to students in the Music Education Minor.

EDEL 428 Music in the Elementary School II

★3 (*fi 6*) (either term, 3-0-2). Lab hours may require scheduled visits to

elementary classrooms. Prerequisite: MUSIC 101; or consent of Department. Note: Priority given to students in the Music Education MInor.

EDEL 430 Approaches to Elementary School Science

★3 (*fi 6*) (second term, 3-0-0). Prerequisite: An introductory curriculum and instruction course in elementary science education; or EDEL 330; or consent of Department.

EDEL 431 Curriculum in Elementary School Science

★3 (*fi 6*) (second term, 0-3L-0). Prerequisite: An introductory curriculum and instruction course in elementary science education; or EDEL 330; or consent of Department.

EDEL 435 Instruction in Elementary School Social Studies

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: An introductory curriculum and instruction course in elementary Social Studies; or EDEL 335; or consent of Department.

EDEL 445 Teaching Second Languages in the Elementary School

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: A working knowledge of the language to be taught or consent of Department. Note: Priority given to students in the Second Languages Minor.

EDEL 451 Methods and Programs in the Teaching of English as a Second Language

★3 (*fi 6*) (either term, 3-0-0). This course will include a field placement in an off-campus ESL classroom one morning per week. Prerequisite: EDPY 416; or consent of Department. Note: Priority given to students in Teaching English as a Second Language Minor. [Coordinated by Department of Educational Policy Studies]

EDEL 455 Play as a Teaching Strategy

★3 (*fi 6*) (either term, 3-0-0).

EDEL 456 Integrating Theory and Practice in Early Childhood Education

★3 (*fi 6*) (either term, 3-0-3). Prerequisite: EDEL 355; or consent of Department. Note: Restricted to students in the Early Childhood Education Minor.

EDEL 460 The Teacher's Role in Curriculum Development

★3 (*fi 6*) (either term, 3-0-0).

EDEL 461 Individualizing Curriculum in the Elementary School

★3 (*fi 6*) (either term, 0-3L-0).

EDEL 470 Reflective Practice in the Elementary School

★3 (*fi 6*) (either term, 0-3s-0). Prerequisites: ED EL 370 and completion of ★15 of introductory ED EL courses. Must be taken in conjunction with EDFX 420. Note: last offered in 1997/98. Restricted to students in Year 4 of the old program.

EDEL 490 Supervised Independent Study in Elementary Education II

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDEL 495 Seminar in Group Projects in Elementary Education II

★variable (*fi variable*) (either term, variable). Prerequisite: consent of Department.

EDEL 496 Group Projects in Elementary Education II

★3 (*fi 6*) (either term, 0-3s-0). Prerequisite: consent of Department.

211.67.2 Graduate Courses

EDEL 505 Theories of Language Processing

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Equivalent to ★3 in language arts education, or consent of Department.

EDEL 506 Theories of Language Development: The Elementary School Child

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Equivalent to ★3 in language arts education, or consent of Department.

EDEL 507 Issues in Developmental Literacy

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Equivalent to ★3 in language arts education, or consent of Department.

EDEL 508 Diagnosis and Remediation of Reading and Writing Problems I

★3 (*fi 6*) (either term, 3-0-3). Prerequisite or corequisite: EDEL 505 or equivalent.

EDEL 509 Diagnosis and Remediation of Reading and Writing Problems II

★3 (*fi 6*) (either term, 3-0-3). Prerequisite EDEL 508.

EDEL 510 Curriculum and Instruction in Children's Literature for Elementary Schools

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Equivalent to ★3 in language arts education, or consent of Department.

EDEL 511 Elementary Language Arts Programs: Development and Supervision

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Equivalent to ★3 in language arts education, or consent of Department.

EDEL 512 Oral Language: Content and Context of the Classroom

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★3 in language education or consent of Department.

EDEL 513 Speech and Oral Language Disorders—Implications in the Elementary Classroom

★3 (*fi 6*) (either term, 3-0-0).

EDEL 517 Research in Mathematics Education I

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: EDEL 415 or consent of Department.

EDEL 530 Research in Elementary School Science

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: EDEL 430 or 431 or consent of Department.

EDEL 545 Program Development in Second Language Education

★3 (*fi 6*) (either term, 3-0-0).

EDEL 555 Early Childhood Education: Home/School/Community Relations

★3 (*fi 6*) (either term, 3-0-0). This course is designed to investigate the teacher's role in improving communication among the school, home, and community.

EDEL 556 Program Development in Early Childhood

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: EDEL 457 or consent of Department.

EDEL 557 Research in Program Development in Early Childhood Education

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: EDEL 556 or consent of Department.

EDEL 558 Curriculum and Instruction in Early Childhood Education

★6 (*fi 12*) (full session, 3-0-3; 3-0-0). A basic course on programming in early childhood classrooms for teachers requiring a background in this field of study.

EDEL 560 Foundations of Curriculum Development

★3 (*fi 6*) (either term, 3-0-0). A study of educators' views of knowledge, society, and the learner and the effect of those views on curriculum development.

EDEL 561 Processes of Curriculum Development

★3 (*fi 6*) (either term, 3-0-0). A study of the ways in which curricula are produced, implemented, and evaluated.

EDEL 565 Research and Support Services and Skills

★3 (*fi 6*) (either term, 0-3s-0). Reports and discussion by staff and graduate students to provide candidates for advanced degrees with experience in the selection and evaluation of research problems and procedures.

EDEL 567 Introduction to Educational Research

★3 (*fi 6*) (either term, 0-3s-0). Prerequisite: consent of Department.

EDEL 568 Introduction to Qualitative Research Methods in Education

★3 (*fi 6*) (either term, 3-0-0).

EDEL 570 Instructional Practices in the Elementary Classroom

★3 (*fi 6*) (either term, 3-0-0).

EDEL 571 Models of Teaching

★3 (*fi 6*) (either term, 3-0-0).

EDEL 590 Directed Individual Study in Elementary Education

★3 (*fi 6*) (variable). Prerequisite: consent of Department.

EDEL 591 Directed Individual Study in Elementary Education

★6 (*fi 12*) (full session, variable). Prerequisite: consent of Department.

EDEL 595 Seminar in Elementary Education—Selected Topics

★3 (*fi 6*) (variable, 0-3s-0). Prerequisite: consent of Department.

EDEL 596 Special Seminars in Elementary Education

★variable (*fi variable*) (either term, variable). Prerequisite: consent of Department.

EDEL 605 Theories and Models of Language

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: EDEL 500 or consent of Department.

EDEL 607 Symposium in Language Learning Research

★3 (*fi 6*) (either term, 3-0-0). The course consists of an exploration of recent research in language learning at the local, national, and international levels. Prerequisite: EDEL 505 or 506, or consent of Department.

EDEL 609 Research in Language★6 (*fi 12*) (full session, 3-0-0).**EDEL 690 Individual Project**★3 (*fi 6*) (variable). Comprehensive problems in Curriculum and Instruction—Elementary. Prerequisite: consent of Department.**EDEL 691 Individual Project**★6 (*fi 12*) (full session, variable). Comprehensive problems in Curriculum and Instruction—Elementary. Prerequisite: consent of Department.**EDEL 696 Conference Course in Elementary Education**★6 (*fi 12*) (full session, variable). Note: May be offered in a single term.**EDEL 697 Symposium in Elementary Education**★6 (*fi 12*) (full session, 0-3s-0). Research reports by staff and students. Compulsory for all doctoral students.**EDEL 900 Directed Research Project**★6 (*fi 12*) (variable).**211.68 Education—Elementary and Secondary
(Common Curriculum and Instruction Courses)**Departments of Elementary and Secondary Education
Faculty of Education**211.68.1 Undergraduate Courses****EDES 132 Speech Improvement**Unassigned (*fi 0*) (either term).**EDES 144 Education Concert Band**★0 (*fi 2*) (either term, 0-0-4). A music ensemble designed to provide education students with practical experience in the organization, administration, and literature of the concert band. Note: This is a credit/no credit course that may be offered over the full session.**EDES 145 Mixed Chorus**★0 (*fi 2*) (full session, 0-0-4). A music ensemble designed to provide education students with practical experience in the organization, administration and literature of the mixed chorus. Note: This is a credit/no credit course.**EDES 146 Education Handbell Choir**★0 (*fi 2*) (full session, 0-0-4). A music ensemble designed to provide education students with practical experience in the organization, administration and literature of the handbell choir. Note: This is a credit/no credit course.**EDES 147 Education Pep Band**★0 (*fi 1*) (either term, 0-0-2). A music ensemble designed to provide education students with practical experience in the organization, administration and literature of the pep band. Note: This is a credit/no credit course that may be offered over the full session.**EDES 148 Education Chamber Music Ensemble**★0 (*fi 1*) (either term, 0-0-2). A music ensemble designed to provide education students with practical experience in the organization, administration and literature of a chamber ensemble. Note: This is a credit/no credit course that may be offered over the full session.**EDES 346 Resource-Based Teaching**★3 (*fi 6*) (either term, 3-0-0). An introduction to planning active learning experiences using school library materials and other resources, with a focus on how teachers and teacher-librarians cooperatively implement the curriculum.**EDES 348 Reading in the Junior and Senior High School**★3 (*fi 6*) (either term, 3-0-0).**EDES 401 Conference Seminar**★variable (*fi variable*) (variable).**EDES 445 Canadian Literature for Young People in Schools and Libraries**★3 (*fi 6*) (either term, 3-0-0). A survey of Canadian literature written for young people from preschool through junior high years. Emphasis on contemporary works, and consideration of current issues and trends in the field.**211.68.2 Graduate Courses****EDES 501 Conference Seminar**★variable (*fi variable*) (variable).**EDES 540 School Librarianship**★3 (*fi 6*) (first term, 3-0-0). Introduction to the philosophy and administration of school library programs in elementary and secondary schools.**EDES 541 School Library Collection Development**★3 (*fi 6*) (either term, 3-0-0).**EDES 543 School Library Programs**★3 (*fi 6*) (second term, 3-0-0). Focus on cooperative planning and implementation of school library programs.**EDES 546 School Library Information Materials**★3 (*fi 6*) (either term, 3-0-0).**EDES 547 Organization of School Library Materials**★3 (*fi 6*) (either term, 3-0-0).**EDES 548 Directed Study in School Library Research**★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.**EDES 649 Curriculum Evaluation**★3 (*fi 6*) (first term, 3-0-0). An interdepartmental seminar devoted to an examination of evaluation in the broad perspective of its place in education.**EDES 690 Doctoral Seminar in Teacher Education**★3 (*fi 6*) (either term, 0-3s-0).**211.69 Education—Field Experience**Division of Field Experiences
Faculty of Education**Notes**

- (1) Field Experience courses other than EDFS 475 and 476 are normally not offered in Intersession.
- (2) The Fee Index for these courses is one unit higher due to the practicum placement fees. See §22.2.1 for details.

EDFS 200 Introduction to the Profession of Teaching★3 (*fi 7*) (either term, 2-0-4). This course explores the complex roles of teachers as professionals in contemporary schools. Through a combination of field-based and classroom experiences students will become familiar with the scope and expectations of the role of the teacher and the framework within which teachers work. (Offered by the Department of Educational Policy Studies.)**EDFS 325 Elementary Route Field Experience for the Introductory Professional Term**★3 (*fi 7*) (either term, 4 weeks full-time in schools). Prerequisites: EDFS 200 and EDPY 200. Note: These prerequisites do not apply to After Degree students.**EDFS 350 Secondary Route Field Experience for the Introductory Professional Term**★3 (*fi 7*) (either term, 4 weeks full-time in schools). Prerequisites: EDFS 200 and EDPY 200. Note: These prerequisites do not apply to After Degree students.**EDFS 375 Field Experience in Adult Education**★3 (*fi 6*) (either term, 5 weeks). An initial field experience in Adult Education. Prerequisite: EDFS 200.**EDFS 420 Student Teaching in the Elementary School**★12 (*fi 25*) (either term, 12 weeks). Prerequisite: Completion of ★18 of EDEL courses. Note: last offered 1997/98. Restricted to students in Year 4 of old program.**EDFS 425 Elementary Route: Generalist Field Experience for the Advanced Professional Term**★9 (*fi 19*) (either term, 9 weeks full-time in schools). Prerequisites: Introductory Professional Term and ★15 of EDEL courses.**EDFS 426 Elementary Route Special Education Field Experience for the Advanced Professional Term**★9 (*fi 19*) (either term, 9 weeks full-time in schools). Prerequisites: Introductory Professional Term ★15 of EDEL courses, and completion of all courses in the Special Education Minor.**EDFS 430 Student Teaching in the Elementary School (Special Education)**★6 (*fi 13*) (either term, 6 weeks). Special Education focus area only. Prerequisite: Completion of ★18 of ED EL courses. Corequisite: EDPY 461. Note: Last offered in 1997/98. Restricted to students in Year 4 of the old program.**EDFS 440 Student Teaching in Special Education Programs in the Elementary School**★6 (*fi 12*) (either term, 6 weeks). Special Education focus area only. Prerequisites: EDFS 430, EDPY 461, and completion of ★18 of EDEL courses. Note: last offered in 1997/98. Restricted to students in Year 4 of the old program.

EDFX 450 Secondary Route Field Experience for the Advanced Professional Term

★6 (*fi 13*) (either term, 9 weeks full-time in schools). Prerequisites: Introductory Professional Term and ★24 in the Major. Corequisite: EDFX 451.

EDFX 451 Integrating Theory and Classroom Practice in the Advanced Professional Term

★3 (*fi 6*) (either term, 3-0-1). Prerequisites: Introductory Professional Term and ★24 in the Major subject area. Corequisites: EDFX 450 and EDSE (Major) courses. (Offered by the Department of Secondary Education.)

EDFX 475 Field Experience Student Teaching at the Postsecondary Level I

★3 (*fi 6*) (either term, 3 weeks, full-time).

EDFX 476 Student Teaching at the Postsecondary Level II

★3 (*fi 7*) (either term, 3 weeks, full-time in schools).

EDFX 498 Field Experience in the Elementary School

★variable (*fi variable*) (variable).

EDFX 499 Field Experience in the Secondary School

★variable (*fi variable*) (variable). Prerequisite: Permission of Professional Officer, Field Experiences.

211.70 **Reserved**

211.71 Education—Foundations

Department of Educational Policy Studies
Faculty of Education

211.71.1 Undergraduate Courses**EDFN 301 Education in Canada: Selected Topics**

★3 (*fi 6*) (either term, 3-0-0). Not to be taken by students who have credit in EDFDN 101. Note: last offered in 1997/98. Restricted to students in Year 4 of the old program.

EDFN 360 Society and Education

★3 (*fi 6*) (either term, 3-0-0). The changing function and structures of education, with special reference to contemporary Canadian society.

EDFN 361 Sociology of Learning and Achievement

★3 (*fi 6*) (either term, 3-0-0).

EDFN 456 The Philosophy of Moral Education

★3 (*fi 6*) (either term, 3-0-0). An examination of the philosophical problems that arise in the moral education of students.

EDFN 461 School and Community

★3 (*fi 6*) (either term, 3-0-0). The school in the context of community culture and structure.

EDFN 493 Basic Issues in Contemporary Education

★3 (*fi 6*) (either term, 3-0-0). Note: last offered in 1997/98. Restricted to students in Year 4 of the old program.

EDFN 495 Developing a Philosophy of Education

★3 (*fi 6*) (either term, 3-0-0). Note: last offered in 1997/98. Restricted to students in Year 4 of the old program.

211.71.2 Graduate Courses**EDFN 510 Education from an Anthropological Perspective**

★3 (*fi 6*) (either term, 3-0-0).

EDFN 522 Functions of Education in the Development of Emerging Nations

★3 (*fi 6*) (either term, 3-0-0). This course focuses on the development of and the current problems in education in developing countries.

EDFN 523 Development Theory and Education

★3 (*fi 6*) (either term, 3-0-0). An examination of the meaning of the concept "Societal Development". A review of theories of development put forward by selected writers, and an analysis of the role of education in the development process, with particular attention to the Third World. Prerequisite: consent of Department.

EDFN 524 Strategies of Educational Reform and National Development in Socialist and Non-Socialist Third World Societies

★3 (*fi 6*) (either term, 3-0-0). A critical examination of strategies of educational reform and development in selected socialist and non-socialist societies in the Third World. Prerequisite: EDFN 523 or consent of Instructor.

EDFN 525 Global Education: Theory and Practice

★3 (*fi 6*) (either term, 3-0-0). This course encompasses critical reflections on theoretical, curriculum, and research themes in global education, peace education, development education, and other related fields. Global literacy

in both South and North contexts will be studied and implications drawn for creative curriculum and pedagogical strategies. The state of research on issues and problems of global education will be examined and students encouraged to develop possible proposals for assessing how teaching and learning global issues for peaceful features may be enhanced. Prerequisite: consent of Department.

EDFN 530 History of Education in Canada

★3 (*fi 6*) (either term, 3-0-0). A survey of studies in the history of formal and informal educational institutions in Canada, and their interrelationship with Canadian society.

EDFN 532 Topics in the History of Education in Western Canada

★3 (*fi 6*) (either term, 3-0-0).

EDFN 536 Women's Education and Historiography

★3 (*fi 6*) (either term, 3-0-0). A feminist critique of the discourse on women's education, female "culture" and experience, using a historiographical approach as an analytical tool. Gender-based arguments will be analyzed in appropriate social and ideological settings. These will include ideas on domesticity, woman's role, the ideal of the "educated woman." Higher education, formal education, and girl's schooling will be studied.

EDFN 537 Education, Feminism, and Social Policy

★3 (*fi 6*) (either term, 3-0-0). Post World War II social policy and women's participation in postsecondary education, the workforce, and politics.

EDFN 541 History of Higher Education

★3 (*fi 6*) (either term, 3-0-0).

EDFN 543 Research Methods and Theory in the History of Education

★3 (*fi 6*) (either term, 3-0-0).

EDFN 546 Childhood and Childrearing in Western Culture: An Historical Perspective

★3 (*fi 6*) (either term, 3-0-0).

EDFN 547 History of English Education Since the Industrial Revolution

★3 (*fi 6*) (either term, 3-0-0).

EDFN 550 Philosophical Analysis and Education

★3 (*fi 6*) (either term, 3-0-0).

EDFN 551 Philosophy of Education I

★3 (*fi 6*) (either term, 3-0-0).

EDFN 553 Philosophical Analysis of Teaching

★3 (*fi 6*) (either term, 3-0-0).

EDFN 554 Philosophical Foundations of Educational Research

★3 (*fi 6*) (either term, 3-0-0).

EDFN 555 Moral Education: A Philosophical Perspective

★3 (*fi 6*) (either term, 3-0-0). An introduction to current philosophical research on moral education and the implications of that research for contemporary schooling.

EDFN 556 The Educational Theory of a Selected Philosopher

★3 (*fi 6*) (either term, 3-0-0).

EDFN 557 Learning and the Philosophy of Knowledge

★3 (*fi 6*) (either term, 3-0-0).

EDFN 558 Religious Education: A Philosophical Perspective

★3 (*fi 6*) (either term, 3-0-0). Rival philosophical views on the aims and limits of religious education will be examined, with particular emphasis on the implications of such views for pedagogy and curricula in denominational and nondenominational schools.

EDFN 559 Schooling and Social Justice

★3 (*fi 6*) (either term, 3-0-0). An examination of how educational practices may be assessed, and where necessary, changed, according to the standards of justice and respect for human rights.

EDFN 560 Education from a Sociological Perspective

★3 (*fi 6*) (either term, 3-0-0).

EDFN 561 Community Education: A Sociological Perspective

★3 (*fi 6*) (either term, 3-0-0). The organization and processes of community education at the local, provincial and national levels of social interaction as seen from the theory and research of contemporary sociology.

EDFN 562 Development and Theory of Sociology of Education

★3 (*fi 6*) (either term, 3-0-0).

EDFN 563 Research Methods in Sociology of Education

★3 (*fi 6*) (either term, 3-0-0).

EDFN 564 Education and Social Change

★3 (*fi 6*) (either term, 3-0-0).

EDFN 565 Sociology of Higher Education

★3 (*fi 6*) (either term, 3-0-0).

EDFN 566 Sociology of Women, Education and Work

★3 (*fi 6*) (either term, 3-0-0) This course explores the complex pattern of gender stratification, education, and employment in Canada, with a focus on education and the experience of women. The course will draw on current empirical literature and sociological and feminist theory. Discussion will include consideration of formal education (certification), nonformal education, informal education, activity in a market economy, and unpaid labor. The course focus will be Canada, but consideration will be given to research related to women and development in other countries. Prerequisite: consent of Department.

EDFN 574 Current Developments in Native Education: A Social Science Perspective

★3 (*fi 6*) (either term, 3-0-0). A discussion of theoretical and methodological issues relating to Native education in Alberta together with an examination of relevant data-based studies. Prerequisite: EDPS 432 or EDPS 474 or consent of Instructor.

EDFN 611 Research Methods in Anthropology and Education

★6 (*fi 12*) (either term, 0-3s-0).

EDFN 620 International/Intercultural Education: Disciplinary Geographic/Cultural Focus

★6 (*fi 12*) (either term, 0-3s-0).

EDFN 621 International/Intercultural Education: Methods and Substantive Research Paper

★6 (*fi 12*) (either term, 0-3s-0).

EDFN 640 History of Education

★6 (*fi 12*) (either term, 0-3s-0).

EDFN 641 History of Education: Historiography

★6 (*fi 12*) (either term, 0-3s-0).

EDFN 642 History of Education: Selected Areas

★6 (*fi 12*) (either term, 0-3s-0).

EDFN 650 The Nature of Philosophy in Education

★6 (*fi 12*) (either term, 0-3s-0).

EDFN 651 Traditional Philosophies of Education

★6 (*fi 12*) (either term, 0-3s-0).

EDFN 652 Recent Philosophy of Education

★6 (*fi 12*) (either term, 0-3s-0). Prerequisite: consent of Department.

EDFN 660 Sociology of Education

★6 (*fi 12*) (either term, 0-3s-0).

EDFN 661 Sociological Theory in Education

★6 (*fi 12*) (either term, 0-3s-0).

EDFN 662 Sociology of Education: Research Methodology

★6 (*fi 12*) (either term, 0-3s-0).

211.72 Education—Instructional Technology

Department of Educational Psychology
Faculty of Education

EDIT 568 Interactive Multimedia Instruction

★3 (*fi 6*) (either term, 3-0-3). Explores principles and foundations of interactive instruction. Provides experience with currently available interactive multimedia systems. Prerequisites: EDPY 485 and EDPY 482; or consent of Department. Note: credit will not be granted for both EDPY 486 and EDIT 568.

EDIT 571 Educational Technology and Communication

★3 (*fi 6*) (either term, 3-0-0). Pre-/Corequisite: EDPY 489 or consent of Department.

EDIT 572 Topics in Computer-Based Instruction

★3 (*fi 6*) (either term, 3-0-0).

EDIT 573 Designing Multimedia Instruction

★3 (*fi 6*) (either term, 3-0-0). Pre-/corequisite: EDIT 571 or consent of Department.

EDIT 574 Project Design in Computer-Based Instruction

★3 (*fi 6*) (either term, 3-1s-3).

EDIT 575 Application of Microcomputers in Education

★3 (*fi 6*) (second term, 3-0-0). Practically oriented course which provides the opportunity to explore the instructional potential of desktop publishing, Hypercard, and authoring systems. Prerequisite: EDPY 482 or equivalent or consent of Department. Credit will not be granted for both EDPY 375 and EDIT 575.

EDIT 576 Seminar in Theory of Computer-Based Instruction

★3 (*fi 6*) (either term, 3-0-0).

EDIT 578 Internship in Instructional Technology

★3 (*fi 6*) (either term, 3-0-3). Note: credit cannot be earned for both EDIT 578 and EDIT 579.

EDIT 579 Internship in Instructional Technology

★6 (*fi 12*) (either term, 6-0-6). Note: credit cannot be earned for both EDIT 578 and EDIT 579.

EDIT 583 Educational Television: Survey of Educational Applications

★3 (*fi 6*) (either term, 0-3L-0). Prerequisite: consent of Department.

211.73 Education—Policy Studies

Department of Educational Policy Studies
Faculty of Education

211.73.1 Undergraduate Courses**EDPS 310 Managing the Learning Environment**

★3 (*fi 6*) (either term, 3-0-0). This course will explore the ways in which teachers participate as professionals in the process of managing the learning environment within the social and organizational contexts and structures of schooling. Prerequisites: EDFX 200 and EDPY 200. Corequisite: EDFX 325 or 350.

EDPS 311 Anthropology and Canadian Education

★3 (*fi 6*) (either term, 3-0-0). A review of the organization of schooling in Canada and of selected educational issues, from perspectives provided by sociology, symbolic and biological anthropology.

EDPS 341 Concepts of Childhood in History

★3 (*fi 6*) (either term, 3-0-0). A study of those views of childhood which have exerted a significant influence on educational theory and practice over the last two hundred years.

EDPS 401 Selected Topics in Educational Policy Studies

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDPS 402 Directed Study in Educational Policy Studies

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDPS 403 Development Course in Educational Policy Studies

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Consent of Department.

EDPS 410 Ethics and Law in Teaching

★3 (*fi 6*) (either term, 3-0-0). This course will examine the ethical and legal responsibilities of teachers. Among the topics addressed will be the following: punishment and child abuse; freedom of speech and academic freedom in schools; parents' rights and teachers' professional autonomy; issues of quality such as inclusive education and the problems of racism and sexism; fairness in assessment and evaluation; teachers' private lives and public obligations; indoctrination and the teaching of value. Prerequisite: EDPS 310.

EDPS 411 Cross Cultural Studies in Education

★3 (*fi 6*) (either term, 3-0-0). The ethnographic study of education and cultural change. Prerequisite: ANTHR 101/301, or ANTHR 307, or ANTHR 325, or ANTHR 350, or ANTHR 355, or consent of Department.

EDPS 422 Education in Developing Countries: A Study of Education in Selected Areas in Asia, Africa and Latin America

★3 (*fi 6*) (either term, 3-0-0).

EDPS 425 Global Education: Issues and Strategies for Teachers

★3 (*fi 6*) (either term, 3-0-0). This course explores, in theory and practice, how global education in schools can facilitate critical understanding and develop skills and values for building more peaceful futures in local, national, and global contexts. It draws on North and South scholars and educators to clarify underlying conceptual and pedagogical principles of global education and related fields (education for peace, justice, development, human rights, cultural solidarity, environmental care). Exemplars of creative curriculum content and teaching-learning strategies for global literacy will be included.

EDPS 432 The Education of Native Peoples in Canada: An Historical Study

★3 (*fi 6*) (either term, 3-0-0). An historical examination of the formal education provided Indian, Metis, and Inuit peoples with special attention to Aboriginal, missionary, and federal-provincial educational programs.

EDPS 435 Child Abuse and Advocacy Since 1800

★3 (*fi 6*) (either term, 3-0-0). History of the "social claims marketplace" with regard to the rearing, socialization, care, and protection of children since 1800.

EDPS 474 Contemporary Issues in the Education of Native Peoples: A Social Science Perspective

★3 (*fi 6*) (either term, 3-0-0). An analysis of current issues of debate in Indian, Metis and Inuit education, with special reference to their social origins.

211.73.2 Graduate Courses**EDPS 501 Conference Course on Selected Topics**

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDPS 502 Conference Course on Selected Topics

★6 (*fi 12*) (full session, 3-0-0). Prerequisite: consent of Department.

EDPS 503 Research Projects I

★3 (*fi 6*) (either term, 3-0-2). Prerequisite: consent of Department.

EDPS 504 Research Projects II

★3 (*fi 6*) (either term, 3-0-2). Prerequisite: consent of Department.

EDPS 505 Individual Directed Laboratory Study

★3 (*fi 6*) (either term, 0-6L-0). Prerequisite: consent of Department.

EDPS 506 Individual Directed Study

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDPS 507 Individual Directed Study

★3 (*fi 6*) (either term, 3-0-0).

EDPS 601 Selected Topics in Educational Policy Studies

★3 (*fi 6*) (either term, 3-0-0).

EDPS 602 Selected Topics in Educational Policy Studies

★6 (*fi 12*) (full session, 3-0-0).

EDPS 606 Supervised Individual Study I

★3 (*fi 6*) (either term, 3-0-0).

EDPS 607 Supervised Individual Study II

★3 (*fi 6*) (either term, 3-0-0).

EDPS 900 Directed Research Project

★6 (*fi 12*) (variable).

211.74 Education—Psychology

Department of Educational Psychology
Faculty of Education

211.74.1 Undergraduate Courses**EDPY 200 Educational Psychology for Teaching**

★3 (*fi 6*) (either term, 2-1s-0) This course deals with the teaching learning process and student behavior. It includes theory, research, and illustrations, all dealing with the classroom application of psychological principles. Topics typically covered are student development, student learning and instruction, individual and group differences in student abilities, and student motivation. The course presents the basic principles of effective teaching and learning using a balanced theoretical orientation.

EDPY 301 Inclusive Education: Adapting Instruction for Students with Special Needs

★3 (*fi 6*) (either term, 3-0-0). This course reviews educationally relevant characteristics of students exhibiting mild, moderate, and severe disabilities, and exceptional educational gifts and talents. In addition, the needs of students with diverse educational, cultural, and linguistic backgrounds will be discussed. The major focus is on planning Individual Program Plans and adapting regular classroom instruction and management to the diversity of individual needs. More specialized techniques are reviewed as needed. Note: This course is part of the Introductory Professional Term. Prerequisites: EDPY 200 and EDPY 200, except for After Degree students. Corequisite: EDFX 325 or 350 and EDPS 310.

EDPY 302 Instructional Applications of Technology

★1.5 (*fi 3*) (either term, 1.5-0-1.5). This course is concerned with developing a practical awareness of computer-based applications, instructional support and delivery systems, and learning resources for use in a variety of instructional settings. Note: This course is part of the Introductory Professional Term. Prerequisite: Basic computer skills within the windows environment including word processing, spread sheets, graphic tools, e-mail and Internet. Corequisite: EDPY 303.

EDPY 303 Educational Assessment

★1.5 (*fi 3*) (either term, 1.5-0-0). The intent of this course is to develop an understanding of important concepts and issues in the evaluation of a learner's knowledge and skills, and to develop competence in constructing instruments and processes to evaluate learner performance. Note: This course is part of the Introductory Professional Term. Corequisite: EDPY 302.

EDPY 363 Introduction to Life Span Educational Psychology

★3 (*fi 6*) (either term, 3-2s-0). Restricted to students in the BEd/AD program.

EDPY 397 Educational Psychology Seminars

★1 (*fi 2*) or ★2 (*fi 4*), or ★3 (*fi 6*) (either term, variable). Prerequisite: consent of Department.

EDPY 404 Adolescent Development for Educators

★3 (*fi 6*) (either term, 3-0-0) Prerequisite: Introductory Professional Term.

EDPY 406 Religious and Moral Development and Education

★3 (*fi 6*) (either term, 3-0-0).

EDPY 410 Individual Differences in Education

★3 (*fi 6*) (either term, 3-0-1). Prerequisite: Introductory Professional Term.

EDPY 412 Language and Cognition in the Education of the Child

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Introductory Professional Term.

EDPY 414 Bilingualism and Cognition in the Education of the Child

★3 (*fi 6*) (either term, 3-0-0), Prerequisites: Introductory Professional Term.

EDPY 416 Introduction to the Teaching of English as a Second Language

★3 (*fi 6*) (either term, 3-0-0). This course focuses on principles of language learning, language learners, and learning contexts. Prerequisite: Successful completion of practicum requirements or teaching experience; or consent of Department. Prerequisite/Corequisite: An approved introductory course in Linguistics.

EDPY 418 Methods and Programs in the Teaching of English as a Second Language to Adults

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: EDPY 416.

EDPY 422 Test Construction for Teachers

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Introductory Professional Term.

EDPY 432 Interpersonal Communication for Teachers

★3 (*fi 6*) (either term, 1.5-1.5s-0). Prerequisite: Introductory Professional Term.

EDPY 436 Applied Health Psychology and Education

★3 (*fi 6*) (either term, 3-0-3).

EDPY 442 Introduction to Counselling

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Introductory Professional Term

EDPY 446 Educational and Vocational Guidance in the Classroom

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: Introductory Professional Term.

EDPY 452 Assessment and Instruction of Exceptional Learners

★3 (*fi 6*) (either term, 3-0-1) Note: Special Education Minor-Elementary Route only.

EDPY 454 Behavioral Management of Severely Disruptive Children

★3 (*fi 6*) (either term, 3-0-1) Note: Special Education Minor-Elementary Route only.

EDPY 458 Advanced Assessment and Instruction of Exceptional Learners

★3 (*fi 6*) (either term, 3-0-0) Note: Special Education Minor-Elementary Route only. Prerequisite: EDPY 452.

EDPY 461 Clinical Practicum and Reflective Practice in the Elementary School

★3 (*fi 6*) (either term, 0-3s-4). Prerequisites: EDPSY 355, 357, 359, and completion of ★15 of introductory ED EL courses. Note: Must be taken in conjunction with Elementary Term Field Experience. Last offered in 1997/98. Restricted to students in Year 4 of the old program.

EDPY 466 Classroom Management of Adolescents With Special Needs

★3 (*fi 6*) (first term, 3-0-1). Note: Special Education-Secondary Route minors only. Pre-/corequisite: EDPY 404. Corequisites: EDES 348 and EDPY 468.

EDPY 468 Individualizing Instruction for Adolescents With Special Needs

★3 (*fi 6*) (either term, 3-0-1). Note: Special Education Minors-Secondary Route only. Corequisite: EDPY 466.

EDPY 470 Deafness: An Introduction and Survey

★4 (*fi 8*) (either term, 3-0-2). A basic survey of the field of education of the hearing impaired. Covers theory and practice from an historical and a current perspective. A desirable prerequisite for uninitiated students entering the hearing impaired program.

EDPY 472 Introduction to Language Development

★3 (*fi 6*) (either term, 3-0-1). The course content includes cognitive and social basis for language, as well as an overview of recent developments in semantic, syntactic, pragmatic and phonological development. The course focuses specifically on the impact of hearing loss on language development.

EDPY 474 Basic Manual Communication

★3 (*fi 6*) (either term, 2-1s-1). This is a practical course to develop basic skills in manual communication.

EDPY 478 Psychology and Education of Gifted Children

★3 (*fi 6*) (either term, 3-0-3). Prerequisite: Introductory Professional Term.

EDPY 480 Introduction to Computer-Assisted Instruction

★3 (*fi 6*) (either term, 3-0-3). Prerequisite: An introductory University credit course in Computing Science or consent of Department.

EDPY 481 Problems in Implementation and Evaluation of Computer-Based Instructional Systems

★3 (*fi 6*) (second term, 1-0-3). Prerequisite: Introductory Professional Term.

EDPY 482 Introduction to Microcomputers in Education

★3 (*fi 6*) (either term, 3-0-3). Educational applications of microcomputers. Practically oriented course which emphasizes applications. Other topics include the historical development of the computer, an introduction to operating systems; introduction to Logo.

EDPY 483 Applications of Microcomputers in Education

★3 (*fi 6*) (either term, 3-0-0). Practically oriented course which provides the opportunity to explore the instructional potential of desktop publishing, Hypercard, and authoring systems. Prerequisite: EDPY 482 or CMPUT 101 or consent of Department. Credit will not be granted for both EDPY 483 and EDIT 575.

EDPY 485 Introduction to Educational Media and Instructional Technology

★3 (*fi 6*) (either term, 3-0-3).

EDPY 486 Interactive Multimedia Instruction

★3 (*fi 6*) (either term, 3-0-3). Explores principles and foundations of interactive instruction. Provides experience with currently available interactive multimedia systems. Note: Credit will not be granted for both EDPY 486 and EDIT 568. Pre-/Corequisites: EDPY 485 and EDPY 482 or consent of Department.

EDPY 487 Curricular Integration of Audiovisual Materials

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: EDPY 485 or consent of Department.

EDPY 488 Educational Technology and Communication

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: EDPY 485 or consent of Department.

EDPY 489 Designing Multi-Media Instruction

★3 (*fi 6*) (either term, 0-3L-0). Prerequisite: EDPY 485 or consent of Department.

EDPY 490 Educational Television

★3 (*fi 6*) (either term, 0-3L-0). Prerequisite: consent of Department.

EDPY 493 Basic Issues in Contemporary Education

★3 (*fi 6*) (either term, 3-0-0).

EDPY 497 Senior Seminars

★1 (*fi 2*), or ★2 (*fi 4*), or ★3 (*fi 6*) (either term, variable). Content varies from year to year. Topics announced prior to registration period. Prerequisite: consent of Department.

EDPY 499 Directed Individual Study in Educational Psychology

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

211.74.2 Graduate Courses

Note: consent of Department is required for all 500- and 600-level courses.

EDPY 500 Introduction to Data Analysis in Educational Research

★3 (*fi 6*) (either term, 3-0-3). Prerequisite: consent of Department.

EDPY 501 Introduction to Methods of Educational Research

★3 (*fi 6*) (either term, 3-0-3). Prerequisite: consent of Department.

EDPY 502 Single Subject Research Design

★3 (*fi 6*) (first term, 3-0-0). Relates to profoundly or severely mentally retarded, multiply handicapped persons. Offered alternate years. Prerequisite: consent of Department.

EDPY 503 Qualitative Methods of Education Research

★3 (*fi 6*) (either term, 3-0-3). Prerequisite: EDPY 501 or equivalent or consent of Department.

EDPY 504 Non-parametric Statistical Inference in Educational Research

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: EDPY 500 or equivalent and consent of Department.

EDPY 505 Advanced Univariate Statistics in Educational Research

★3 (*fi 6*) (either term, 3-0-3). Prerequisites: EDPY 500 or equivalent and consent of Department.

EDPY 507 Test Theory

★3 (*fi 6*) (first term, 3-0-0). Prerequisites: EDPY 500 or equivalent, and consent of Department.

EDPY 508 Seminar and Research in Educational Measurement

★3 (*fi 6*) (second term, 3-0-0). Prerequisites: EDPY 507 or equivalent and consent of Department.

EDPY 509 Human Development Education

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDPY 510 Learning, Cognition and Education

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDPY 511 Theories of Personality

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDPY 512 Social Psychology and Education

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDPY 513 Language, Cognition, and Bilingualism: An Interdisciplinary Approach

★3 (*fi 6*) (first term, 3-0-0). Prerequisite: consent of Department.

EDPY 514 Cross-Cultural Psychology

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDPY 516 Education and Psychology in Developing Countries

★3 (*fi 6*) (second term, 3-0-0). Prerequisite: consent of Department.

EDPY 525 Religious and Moral Development and Education

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDPY 526 Vocational Development and Choice

★3 (*fi 6*) (either term, 3-0-3). Prerequisite: consent of Department.

EDPY 528 Patterns of Interpersonal Relating

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDPY 532 Systems of Counselling I

★3 (*fi 6*) (either term, 3-0-0). This course will introduce students, with interests in counselling, to the major theories utilized in the counselling/psychotherapy area. Prerequisites or corequisites: EDPY 511 or equivalent and consent of Department.

EDPY 533 Basic Skills, Issues, and Attitudes in Counselling I

★3 (*fi 6*) (either term, 3-3s-4). This course will focus on generic counselling skills and the enhancement of counsellor self-awareness. Prerequisites or corequisites: EDPY 511 or equivalent and consent of Department.

EDPY 534 Basic Skills, Issues and Attitudes in Counselling II

★3 (*fi 6*) (either term, 3-3s-4). Prerequisites: EDPY 533 or equivalent and consent of Department.

EDPY 535 Family Counselling: Advanced Practicum

★3 (*fi 6*) (either term, 3-0-3). Prerequisites: EDPY 533 or equivalent and consent of Department.

EDPY 536 Principles of Professional Practice in Educational Psychology

★3 (*fi 6*) (either term, 3-1.5s-0). Prerequisite: consent of Department.

EDPY 544 Principles of Psychological Testing and Assessment

★3 (*fi 6*) (either term, 3-0-1). Prerequisite: consent of Department.

EDPY 545 Individual Psychological Assessment

★6 (*fi 12*) (full session, 3-0-3). Prerequisites: EDPY 544 or EDPY 549 or equivalent and consent of Department.

EDPY 546 Preschool Assessment Strategies

★3 (*fi 6*) (either term, 3-0-3). This course fits into diploma, masters and doctoral programs in basic educational psychology, school psychology, special education, and counselling psychology as an option in students' programs. It also serves as an option for students in other departments, i.e., early childhood education, psychology (developmental). Pre-/corequisites: EDPY 509, EDPY 544 or EDPY 549, and consent of Department.

EDPY 549 Advanced Course in Psychoeducational Assessment

★3 (*fi 6*) (first term, 3-0-1). To provide skill in administration and interpretation of a variety of psychoeducational measures which show potential in advancing our understanding of exceptional children. Prerequisites: EDPY 452 and consent of Department.

EDPY 553 Practicum and Capping Exercise: General Special Education

★3 (*fi 6*) (either term, 0-1s-3). Supervised practicum in a variety of special education settings. Normally taken near the end of the course-based Master's program; capping exercise will be a paper or other product prepared in conjunction with the practicum. Prerequisite: consent of Department.

EDPY 554 Behavior Management for Exceptional Individuals

★3 (*fi 6*) (either term, 0-4L-0). To provide skill in implementing behavior management practices in classroom settings as well as skills for assisting teachers to implement behavior management techniques. Prerequisite: consent of Department.

EDPY 556 Problems and Issues in Special Education: Prevalence of Exceptionalities and Professional Practice

★3 (*fi 6*) (first term, 3-0-0). Aspects of theory, research and professional practice within the field of special education will be examined in this class. All special needs and developmental disorders are considered, particularly in the realm of theory/practice relationships. Such issues as program evaluation, integration, personnel preparation, and the identification of special needs will be considered. Validity of current practices and beliefs will be addressed through reviews of research, theory, and legislation/policy and the relationship between these areas and professional practice. Prerequisite: consent of Department.

EDPY 558 Development and Learning of Exceptional Children and Adults

★3 (fi 6) (either term, 3-0-0). A consideration of the value of current theories in learning and development for understanding exceptional children. Prerequisites or corequisites: EDPY 509, 548 and 510 or equivalent and consent of Department.

EDPY 560 Seminar on Research in Special Education

★3 (fi 6) (either term, 0-3s-0). Contemporary research and applications regarding children exhibiting exceptionalities are reviewed from the perspectives of current research paradigms and methods. Students apply these qualitative and quantitative models of exploration and knowledge development in terms of better informed practice and more adequate theory development. Pre-/corequisites: EDPY 501 or equivalent and consent of Department.

EDSY 561 Behavior Disorders of Childhood and Adolescence

★3 (fi 6) (either term, 2-1s-0). In depth treatment of basic topics, including definition, classification, models, assessment, education, treatment and prevention. Prerequisites: EDPY 301 or equivalent and consent of Department.

EDPY 562 Research Project in Special Education

★3 (fi 6) (either term, 0-3s-0). Following the prerequisite course on research on exceptionalities (EDPY 560), participants develop, pilot and report upon a research plan of their own in the field of exceptionalities. This project is often the precursor to master's thesis projects. Prerequisites: EDPY 560 or equivalent and consent of Department.

EDPY 564 Oral Communication in the Instruction of Hearing Impaired Students

★3 (fi 6) (either term, 2-1s-2). A practical course to develop speech teaching skills in intending teachers of hearing impaired students. Focuses on analytical and synthetical approaches to teaching speech and speech reading. Note: Limited to Special Education students in the Hearing Impaired Program or practising teachers of the hearing impaired. Prerequisite: consent of Department.

EDPY 565 Manual Communication in the Instruction of Hearing Impaired Students

★3 (fi 6) (either term, 2-1s-1). Develops skills in expressive and receptive manual communication in intending teachers of hearing impaired students. Focuses on the use of these skills in a classroom setting, rather than on the training of interpreters. Limited to Special Education students in the Hearing Impaired Program or practising teachers of the hearing impaired. Prerequisite: consent of Department.

EDPY 566 Curriculum Design and Instructional Strategies for Hearing Impaired Students

★3 (fi 6) (either term, 2-1s-1). Explores the need for an integrated approach in planning and adapting existing curricula to meet the needs of hearing impaired students. The course will also explore the use of different instructional techniques with hearing impaired students. Prerequisite: consent of Department.

EDPY 567 Social Psychology of Hearing Impairment

★3 (fi 6) (either term, 2-0-2). A course designed to develop an understanding of basic psychological social processes associated with deafness. It will emphasize preventative techniques in mental health and will foster empathy with the personal and social needs of deaf students. Prerequisite: consent of Department.

EDPY 569 Language Development and Remediation with Hearing Impaired Students

★3 (fi 6) (either term, 1-1s-3). Application and development of the skills acquired in the two first level communication courses. Focuses on evaluation and analytical skills and on a diagnostic/prescriptive approach. Prerequisites: A basic course in communication processes and consent of Department.

EDPY 570 Practicum in Education of Hearing Impaired Students

★variable (fi variable) (variable). Supervised placement in a classroom for hearing impaired students. Prerequisite: consent of Department.

EDPY 571 Internship and Capping Exercise: Hearing Impaired Students

★variable (fi variable) (variable). Supervised placement with hearing impaired students. Normally taken near the end of the course-based Master's program: capping exercise will be a paper or other product prepared in conjunction with the practicum. Prerequisite: consent of Department.

EDPY 574 Oral/Auditory Rehabilitation in the Instruction of Hearing Impaired Students

★3 (fi 6) (either term, 2-1s-2). A practical course to develop speech teaching skills for teachers of hearing impaired students. This course incorporates auditory training techniques and is intended for students specializing in working with students who have impaired hearing. Prerequisites: EDPY 564 or equivalent, and consent of Department.

EDPY 578 Severe Disabilities: Behavior Management

★3 (fi 6) (either term, 3-0-0). Relates to profoundly or severely mentally/multiply handicapped persons. Prerequisite: consent of Department.

EDPY 580 Severe Disabilities: Assessment and Instruction

★3 (fi 6) (either term, 3-0-0). Relates to profoundly or severely mentally/multiply handicapped persons. Prerequisite: consent of Department.

EDPY 582 Severe Disabilities: Assessment and Communications

★3 (fi 6) (second term, 3-0-0). Relates to profoundly or severely mentally/multiply handicapped persons. Alternates between second and spring term. Prerequisite: consent of Department.

EDPY 584 Severe Disabilities: Physical Aspects

★3 (fi 6) (either term, 3-0-0). Relates to profoundly or severely mentally/multiply handicapped persons. Prerequisite: consent of Department.

EDPY 588 Interdisciplinary Seminar in Early Childhood/Special Education

★3 (fi 6) (either term, 3-2s-0). Within the field of early childhood/special education studies, this interdisciplinary seminar will involve participants in the conceptualizations of special needs of young children with exceptionalities. These conceptualizations will be drawn from child development, early childhood education, speech and language development, motor development, and health care and family studies perspectives. Participants may come from a variety of disciplines including education, special education, family studies, psychology, rehabilitation medicine, nursing, and medicine. Prerequisite: consent of Department.

EDPY 589 Early Intervention Programs

★3 (fi 6) (either term, 0-0-4). An in-depth review and analysis of early intervention programs with at-risk and established-risk infants and young preschool children with a special emphasis upon family-based programs. Prerequisite: consent of Department.

EDPY 590 Practicum and Capping Exercise: Early Childhood Special Education

★3 (fi 6) (either term, 0-1s-3). Supervised practicum in a variety of Special Education settings. Normally taken near the end of the course-based Master's program: capping exercise will be a paper or other product prepared in conjunction with the practicum. Prerequisite: consent of Department.

EDPY 592 Psychology and Education of Gifted Children

★3 (fi 6) (either term, 3-0-3). Prerequisite: consent of Department.

EDPY 597 Special Seminars

★1 (fi 2), or ★2 (fi 4), or ★3 (fi 6), or ★4 (fi 8), or ★5 (fi 10), or ★6 (fi 12) (either term, variable). Content varies from year to year. Topics announced prior to registration period. The student's transcript carries title descriptive of content. May be repeated. Prerequisite: consent of Department.

EDPY 599 Individual Directed Reading and Research

★3 (fi 6) (either term, 3-0-0). Prerequisite: consent of Department.

EDPY 605 Multivariate Statistical Methods in Education Research

★3 (fi 6) (second term, 3-0-3). Prerequisites: EDPY 505 or equivalent and consent of Department. Formerly EDPY 506.

EDPY 606 Research Seminar in Educational Psychology

★3 (fi 6) (full session, 0-1.5s-0). Prerequisite: consent of Department.

EDPY 608 Selected Topics in Educational Measurement

★3 (fi 6) (either term, 3-0-0). Prerequisites: EDPY 507 or equivalent and consent of Department.

EDPY 609 Selected Topics in Human Development

★3 (fi 6) (either term, 3-0-0). Prerequisite: consent of Department.

EDPY 610 Selected Topics in Learning, Cognition and Instruction

★3 (fi 6) (either term, 3-0-0). Prerequisite: consent of Department.

EDPY 630 Doctoral Internship

★6 (fi 12) (full session, 0-6L-3). Prerequisites: EDPY 633 or 640/641 and completion of candidacy examination and consent of Department.

EDPY 631 Research in Counselling

★3 (fi 6) (first term, 3-0-0). Prerequisite: consent of Department.

EDPY 632 History and Systems

★3 (fi 6) (first term, 3-0-0). Prerequisite: consent of Department.

EDPY 633 Generic Orientation to Counselling Practice

★3 (fi 6) (first term, 3-3s-3). Prerequisite: consent of Department.

EDPY 634 Advanced Counselling Practicum

★3 (fi 6) (either term, 3-3s-3). Note: previously offered as EDPSY 697 Special Seminar.

EDPY 635 Counselling Speciality: Theory and Practice

★3 (fi 6) (either term, 3-3s-3). Note: previously offered as EDPSY 697 Special Seminar.

EDPY 640 Advanced Psychological Assessment: Theories and Models

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: EDPY 545 or equivalent, and consent of Department.

EDPY 641 Advanced Personality Assessment: Objectives and Projective Testing

★3 (*fi 6*) (either term, 3-0-3). Prerequisites: EDPY 545 or equivalent, and consent of Department.

EDPY 642 Applied Neuropsychological Assessment: Clinical Counselling and School

★3 (*fi 6*) (either term, 3-0-3). Prerequisites: EDPY 545 and one of EDPY 640 or 641, or equivalent, and consent of Department.

EDPY 656 Seminar in Special Education

★6 (*fi 12*) (full session, 3-0-0). Prerequisite: consent of Department.

EDPY 697 Special Seminars

★1 (*fi 2*) , or ★2 (*fi 4*) , or ★3 (*fi 6*) , or ★4 (*fi 8*) , or ★5 (*fi 10*) , or ★6 (*fi 12*) (either term, variable). Prerequisite: consent of Department. Content varies from year to year. Topics announced prior to registration period. The student's transcript carries title descriptive of content. May be repeated.

EDPY 699 Individual Directed Reading and Research

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

211.75 Education—Secondary (Curriculum and Instruction)

Department of Secondary Education
Faculty of Education

211.75.1 Undergraduate Courses**EDSE 312 Curriculum and Teaching for Secondary School Art Minors**

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★6 in the Minor subject area.

EDSE 317 Curriculum and Teaching for Secondary School Business Education Minors

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: ★6 in the Minor subject area, and Typing 20 and ACCTG 311; or consent of Department.

EDSE 322 Curriculum and Teaching for Secondary School Drama Minors

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★6 in the Minor subject area.

EDSE 327 Curriculum and Teaching for Secondary School English Language Arts Minors

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★6 in the Minor subject area.

EDSE 332 Curriculum and Teaching for Secondary School Minors in Clothing and Textiles, Foods and Nutrition, and Family Studies

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★6 in the Minor subject area.

EDSE 337 Curriculum and Teaching for Secondary School Mathematics Minors

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★6 in the Minor subject area.

EDSE 343 Curriculum and Teaching for Secondary School Music Minors

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★6 in the Minor subject area.

EDSE 347 Curriculum and Teaching for Secondary School Physical Education Minors

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★6 in the Minor subject area.

EDSE 352 Curriculum and Teaching for Secondary School Biology Minors

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★6 in the Minor subject area.

EDSE 364 Curriculum and Teaching for Secondary School Science Minors

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★6 in the Minor subject area.

EDSE 368 Curriculum and Teaching for Secondary School Second Language Minors

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★6 in the Minor subject area.

EDSE 369 Curriculum and Teaching for Secondary School ESL Minors

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★6 in the Minor subject area.

EDSE 373 Curriculum and Teaching for Secondary School Social Studies Minors

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★6 in the Minor subject area.

EDSE 378 Curriculum and Teaching for Religious and Moral Education Minors

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★6 in the Minor subject area.

EDSE 400 Conference Seminar

★1 (*fi 2*) , or ★2 (*fi 4*) , or ★3 (*fi 6*) (either term, variable).

EDSE 401 Conference Seminar

★1 (*fi 2*) , or ★2 (*fi 4*) , or ★3 (*fi 6*) (either term, variable).

EDSE 402 Guided Individual Study in Secondary Education

★3 (*fi 6*) (either term, 3-0-0). May be offered over the full session. Prerequisites: consent of instructor and Department.

EDSE 412 Curriculum and Teaching in Secondary School Art I

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: Introductory Professional Term and ★24 in the Major Subject area.

EDSE 413 Curriculum and Teaching in Secondary School Art II

★3 (*fi 6*) (either term, 3-0-0). Pre-/corequisite: EDSE 412.

EDSE 417 Curriculum and Teaching in Secondary School Business Education I

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: EDBU 341, Introductory Professional Term, and ★21 in the Major subject area.

EDSE 418 Curriculum and Teaching in Secondary School Business Education II

★3 (*fi 6*) (either term, 3-0-0). Pre-/corequisite: EDSE 417.

EDSE 422 Curriculum and Teaching in Junior High School Drama

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: Introductory Professional Term, DRAMA 383 and ★21 in the Major subject area.

EDSE 423 Curriculum and Teaching in Senior High School Drama

★3 (*fi 6*) (either term, 3-0-0). Prerequisite or corequisite: EDSE 422.

EDSE 427 Curriculum and Teaching in Secondary School English Language Arts I

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: Introductory Professional Term, and ★24 in the Major subject area.

EDSE 428 Curriculum and Teaching in Secondary School English Language Arts II

★3 (*fi 6*) (either term, 3-0-0). Pre-/corequisite: EDSE 427.

EDSE 429 Teaching Literature to Adolescents

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★12 in English.

EDSE 430 Teaching Composition to Adolescents

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: ★12 in English.

EDSE 432 Curriculum and Teaching in Secondary School Home Economics I

★3 (*fi 6*) (either term, 3-0-1). Prerequisites: Introductory Professional term, and ★24 in the Major subject area.

EDSE 433 Curriculum and Teaching in Secondary School Home Economics II

★3 (*fi 6*) (either term, 3-0-1). Prerequisite or corequisite: EDSE 432.

EDSE 437 Curriculum and Teaching in Secondary School Mathematics I

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: Introductory Professional Term, and ★24 in the Major subject area.

EDSE 438 Curriculum and Teaching in Secondary School Mathematics II

★3 (*fi 6*) (either term, 3-0-0). Pre-/corequisite: EDSE 437.

EDSE 442 The Use of Computers in the Teaching and Learning of Mathematics

★3 (*fi 6*) (either term, 3-0-1).

EDSE 443 Curriculum and Teaching in Secondary School Music I

★3 (*fi 6*) (second term, 3-0-0). Prerequisites: Introductory Professional term, and ★24 in the Major subject area.

EDSE 444 Curriculum and Teaching in Secondary School Music II

★3 (*fi 6*) (either term, 3-0-0). Pre-/corequisite: EDSE 443.

EDSE 447 Curriculum and Teaching in Secondary School Physical Education I

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: PESS 294, Introductory Professional Term, and ★21 in the Major subject area.

EDSE 448 Curriculum and Teaching in Secondary School Physical Education II

★3 (*fi 6*) (either term, 3-0-0). Pre-/corequisite: EDSE 447.

EDSE 452 Curriculum and Teaching in Secondary School Biological Sciences I

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: Introductory Professional Term, and ★24 in the Major subject area.

EDSE 453 Curriculum and Teaching in Secondary School Biological Sciences II

★3 (*fi 6*) (either term, 3-0-0). Pre-/corequisite: EDSE 452.

EDSE 456 Curriculum and Teaching in Secondary School General Sciences I

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: Introductory Professional Term, and ★24 in the Major subject area.

EDSE 457 Curriculum and Teaching in Secondary School General Sciences II

★3 (*fi 6*) (either term, 3-0-0). Pre-/corequisite: EDSE 456.

EDSE 460 Curriculum and Teaching in Junior Secondary School Physical Sciences

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: Introductory Professional Term, and ★24 in Major subject area.

EDSE 461 Curriculum and Teaching in Senior Secondary School Physical Sciences

★3 (*fi 6*) (either term, 3-0-0). Pre-/corequisite: EDSE 460.

EDSE 463 Environmental Education for the Secondary School

★3 (*fi 6*) (either term, 3-0-0). Note: Not recommended for Science Majors. Prerequisite: consent of Department.

EDSE 466 Teaching Science in Its Social Context

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDSE 468 Curriculum and Teaching in Secondary School Second Language I

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: Introductory Professional Term, and ★24 in the Major subject area.

EDSE 469 Curriculum and Teaching in Secondary School Second Language II

★3 (*fi 6*) (either term, 3-0-0). Pre-/corequisite: EDSE 468.

EDSE 473 Curriculum and Teaching in Secondary School Social Studies I

★3 (*fi 6*) (either term, 3-0-0). Introductory Professional Term, and ★24 in the Major subject area.

EDSE 474 Curriculum and Teaching in Secondary School Social Studies II

★3 (*fi 6*) (either term, 3-0-0). Pre-/corequisite: EDSE 473.

EDSE 475 New Approaches in Secondary School Social Studies

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDSE 488 Curriculum and Teaching in Secondary School Industrial Education I

★3 (*fi 6*) (either term, 3-0-0). Prerequisites: EDCT 321, Introductory Professional Term, and ★21 in the Major subject area.

EDSE 489 Curriculum and Teaching in Secondary School Industrial Education II

★3 (*fi 6*) (either term, 3-0-0). Pre-/corequisite: EDSE 488.

211.75.2 Graduate Courses

EDSE 501 Conference Seminar in Secondary Education I

★1 (*fi 2*), or ★2 (*fi 4*), or ★3 (*fi 6*) (variable). Prerequisites: consent of instructor and Department.

EDSE 502 Advanced Level Guided Individual Study in Secondary Education

★1 (*fi 2*), or ★2 (*fi 4*), or ★3 (*fi 6*) (either term, variable). May be offered over the full session. Prerequisites: consent of instructor and Department.

EDSE 503 Curriculum Foundations

★3 (*fi 6*) (first term, 3-0-0). This course focuses on the bases of current curriculum theories and their relationship to current educational practices.

EDSE 504 Curriculum Inquiry

★3 (*fi 6*) (second term, 3-0-0). This course focuses on curriculum perspectives and possibilities. Prerequisite: EDSE 503.

EDSE 507 Postmodernism and Curriculum: Issues in Culture, Gender and Difference

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDSE 508 Media and Popular Culture in the Curriculum

★3 (*fi 6*), (second term, 0-3s-0). A seminar course examining texts and student reception of media (primarily television and film) within the rubric of popular culture for curriculum purposes.

EDSE 510 Research Methods in Secondary Education

★3 (*fi 6*) (first term, 3-0-0).

EDSE 511 Research Design in Secondary Education

★3 (*fi 6*) (second term, 3-0-0).

EDSE 512 Research Project in Secondary Education

★3 (*fi 6*) (either term, 3-0-0).

EDSE 529 Curricular Issues in English Language Arts Education

★3 (*fi 6*) (either term, 0-3s-0). Through critically considering the relationship

of current theory, research, and practice, this course will address a number of issues in the development and implementation of language arts programs at the secondary school level. It will also provide an overview of the key theories and influences which have shaped and are continuing to affect language arts curriculum and instruction.

EDSE 530 Teaching Writing in Secondary Schools

★3 (*fi 6*) (either term, 0-3s-0). This course develops an understanding of writing, composition theory, and writing instruction through involvement in the process, discussion of classroom practices, and critical examination of research and theory. The seminar will examine key aspects of composing processes, students' development as writers, curriculum, research, and evaluation. Students in this course will be expected to share their writing regularly as well as examine pedagogical and curricular concerns.

EDSE 539 Secondary Mathematics Education Research Seminar

★3 (*fi 6*) (first term, 3-0-0).

EDSE 540 Secondary Mathematics Education Teaching and Program Analysis

★3 (*fi 6*) (second term, 3-0-0).

EDSE 544 Music Learning and Pedagogy I

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDSE 545 Music Learning and Pedagogy II

★3 (*fi 6*) (either term, 3-0-0). Prerequisite: consent of Department.

EDSE 566 Science and Society: Implications for Teaching

★3 (*fi 6*) (either term, 0-3s-0). A seminar course on the nature of science and social aspects of science, and implications for science teaching. Emphasis is placed on the understanding of the scientific components of current social problems, and techniques and curricula for dealing with the nature and social context of science.

EDSE 567 Instructional Strategies in Science Teaching

★3 (*fi 6*) (either term, 0-3s-0). A seminar course in which an in-depth study is made of the major techniques in science instruction. Heavy emphasis is given to research in science education and its implication for instruction.

EDSE 580 Curriculum and Teaching for Religious and Moral Education

★3 (*fi 6*) (either term, 3-0-0).

EDSE 591 Evaluation of Industrial Education Programs

★3 (*fi 6*) (either term, 3-0-0).

EDSE 592 Problems and Trends in Industrial and Vocational Education

★3 (*fi 6*) (either term, 3-0-0).

EDSE 600 Secondary Education

★6 (*fi 12*) (full session, 3-0-0). Reading and discussion of research, curriculum, and teaching procedures in secondary schools.

EDSE 601 Conference Seminar in Secondary Education II

★1 (*fi 2*), or ★2 (*fi 4*), or ★3 (*fi 6*) (variable). Prerequisites: consent of instructor and Department.

EDSE 605 Studies in Pedagogy

★3 (*fi 6*) (either term, 0-3s-0). This is a course on the reflective and prereflective process in teaching, childcare or pedagogy. The focus will be on the nature of the pedagogical moment, forms of pedagogic understanding, pedagogic thoughtfulness and tact, and other selected concerns pertaining to everyday pedagogic thinking and acting. To a certain extent this course will draw on historical and modern continental thought and scholarly sources.

EDSE 606 Theory and Practice in Action Research

★3 (*fi 6*) (first term, 3-0-0). Prerequisites: EDSE 503 and 504 or consent of Department.

EDSE 607 Action Research Practicum

★3 (*fi 6*) (second term, 3-0-0). Prerequisites: EDSE 503, 504, and 606 or consent of Department.

EDSE 610 Advanced Research Topics in Secondary Education

★3 (*fi 6*) (either term, 0-3s-0).

EDSE 611 Human Science Research in Pedagogy

★6 (*fi 12*) (full session, 0-3s-0). In this course students are introduced to a qualitative approach to pedagogical research and theorizing that is based on phenomenology, hermeneutics, and aspects of semiotics, critical ethnography and related human sciences.

EDSE 614 Current Issues in Art Education

★3 (*fi 6*) (first term, 3-0-0). Prerequisite: Undergraduate major in art or consent of Instructor.

EDSE 615 Directed Study in Art Education

★3 (*fi 6*) (second term, 3-0-0). Prerequisite: EDSE 614 or consent of Department.

EDSE 629 Reading and Teaching Literature in Secondary Schools

★3 (*fi 6*) (either term, 0-3s-0). This course will examine current theory and

research on literary texts, their reading and teaching, and consider implications for classroom practice. Processes involved in reading literary texts, reader-response theories, and approaches for teaching, assessing, and researching will be explored. The implications for the secondary school curriculum or trends and developments in literary theory will be considered.

EDSE 630 Theory and Research in Secondary English Language Arts Education

★3 (fi 6) (either term, 0-3s-0). This course will provide an in-depth critical examination of the theory and research associated with selected topics in English language arts curriculum and instruction. Topics of historical and current relevance will be explored, such as emerging definitions of the field of English language arts education, English curriculum and teaching models, and approaches to evaluation. Students will examine landmark research studies in English language arts education to learn more about appropriate research approaches for different types of studies, as well as consider the ideas presented through the studies. Prerequisites: EDSE 529, 530, 629, or consent of Instructor.

EDSE 639 Seminar: Secondary Education Mathematics

★6 (fi 12) (full session, 3-0-0).

EDSE 645 Trends and Issues in Music Education

★3 (fi 6) (either term, 3-0-0).

EDSE 667 Current Issues and Trends in Science Education

★3 (fi 6) (either term, 0-3s-0). A seminar course in which an examination and synthesis is made of current thinking and research in science education. Topics are selected from major areas of interest including curriculum development, scientific literacy, science concept acquisition, instruction and evaluation. Emphasis is given to classroom applications of major ideas.

EDSE 900 Directed Research Project

★6 (fi 12) (variable).

211.76 Electrical Engineering

Department of Electrical and Computer Engineering
Faculty of Engineering

Notes

- (1) A course listed for either term will be offered in the first term or in the second term.
- (2) In some cases prerequisite requirements may be waived with the consent of Department.

The following table lists renumbered courses effective 1993/94.

Old	New	Old	New
E E 301	E E 201	E E 470	E E 340
E E 331	E E 231	E E 471	E E 350
E E 354	E E 239	E E 479	E E 380
E E 355	E E 240	E E 487	E E 387
E E 356	E E 250	E E 489	E E 390
E E 379	E E 280	E E 521	E E 421
E E 405	E E 305	E E 535	E E 480
E E 415	E E 315	E E 537	E E 482
E E 416	E E 316	E E 538	E E 438
E E 417	E E 317	E E 560	E E 458
E E 423	E E 323	E E 562	E E 462
E E 430	E E 330	E E 569	E E 469
E E 431	E E 332	E E 594	E E 494
E E 435	E E 335	E E 595	E E 495
E E 440	E E 570	E E 598	E E 498
E E 460	E E 358	E E 599	E E 499

211.76.1 Undergraduate Courses

E E 201 Elements of Electrical Engineering

□3.8 (fi 6) (first term, 3-0-3/2). Circuit parameters, Kirchoff's Laws, basic circuit analysis including loop and node methods, steady-state AC circuits, phasor diagrams, power, power factor, three-phase systems for power transmission, transformers, introduction to DC and AC rotating machines, motor selection for various applications. (★3)

E E 231 C Programming and Numerical Methods for Electrical Engineering

□3.5 (fi 6) (second term, 3-1s-0). C language programming applied to numerical techniques for solving electrical engineering problems; numerical differentiation and integration, roots of linear and nonlinear simultaneous equations, interpolation and curve-fitting, ordinary differential equations. Prerequisite: ENCMP 100 or CMPUT 114. Corequisite: E E 250. (★3)

E E 239 Fundamentals of Electrical Engineering

□3.8 (fi 6) (second term, 3-0-3/2). Physical concepts of resistance, inductance and capacitance. Kirchoff's Laws and circuit equations of DC networks,

magnetic circuits, energy concepts, time domain analysis of R-L, R-C and R-L-C networks, complex numbers and phasor algebra, impedance concept, power factor, resonance, three phase circuits, network theorems, measuring instruments, vacuum tube and transistor. (★3)

E E 240 Electrical Circuits I

□4.3 (fi 6) (first term, 3-1s-3/2). Circuit element definitions. Circuit laws: KVL, KCL, Ohm's. Resistive voltage and current dividers. Basic loop and nodal analysis. Dependent sources. Circuit theorems: superposition, maximum power transfer, Thevenin, Norton. Time domain behavior of inductance and capacitance, energy storage. Sinusoidal signals, complex numbers, phasor and impedance concepts, complex power, RMS power. Resonant circuits, Three-phase power, wye and delta connections, wattmeters. Prerequisites: MATH 101, 102. Corequisite: MATH 201. (★3)

E E 250 Electrical Circuits II

□4.3 (fi 6) (second term, 3-1s-3/2). Forced and natural time domain response of RC, RL, and RLC circuits using differential equations. Introduction to Laplace transform. Complex frequency analysis. Transient and steady-state circuit responses. Frequency domain. Transfer functions. Mutual inductance. One- and two-port networks and their ZYT parameter sets. Introduction to the ideal operational amplifier. Prerequisites: MATH 102 and E E 240. (★3)

E E 280 Introduction to Digital Electronics

□3.8 (fi 6) (either term, 3-0-3/2). Boolean Algebra including truth tables and Karnaugh Maps. Switching devices and their symbology with an introduction to NAND and NOR logic. Number systems, codes, minimization procedures, synthesis of combinational networks. Synchronous sequential circuits, flip-flops, counters. (★3)

E E 305 Fundamentals of Electrical Engineering

□3.8 (fi 6) (second term, 3-0-3/2). Magnetic fields, forces on conductors, induced voltage, commutation, DC motors. The induction motor, transformer action, torque - speed characteristics, applications. Transistors, biasing, basic amplifiers, operational amplifiers and circuits. Silicon Controlled Rectifiers and Applications. Introduction to logic devices. Prerequisite: E E 239 or equivalent. (★3)

E E 315 Engineering Electromagnetics I

□3.5 (fi 6) (first term, 3-1s-0). Review of vector calculus, electrostatics, and magnetostatics. Electric and magnetic fields in material media, including polarization mechanisms and general boundary conditions. Solutions to static field problems. Maxwell's Equations and waves in free space, dielectrics and conducting media. Reflection and refraction, standing waves. Prerequisites: MATH 102, 209 and PHYS 230. (★3)

E E 316 Engineering Electromagnetics II

□2.5 (fi 6) (either term, 2-1s-0). Transient and time harmonic signals on rectangular lines, including impedance matching and the Smith Chart. Rectangular wave guides. Introduction to radiation. Prerequisite: E E 315. (★3)

E E 317 Electromagnetics for Computer Engineers

□3.0 (fi 6) (second term, 3-0-0). Review of electrostatics, magnetostatics and vector theorems. Introduction to Maxwell's equations. Ideal transmission line, wave equation, travelling waves. Characteristic impedance, reflection coefficient, power flow, multiple reflections and transient response of a transmission line. AC steady-state and lossy transmission lines. Smith Charts, plane wave propagation, reflection and transmission coefficients. Implications on transmission rates of digital data. Local area networks, instrumentation buses. Prerequisite: PHYS 230 or equivalent. (★3)

E E 323 Analytical Methods of Electrical Engineering

□3.5 (fi 6) (either term, 3-1s-0). Applications of the theory of partial differential equations to Maxwell's equations, heat flow problems, the transmission line equation and Laplace's equation. Transform methods and special functions. Prerequisites: E E 335 and MATH 309. (★3)

E E 330 Introduction to Power Engineering

□3.0 (fi 6) (first term, 3-0-0). DC and AC magnetic circuit analysis. Ideal and non-ideal transformers. Ideal and non-ideal autotransformers. Three phase transformers. Mechanical forces and magnetic devices. Modelling and analysis of transducers. Prerequisite: E E 240. (★3)

E E 332 Electric Machines

□3.8 (fi 6) (either term, 3-0-3/2). Theory, basic concepts and characteristics of DC machines; generators and motors. Induction motor theory. Synchronous machine theory. Fractional HP motor theory. Prerequisite: E E 330. (★3)

E E 335 Signals and Transform Methods

□3.5 (fi 6) (first term, 3-1s-0). Classes of signals and systems; impulse functions, impulse response and convolution; Fourier and Laplace transforms and applications; discrete time signals and Z-transform. Prerequisites: E E 250; MATH 102 and 201 or equivalent; MATH 309. (★3)

E E 340 Electronics—Active Devices

□4.3 (fi 6) (first term, 3-1s-3/2). PN junction semiconductor basics, charge flow and diode equation. Diodes: clipping and clamping circuits, bridge

rectifier, capacitive filtering, and zener regulator. Power supply design. Bipolar Junction Transistor (BJT): operation and its small-signal hybrid- π model. BJT amplifier basics: biasing, DC/AC load line viewpoint, gain. Rin and Rout properties, analysis and design. JFET and MOSFET Field Effect device operation with application to amplifiers. Prerequisite: E E 250. (★3)

E E 350 Electronics—Analog Circuits

□4.3 (*fi 6*) (either term, 3-1s-3/2). Op-amp as ideal 3-terminal device, virtual ground concept, linear versus nonlinear (switched) operation, design and applications. Differential amplifiers (BJT and MOSFET). Biasing with current mirrors. Common-mode (noise) rejection, I and V offsets. Frequency response of amplifiers: basic high frequency model, dominant pole calculation and design. Frequency performance comparison of design topologies. Common op-amp circuit design. Feedback application in amplifier circuits (VCVS). Prerequisite: E E 340. (★3)

E E 358 Introduction to Linear Systems

□3.0 (*fi 6*) (either term, 3-0-0). Transfer functions and linear models of physical systems. Block diagrams and signal flow graphs. Feedback control systems. System stability. Time and frequency responses. Bode plots. State variables and state space methods. Active filters. Prerequisites: E E 250, 335. (★3)

E E 365 Technical Communications

□3.0 (*fi 6*) (second term, 3-0-0). Technical approach to writing, pyramid technique, technical correspondence, references, critiques of written assignments. Time management, engineering professionalism, brainstorming, IEEE paper contest, changing engineering profession, working in groups and group dynamics. Extemporaneous oral presentations, semi-formal and formal oral presentations, moderating oral presentations. (★3)

E E 380 Introduction to Microprocessors

□3.8 (*fi 6*) (either term, 3-0-3/2). Microcomputer architecture, assembly language programming, sub-routine handling, memory and input/output system and interrupt concepts. Prerequisite: E E 280. (★3)

E E 387 Statistical Methods in Electrical Engineering

□3.5 (*fi 6*) (either term, 3-1s-0). Introduction to descriptive statistics; measures of central tendency. Probability theory: discrete sample spaces, Bayes' rule, random variables. Discrete and continuous distributions (binomial, hypergeometric, Poisson; normal, standardized normal, exponential and chi-square). Estimation and sampling theory. Hypothesis testing. Application of techniques to electrical engineering measurements, to communications, reliability, queuing, modelling and simulation studies of electrical and computer engineering systems and other areas of signal analysis. (★3)

E E 390 Introduction to Communication Systems

□3.0 (*fi 6*) (either term, 3-0-0). Basics of analog communication: amplitude, angle, and analog pulse modulation; modulators and demodulators; frequency multiplexing. Basics of digital communication: sampling, quantization, pulse code modulation, time division multiplexing, binary signal formats. Prerequisite: E E 335. (★3)

E E 438 Introduction to Signal Theory and Processing

□3.4 (*fi 6*) (either term, 3-0-3/4). Discrete-time signals and systems; sampled signals and sampling theorem; the z-transform; design of digital filters; discrete Fourier Transform, the periodogram. Fast Fourier Transform, Algorithms, aliasing, leakage; spectral analysis, applications. Prerequisite: E E 335. (★3)

E E 445 C/C++ Programming for Engineers

□4.5 (*fi 6*) (either term, 3-0-3). Applications of C/C++ programming language for solving practical engineering problems. Special attention to programming methodology for engineers, communication with external devices. Modular programming in C-exchange of variables, header files, and project files. Introduction to engineering graphics using C. Engineering data handling and acquisition, on-line visualization and processing. Modular programming in C++. Classes and objects. Data abstraction, inheritance, and polymorphism. Prerequisite: E E 231 or equivalent. Note: This course may not be taken for credit if credit has already been obtained in CMPUT 201. (★3)

E E 458 Control Systems I

□3.8 (*fi 6*) (either term, 3-0-3/2). Feedback control system characteristics. Feedback compensators. Stability and Routh Criterion. Root Locus method. Compensation in time-domain, lead and lag networks. Frequency methods and Nyquist Criterion. Compensation in frequency-domain. Discrete-time systems. Digital controller design. Prerequisites: E E 358 and MATH 309. Prerequisite or corequisite: E E 438. Note: This course may not be taken for credit if credit has already been obtained in either E E 462 or 469. (★3)

E E 462 Control Systems for Computer Engineers

□3.8 (*fi 6*) (second term, 3-0-3/2). Linear models of control systems. PID controller transient response and tuning. Stability analysis. Root locus method. Bode plots and frequency domain analysis and design. State space techniques. Discrete-time system modelling and digital controller design. Prerequisites: E E 335 and 438. Note: This course may not be taken for credit if credit has already been obtained in either E E 458 or 469. (★3)

E E 469 Feedback Control Systems for Mechanical Engineers

□3.8 (*fi 6*) (second term, 3-0-3/2). Laplace Transforms. Linear models of

physical systems. Transient response and system performance. Stability and Routh criterion. PID regulator transient response and tuning methods. Root locus. Bode plots and frequency response analysis and design. Prerequisite: MATH 201. Note: This course may not be taken for credit if credit has already been obtained in either E E 458 or 462. (★3)

E E 480 Advanced Digital Logic Design

□3.8 (*fi 6*) (either term, 3-0-3/2). Review of Classical Logic Design. Asynchronous sequential circuits. Digital System Design. Testing and design for testability. Computer Arithmetic Circuits. Prerequisite: E E 280. (★3)

E E 494 Research Project Seminar

□0.5 (*fi 2*) (either term, 0-1s-0). Organizational seminars for the research project in the following term. (★1)

E E 495 Research Project

□3.0 (*fi 6*) (either term, 0-0-6). Engineering Physics student research projects. (★3)

E E 513 Variable Speed Drives Lab

□3.5 (*fi 6*) (second term, 0-1s-6). Laboratory testing of industrial drive systems: 3-phase diode rectifiers and harmonics, commutation overlap in 3-phase rectifiers, 3-phase full-wave SCR phase controlled rectifier, DC drive, variable-voltage square-wave inverter drive (VVI drive), PWM voltage source inverter drive (VSI PWM drive), soft-start 12-pulse rectifier with D-D and D-Y transformer. Pre-/Corequisite: E E 531. (★3)

E E 514 Reliability Engineering

□3.0 (*fi 6*) (either term, 3-0-0). Study of how and why electrical and mechanical systems and components fail; Murphy's law; definitions of reliability and failure modes; practical statistical distributions and frequency and duration approach for designing and evaluating system and component reliability levels; repairable, non-repairable and standby systems. Prerequisite: E E 387 or equivalent. (★3)

E E 521 Power Systems I

□3.0 (*fi 6*) (either term, 3-0-0). Power system components and performance; per unit analysis of power systems; characteristics of transposed and untransposed transmission lines; transmission line models, load flow methods and Z bus building. Prerequisites: E E 250 and MATH 102. (★3)

E E 524 Switchmode Power Supplies

□3.4 (*fi 6*) (first term, 3-0-3/4). Power semiconductors: MOSFETS, IGBT, DC/DC converters; buck, boost, buck-boost, cuk. Converter operation in continuous and discontinuous conduction modes. Power supplies with high frequency isolation: flyback, push-pull, full-bridge and half-bridge. Resonant mode converters, soft-switching, resonant DC-link, parallel/series topologies. Applications and design examples. Prerequisite: E E 350. (★3)

E E 525 Power Systems II

□3.0 (*fi 6*) (either term, 3-0-0). Faults and unbalanced operation of power systems; symmetrical components sequence networks; stability and control; circuit breakers; overvoltages; voltage sags; lightning and switching surges. Prerequisite: E E 421 or consent of Department. (★3)

E E 527 Industrial Power Distribution

□3.0 (*fi 6*) (either term, 3-0-0). Fundamentals of engineering design of electrical distribution systems for buildings and electrical plants. Current design practices and engineering methods. Prerequisite: E E 332. (★3)

E E 528 Design of Reliable Industrial and Commercial Power Systems

□3.0 (*fi 6*) (either term, 3-0-0). Fundamentals of reliability analysis as it applies to planning and design of industrial and commercial electric power distribution systems. Cost of power outage analysis, economic evaluation of reliability. Reliability compliance and reliability demonstration for electronic and electrical equipment and systems. Design of emergency and standby systems. Design and reliability analysis of radial primary and secondary selective distribution systems. Preventive maintenance. Case studies. Prerequisite: E E 387 or equivalent. (★3)

E E 529 Power Quality

□3.0 (*fi 6*) (either term, 3-0-0). Introduction to power quality. Definition of power system disturbances and mathematical modelling of 80 power quality factors found in the Canadian Power Quality Measurement Protocol. Defining power system disturbance profiles and electronic and electrical equipment susceptibility characteristics. Designing mitigating equipment for the protection of electronic equipment (e.g. surge suppressors). Power system harmonic fundamentals (e.g. IEEE 519) and designing mitigating strategies. Prerequisite: E E 350. (★3)

E E 530 Power Electronics

□3.4 (*fi 6*) (first term, 3-0-3/4). Diode rectifiers. Power semiconductors: switching characteristics, gate drives and switching aid circuitry. Full-wave phase-controlled SCR rectifier and semiconductor. Topologies: DC choppers, DC drive systems, inverters, AC controllers and DC/DC converters. PWM control techniques. Applications and design examples. Prerequisite: E E 350. (★3)

E E 531 Variable Speed AC Drives

□3.4 (*fi 6*) (second term, 3-0-3/4). Variable speed control of induction motors. Phase-controlled rectifiers. Variable frequency control of induction motors: variable-voltage inverter "square-wave" inverter (VVI) drive, pulsewidth modulated voltage source inverter (VSI PWM) drive, current source inverter (CSI) drive. Cycloconverters, slip-energy recovery drives. Specialty drives: brushless permanent magnet motors, stepper motors and switched reluctance motors. Prerequisites: E E 350 and 332. (★3)

E E 533 Electrical Energy Sources

□3.0 (*fi 6*) (either term, 3-0-0). Energy consumption and reserves. Growth and usage characteristics. Electrical energy sources and costs, fossil, hydro nuclear and other sources. Economic planning of future sources and allocation of load among existing sources. (★3)

E E 539 Digital Filter Implementation and Applications

□3.8 (*fi 6*) (either term, 3-0-3/2). Design of FIR digital filters using approximation methods. Implementation of digital filters through assembly language programming of digital signal processing hardware. Digital frequency and waveform synthesis, multirate systems, applications to spectrum analyser design. Applications in digital telephony. Finite wordlength effects in DSP, signal quantization, roundoff noise, overflow oscillations and scaling for fixed point arithmetic, comparative performance with floating point arithmetic, coefficient quantization and sensitivity, minimum sensitivity realizations. Prerequisites: E E 380 and 438. (★3)

E E 545 Power System Protection

□4.5 (*fi 6*) (either term, 3-0-3). Review of power systems, relays and current transformers, per unit phasors, polarity, fundamental units, transformers. Site visit to actual power system installations, systems faults and relay coordination. (★3)

E E 550 Analog Filter Design

□3.0 (*fi 6*) (either term, 3-0-0). Filter types. Operational Amplifier Circuits. Butterworth and Chebyshev response. Positive gain, the biquadratic, state variable filters. Frequency transformations. Switched capacitor filters. Prerequisite: E E 358. (★3)

E E 552 Computer Aided Circuit Design

□3.5 (*fi 6*) (either term, 2-0-3). Students will participate in the design and realization of a digital application specific integrated circuit (ASIC). CAD tools are used for the high level description, gate level schematic entry, and simulation of the circuit. A field programmable gate array, based on the student's design, is constructed and tested. Lectures include such topics as IC technology, high level design description language and testing. Prerequisite or corequisite: E E 480. (★3)

E E 561 Control Systems II

□3.8 (*fi 6*) (either term, 3-0-3/2). State space method; stability, controllability, observability, and stabilizability, modal decomposition; design of state feedback controllers, state observers, and optimal regulators; state space method for discrete-time systems; state space analysis and design of digital control systems; important nonlinearities; describing function method; phase plane method; nonlinear control systems and controller design examples; case studies of control system design. Prerequisite: E E 458. Corequisite: E E 438. (★3)

E E 565 Introduction to Robotics

□3.4 (*fi 6*) (either term, 3-0-3/4). Description of positions and orientations in 3-D space. Geometry of robot manipulators. Motion of robot manipulators. Control of robot manipulators. Prerequisites: MEC E 250 and E E 240. (★3)

E E 570 Large Signal and Pulse Circuits

□4.5 (*fi 6*) (either term, 3-0-3). Pulse circuit basics: sweep and Schmitt trigger circuits. Large signal BJT models. Monostable and astable multivibrator and timing circuit analysis. Digital logic gate circuits: NMOS, CMOS, TTL, ECL. Sampling circuits. D/A circuit principles, inverted R-2R ladder design. A/D circuit principles and converter types. Prerequisite: E E 350. (★3)

E E 571 Radio Frequency Electronics

□4.5 (*fi 6*) (either term, 3-0-3). RF oscillator analysis and design. Non-linear amplitude limiting, crystal oscillators. Mixer analysis and design, Tuned RF and IF amplifiers. Amplitude modulation and demodulation. Power amplifiers. AM transmitters. Prerequisites: E E 358 and 570. (★3)

E E 572 Physical Electronics

□3.0 (*fi 6*) (either term, 3-0-0). Crystal structures; Semiconductor quantum mechanics and band model; carrier conduction and recombination/generation, light absorption, and emission; pn junctions, Schottky junctions, heterojunctions; FET and MOSFET operation. (★3)

E E 582 Design of Microprocessor-based Systems

□3.0 (*fi 6*) (second term, 1-0-4). Design of microprocessor systems, input/output systems, programmable timers, address decoding and interrupt circuitry. This course has a major laboratory component and requires the design and fabrication of a complete microprocessor-based system. Prerequisites: E E 350, 380 and 480. (★3)

E E 583 Introduction to Plasma and Fusion

□3.0 (*fi 6*) (either term, 3-0-0). Behavior of plasma, single particle motion, plasmas as fluids, diffusion and resistivity, principles of MHD generators and pumps. Waves in plasmas, plasma equilibrium and stability. Current experimental approaches to fusion—steady state and pulsed. State-of-the-art in confinement and heating of plasma. (★3)

E E 586 Introduction to Optical Fibre Communications

□3.0 (*fi 6*) (either term, 3-0-0). Properties of optical communication systems; dispersion, attenuation and physical properties of single mode and multimode fibres; LED and laser diode sources; photodetectors; optical coupling; system design; latest developments. Prerequisites: E E 316 or 317 and E E 350 and 390 or consent of Department. (★3)

E E 588 Communication in Noise

□3.0 (*fi 6*) (either term, 3-0-0). Description and analysis of random processes, characterization of noise in electric circuits, evaluation of the output signal-to-noise ratio in analog communication systems (amplitude and angle modulated), performance of digital communication systems (linear and companded pulse code modulation, binary and multilevel baseband and carrier systems) in white Gaussian noise. Prerequisites: E E 387 and 390. (★3)

E E 589 Telecommunication System Engineering

□3.0 (*fi 6*) (second term, 3-0-0). Telephony basics, subscriber loop, binomial, Poisson, Erlang traffic theories, optimum overflow, efficiency of large groups, network architecture, 2 Wire-4Wire conversion, loss plan, stability, call-routing, switching and crossconnect systems, central office functions, digital time-space switching, ISDN plus selected topics in satellite, digital radio, digital transmission, and multiplexing systems. Field trip(s). Prerequisites: E E 387 and E E 390. (★3)

E E 591 Antennas and Propagation

□3.0 (*fi 6*) (either term, 3-0-0). Introduction to radiation, antenna fundamentals, self- and mutual-impedances of linear antennas, arrays of linear antennas, practical considerations and feeding arrangements. Friis transmission equation, propagation between elevated antennas over a lossy earth, Fresnel zones and the effect of obstacles, earth curvature and the effects of normal refraction and ducting, tropospheric scatter, propagation in an ionized medium, ionospheric critical frequency and MUF. Prerequisites: E E 250 and 316. (★3)

E E 596 Introduction to Principles and Physics of Lasers

□3.0 (*fi 6*) (either term, 3-0-0). Interaction of radiation with atoms, laser oscillations and threshold conditions, 3- and 4-level laser systems, rate equations, special properties of laser light, cavity Q and photon lifetime, optical resonators and lens waveguides, Gaussian beams, gain saturation, Q-switching, mode locking, interaction of light and sound, holography. Description of various lasers: solid, gas, semiconductor, dye, Raman and chemical. Laser applications. Prerequisite: E E 316 or equivalent. (★3)

E E 597 Microwave Engineering

□3.8 (*fi 6*) (second term, 3-0-3/2). Introduction to microwave engineering and wave equation review. Wave propagation and cutoff considerations. Transmission line power and mode limits. Planar and microstrip lines. Obstacles in transmission lines. Impedance matching and tuning. Quarter-wave transformer design. Microstrip transitions. Transmission line and cavity resonators. Scattering-parameters and applications. Microwave transistor amplifier gain and stability design. Microwave filter design by insertion loss method. Prerequisite: E E 315. (★3)

E E 598 Special Problems I

□3.0 (*fi 6*) (first term, 3-0-0). (★3)

E E 599 Special Problems II

□3.0 (*fi 6*) (second term, 3-0-0). Courses E E 598 and 599 are intended to enable individuals or a small group of students to study topics in their particular field of interest under the supervision of a member of the Faculty. (★3)

211.76.2 Graduate Courses

The following undergraduate courses may be taken for credit by graduate students: E E 482, 498, 499, 514, 525, 527, 531, 539, 545, 550, 552, 561, 570, 571, 572, 583, 586, 588, 589, 591, 596, 597, EE BE 512, EE BE 540.

The following courses will be offered on a regular basis, subject to demand.

E E 600 MSc Research Project Definition

□0.5 (*fi 1*) (second term, 0-1s-0). Preparation of a report defining the proposed MSC thesis research. (★0.5)

E E 601 Special Topics in Electrical Engineering I

□3.0 (*fi 6*) (first term, 3-0-0). Intended to enable individual students to study special topics under the supervision of a member of the faculty. (★3)

E E 602 Special Topics in Electrical Engineering II

□3.0 (*fi 6*) (second term, 3-0-0). Same as E E 601, except this course number is to be used during the second term. (★3)

E E 609 PhD Research Project Definition

□3.0.5 (*fi 1*) (either term, 3-0-0). Preparation of a report defining the proposed PhD thesis research. (★0.5)

E E 619 Microelectronics Process Technology

□3.0 (*fi 6*) (either term, 3-0-0). The VLSI integrated circuit fabrication process. Overview of processing steps. Basic semiconductor physics. Silicon wafer material. Oxidation. Photolithography. Diffusion. Ion implantation. Chemical vapour deposition. Metallization. Process model. Yield, packaging, and assembly. (★3)

E E 622 Power System Problems I

□3.0 (*fi 6*) (first term, 3-0-0). Selected power system topics, such as stability, circuitbreaking, economic scheduling of generation, overvoltages, digital and analogue approaches to analysis. (★3)

E E 623 Power System Problems II

□3.0 (*fi 6*) (second term, 3-0-0). A continuation of E E 622, considering topics such as tie line control, excitation and its effect on the system. The application of control systems is emphasized. (★3)

E E 624 Power Electronics and Motor Drives Lab

□3.5 (*fi 6*) (second term, 0-1s-6). Laboratory testing of industrial drive systems; 3-phase diode rectifiers and harmonics, commutation overlap in 3-phase rectifiers, 3-phase full-wave SCR phase-controlled rectifier. DC drive variable-voltage square-wave inverter drive (VVI drive). PWM voltage source inverter drive (VSI PWM drive), soft-start, 12 pulse rectifier with Δ - Δ and Δ -Y transformer. LabView data acquisition techniques, simulation of induction motor speed control. Pre/Corequisite: E E 531. This course is not open to students who have taken E E 513. (★3).

E E 627 Advanced Power Quality

□3.0 (*fi 6*) (either term, 3-0-0). Advanced power system harmonic fundamentals. Modelling transmission lines and cable systems, three phase transformers, synchronous generators, and motors, switched mode power supplies, variable speed drives, power system loads for harmonic studies. Designing and modelling utility and industrial power system network configurations. Impact of standards on design and design of mitigating actions to minimize harmonic distortion of voltage and current waveforms. Prerequisites: E E 421, 525, 529, 531, or consent of Department. (★3)

E E 628 Radio Astronomy Techniques

□3.0 (*fi 6*) (first term, 3-0-0). Radiometry; galactic background and sources; antennas and arrays as spatial frequency filters; aperture synthesis; earth-rotation synthesis; interferometry; correlation receivers. (★3)

E E 631 Analogue Integrated Circuit Design

□3.0 (*fi 6*) (first term, 3-0-0). Models for bipolar, JFET and MOS transistors; basic single transistor stages, cascode stage; differential stage with bipolar, JFET, MOS transistors, device mismatch, offset and drift; current sources for biasing; current sources as active loads; supply independent bias, voltage sources and voltage references; level shifters; input stages of operational amplifiers; output stages and protection circuits; monolithic operational amplifier, tutorial study and design example. (★3)

E E 632 Design with Analogue Integrated Circuits

□3.0 (*fi 6*) (second term, 3-0-0). Basic application of integrated operational amplifiers, inverting and noninverting modes, errors; difference and AC amplifiers, current sources; integration, differentiator, dynamic errors; sample and hold amplifiers; frequency compensation of operational amplifiers; comparators, limiters, waveform generators; multipliers, phaselock loops, design and applications; wideband amplifiers; noise in integrated circuits. (★3)

E E 633 Analogue MOS LSI Circuit Design

□3.0 (*fi 6*) (either term, 3-0-0). MOS transistor operation and models. Bias in MOS analogue integrated circuits. MOS transistor operation amplifier, its design and limitations. Comparators. Multipliers and sensors. Switch-capacitor filters, biquad realization and realization of complex filters. Dynamic MOS transistor converters. (★3)

E E 635 Logical Design of Digital Computers

□3.0 (*fi 6*) (first term, 3-0-0). A continuation of E E 280; design and realization of synchronous and asynchronous sequential circuits in checking the design of controller; using standard integrated circuits and MSI devices. (★3)

E E 641 High Vacuum Technology

□3.8 (*fi 6*) (either term, 3-0-3/2). Gas kinetics; gas flow; pumping speed theory; pumping methods; pressure, measurement; vacuum system design; leak detection techniques; residual gas analysis; sorption processes. (★3)

E E 642 Thin Film Technology

□3.0 (*fi 6*) (second term, 3-0-0). Vacuum principles; thin film growth by sputtering, evaporation, and chemical techniques; characterization and classification of optical, electrical and mechanical properties; applications of thin films. (★3)

E E 645 Selected Laser Topics

□3.0 (*fi 6*) (either term, 3-0-0). Design, construction and operational aspects of various types of lasers; principles of modulation and detection; transmission

medium effects; optical components and concepts; information systems; noise and quantum considerations; special applications. (★3)

E E 651 Digital System Testing and Design for Testability

□3.0 (*fi 6*) (second term, 3-0-0). Designing and testing digital VLSI/ULSI systems. Reliability issues of digital systems, testing algorithms, design-for-testability strategies. Fault modelling, fault simulation, automatic test generation, data compaction, and pseudorandom techniques, built-in self-test, error detecting, and correcting codes in digital design and testing; CAD tools for design testability. (★3)

E E 653 Integrated Circuit Design

□3.0 (*fi 6*) (either term, 3-0-0). Electrical characteristics of MOSFET devices and circuits. Simulation of MOSFET circuits. Integrated circuit fabrication. Design and layout of CMOS digital integrated circuits. Use of a computer layout system. Architecture of LSI and VLSI systems. Digital system timing and timing simulation. Computer aids for integrated circuit design. (★3)

E E 655 Introduction to Modern Control Theory

□3.0 (*fi 6*) (first term, 3-0-0). System concepts. Classical and modern control system theories. Matrix calculus. Eigenvalues and eigenvectors. Formulation and solution of state equation of continuous and discrete systems. Controllability and observability. Lyapunov stability of linear and nonlinear systems. Design of controllers for pole placement by state and output feedback. Observer design. (★3)

E E 656 Statistical Communications

□3.0 (*fi 6*) (second term, 3-0-0). Random processes; correlated function and power spectrum of stationary processes; optimal receivers in the presence of noise; coding for noise immunity; implementation of coded systems; Fano decoding algorithm. (★3)

E E 660 Optimal Control Systems

□3.0 (*fi 6*) (second term, 3-0-0). Optimal control problem statement. Use of calculus of variations to solve optimal control problems. Continuous system linear regulator problem. Control constraint and Pontryagin's Minimum Principle. Time-optimal control. Dynamic programming and discrete linear regulator. Kalman Filtering for discrete systems. Extended Kalman Filter for nonlinear systems. Prerequisite: E E 655 or equivalent. (★3)

E E 662 Discrete Data Control Systems I

□3.0 (*fi 6*) (first term, 3-0-0). Introduction to sampled-data and computer controlled systems. Difference equations representation. Z transforms. Block diagrams and transfer functions. Mason's gain formula. Digital redesign of analogue systems. Design of digital controllers using root-locus in the z-plane. State space models of sampled data control systems. Design of state feedback controllers for pole placement in discrete systems: Ackermann formula. State estimators (full order and reduced order observers). Servo controller design with and without observers. (★3)

E E 666 Nonlinear Systems Theory

□3.0 (*fi 6*) (either term, 3-0-0). Analysis of nonlinear systems with deterministic and random inputs, using state space methods, perturbation methods, averaging methods, describing function methods, functional analysis; topics in stability theory. (★3)

E E 681 Survivable Networks

□3.0 (*fi 6*) (either term, 2-2s-0). History concepts, theories, and technologies of high speed restoration of the backbone telecommunications transport network. Unavailability, network reliability, survivability, impact of failures, k-shortest paths rerouting, max flow, distributed restoration, selfhealing network protocol, optimal capacity allocation, path vs span restoration, selfhealing rings, matched nodes, uni- and bi-directional rings, optimal ring design problem, dual feeding, diverse path pairs. Current research topics: pre-connection, node recovery, distributed preplanning, self-traffic engineering, hybrid networks. Student projects and seminars. Prerequisites: E E 589 and 686. (★3)

E E 682 Photonic Devices

□3.0 (*fi 6*) (second term, 3-0-0). Overview of modern photonic devices for informatics. Photon emitters and detectors, optical waveguide devices; nonlinear optics in waveguides; electro- and acousto-optic devices; photonic integrated circuits; applications to switching signal processing, computing and sensing. Prerequisite: E E 586 or permission of Instructor. (★3)

E E 683 Optical Fibre Communications

□3.0 (*fi 6*) (first term, 3-0-0). Semiconductor laser structures; analysis of spectra, modulation characteristics and coupling. Fibre wave analysis, attenuation, dispersion, taps. Detector noise considerations and receiver circuit design. System options and design, coding. Heterodyning, electro-optical switching and recent developments. (★3)

E E 685 Data Communication and Computer Networks

□3.0 (*fi 6*) (second term, 3-0-0). Layered models for protocols. Point-to-point protocols. Delay models. Multiaccess systems. Routing. Flow control. (★3)

E E 686 Digital Transmission Networks

□3.0 (*fi 6*) (first term, 3-0-0). Plesiochronous (near synchronous) digital

multiplexing, waiting time jitter, jitter tolerance, jitter accumulation, coherent and random regenerator jitter, lumped-word and distributed framing systems, misframe time, SONET, network overhead functions, payload mapping, payload pointer concepts, network synchronization. TVAR calculation, wander and slips, protection switching, ring, mesh and selfhealing survivable networks, restorability and availability, asynchronous transfer mode, studies of specialized circuits, equipment design and recent research. Prerequisites: E E 588 and E E 589, or consent of Instructor. (★3)

E E 690 Concurrent Systems Engineering

□ 3.0 (*fi 6*) (either term, 3-0-0). Classification of concurrent systems. Modelling the system environment. Design methods. Concurrent programming environment and concepts. Petri nets. Concurrent software (Modula-2, Oberon, Occam, Ada). Timing requirements and scheduling algorithms. (★3)

E E 900 Directed Research Project

★6 (*fi 12*) (variable).

211.77 Electrical Engineering/Biomedical Engineering

Departments of Biomedical Engineering and Electrical and Computer Engineering
Faculties of Medicine and Oral Health Sciences and Engineering

EE BE 512 Physical Measurements in Medicine

★3 (*fi 6*) (first term, 3-0-0). An introduction to biomedical transducers and to medical applications of lasers, fibre optics, ultrasound, and thermography. Principles and applications of electrodes. The cell membrane, Nerst-Planck equation, Goldman equation, core-conductor model and action potentials. Functional electrical stimulation, neuroprotheses, cardiac pacemakers, and defibrillators. Electroneurography, electromyography, electrocardiography, and electroencephalography. Safety aspects of electrical equipment in medicine. Prerequisite: consent of Instructor.

EE BE 540 Digital Computer Processing of Images

★3 (*fi 6*) (second term, 3-0-3/2). Extension of sampling theory and the Fourier transform to two dimensions, pixel operations including gray-level modification, algebraic and geometric transformations. The design of spatial filters for noise reduction, image sharpening and edge enhancement, and some discussion of interpolation techniques. An introduction to the concepts of image restoration from known degradations and the reconstruction of images from parallel and fan projections. Prerequisite: EE 438 or consent of Instructor.

211.78 Emergency Medicine

Faculty of Medicine and Oral Health Sciences

EMER 431 Emergency Medicine

★1 (*fi 2*) (first term, 19 hours). A general introduction to Emergency Medicine. For third year medical students only.

211.79 Engineering, Computer

Department of Computing Science
Faculties of Science and Engineering

ENCMP 100 Computer Programming for Engineers

□ 3.8 (*fi 6*) (either term, 3-0-1.5). Computer programming for solving engineering problems. Structured programming in Pascal. Use of subprogram libraries. Use of UNIX operating system on a computer workstation. (★3)

211.80 Reserved

211.81 Engineering, General

Faculty of Engineering

The following table lists renumbered courses effective 1993/94:

Old	New	Old	New
ENGG 200	ENGG 100	ENGG 500	ENGG 400
ENGG 201	ENGG 101	ENGG 502	ENGG 402
ENGG 230	ENGG 130	ENGG 504	ENGG 404
ENGG 300	ENGG 299	ENGG 505	ENGG 405
ENGG 308	ENGG 208	ENGG 506	ENGG 406

ENGG 100 Orientation to the Engineering Profession I

□ 1.0 (*fi 2*) (first term, 1-0-0). A introduction to the Faculty and the engineering profession: the engineering disciplines, study skills, cooperative education, work opportunities, engineering, and society. Several written assignments will be required to assist in developing the student's communication skills. (★1)

ENGG 101 Orientation to the Engineering Profession II

□ 1.0 (*fi 2*) (second term, 1-0-0). An introduction to the engineering profession and its challenges; career fields, professional responsibilities of the engineer, ethics, the history and development of the engineering profession. Several written assignments will be required to assist in developing the student's communication skills. (★1)

ENGG 130 Engineering Mechanics

□ 4.0 (*fi 6*) (either term, 3-0-2). Equilibrium of planar systems. Analysis of statically determinate trusses and frames. Friction. Centroids and centres of gravity. Forces and moments in beams. Second moments of area. Note: Students in all sections of this course will write a common final examination. Corequisite: MATH 100. (★3)

ENGG 208 Introductory Computer Aided Design

□ 3.0 (*fi 6*) (either term, 2-0-2). Introduction to microcomputers and microcomputer-aided design for non-engineering students. Introduction to technical sketching for a variety of applications. Microsoft Windows for the beginner. Computer-aided drawing using AutoCad. This course is not open to students registered in Engineering or Science. (★3)

ENGG 209 Intermediate Computer Aided Design

□ 3.0 (*fi 6*) (first term, 2-0-2). Introduction to microcomputers and computer-aided design for non-engineering students. Introduction to technical sketching for a variety of applications. Computer-aided drawing and design using AutoCAD, with emphasis on the advanced features. Open to students in Business, Industrial or Visual Communication Design, or with the Instructor's approval. This course is not open to students registered in Engineering or Science. (★3)

ENGG 299 Orientation to Cooperative Education

□ 1.0 (*fi 2*) (first term, 1-0-0). An examination of the history, philosophy and objectives of Cooperative Education; introduction to the operation of the Cooperative Studies Program; self-assessment of transferable skills and work values; preparation of the resumé; practice of job interview skills; goal setting on the job; ethics, safety and human rights. Note: This course is only open to students registered in the Cooperative Studies Program and must be taken prior to a student's first work placement. (★1)

ENGG 400 The Practice of the Engineering Profession

□ 1.0 (*fi 2*) (second term, 1-0-0). The technical and professional duties and responsibilities of the engineer, the ethics of the engineering profession, technical and professional organizations. The role of the engineer in the social environment. Note: Restricted to fourth-year regular and fifth-year co-op engineering students. (★1)

ENGG 402 Project Management and Entrepreneurship

□ 3.0 (*fi 6*) (either term, 3-0-0). The theory and practice of project management applied to the creation of new business activities and ventures. Intended to provide engineering and business students with an awareness of specific planning, budgeting and scheduling techniques which can be used to implement and monitor new business activities, especially those which require high ratios of capital investment per employee. Emphasis is placed on the importance of individual behavior and performance in starting new activities and attaining non-routine objectives. Comparisons of sole proprietorships and partnerships versus corporations, matrix versus line organizations, leadership and entrepreneurship versus administration. Introduction to finance, marketing and tax principles. Preparation of memos, letters, reports and management presentations to help communicate ideas to others. Prerequisites: consent of Instructor and completion of the second year of studies in an Engineering, Business, or Science program. (★3)

ENGG 404 Industrial Safety and Loss Management

□ 3.8 (*fi 6*) (first term, 3-3s/2-0). A broad study of the principles and practices of providing a safe and reliable working environment in all types of major industries. Government regulatory requirements are reviewed. The key topics of study, using leading industry practices, are industrial health, safety, and environmental risks. The course emphasizes the importance of the decisions of engineers and business managers in protecting workers, the environment, assets, production, and the public in general. Plant visits, case studies, and guest lecturers from industry and government are included. This course requires the payment of additional miscellaneous fees. See §22.2.3 for details. Prerequisite: Completion of at least two years of study in Engineering or Business or by consent of the Instructor. (★3)

ENGG 405 Engineering, Business and Society

□ 3.0 (*fi 6*) (either term, 3-0-0). An interpretative course on the art and science of engineering. The evolution of engineering. Examples and discussions of engineers' varied roles throughout business and society. Emphasis on engineers as 'problem solvers' who apply scientific principles and judgement to the creation and optimization of safe systems, and to the identification of those special systems which offer the best return on an investment of money, time and other resources. Attention is directed to major current and long-term business and societal problems in such areas as energy supply, population growth, man's impact on the environment, and Canada's technology and business status. Note: This course is intended for Business

and Engineering students registered in their third or fourth year. Students from other faculties may be admitted on a space-available basis. (★3)

ENGG 406 Industrial Safety and Risk Management

□3.8 (fi 6) (second term, 3-3s/2-0). A comprehensive study of the theories and practices of providing a low-risk working environment in all types of major industries, with particular emphasis on risk analysis/management solutions. Case studies of recent industrial disasters and industrial site visits are used to focus on proactive management techniques. The course strongly emphasizes risk analysis, risk management, and loss control. Techniques of leadership, management, and motivation to provide excellence of results are emphasized. Legal and ethical responsibilities of engineers and business managers are reviewed. This course requires the payment of additional miscellaneous fees. See §22.2.3 for details. Prerequisite: Completion of at least two years of study in Engineering or Business or by consent of the Instructor. (★3)

ENGG 420 Engineering Law

□3.0 (fi 6) (either term, 3-0-0). Contracts; specifications; tenders; bonds; construction contract forms; Public Works Act; Workers' Compensation Act; building trades; company law; the engineer as an expert witness; patents; trade marks; copyrights; negligence; arbitration. Note: Restricted enrolment. Registration approval by Dean's office only. Credit will be granted for only one of ENGG 420 and B LAW 301. (★3)

211.82 Engineering Management

Department of Mechanical Engineering
Faculty of Engineering

The following table lists renumbered courses effective 1994/95:

Old	New	Old	New
MEC E 610	ENG M 620	MEC E 612	ENG M 640
MEC E 611	ENG M 630	MEC E 613	ENG M 650

ENG M 601 Graduate Seminar

□0.5 (fi 2) (either term, 0-1s-0). Presentations by graduate students, staff, and visitors of issues and topics in Engineering Management. (★1)

ENG M 620 Engineering Economic Analysis

□3.0 (fi 6) (either term, 3-0-0). Advanced topics in engineering economics including: operating and capital budgets, financial statement use by managers, replacement analysis, cost of capital and leasing. Prerequisite: MEC E 310 or equivalent. (★3)

ENG M 621 Engineering Economics Analysis I

□1.5 (fi 3) (either term, 18 hours). Financial statements and their use. Review of basic financial analysis techniques, review of project evaluation, equivalence and rate of return analysis. Effects of depreciation. Capital Cost Allowance (CCA) and income tax on project evaluation. Prerequisite: MEC E 310. (★1.5)

ENG M 622 Engineering Economics Analysis II

□1.5 (fi 3) (either term, 18 hours). Estimating and costing, capital budgeting and cost of capital multiple investment alternative, risk assessment and risk management, inflation and its effects on cash flows, alternative methods of project finance (venture capital, long term debt, initial public offerings, etc.), and cost-benefit analysis. Prerequisite: ENG M 621. (★1.5)

ENG M 630 Project Management Techniques

□3.0 (fi 6) (either term, 3-0-0). This course involves study of the management techniques that are particularly relevant to the design, development and control of engineering projects. Special attention will be given to network (CPM, PERT) systems and the use of computers for time and cost control. (★3)

ENG M 640 Engineering Optimization

□3.0 (fi 6) (either term, 3-0-0). This course introduces optimization techniques and their applications to various engineering problems. Topics to be covered include modelling techniques, linear programming, sensitivity analysis, nonlinear programming, dynamic programming, decision theory, queuing theory, and other optimization methods. Case studies and computer modeling will be used. Application areas of the covered techniques include production planning, operations management, engineering design, optimal control, and reliability engineering. (★3)

ENG M 650 Managing in a Technical Environment

□3.0 (fi 6) (either term, 3-0-0). Design concepts for management systems, philosophy of engineering management, the management function, matrix management, management by objectives. (★3)

ENG M 670 Advanced Topics in Engineering Management I

□ 3.0 (fi 6) (either term, 3-0-0). (★3)

ENG M 680 Advanced Topics in Engineering Management II

□ 3.0 (fi 6) (either term, 3-0-0). (★3)

211.83 Engineering Physics

Department of Physics
Faculties of Science and Engineering

EN PH 131 Mechanics

□4.3 (fi 6) (either term, 3-1s-3/2). Kinematics and dynamics of particles; gravitation; work and energy; linear momentum; angular momentum; systems of particles; introduction to dynamics of rigid bodies. Prerequisites: MATH 100, ENGG 130. Corequisite: Math 101. Prerequisite or corequisite: PHYS 130. Restricted to Engineering students. (★3)

211.84 English

Department of English
Faculty of Arts

Note: Courses in the Department of English teach the English language and its several literatures; some works may be taught in translation as necessary to fulfil the primary goal of understanding English literature.

See also Writing (§211.238).

The courses listed below represent an extensive reorganization and modification of the Department's offerings. Because of changes in course numbers and/or content, students should compare their new course selections with courses previously taken, so as to avoid duplication or overlap.

Following are renumbered courses effective 1990/91 only:

Old	New
ENGL 200	ENGL 100

The following table lists renumbered courses effective 1991/92:

Old	New	Old	New
ENGL 114	ENGL 199	ENGL 364	ENGL 377
ENGL 119	ENGL 108	ENGL 365	ENGL 363
ENGL 170	ENGL 104	ENGL 366	ENGL 206
ENGL 175	ENGL 105	ENGL 367	ENGL 364
ENGL 302	ENGL 511	ENGL 369	ENGL 362
ENGL 303	ENGL 287	ENGL 370	ENGL 366
ENGL 304	ENGL 388	ENGL 373	ENGL 358
ENGL 305	ENGL 389	ENGL 380	ENGL 369
ENGL 306	ENGL 212	ENGL 381	ENGL 371
ENGL 307	ENGL 299	ENGL 382	ENGL 372
ENGL 316	ENGL 324	ENGL 383	ENGL 360
ENGL 318	ENGL 204	ENGL 388	ENGL 375
ENGL 332	ENGL 338	ENGL 389	ENGL 376
ENGL 333	ENGL 239	ENGL 390	ENGL 373
ENGL 334	ENGL 339	ENGL 391	ENGL 374
ENGL 336	ENGL 327	ENGL 402	ENGL 521
ENGL 345	ENGL 350	ENGL 431	ENGL 444
ENGL 350	ENGL 352	ENGL 432	ENGL 454
ENGL 351	ENGL 353	ENGL 441	ENGL 445
ENGL 356	ENGL 351	ENGL 442	ENGL 455
ENGL 357	ENGL 305	ENGL 470	ENGL 479
ENGL 358	ENGL 462	ENGL 472	ENGL 474
ENGL 360	ENGL 361	ENGL 473	ENGL 475
ENGL 361	ENGL 365	ENGL 502	ENGL 531
ENGL 363	ENGL 368	ENGL 503	ENGL 532

The following table lists renumbered courses effective 1994/95:

Old	New	Old	New
ENGL 298	WRITE 298	ENGL 494	WRITE 494
ENGL 394	WRITE 394	ENGL 495	WRITE 495
ENGL 395	WRITE 395	ENGL 498	WRITE 498
ENGL 398	WRITE 398		

211.84.1 Undergraduate Courses

Notes

- (1) Most students will take ENGL 100 or 101, full session courses, either of which will serve as the prerequisite to all senior English courses. Students with credit in ENGL 100 or 101 or equivalent should not take current ENGL 100 or 101 and may proceed to senior English courses. Transfer students to the Faculty of Arts who have received credit in ★3 in junior-level English are permitted to take either ENGL 104 or 105 in lieu of the ENGL 100/101 requirement.
- (2) Junior English courses require a substantial amount of writing in essays and tests to afford practice in setting down ideas in good English.
- (3) All senior courses have as prerequisite ENGL 100, 101 or equivalent; prerequisites for 400-level courses are ★12 of senior English, ★6 of which must be at the 300-level (as numbered in this edition of the Calendar, including any specific course prerequisites in the individual course descriptions).
- (4) Not all senior courses are offered in any given year.