COMM 434 Advanced Digital Recording (3 sem. hrs.)
A continuation of COMM 334/MUSI 340. Students gain a thorough understanding of: Nuendo recording/post production software; Reason electronic composition software; MIDI arranging for live musicians; synchronized film composition; and a variety of related topics.
Cross-listed: MUSI 341.
Prerequisite(s): COMM 334/MUSI 340, or instructor's consent. (3-0 or 3-0)

COMM 435 Religious Themes in Cinema (3 sem. hrs.)
This course explores key films and filmmakers that have presented traditional and controversial religious messages in their work including filmic symbolic creations regarding God, the Church, sin, redemption, and grace. Filmmakers include Krzysztof Kieslowski, Carl Dreyer, Andrei Tarkovsky, Robert Bresson, Ingmar Bergman, Martin Scorsese, and Horton Foote. The course discusses rhetorical ways film conveys spiritual and emotional messages. Of note is the role Christ and Christ-figures play in selected films.
NB: Not offered every year. See Department chair.
Prerequisite(s): None. (3-0 or 3-0)

COMM 440 Digital Film Directing (3 sem. hrs.)
This course introduces students to the history, theory, and craft of digital film directing. It involves theoretical and applied components. Topics include the role of the director, scene and script analysis, storyboarding, working with actors, digital movie technology, camera techniques, principles of editing, and personal discipline. A key component includes working with actors, shooting and editing scenes.
NB: Not offered every year. See Department chair.
Prerequisite(s): COMM 220 or instructor's consent. (0-0; 3-0)

COMM 450 Directed Studies in Communication (3 sem. hrs.)
Students are required to produce an outline of the topics to be studied in consultation with the instructor. A course of reading and writing is pursued according to the approved outline.
NB: In keeping with University policy, students are normally not allowed to do a Directed Study in a course currently offered by the Communications Department.
Prerequisite(s): 12 sem. hrs. lower level Communications courses and instructor's consent.

COMM 452 Leadership Communication in Multi-cultural Contexts (3 sem. hrs.)
This course builds on fundamental concepts of cross-cultural communication, taking a deeper look at issues raised by the interface of leadership communication and multi-cultural, non-Western contexts. The student explores issues such as cognitive frameworks, motivation, decision-making, conflict resolution, and the management of time, people, and projects. The course studies perception and the enactment of relational leadership behaviour in settings abroad, deepening understanding and sharpening cross-cultural skills, thereby equipping students for maximum effectiveness in a professional multi-cultural setting.
NB: Also offered as summer travel study to Guatemala or Kenya.
Cross-listed: ANTH 452.
Prerequisite(s): COMM 302. (0-0; 3-0)

COMM 470 Feature Writing for Newspapers and Magazines (3 sem. hrs.)
Building on skills developed in COMM 212 or 270, students study the best in magazine and newspaper feature writing and produces several pieces of their own with the intent of publishing their work.
Prerequisite(s): COMM 212 or 270; ENGL 103, 104, and third or fourth year standing. (3-0; 0-0)

COMPUTING SCIENCE

Computing Science courses may be used to satisfy core requirements for natural sciences but not for a laboratory science.

NB: Students studying programming must master very large amounts of technical material and demonstrate their mastery in written form. For this reason, a high level of English reading and writing skills is required before taking the following courses. Students who lack such skills should take courses to develop them before considering enrolment in any programming course.

CMPT courses numbered below 130 do not count towards a Mathematics, Applied Mathematics with Computing Science, or Computing Science major, concentration, or minor. Exception: CMPTY/ISYS may be counted toward a Computing Science degree.

CMPT 113 Introduction to Information Systems and Web Technologies (3 sem. hrs.)
An introductory level of understanding of information systems with an emphasis on web technologies. Authoring static and client-sided dynamic web pages and sites. Information systems and web technology studies including the development of database aware server-sided web pages and sites in later courses.
NB: Not offered every year. See Department chair.
Cross-listed: ISYS 113
Prerequisite(s): None. (0-0; 3-0)

CMPT 123 Data Analysis for Information Systems B (0.5 sem. hrs.)
An introduction to spreadsheets and databases. Cell formulas, charts, macro programming. Database design, decomposition; basic SQL. Tools such as Excel, Access, and MS-SQL may be used, but the focus is on concepts and design rather than skills with specific tools.
Prerequisite(s): CMPT 113 or CMPT 140, or equivalent.
Cross-listed: ISYS 123 (3-1-3 or 3-1-3)

CMPT 140 Introduction to Programming (3 sem. hrs.)
A more gradual introduction to programming and problem solving than CMPT 141. Using systematic and structured techniques in the context of problem definition, the determination of input/output requirements, preparation of problem solving algorithms, and writing simple code. Debugging programs and producing internal and external documentation that specifies how the program can be used and the methods by which the program achieves its objectives.
NB: CMPT 140, 145 is the normal sequence for most programming students. This course may be offered in a six-week format with five classes per week.
Cross-listed: ISYS 140
Prerequisite(s): None, but students must be familiar with using a computer. (3-1-3 or 3-1-3)

CMPT 150 Introduction to Discrete Math (3 sem. hrs.)
An introduction to those branches of pure mathematics which are most commonly used in the study of Computing Science and/or have other practical applications. Topics include logic, proofs, switching circuits, set theory, induction, functions, languages, finite automata, combinatories, and algebraic structures. This course may be taken by non-majors for non-lab science credit.
NB: Not offered every year. See Department chair.
Cross-listed: MATH 150.
Prerequisite(s): B.C. high school Mathematics 12, or MATH 101, or the equivalent. (3-0 or 3-0)

CMPT 166 Intermediate Programming (3 sem. hrs.)
Intermediate programming techniques in one or more programming notations.
Cross-listed: ISYS 166
Prerequisite(s): CMPT 140 with a minimum grade of C+. (2-3; 0-0)

CMPT 200 Computing Projects (1-3 sem. hrs.)
Possible projects include: a second computer language, computer applications in the arts and sciences, ethical issues, computer security, networking, or a major software project. Enrolment is strictly limited and instructor's consent is required.
NB: Not offered every year. See coordinator of academic computing for permission to take this course.
Prerequisite(s): Second year standing in Computing Science and in the subject area of the proposed project. (3-3 or 3-3)

CMPT 211 Web Technologies I (3 sem. hrs.)
This course is a continuation of CMPT 113 and introduces students to the programming side of web technologies. Students learn to write client side, and begin to explore server-side dynamic web page programming utilizing web programming language, such as JavaScript and PHP. This course provides initial instruction in the latest web technologies; the exact techniques taught from year to year depend on W3C, and programming standards developments.
NB: Not offered every year. See Department chair.
Prerequisite(s): CMPT 113 or instructor's consent. (3-3 or 3-3)

CMPT 231 Data Structures and Algorithms (3 sem. hrs.)
Basic organization of programs, optimizing program structure, modularization. Data structures, searching and sorting algorithms, handling large data sets, analysis of algorithms.
NB: Not offered every year. See Department chair.
Prerequisite(s): CMPT 140 or instructor's consent. (3-3 or 3-3)

CMPT 237 Introduction to Database Management Systems (3 sem. hrs.)
Introduction to the common methods of structuring files for a variety of applications and to methods of using data organization techniques in the design and management of databases.
NB: Not offered every year. See Department chair. Students with credit for CMPT 337 may not take this course.
Cross-listed: ISYS 237
Prerequisite: CMPT 123 and 140. (3-2 or 3-2)

CMPT 242 Computing Machine Organization (3 sem. hrs.)
Introduction to assembly language, machine architecture, low-level components of the operating system, and other low-level issues.
NB: Not offered every year. See Department chair.
Prerequisite(s): CMPT 140 or equivalent. (3-0-3 or 3-0-3)

CMPT 311 Web Technologies II (3 sem. hrs.)
This course provides students with a deeper level of understanding of web technologies. Students learn how to author more complex server-sided dynamic web pages and sites utilizing web programming languages, such as Perl, and PHP coupled with a database interface such as MySQL. Techniques such as AJAX and Java may also be utilized. The course prepares students to develop database aware server-sided web pages and sites. This course is specifically designed to provide the student with instruction in the latest web technologies; so, the exact technology taught from year to year depends on W3C, programming language, and database standards development.
NB: Not offered every year. See Department chair.
Cross-listed: ISYS 311
Prerequisite(s): CMPT 123, 140 (or suitable equivalent programming courses), and 211. (3-0 or 3-0)

CMPT 320 Digital Electronics and Instrumentation (3 sem. hrs.)
To provide students with a working knowledge of basic semiconductor devices and gates and their use for implementing logic devices and simple measurement and control functions, and to provide experience in constructing and using circuit diagrams and test/measurement equipment.
NB: Not offered every year. See Department chair.
Cross-listed: PHYS 320.
Prerequisite(s): CMPT 140; MATH 123, 124; PHYS 230; or instructor's consent. (3-0-3 or 3-0-3)

CMPT 325 Distributed Systems and Networking (3 sem. hrs.)
Network operating systems, physical networks, and the construction and maintenance of server sites.
NB: Not offered every year. See Department chair.
Cross-listed: ISYS 325
Prerequisite(s): third year standing in Computing Science or Information Systems. (3-0-3 or 3-0-3)

CMPT 330 Numerical Analysis (3 sem. hrs.)
Numerical techniques for solving problems in applied mathematics. Error analysis, roots of equations, interpolation, numerical differentiation and integration, ordinary differential equations, matrix methods.
NB: Not offered every year. See Department chair.
Cross-listed: MATH 330.
Prerequisite(s): MATH 223, 250; CMPT 140; or equivalent. (3-0 or 3-0)

CMPT 334 Computer Systems Software (3 sem. hrs.)
Operating system and control software at a low level, memory management, and system architecture are among the topics considered.
NB: Not offered every year. See Department chair.
Prerequisite(s): CMPT 242. (3-0-3 or 3-0-3)

CMPT 338 Advanced Topics in Database Management (3 sem. hrs.)
Advanced topics on implementation, query optimization, transaction processing, concurrency, control, recovery, security, distributed data issues, data warehousing, and data mining are discussed. It concludes with an overview of new trends in the emerging database applications.
NB: Not offered every year. See Department chair.
Cross-listed: ISYS 338
Prerequisite(s): CMPT/ISYS 237. (3-0 or 3-0)

CMPT 340 Discrete Structures and Computing Theory (3 sem. hrs.)
This course continues CMPT 150. It also includes models of computation, formal languages, and algorithms. It may include topics such as advanced graph theory and applications, optimization problems, autonoma theory, and encryption.
NB: Not offered every year. See Department chair.
Cross-listed: MATH 340.
Prerequisite(s): CMPT 150 or MATH 150. (0-0; 3-0)

CMPT 345 Simulation and Modeling (3 sem. hrs.)
This course is designed to give Computing Science/Applied Mathematics students the ability to analyze, formulate, and program problems related to discrete simulation methods. Students learn and use simulation languages. The course concentrates on the language GPSS-V; however, an introduction is also provided to other languages such as SIMSCRIPT II.5. The course introduces students to queuing theory and some commonly used continuous and discrete statistical distributions. By the end of the course, students are able to simulate real world computer systems and industrial manufacturing systems.
NB: Not offered every year. See Department chair.
Prerequisite(s): Third year standing in Computing Science, Mathematics, or Physics, or permission of the instructor. (3-0-3 or 3-0-3)

CMPT 350 Operations Research (3 sem. hrs.)
Linear programming, duality, network analysis, queuing theory, inventory theory, dynamic programming, non-linear programming.
NB: Not offered every year. See Department chair.

Cross-listed: MATH 350.
Prerequisite(s): Knowledge of a programming language and MATH 223, 250. (3-0 or 3-0)

CMPT 360 Comparative Programming Languages (3 sem. hrs.)
The history and development of modern programming languages. The user interfaces and internal operations of the major notations are examined in detail. Students are expected to become proficient in at least four languages they have not previously learned, typically chosen from Oberon, Java, Pascal, Ada, Smalltalk, Prolog, Scheme, APL (or J), C (or C++), and one or more scripting languages.
NB: Not offered every year. See Department chair.
Prerequisite(s): CMPT 140, 166 and at least one second year Computing Science course. (3-0-3 or 3-0-3)

CMPT 370 Advanced Programming Paradigms (3 sem. hrs.)
This course is designed to provide already experienced students with some of the advanced tools that they need to take their places as competent professional programmers. The principal paradigms considered are: exception handling, advanced algorithms, event driven programming, the graphics user interface, generic programming, generic programming, and object-oriented programming.
NB: Not offered every year. See Department chair.
Prerequisite(s): CMPT 140 and either CMPT 166; 231, 285, or second year transfer from another school of computing with instructor's permission. (3-3 or 3-3)

CMPT 380 Logic Programming and Artificial Intelligence (3 sem. hrs.)
Artificial Intelligence: knowledge representation, logic programming, knowledge inference. Application domains within the discipline of Artificial Intelligence include logical and probabilistic reasoning, learning, natural language understanding, vision, and expert systems.
NB: Not offered every year. See Department chair.
Prerequisite(s): CMPT 140, or equivalent and at least 12 sem. hrs. of Computing Science. (3-3 or 3-3)

CMPT 385 Software Engineering (3 sem. hrs.)
An introduction to the theory of designing and carrying out large software projects. All stages of the software engineering cycle are examined and experienced, and planning for at least one project is undertaken.
NB: Not offered every year. See Department chair. Students with credit for CMPT 285 may not take this course.
Cross-listed: ISYS 385
Prerequisite(s): Proficiency in C, C++, Java, Pascal, Modula-2 or Ada; CMPT 140; CMPT 231, and 237. (3-3; 0-0)

CMPT 386 Software Engineering Project (3 sem. hrs.)
The project designed in CMPT 385 are carried through to completion and tested. Students may count a maximum of 7 sem. hrs. toward their minor, concentration, or major from among CMPT 387; 400, 409, 410, 411, 419, 420, 421, or other CMPT offerings designated as a project course. Any additional credits earned from such courses must be counted as electives. Students may do either a thesis (410/411) or a collaborative project (420/421), but not both.
NB: Not offered every year. See Department chair.
Cross-listed: ISYS 386
Prerequisite(s): Grade of B- in CMPT 385 and the ability to work on a team. (0-0; 1-6)

CMPT 387 Software Engineering Project II (3 sem. hrs.)
The project designed in CMPT 385/386 are carried through to completion and tested.
NB: Not offered every year. See Department chair.
Cross-listed: ISYS 387
Prerequisite(s): Grade of B- in CMPT 385 and the ability to work on a team. (0-0; 1-6)

Note: Students may count a maximum of 7 sem. hrs. toward their minor, concentration, or major from among CMPT 387; 400, 409, 410, 411, 419, 420, 421, or other CMPT offerings designated as a project course. Any additional credits earned from such courses must be counted as electives. Students may do either a thesis (410/411) or a collaborative project (420/421), but not both.

CMPT 400 Directed Studies in Computing Science (1-3 sem. hrs.)
Students are required to produce an outline of the topic studied in consultation with the instructor. A course of reading and/or experimentation is pursued according to the approved outline. Assessment may be via examination and/or a final written report.
NB: This course with the appropriate choice of topics can be used as a preparation for the senior thesis (CMPT 410) or senior project (CMPT 420). This course can only be taken with the consent of the academic computing coordinator.
Cross-listed: ISYS 400
Prerequisite(s): Advanced standing in Computing Science.

CMPT 409 Thesis Preparation (1 sem. hr.)
Students are required to choose a topic for their senior thesis (CMPT 410 or 411) in consultation with an instructor. Selected readings and references pertinent to the topic are assigned. A final written report is presented, consisting of a detailed thesis proposal and a literature review.
NB: A student is allowed credit for only one of CMPT 409 or 419.
Cross-listed: ISYS 409
Prerequisite(s): Advanced standing in Computing Science or instructor's consent.

CMPT 410 Senior Thesis (2 sem. hrs.)
Research in a chosen area of Computing Science with a final written report.
NB: Normally 2 sem. hrs. are assigned unless prior arrangement is made with the Department chair and Registrar.
Cross-listed: ISYS 410
Prerequisite(s): CMPT 409, a related directed study in preparation, or instructor's consent.

CMPT 411 Senior Thesis (3 sem. hrs.)
Research in a chosen area of Computing Science with a final written report.
NB: Normally 2 sem. hrs. are assigned for a senior thesis unless prior arrangement is made with the Department chair.
Cross-listed: ISYS 411
Prerequisite(s): CMPT 409, a related directed study in preparation, or instructor's consent.

CMPT 419 Project Preparation (1 sem. hr.)
Students are required to choose a topic for their senior group project (CMPT 420 or 421) in consultation with the instructor. Selected readings and references pertinent to the topic are assigned. A final written report (software requirements document) is produced giving a detailed specification of the proposed software project.
NB: A student is allowed credit for only one of CMPT 409 or 419.
Cross-listed: ISYS 419
Prerequisite(s): Advanced standing in Computing Science or instructor's consent.

CMPT 420 Special Topics - Senior Collaborative Project (1-6 sem. hrs.)
A major collaborative software project in a chosen area of Computing Science with a final report and presentation. At least two, and normally not more than five people work as a team to design, code, debug, test, and document the software.
NB: The choice of CMPT 420 or 421 depends on the instructor's assessment of the size and complexity of the proposed project.
Cross-listed: ISYS 420
Prerequisite(s): CMPT 419, a related directed study, or instructor's consent.

CMPT 421 Special Topics - Senior Collaborative Project (1–6 sem. hrs.)
A major collaborative software project in a chosen area of Computing Science with a final report and presentation. At least two, and normally not more than five people work as a team to design, code, debug, test, and document the software.
NB: The choice of CMPT 420 or 421 depends on the instructor's assessment of the proposed project's size and complexity.
Cross-listed: ISYS 421
Prerequisite(s): CMPT 419, a related directed study, or instructor's consent.

CMPT 430 Numerical Analysis II (3 sem. hrs.)
Numerical solution of systems of equations; eigenvalues; approximation theory; non-linear systems; boundary-value problems; numerical solution of partial differential equations.
NB: Not offered every year. See Department chair.
Cross-listed: MATH 430.
Prerequisite(s): CMPT 330 or MATH 330. (3-0 or 3-0)

CMPT 480 Ethical and Social Issues in High Technology (3 sem. hrs.)
A study from a Christian context of some historical, social, and ethical issues relating to the development and use of scientific ideas and techniques. Science and technology are examined in their total social, historical, and intellectual contexts, with a view to tracing, in possible new developments, what the key issues are today. Students are challenged to think through the issues from more than one point of view and to learn how to determine appropriate Christian responses to them.
NB: Not offered every year. Offered only in fall semester. See Department chair. This course may be substituted for IDIS 400 and/or NATS 487, but not NATS 490. Students need to take both CMPT 480 and NATS 490 to meet the core requirement in upper level Interdisciplinary Studies. Students from other departments may take CMPT 480 as their IDIS 400 requirement, but they should be familiar with the history and/or the practice of science.
Cross-listed: ISYS 480
Prerequisite(s): Third year standing overall and at least one Computing Science or lab science course at the university level. (3-0; 0-0)

CO-OPERATIVE EDUCATION

COOP 110, 210, 310, 410, 420 Co-op Work Terms (0 sem. hrs.)
These are the course numbers for Co-op work terms. The appropriate semester would coincide with the first digit, e.g., 110 would be the first semester of work experience for students in the Co-op program. Co-op terms provide an opportunity to integrate theory and practice. Requirements include completion of a work term report. Approval from The Career Development Office is required prior to registration for this course.
NB: Non-credit, Pass/Fail course.

COUNSELLING PSYCHOLOGY, GRADUATE COURSES

NB: Courses CPSY 501-695 are graduate courses. For further information about when courses are offered, see the School of Graduate Studies section or contact the Counselling Psychology Graduate Program Director.

CPSY 501 Advanced Statistics (3 sem. hrs.)
Provides an in-depth study of standard parametric and non-parametric statistical methods used in psychological research. Topics include multiple regression, ANOVA, different models of analysis of variance, analysis of covariance, multivariate analysis of variance (MANOVA), and factor analysis.
NB: Limit 25 students.
Prerequisite(s): Undergraduate psychology course covering basic statistics.

CPSY 502 Research Design (3 sem. hrs.)
Provides an in-depth examination of quantitative and qualitative research methods available for the conduct of research in counselling psychology. Students are equipped to define and evaluate research problems, conduct literature searches, and critically evaluate published research and professional writing. Ethical and cultural considerations in research are also addressed.
NB: Limit 25 students.
Prerequisite(s): CPSY 501.

CPSY 504 Evaluating Statistics and Research (3 sem. hrs.)
This course prepares students to evaluate and critique statistics and research methods in Counselling Psychology, including learning about the use and misuse of basic quantitative and qualitative analytical techniques in counselling-related research and in program evaluation. The course also provides an introduction to ethical issues in research, and conducting critical reviews of the literature.
NB: Limit 25 students

CPSY 505 Foundations of Counselling Psychology (3 sem. hrs.)
Provides a critical introduction to scholarly literature on philosophical, cultural, historical, and theological issues related to counselling and psychotherapy. Students explore their personal worldviews in relationship to professional, biblical, and scientific standards and begin to formulate their approaches to serving in socially and culturally diverse professional settings.
NB: Limit 25 students.

CPSY 506 Theories of Counselling (3 sem. hrs.)
Critically evaluates major theories of counselling and psychotherapy in terms of their assumptions, research support, and applications. Such issues as cultural diversity, gender differences, and human development are discussed. Students are introduced to the process of integrating theories as they develop their own framework for counselling practice.
NB: Limit 25 students.

CPSY 508 Marriage and Family Therapy (3 sem. hrs.)
Utilizing a systems perspective, the course provides an opportunity for students to become familiar with, identify, and differentiate the major theoretical and therapeutic models assumed by contemporary theorists and practitioners of marriage and family therapy.
NB: Limit 25 students.

CPSY 510 Group Counselling (3 sem. hrs.)
An overview of the theory and application of group processes. The course provides participants with introductory group facilitation skills. It consists of an introduction to group dynamics, an introduction to the major models of group counselling and therapy, and a laboratory section to facilitate the development of group counselling skills and competencies. Ethics and cultural differences are also addressed.
NB: Limit 24 students.

CPSY 515 Career Counselling (3 sem. hrs.)
Provides a critical examination of major career development theories and research. The course also addresses a wide range of issues such as gender, culture, socio-economic status, age, and mental health concerns, as these issues relate to career. Students are introduced to a variety of career counselling strategies within the current labour market. In addition, students each complete a set of career assessment instruments, and interpret them for class partners.
NB: Limit 25 students.