Computer Science

Faculty

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Program Overview

Computer science is a subject related to almost every contemporary intellectual discipline, the arts (computer-generated art, verification of historical documents, syntax study of languages including translation, etc.), social sciences (correlating experimental data, simulation, artificial intelligence studies), natural sciences (has always had application in this area), business and government (the largest single groups of users), education (computer-aided instruction, artificial intelligence), medicine, etc.

The department offers a wide selection of programs, ranging from broad to specialized:

1) Undergraduate B.Sc. Degree Programs

I. B.Sc, Honours in Computer Science
II. B.Sc, Major in Computer Science

2) A multidisciplinary B.A. with a Major in Information Technology (BAIT)

3) Minor in Computer Science

4) Certificate Program in Computer Science

Note: *A Co-op program is offered for all students in programs 2) and 3) above. Please refer to the Co-op section.*

5) Master's Degree Program (see *Graduate Programs* section)

I. Thesis Option
II. Project Option

Undergraduate B.Sc. Degree Programs

Honours in Computer Science (120 credits) HONCSC

A. Dissertation-based Honours

18 credits: Program prerequisites (please refer to Table II in the Divisional section of the Calendar)
57 CS credits: 42 required: CS 201, CS 211, CS 216, CS 304, CS 310, CS 311, CS 317, CS 321, CS 375 / CS 308 / CS 401, CS 403, CS 409, CS 455, CS 499
15 electives: must include 9 credits from 400-level courses and above
12 MAT credits: 12 required: MAT 108, MAT 200, MAT 206, MAT 207
3 PHY credits: PHY 101
3 credits: Arts and Science requirement (please refer to the Divisional section of the Calendar)
27 credits of free electives

B. Course-based Honours

The course-based stream does not require a dissertation (i.e. CS 499) but requires 3 more CS courses. It is primarily designed for students wishing a specialization in Computer Science but are not interested in research and do not intend to pursue graduate studies:

18 credits: Program prerequisites (please refer to Table II in the Divisional section of the Calendar)
60 CS credits: 36 required: CS 201, CS 211, CS 216, CS 304, CS 310, CS 311, CS 317, CS 321, CS 375 / CS 308 / CS 401, CS 403, CS 409, CS 455
24 electives: must include 12 credits from 400-level courses
12 cr. MAT: 12 required: MAT 108, MAT 200, MAT 206, MAT 207
3 PHY credits: PHY 101
3 credits: Arts and Science requirement (please refer to the Divisional section of the Calendar)
24 credits of free electives

General Notes for Honours

- after a minimum of 1 semester, a student with a grade of at least 80% in required courses may request entry to the Honours program
- the dissertation stream requires, in addition, departmental permission.
- students must maintain an average of 80% in required courses to stay in the program

Major in Computer Science (120 credits) MAJCSC

18 credits: Program prerequisites (please refer to Table II in the Divisional section of the Calendar)
45 CS credits: 30 required: CS 201, CS 211, CS 216, CS 304, CS 310, CS 311, CS 317, CS 321, CS 403, CS 409
15 electives
9 MAT credits: 6 required: MAT 108, MAT 200
3 elective (MAT 19X cannot count as MAT elective)
3 PHY credits: PHY 101
3 credits: Arts and Science requirement (please refer to the Divisional section of the Calendar)
42 credits of free electives

B.A. PROGRAM, MAJOR IN INFORMATION TECHNOLOGY

Information Technology MAJITC

Information Technology (IT) is defined by the Information Technology Association of America (ITAA), as the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware. IT deals with the use of electronic computers and computer software to convert, store, protect, manage, transmit and retrieve data, securely.

This program provides the necessary skills and knowledge to work/design/participate within organizations that manage large amount of data and provide services to a large number of users. Students will develop skills and knowledge in Information Technologies, Management practices and Organizations, with the required fundamentals of Computer Science

Note: Students following this degree program are not eligible to add a Business program.

Program prerequisites: (12 credits) Please refer to Table II in the Divisional section of the Calendar.

Core curriculum (30 credits):

CS 201, CS 211, CS214/CS 315, CS 304, CS 307
BCS 220, BHR 221, BMA 140, BMA 141,
BMG 100

Secondary Core [1] (30 credits)

A minimum of 3 courses in Computer Science, normally chosen from the following list:

CS 203, CS 207, CS 230, CS 301, CS 316, CS 321, CS 325, CS 401, CS 404, CS 405, CS 410, CS 457, CS 464

A minimum of 3 courses in Business, normally chosen from the following list:

BAC 121, BCS 210, BCS 212, BCS 216, BCS 313, BMG 214, BMK 211, BMK 214, BMK 291, BMK 323, BMK 371, BMS 231, BMS 303, BMS 332

[1] Students are advised to consult the Calendar for prerequisites

Arts and Science requirements (3 credits)
Please refer to the Divisional section of the Calendar

Free electives (45 credits)

Co-Operative Education Program

B.Sc. Coop

The co-operative Education Program combines a student's academic program with integrated work experiences through full-time work terms and regular academic sessions. The work terms are designed to present the students with the opportunity to blend theory and practice and to gain relevant work experience.

Each co-operative work term is between 12 and 16 weeks in length, and the student will be registered in a 3-credit Co-operative Placement course (CS 391, CS 392 or CS 393). These course credits are in addition to regular degree program requirements. Each is graded on a pass/fail basis and this grade is not included in the student's cumulative average. The evaluation is the responsibility of the Departmental Chair and will be based upon the submission of a work term report and a job performance report submitted by the employer. Normal academic regulations apply to the conduct and evaluation of the courses.

The number of work terms needed depends on the number of credits the students need to complete upon admission at Bishop's. Student who have been granted 30 advance credits (or more) will be required to complete two work terms (6 credits). Other students who have been admitted into a regular 120-credit degree program will be required to complete three work terms (9 credits). These credits will be added to the student's program and do not count as computer science courses, computer science electives, or free electives. All work terms must be completed before the student's final academic semester and a student's last semester before graduation cannot be a work term. While every effort will be made to find a suitable placement for all students in the program, no guarantee of placement can be made since the employment process is competitive and subject to market conditions.

Admission to the Co-operative Education Program
Students must submit an application to be admitted to the program. Full-time students in any Honours or Major program offered in the Computer Science Department who have completed the online application package, who have successfully completed BMG191 and who have a minimum cumulative average of 70% upon application are admissible into the Co-op Program. Students in the Co-op must maintain their 70% average and be full-time in order to stay in the program.

Work Term Registration
Once a student has signed the Co-operative Education Agreement, he may not drop the course associated with the work placement, except for exceptional circumstances. A student who decides to do so will not be able to stay in the Co-operative Education program.

Tuition and Fees

Each work term placement is a 3-credit course and students will pay tuition based upon their fee paying status (Quebec resident, Canadian out-of-province, International). In addition, an administrative fee *of $200 per placement* will be charged to help cover the cost of monitoring and evaluating work placement. Payment is to be made through the Business Office.

Work Term Evaluation

Successful completion of the work term is based upon the following:

- The receipt of a satisfactory job performance report from the employer
- The submission of a satisfactory work term report by the student.

The job performance report will be completed by the employer, using guidelines supplied by the Computer Science Department. It is the student's responsibility to ensure that the employer sends the completed evaluation to the Co-op Coordinator on or before the established deadline. Employer evaluations are confidential and are not reported on the student's transcript.

MINOR IN COMPUTER SCIENCE (24 credits) MINCSC

9 required: CS 201, CS 211, CS 304
15 electives from any CS course

CERTIFICATE PROGRAM (30 credits) CONCSC

Description and objectives:

The Certificate Program in Computer Science is designed for individuals who need to acquire a basic understanding of computers and programming and knowledge of the field in order to expand their area of interest and professional expertise. Topics include: Programming, Software Engineering, Web Design, Networks, Graphics, Artificial Intelligence and others. This program will help students to take full advantage of the computer technology available in the workplace.

Prerequisites to programs:

Applicants with insufficient Math background might be required to take an additional 3-credit Math course in their first semester (Math 190 or equivalent).

Program Overview

Certificate in Computer Science

- 9 required credits: CS 201, CS 211, CS 304
- At least 3 credits from each of Group A, Group B, Group C and Group D (listed below)
- 9 credits from any CS course

Group A: CS 203, CS 230

Group B: CS 214, CS 216, CS 311, CS 315

Group C: CS 405, CS 308, CS 401

Group D: CS 306, CS 316, CS 318, CS 321, CS 403

General Notes/Restrictions:

1. Only one of CS 404, CS 408 or CS 499 may be taken for credit, unless with a special departmental authorization
2. Computer Science courses that are double-listed in Math cannot be counted toward fulfilling the Math electives required for the Computer Science Honours/Major.
3. Students must fulfill their Arts and Science requirements and Humanities requirements outlined in the "Divisional" section of the Calendar.

List of Courses

CS 201 Foundations of Computer Science 3-3-0
An introduction to Computer Science and selected applications suitable for both majors and science non-majors who want a broad overview of the field. The course provides a layered introduction covering hardware, system software and applications packages. The course includes elementary programming. Topics include Algorithmic foundations of Computer Science; The hardware world: number systems, boolean logic, computer circuits, Von-Newmann architecture; System software: assembly language, operating systems, high level languages, language translation; Models of Computation; Applications and Social Issues
Note: Registration priority is given to Science and IT students. CS students must take this course in their first year.

CSL 201 Foundations of Computer Science Laboratory 1-0-3
This is the practical laboratory for CS 201

CS 203 Interactive Web Page Design 3-3-0
In this course, students will learn the basics of HTML, the language describing web pages, and CSS, another web page language. By constructing fill-in forms and employing short sections of script, students will learn how to enable users of the Internet to interact with their web pages: sending data to be stored, and receiving customized responses. The course will include simple database operations. Extensive laboratory work will result in students creating their own set of personal web pages on a publicly accessible server. The course is open to anyone interested in the subject.

CSL 203 Interactive Web Page Design Laboratory 1-0-3
This is the practical laboratory for CS 203

CS 207 Databases and Dynamic Web Design 3-3-0
In this course students will build dynamic websites using SQL and PHP, learn the web technology that powers a million e-commerce sites, and enables dynamic, interactive tools and applications. Many real-world websites, and especially e-commerce sites, are complex and need flexibility. As a result, the use of databases as a back-end for websites is increasingly popular. Queries in the SQL language allow a high degree of selectivity, as well as easy storage and retrieval of large image and media content objects. This course expands upon the techniques of web programming introduced in CS 203, to teach the use of databases in web design. Applications are primarily drawn from the e-commerce area, but are not limited to this domain. Students will learn how to design and administer a database, set up mailing lists, build discussion forums, create a storefront, and even build a working shopping cart. This course emphasizes practical skills with hands-on-projects.
Prerequisite: CS 203 or permission of the instructor.

CSL 207 Databases and Dynamic Web Design Laboratory 1-0-3
This is the practical laboratory for CS 207

CS 211 Introduction to Programming 3-3-0
This course introduces algorithms, data structures and software engineering principles. The use of a high level language is the tool to develop these components. By the end of the course, a successful student should be 'fluent' in programming, and have a good base for simple data structures. The course provides the necessary programming skills needed for further studies in Computer Science.

CSL 211 Introduction to Programming Laboratory 1-0-3
This is the practical laboratory for CS 211

CS 214 Introduction to Networks 3-3-0
This course introduces and discusses the components and architectures of computer networks. Topics to be covered include: Resources Sharing (Network Interface Circuitry, Files Servers, Workstations, etc.), Network Protocols (TCP/IP, Apple Talk, Novel, etc.) and Network Infrastructure (Hubs, Routers, Gateways, Bridges, etc.).