1. New Program

Geocomputational Science – Specialist

Program Description and Rationale

This program allows the strengths of two departments, Geography and Mathematical and Computational Sciences, to join into one formal degree that allows students interested in geographic information systems, remote sensing, and computer science to pursue a specialist degree that combines two demanding fields under less onerous circumstances than getting a double major in both. In its *Stepping Up* plan, the Department of Geography committed to strengthening its core activities such as geographical modelling by structuring teaching activities to facilitate and enhance interdisciplinary efforts with other academic programs/units. This program clearly does this by providing students with an interdisciplinary academic experience that furthers the department's commitment to one of its core intellectual foci – namely geographical modelling. Additionally, it responds to a need in research, industry, and government for graduates to have grounding in both the geographical and computational disciplines, and who can integrate these areas when solving problems of a geographical nature.

Advanced programs in geomatics, geocomputation, or geographical information science are among the most demanding in our field. They emphasize demonstrable strength in both the computational sciences as well as the geographical sciences. This makes the program potentially more attractive to prospective students. It also allows students to "brand" themselves more effectively when seeking employment upon graduation.

It is anticipated that approximately 10 students a year will opt for the Specialist. The requirements for the specialist will ensure that students obtain a strong foundation in theory, methods, and application of the computational and geographical sciences.

The program adopts an interdisciplinary approach where students must complete a demanding mixture of mathematics, computer science, geographical science, statistics, and spatial analysis. The Department of Geography consulted extensively with the Department of Mathematics and Computer Science and receive its support and approval to cross-list their courses.

The Department of Geography currently has thirteen faculty members, seven of whom are pursuing research agendas that incorporate geocomputational science to some degree and are part of this program, thus ensuring that the quality of teaching will be high. The same level of engagement holds true for members of The Department of Mathematical and Computational Sciences. The program relies on existing courses taught within the university; hence, there are no anticipated resource requirements.

Learning Objectives:
- To provide a foundation for students with an academic interest in both the geographical and computational sciences.
- To provide students with an understanding of how the computational sciences can be integrated with the geographical sciences to solve problems of a geographical nature.
- To provide students with the tools necessary to understand and analyze the complexities of computationally intensive geographical problems.
- To ensure a competitive advantage among our students when applying to graduate programs or for positions in private industry.

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<u>Program Requirements:</u>

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Within an Honours degree, 14.0 credits are required.

Limited Enrolment --Students may apply to enroll after having completed this program's requirements for the first year with 65% or better in both GGR117Y5/ENV100Y5 and CSC148H5. Students must also have a Cumulative Grade Point Average (CGPA) of 2.0 or higher for the first year. The minimum CGPA is determined annually. It is never lower than 2.0.

First Year:	3.5 credits from: CSC108H5, 148H5; MAT102H5, 135Y5/137Y5; GGR117Y5/ENV100Y5
Second Year	4.0 credits from: CSC207H5, 209H5, 236H5, 263H5; MAT223H5, 224H5/232H5; GGR278H5; STA257H5/GGR276H5
Third Year	4.0 credits within total 4.0 credits, choose 3.0 credits from: GGR321H5, 337H5, 372H5/375H5/380H5; CSC343H5, 338H5 STA331H5/322H5/348H5 and 1.0 credit from **LIST A** **LIST A:** CSC369H5/373H5/320H5/309H5/318H5 [Note 1]
Fourth Year	2.5 credits from GGR463H5, 488H5, 417Y5, CSC492H5/493H5/411H5/310H5/321H5/ 0.5 credit CSC369H5/373H5/320H5/309H5/318H5 [Notes 1, 2 and 3]

[Note 1] Where there is a choice in courses, some courses have additional prerequisites not in the program. For example, STA331H5 requires STA258H5 and CSC369H5 requires CSC258H5.
[Note 2] For students to receive credit towards this specialist degree the projects undertaken in CSC492H5, 493H5 or GGR417Y5 must receive prior approval from the Geocomputational Science program coordinator. This is to insure that the projects have an appropriate level of Geocomputational Science content.
[Note 3] It is highly recommended that students intending to pursue graduate studies take GGR417Y5/CSC492H5/CSC493H5.

First Year Courses:
CSC108H5   Introduction to Computer Programming (in Python)
CSC148H5   Introduction to Computer Science
MAT102H5   Introduction to Mathematical Proofs
MAT137Y5/135Y5   Calculus
GGR117Y5   Where on Earth? Introduction to Geography

Second Year Courses:
CSC 207H5   Software Design (Java)
CSC 236H5   Introduction to the Theory of Computation
CSC 209H5   Software Tools (Unix and C)
CSC 263H5   Data Structures and Analysis of Algorithms
MAT 223H5   Linear Algebra I
MAT 224H5/232H5   Linear Algebra II / Calculus of several variables
GGR 278H5   Geographical Information Systems
GGR 276H5   Spatial Data Analysis and Mapping
STA 257H5   Probability and Statistics

Third Year Courses:

GGR321H5	Geographic Information Processing
GGR337H5	Environmental Remote Sensing
GGR372H5	Geographical Analysis of Land Resources
GGR375H5	Physical Environment of the City
GGR380H5	Communicating with Maps
CSC343H	Introduction to Databases
CSC338H5	Computational Methods
CSC318H5	The Design of Interactive Computational Media
CSC369H5	Operating Systems
CSC373H5	Algorithm Design and Analysis
CSC320H5	Introduction to Visual Computing
CSC309H5	Programming on the Web
STA322H5	Design of Sample Surveys
STA331H5	Regression Analysis
STA348H5	Introduction to Stochastic Processes

Fourth Year Courses:

GGR463H5	Geographic Information Analysis and Processing
GGR488H5	Geostatistics
GGR417Y5	Honours Thesis
CSC309H5	Programming on the Web
CSC318H5	The Design of Interactive Computational Media
CSC320H5	Introduction to Visual Computing
CSC369H5	Operating Systems
CSC373 H5	Algorithm Design and Analysis
CSC411H5	Data Mining
CSC301H5	Software Engineering
CSC492H5	Computer Science Implementation Project
CSC493H5	Computer Science Expository Work

2. Deleted Programs

European Studies: Specialist and Major Programs
In U of T Mississauga's *Stepping Up* document, the programs in European Studies had been slated for discontinuation during the plan period, largely because of fading student interest in this area. These interdisciplinary programs were designed to provide students an opportunity to learn one of three languages, French, German, and Italian and to select from a spectrum of courses in those languages and in Political Science, Philosophy and other areas of the Social Sciences and Humanities. Since the inception of plan in 2004, interest in the program has faded almost completely, with current Specialist program enrolment standing at 2 students and 6 in the Major program. In addition, the discontinuation of the German Studies program (taken through governance one year ago) has resulted in the removal of a significant portion of the European content of the program.