



<p>1.0 Degree Title Please specify the two degrees for concurrent degree programs</p> <p>Ph.D.</p> <p>1.1 Major (Legacy= Subject)(30-char. max.)</p> <p>Mathematics and Statistics</p> <p>1.2 Concentration (Legacy = Concentration/Option) If applicable to Majors only (30 char. max.)</p> <p>Bioinformatics Option</p> <p>1.3 Minor (with Concentration, if Applicable) (30 char. max.)</p> <p></p>	<p>2.0 Administering Faculty/Unit</p> <p>Graduate and Postdoctoral Studies</p> <p>Offering Faculty/Department</p> <p>Mathematics and Statistics</p> <p>3.0 Effective Term of Implementation (Ex. Sept. 2004 = 200409) Term</p> <p>200601</p>
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<p>4.0 Program Information Please check appropriate box(es)</p>		
<p>4.1 Program Type</p> <p><input type="checkbox"/> Bachelor's Program</p> <p><input type="checkbox"/> Master's</p> <p><input type="checkbox"/> M.Sc. (Applied) Program</p> <p><input type="checkbox"/> Dual Degree/Concurrent Program</p> <p><input type="checkbox"/> Certificate</p> <p><input type="checkbox"/> Diploma</p> <p><input type="checkbox"/> Graduate Certificate</p> <p><input type="checkbox"/> Graduate Diploma</p> <p><input checked="" type="checkbox"/> Ph.D. Program</p> <p><input type="checkbox"/> Doctorate Program (Other than Ph.D.)</p> <p><input type="checkbox"/> Private Program</p> <p><input type="checkbox"/> Off-Campus Program</p> <p><input type="checkbox"/> Distance Education Program (By Correspondence)</p> <p><input type="checkbox"/> Other Please specify</p> <p></p>	<p>4.2 Category</p> <p><input type="checkbox"/> Faculty Program (FP)</p> <p><input type="checkbox"/> Major</p> <p><input type="checkbox"/> Joint Major</p> <p><input type="checkbox"/> Major Concentration (CON)</p> <p><input type="checkbox"/> Minor</p> <p><input type="checkbox"/> Minor Concentration (CON)</p> <p><input type="checkbox"/> Honours (HON)</p> <p><input type="checkbox"/> Joint Honours Component (HC)</p> <p><input type="checkbox"/> Internship/Co-op</p> <p><input checked="" type="checkbox"/> Thesis (T)</p> <p><input type="checkbox"/> Non-Thesis (N)</p> <p><input type="checkbox"/> Other Please specify</p> <p></p>	<p>4.3 Level</p> <p><input type="checkbox"/> Undergraduate</p> <p><input type="checkbox"/> Dentistry/Law/Medicine</p> <p><input type="checkbox"/> Continuing Ed (Non-Credit)</p> <p><input type="checkbox"/> Collegial</p> <p><input type="checkbox"/> Masters & Grad Dips & Certs</p> <p><input checked="" type="checkbox"/> Doctorate</p> <p><input type="checkbox"/> Post-Graduate Medicine/Dentistry</p> <p><input type="checkbox"/> Graduate Qualifying</p> <p><input type="checkbox"/> Postdoctoral Fellows</p>

<p>5.0 Total Credits</p> <p>0</p>	<p>6.0 Consultation with Related Units <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Financial Consult <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Attach list of consultations.</p>
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7.0 Description (Maximum 150 words)

Bioinformatics research lies at the intersection of biological/medical sciences and mathematics/computer science/engineering. The intention of the Bioinformatics Option is to train Ph.D. students to become researchers in this inter-disciplinary field. This includes the development of strategies for experimental design, the construction of tools to analyze datasets, the application of modeling techniques, the creation of tools for manipulating Bioinformatics data, the integration of biological databases and the use of algorithms and statistics. Students successfully completing the Bioinformatics option will be fluent in the concepts, language, approaches and limitations of the field and will have the capability of developing an independent Bioinformatics research program. The option consists of a number of inter-disciplinary courses and a seminar designed to bring students from many backgrounds together and to provide a thorough overview of research in this field.

8.0 List of proposed program for the New Program/Major or Minor/Concentration.

If new concentration (option) of existing Major/Minor (program), please attach a program layout (list of all courses) of existing Major/Minor.

Proposed program (list courses as follows: Subj Code/Crse Num, Title, Credit weight under the headings of: Required Courses, Complementary Courses, Elective Courses)

Ph.D. in Mathematics & Statistics; Bioinformatics

Students will meet the Ph.D. degree requirements of the Department of Mathematics & Statistics.

REQUIRED COURSE

COMP 616 Bioinformatics Seminar (3 credits)

COMPLEMENTARY COURSES

In addition, students are to take twelve one-semester courses or their equivalent beyond the Bachelor's level. Courses are to be selected in consultation with the student's advisor or research supervisor with due regard to the student's area of concentration and possible areas in which prior preparation may be weak. The twelve courses must include at least two courses from the list of courses below, unless the student completed the M.Sc. level option in Bioinformatics, in which case they must take only one course from the list of courses below.

BINF 621 Bioinformatics: Molecular Biology (3 credits)
COMP 618 Bioinformatics: Functional Genomics (3 credits)
BMDE 652 Proteomics (3 credits)
PHGY 603 Systems Biology and Biophysics (3 credits)

9.0 Rationale

There is a significant and growing level of Bioinformatics at McGill distributed across three faculties (Faculty of Agricultural and Environmental Sciences, Science, Medicine). The primary Bioinformatics researchers come from departments such as anatomy and cell biology, biology, plant science, biomedical engineering, computer science, human genetics, mathematics and physiology. This research covers a broad range of sub-fields including the Bioinformatics components of the analysis of molecular sequence data, functional genomics, proteomics, aspects of systems biology and dynamical systems. Our researchers are well-recognized in their fields and are dedicated to building Bioinformatics at McGill. Bioinformatics training is in high demand and the number of established programs Canada-wide is small. Graduate students are attracted to McGill due to its reputation and also for the promise of formal training in Bioinformatics.

Over the past several years, Bioinformatics researchers at McGill have cooperated in an informal way with respect to both research and the training of their graduate students. Our students have attended various courses, seminars and colloquia taught by our researchers and through course projects and lab meetings there has been a steady but ultimately insufficient dissemination of information between our labs. Bioinformatics is truly an inter-disciplinary field that requires advanced knowledge in many different areas. Arguably no single researcher understands all aspects of their field. These informal cooperations are not sufficient to develop rigorous, high quality training programs in Bioinformatics. For instance, it is difficult to establish a common computational platform for our students to train with and we lack a systematic program for teaching.

We propose a Bioinformatics Option at Ph.D. level. The Bioinformatics Option program will be a truly inter-disciplinary program designed to train our graduate students to become researchers in Bioinformatics and to become fluent in many aspects of this field. The Bioinformatics Option will bring both students and professors from diverse backgrounds into one classroom and lab where it will be possible to develop a sustained dialogue between all sides. This program will be unique in Canada offering more "pure" Bioinformatics courses than any other we know of. It is progressive and feasible. Ultimately, it will provide the framework for a permanent Ph.D. program in Bioinformatics. Please see the attached document (description of the Bioinformatics Option) for additional information.

10.0 Approvals

Routing Sequence	Name	Signature	Date
Department	<input type="text"/>	<input type="text"/>	<input type="text"/>
Curric/Acad Committee	<input type="text"/>	<input type="text"/>	<input type="text"/>
Faculty 1	<input type="text"/>	<input type="text"/>	<input type="text"/>
Faculty 2	<input type="text"/>	<input type="text"/>	<input type="text"/>
Faculty 3	<input type="text"/>	<input type="text"/>	<input type="text"/>
SCTP	<input type="text"/>	<input type="text"/>	<input type="text"/>
GS	<input type="text"/>	<input type="text"/>	<input type="text"/>
APPC	<input type="text"/>	<input type="text"/>	<input type="text"/>
Senate	<input type="text"/>	<input type="text"/>	<input type="text"/>

Submitted by

Name

Phone

Email

Submission Date

To be completed by ARR:

CIP Code