# New Program/Major or Minor/Concentration Proposal Form

## 1.0 Degree Title
Please specify the two degrees for concurrent degree programs

- B.Sc.

## 1.1 Major (Legacy = Subject)(30-char. max.)

- Computer Science and Biology

## 1.2 Concentration (Legacy = Concentration/Option)
If applicable to Majors only (30 char. max.)

## 1.3 Minor (with Concentration, if Applicable) (30 char. max.)

## 2.0 Administering Faculty/Unit

- Science

## 3.0 Effective Term of Implementation

- Term: 200809

## 4.0 Rationale for new proposal

Life sciences are becoming increasingly quantitative, analytical, and integrative. The program fills an important gap in the undergraduate programs at McGill, as no existing program allows students to get a solid training in the two increasingly interconnected fields of Biology and Computer Science.

## 5.0 Program Information

### 5.1 Program Type
- Bachelor's Program
- Master's
- M.Sc. (Applied) Program
- Dual Degree/Concurrent Program
- Certificate
- Diploma
- Graduate Certificate
- Graduate Diploma
- Ph.D. Program
- Doctorate Program (Other than Ph.D.)
- Private Program
- Off-Campus Program
- Distance Education Program (By Correspondence)
- Other (Please specify)

### 5.2 Category
- Faculty Program (FP)
- Major Program
- Joint Major Program
- Major Concentration (CON)
- Minor Program
- Minor Concentration (CON)
- Honours (HON)
- Joint Honours Component (HC)
- Internship/Co-op
- Thesis (T)
- Non-Thesis (N)
- Other

### 5.3 Level
- Undergraduate
- Dentistry/Law/Medicine
- Continuing Ed (Non-Credit)
- Collegial
- Masters & Grad Dips & Certs
- Doctorate
- Post-Graduate Medicine/Dentistry
- Graduate Qualifying
- Postdoctoral Fellows

### 6.0 Total Credits

- 68 to 73

## 7.0 Consultation with Related Units

- Yes [ ]
- No [ ]

Financial Consult

- Yes [ ]
- No [ ]

Attach list of consultations.
8.0 Program Description (Maximum 150 words)

This program will train students in the fundamentals of biology – with a focus on molecular biology – and will give them computational and mathematical skills needed to manage, analyze, and model large biological datasets. The students take 50-54 credits of required courses, and 18 complementary credits. The required courses include 12 to 16 credits from existing Computer Science courses and 20 from existing Biology/Chemistry courses. Also, they will take: a three-credit joint Independent Studies course, co-supervised by a Biology professor and a Computer Science professor; a one-credit seminar course; BIOL 495, a three-credit new course entitled ‘Integrative Computing in Biology’.

9.0 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)

<table>
<thead>
<tr>
<th>Required Mathematics &amp; Statistics Courses (12 credits)</th>
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<tbody>
<tr>
<td>MATH 222 (3) Calculus 3</td>
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<tr>
<td>MATH 223 (3) Linear Algebra</td>
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<tr>
<td>MATH 323 (3) Probability Theory AND MATH 324 (3) Statistics</td>
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<td>MATH 203 (3) Principle of Statistics 1 AND MATH 204 (3) Principle of Statistics 2</td>
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<tr>
<td>BIOL 309 (3) Mathematical Models in Biology AND BIOL 373 (3) Biometry</td>
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<tr>
<th>Required Computer Science Courses (12, 15 or 16 credits)</th>
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<tr>
<td>COMP 202 (3) Intro to Computing 1 (*)</td>
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<tr>
<td>COMP 206 (3) Software Systems</td>
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<td>COMP 250 (3) Intro to Computer Science</td>
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<td>COMP 251 (3) Data Structures and Algorithms</td>
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<tr>
<td>COMP 462 (3) Computational Biology Methods</td>
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<td>OR</td>
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<tr>
<td>561 (4) Computational Biology Methods</td>
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* Students who have sufficient knowledge in a programming language are not required to take COMP 202.

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<th>Required Biology Courses (20 credits)</th>
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<tr>
<td>CHEM 212 (4) Organic Chemistry</td>
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<tr>
<td>BIOL 200 (3) Molecular Biology</td>
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<td>BIOL 201 (3) Cell Biology and Metabolism</td>
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<td>BIOL 202 (3) Basic Genetics</td>
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<td>BIOL 215 (3) Intro to Ecology and Evolution</td>
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<td>BIOL 301 (4) Cell and Molecular Laboratory</td>
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Attach extra page(s) as needed
Required Joint Courses (7 credits)
COMP 401 (3) Project in Biology and Computer Science New Course
COMP 499 (1) Undergraduate bioinformatics seminar New Course
BIOL 495 (3) Integrative Computing in Biology New Course

Complementary courses (18 credits)
At least 18 credits from the following lists, with the following two requirements:
(1) 9 credits from each of the following two blocks
(2) at least one course at the 400-level or above from each block.

**Computer Science Block**
MATH 240 (3) Discrete Structures 1
COMP 273 (3) Introduction to Computer Systems
COMP 302 (3) Programming Languages and Paradigm
COMP 303 (3) Software Development
COMP 304 (3) Object Oriented Software Design
COMP 310 (3) Operating Systems
COMP 330 (3) Theoretical Aspects: Computer Science
COMP 335 (3) Software Engineering Methods
COMP 350 (3) Numerical Computing
COMP 360 (3) Algorithm Design Techniques
All COMP courses at the 400-level (except 401, 499, and 462) and all courses at the 500-level (except 561).

**Biology Block**
BIOL 300 (3) Molecular Biology of the Gene
BIOL 309 (3) Mathematical Models in Biology
BIOL 310 (3) Large Scale Ecology
BIOL 313 (3) Eukaryotic Cell Biology
BIOL 435 (3) Natural Selection
BIOL 518 (3) Advanced Topics in Cell Biology
BIOL 568 (3) Topics on the Human Genome
BIOL 569 (3) Developmental Evolution
BIOL 572 (3) Molecular Evolution
BIOL 583 (3) Advanced Biometry
## 10.0 Approvals

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Submitted by

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