

# Bioinformatics

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- **M.Sc. Biology with Specialization in Bioinformatics**
- **M.Sc. Mathematics with Specialization in Bioinformatics**
- **M.C.S. with Specialization in Bioinformatics**

## **M.Sc. Biology, M.Sc. Mathematics, M.C.S. with Specialization in Bioinformatics**

### **About the Program**

Bioinformatics is an emerging and increasingly important scientific discipline dedicated to the pursuit of fundamental questions about the structure, function and evolution of biological entities through the design and application of computational approaches. Fundamental research in these areas is expected to increase our understanding of human health and disease which will translate to innovation in industry (i.e. drug discovery). As a field of research, it crosses traditional disciplinary boundaries such as computer science, chemistry, biology, biochemistry, engineering and the medical sciences. While individual researchers usually specialize in a particular area, bioinformaticians today must be able to appreciate significant research in other fields and therefore require an understanding of the basic principles of other disciplines. To meet this challenge Carleton University and the University of Ottawa offer a collaborative program leading to a Master of Science degree with Specialization in Bioinformatics or Master of Computer Science degree with Specialization in Bioinformatics.

### **Academic Regulations**

See the General Regulations section of this Calendar.

### **Admission Requirements**

#### **Application to the Program**

Applications should be directed to the primary participating unit which is the most appropriate to the student's research interests. Once accepted into one of the participating graduate programs, students must then be sponsored into the collaborative program in Bioinformatics by a faculty member. This is normally the student's supervisor. This faculty member must be appointed, cross-appointed or stand as an adjunct at one or more of the participating units.

Application forms and further information can be obtained by writing directly to any of the participating institutes or departments, or the program coordinator.

#### **Requirements**

The requirements for admission to the master's in the Collaborative Program in Bioinformatics are as follows:

- prior admission to the master's program in one of the supporting units participating in the program.

- a letter of recommendation from the participating faculty member of the Collaborative Program, which both recommends admission and indicates the willingness of the faculty member to supervise the candidate's research program in Bioinformatics.

### **Program Requirements**

The student is responsible for fulfilling both the participating unit requirements for the Master's degree, and the requirements of the Collaborative Program. Consult the individual programs for detailed program requirements.

The minimum requirements of the collaborative program include successful completion of two required courses, and a master's thesis on an approved bioinformatics topic.

#### **Required courses:**

- 0.5 credit in BIOL 5515 Bioinformatics
- 0.5 credit in BIOL 5517 Bioinformatics Seminar
- Thesis - candidates must successfully complete a research thesis on a topic in bioinformatics supervised by a faculty member of the Collaborative Program in Bioinformatics.

#### **Notes:**

1. Students in programs in Biology, Computer Science, Mathematics & Statistics may use BIOL 5515 Bioinformatics to count towards degree requirements; BIOL 5517 Bioinformatics Seminar must be taken in addition to the regular seminar course.
2. In addition, the student's thesis committee or advisory committee may direct the student to take or audit further courses to complement the student's background and research program.

### **Bioinformatics Related Courses**

BIOL 5105 (BIO 5302)	Methods in Molecular Genetics
BIOL 5201 (BIO 8301)	Evolutionary Bioinformatics
BIOL 5409 (BIO 5306)	Modelling for Biologists
BIOL 5501 (BIO 8100)	Directed Studies in Biology
BIOL 5502 (BIO 8102)	Selected Topics in Biology
BIOL 5516 (BNF 5107)	Applied Bioinformatics
COMP 5306 (CSI 5100)	Data Integration
COMP 5307 (CSI 5101)	Knowledge Representation
COMP 5704 (CSI 5131)	Parallel Algorithms and Applications in Bioinformatics
COMP 5703 (CSI 5163)	Algorithm Analysis and Design
COMP 5108 (CSI 5126)	Algorithms in Bioinformatics
STAT 5708 (MAT 5170)	Probability Theory I

STAT 5709 (MAT 5171)	Probability Theory II
STAT 5703 (MAT 5181)	Data Mining
STAT 5702 (MAT 5182)	Modern Applied and Computational Statistics
STAT 5600 (MAT 5190)	Mathematical Statistics I
STAT 5501 (MAT 5191)	Mathematical Statistics II
MATH 6508 (MAT 5314)	Topics in Probability & Stats
MATH 6507 (MAT 5319)	Topics in Probability & Stats
SYSC 5104 (ELG 6114)	Methodologies For Discrete-Event Modeling And Simulation