

# Bioinformatics (Collaborative Specialization)

This section presents the requirements for programs in:

- **M.A.Sc. Biomedical Engineering with Collaborative Specialization in Bioinformatics**
- **M.Sc. Biology with Collaborative Specialization in Bioinformatics**
- **M.Sc. Mathematics and Statistics with Specialization 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.

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 and 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. Students in Biomedical Engineering may use both BIOL 5515 Bioinformatics and BIOL 5517 Bioinformatics Seminar to count towards degree requirements.
3. 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.

## M.A.Sc. Biomedical Engineering with Collaborative Specialization in Bioinformatics (5.0 credits)

Consult the Bioinformatics section for details regarding admission requirements to this program.

### Requirements - thesis pathway (5.0 credits)

<b>1. 0.5 credit in:</b>	0.5
BIOM 5010 [0.5]	Introduction to Biomedical Engineering
<b>2. 1.0 credit in:</b>	1.0
BIOL 5515 [0.5]	Bioinformatics
BIOL 5517 [0.5]	Bioinformatics Seminar
<b>3. 1.0 credit in BIOM (BMG) courses</b>	1.0

<b>4. 2.5 credits in:</b>	2.5
BIOM 5909 [2.5]	M.A.Sc. Thesis (in the specialization)
<b>5. 0.0 credit in:</b>	0.0
BIOM 5800 [0.0]	Biomedical Engineering Seminar
<b>Total Credits</b>	<b>5.0</b>

## M.Sc. Biology with Collaborative Specialization in Bioinformatics (5.0 credits)

### Requirements:

<b>1. 1.0 credit in:</b>	1.0
BIOL 5515 [0.5]	Bioinformatics
BIOL 5517 [0.5]	Bioinformatics Seminar
<b>2. 4.0 credits in:</b>	4.0
BIOL 5909 [4.0]	M.Sc. Thesis (in the specialization, including successful oral defence)
<b>Total Credits</b>	<b>5.0</b>

## M.Sc. Mathematics and Statistics with Specialization in Bioinformatics (4.5 credits)

### Requirements:

<b>1. 1.0 credit in:</b>	1.0
BIOL 5515 [0.5]	Bioinformatics
BIOL 5517 [0.5]	Bioinformatics Seminar
<b>2. 1.5 credits in coursework</b>	1.5
<b>3. 2.0 credits in:</b>	2.0
MATH 5909 [2.0]	M.Sc. Thesis in Mathematics (on an approved bioinformatics topic)
<b>Total Credits</b>	<b>4.5</b>

1. Students must receive approval for course selection from their supervisor before registering in courses.
2. All master's students should normally participate in a seminar or research talks under the guidance of their supervisors.

## Bioinformatics-Related Courses

### Biology

BIOL 5105 (BIO 5302)	Methods in Molecular Genetics
BIOL 5201 (BIO 8301)	Evolutionary Bioinformatics
BIOL 5409 (BIO 5306)	Modelling for Biologists
BIOL 5501 (BIO 8120)	Directed Studies in Biology
BIOL 5502 (BIO 8102)	Selected Topics in Biology
BIOL 5516 (BNF 5107)	Applied Bioinformatics

### Biomedical Engineering

BIOM 5405 (BMG 5305)	Pattern Classification and Experiment Design
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### Computer Science

COMP 5306 (CSI 5100)	Data Integration
COMP 5307 (CSI 5101)	Knowledge Representation
COMP 5704 (CSI 5131)	Parallel Algorithms and Applications in Data Science

COMP 5703 (CSI 5163)	Algorithm Analysis and Design
COMP 5108 (CSI 5126)	Algorithms in Bioinformatics

### Mathematics and Statistics

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 6507 (MAT 5319)	Topics in Probability

### Systems and Computer Engineering

SYSC 5104 (ELG 6114)	Methodologies For Discrete-Event Modeling And Simulation
SYSC 5703 (ELG 6173)	Integrated Database and Cloud Systems

### Regulations

See the General Regulations section of this Calendar, and the regulations pertaining to the participating units offering this specialization.

### Admission

Admission to the collaborative program in Bioinformatics is available to students who are admitted in one of the participating programs. To apply to one of the participating programs, please visit the Faculty of Graduate and Postdoctoral Affairs Admissions page.