BIOLOGY AND MATHEMATICS MAJOR (B.SC.) (76 CREDITS)

Offered by: Biology (Faculty of Science)
Degree: Bachelor of Science
Program credit weight: 76

Program Description

This program is built on a selection of mathematics and biology courses that recognize mathematical biology as a field of research, with three streams within biology: Ecology and Evolutionary Ecology, Molecular Evolution, and Neurosciences.

Advising notes for U0 students:

It is highly recommended that freshman BIOL, CHEM, MATH, and PHYS courses be selected with the Program Adviser to ensure they meet the core requirements of the program.

This program is recommended for U1 students achieving a CGPA of 3.2 or better, and entering CEGEP students with a Math/Science R-score of 28.0 or better.

Degree Requirements — B.Sc.

This program is offered as part of a Bachelor of Science (B.Sc.) degree.

To graduate, students must satisfy both their program requirements and their degree requirements.

- The program requirements (i.e., the specific courses that make up this program) are listed under the Course Tab (above).
- The degree requirements—including the mandatory Foundation program, appropriate degree structure, and any additional components—are outlined on the Degree Requirements page.

Students are responsible for ensuring that this program fits within the overall structure of their degree and that all degree requirements are met. Consult the Degree Planning Guide on the SOUSA website for additional guidance.

Note: For information about Fall 2025 and Winter 2026 course offerings, please check back on May 8, 2025. Until then, the "Terms offered" field will appear blank for most courses while the class schedule is being finalized.

Required Courses (37 credits)

Bio-Physical Sciences Core

28 credits

Expand allContract all

Course	Title	Credits
BIOL 219	Introduction to Physical Molecular and Cell Biology.	4
BIOL 301	Cell and Molecular Laboratory.	4
BIOL 395	Quantitative Biology Seminar.	1
CHEM 212	Introductory Organic Chemistry 1.[1]	4
COMP 202	Foundations of Programming.[2]	3
MATH 222	Calculus 3.[1]	3
MATH 223	Linear Algebra.[3]	3
MATH 247	Honours Applied Linear Algebra.[3]	3
MATH 315	Ordinary Differential Equations.	3
MATH 323	Probability.	3

1 If a student has already taken CHEM 212 Introductory Organic Chemistry 1. or its equivalent, or MATH 222 Calculus 3. or its equivalent, the credits can be made up with a complementary course in consultation with the Program Adviser.

2 Students who have sufficient knowledge in a programming language should take COMP 250 Introduction to Computer Science. (3 credits) rather than COMP 202 Foundations of Programming..

3 Students may take either MATH 223 Linear Algebra. or MATH 247 Honours Applied Linear Algebra..

Biology and Mathematics Core

9 credits

Expand allContract all

Course	Title	Credits
BIOL 215	Introduction to Ecology and Evolution.	3
MATH 242	Analysis 1.	3
MATH 243	Analysis 2.	3

Complementary Courses (39 credits)

For the 39 credits, students complete 21 credits of BIOL, NEUR, PHGY, PSYC courses including one of three streams (Ecology and Evolutionary Ecology, Molecular Evolution, Neurosciences) and 18 credits of MATH courses.

Math or Biology Research Course

Note: Students selecting a BIOL course count this toward their 21 credits of BIOL, NEUR, PHGY, PSYC courses while students selecting a MATH course count this toward their 18 credits of MATH courses.

3-6 credits from the following Math or Biology research courses:

Expand allContract all

Course	Title	Credits
BIOL 466	Independent Research Project 1.	3
BIOL 467	Independent Research Project 2.	3
BIOL 468	Independent Research Project 3.	6
MATH 410	Majors Project.	3

Of the remaining complementary courses, at least 6 credits must be at the 400 level or above.

Math Courses

15 credits (if MATH 410 Majors Project. was selected as a research course) or 18 credits of MATH courses chosen from Stream 1 or 2 and from "Remaining Math Courses" as follows:

Stream 1: Theory

12 credits from the following courses:

Expand allContract all

Course	Title	Credits
MATH 314	Advanced Calculus.	3
MATH 317	Numerical Analysis.[1]	3
MATH 319	Partial Differential Equations .	3
MATH 326	Nonlinear Dynamics and Chaos.	3
MATH 327	Matrix Numerical Analysis.[1]	3

[1] Students may take either MATH 317 Numerical Analysis. or MATH 327 Matrix Numerical Analysis..

Stream 2: Statistics

9 credits from the following:

Expand allContract all

Course	Title	Credits
MATH 324	Statistics.	3
MATH 423	Applied Regression.	3
MATH 447	Introduction to Stochastic Processes.	3

Remaining Math Courses

Remaining 3-9 credits of MATH courses may be chosen from any of the two preceding sequences and/or from the following list:

Expand allContract all

Course	Title	Credits
MATH 204	Principles of Statistics 2.	3
MATH 340	Discrete Mathematics.	3
MATH 437	Mathematical Methods in Biology.	3
MATH 523	Generalized Linear Models.	4
MATH 524	Nonparametric Statistics.	4
MATH 525	Sampling Theory and Applications.	4

BIOL, NEUR, PHGY, PHYS, PSYC Courses

18 credits (if 3 credit BIOL course was selected as a research course) or 15 credits (if 6 credit BIOL research course was selected) of BIOL, NEUR, PHGY, PHYS, PSYC courses including one of three streams.

Note: Some courses in the streams may have prerequisites.

Ecology and Evolutionary Ecology Stream

At least 15 credits selected as follows:

3 credits of:

Expand allContract all

Course	Title	Credits
BIOL 206	Methods in Biology.	3

3 credits from the following field courses or any other field course with permission:

Expand allContract all

Course	Title	Credits
BIOL 240	Monteregian Flora.	3
BIOL 331	Ecology/Behaviour Field Course.	3
BIOL 334D1	Applied Tropical Ecology.	1.5
BIOL 334D2	Applied Tropical Ecology.	1.5
BIOL 432	Limnology.	3
BIOL 573	Vertebrate Palaeontology Field Course.	3

At least 9 credits chosen from the following list

Expand allContract all

Course	Title	Credits
BIOL 202	Basic Genetics.	3
BIOL 205	Functional Biology of Plants and Animals.	3
BIOL 304	Evolution.	3
BIOL 305	Animal Diversity.	3
BIOL 308	Ecological Dynamics.	3
BIOL 310	Biodiversity and Ecosystems.	3
BIOL 324	Ecological Genetics.	3
BIOL 434	Theoretical Ecology.	3
BIOL 509	Methods in Molecular Ecology.	3
BIOL 569	Developmental Evolution.	3
BIOL 594	Advanced Evolutionary Ecology.	3

Molecular Evolution Stream

At least 15 credits selected as follows:

3 credits

Expand allContract all

Course	Title	Credits
BIOL 202	Basic Genetics.	3

At least 12 credits selected from the following list:

Expand allContract all

Course	Title	Credits
BIOL 303	Developmental Biology.	3
BIOL 304	Evolution.	3
BIOL 313	Eukaryotic Cell Biology.	3
BIOL 518	Advanced Topics in Cell Biology.	3
BIOL 569	Developmental Evolution.	3
BIOL 592	Integrated Bioinformatics.	3

Neurosciences Stream

At least 15 credits selected as follows:

3 credits from:

Expand allContract all

Course	Title	Credits
BIOL 206	Methods in Biology.	3

At least 12 credits selected from:

Expand allContract all

Course	Title	Credits
BIOL 320	Evolution of Brain and Behaviour.	3
BIOL 389	Laboratory in Neurobiology.	3
BIOL 530	Advances in Neuroethology.	3
BIOL 580	Genetic Approaches to Neural Systems.	3
NEUR 310	Cellular Neurobiology.	3
NEUR 507	Topics in Radionuclide Imaging.	3
PHGY 314	Integrative Neuroscience.	3
PHGY 425	Analyzing Physiological Systems.	3
PSYC 427	Sensorimotor Neuroscience.	3

Remaining BIOL, NEUR, PHGY, PSYC

For the remaining BIOL, NEUR, PHGY, PSYC complementary course credits, if any, students top up their credits to the necessary 18-21 credits with any course listed in the above three streams. Other relevant courses may be substituted with the approval of the Program Adviser.