Mathematical Biology (BSc)

Admission Requirements

Prerequisite Requirements for BSc:

- ENG4U, SBI4U, SCH4U, MHF4U, MCV4U
- **Recommended:** MPH4U

- **Expected minimum admission average:** high 70s – mid 80s

Program Overview

York offers **Canada's only degree in Mathematical Biology.** At York your studies in Mathematical Biology will give you a solid base of knowledge in mathematics with an emphasis on the applications of mathematics and computing in the medical, environmental science, and public health fields. Your studies will begin with core courses in calculus and differential equations, problems, conjectures & proofs, linear algebra, computing and computation, probability and statistics, alongside introductory biology and chemistry courses. You will then specialize in areas like numerical analysis, operations research, probability and statistics in combination with upper year biology and health science courses. You may also combine your studies with other degree programs in Science or Health.

Your studies in Mathematical Biology will allow you access to The Centre for Disease Modelling (CDM), a core group of researchers in disease modelling globally, housed within this department and the York Institute for Health Research. As a fourth-year student, you will have the opportunity to acquire real-life problem-solving skills in a required research project.

First Year Mathematical Biology Major Courses:

- Linear Algebra I
- Calculus
- Statistics
- Problems, Conjectures and Proofs
- Computing for Mathematics & Statistics
- Biology
- Chemistry

Second Year Mathematical Biology Major Courses:

- Linear Algebra II
- Calculus of Several Variables with Applications
- Elementary Probability
- Real Analysis
- Differential Equations
- Symbolic Computational Lab
- Human Physiology or Anatomy
- Ecology
- Introduction to Environmental Studies

Upper Year Mathematical Biology Course Options:

- Mathematical Biology
- Practicum in Mathematical Biology
- Mathematical Modelling
- Vector Integral Calculus
- Introduction to Geometries
- Mathematical Analysis
- Probability Modelling
- Operations Research   • Virology
- Cell Biology   • Dynamical Systems

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Research Highlights

DR. JANE HEFFERNAN is a Professor in the Department of Mathematics and Statistics. She is also the Director of the Centre for Disease Modelling (CDM), and is on the Board of Directors of the Canadian Applied and Industrial Mathematics Society (CAIMS).

Dr Heffernan's research program centres on understanding the spread and persistence of infectious diseases. Her, Modelling Infection and Immunity Lab (MI2), focuses on the development of new biologically motivated models of infectious diseases that describe pathogen dynamics in-host and in a population of hosts.

Career Pathways for Mathematical Biology

Your studies in Mathematical Biology will prepare you for success in professional careers in disease prevention, pharmaceutical, media and space and aeronautics research, natural resource management, education, government, and for further professional or postgraduate studies.

- Finance
- Museums
- City Planning
- Scientific Consultant
- Pharmaceutical research
- Disease Prevention Specialist
- Conservationist; Natural Resource Management
- Post Graduate Studies/Academic Career

- Forestry Industry; Oil and Gas industry
- Armed Forces/Intelligence Agencies Analyst
- Education- high school, college, university
- University researcher in Engineering, Medicine, Environmental Studies

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