BIOLOGICAL SCIENCES

Head: Dr. W. Gary Anderson
Campus Address/General Office: 212 Biological Sciences Building
Telephone: 204 474 7496
Email Address: Gary.Anderson@umanitoba.ca (Gary.Anderson@umanitoba.ca)
Website: umanitoba.ca/science/biological-sciences

Biological Sciences

Biology is one of the most rapidly evolving and diverse sciences in the modern world, exploring all aspects of life from biomolecules to ecosystems. The Department of Biological Sciences is committed to advancing our understanding of biological structure and function at all levels of biological organization, developing new tools and technologies to address current and emerging problems facing all living organisms. Undergraduate students through the course of their program will forge connections between molecules, cells, tissues, organs, organisms, populations, communities, and ecosystems, highlighting the need to explore all levels of biological interactions. Programs emphasize the organism as the key element in studies of the development and evolution of form and function and the role in adaptations to the environment. Based on a core of fundamental biological principles, our programs explore diverse areas such as organismal biology, environmental biology, genetics, cell biology and development, physiology, ecology, behaviour, and systematics and evolution. The Department focuses on the integration of research and teaching expertise to create opportunities for growth and novel synergisms in the training of future leaders in the field.

Areas of Study in the Biological Sciences

Biology

The B.Sc. Biological Sciences degree will be of interest to students who aspire for an undergraduate degree that has breadth within the life sciences. This program will provide the academic foundation for students who are interested in a broad background in the life sciences. The B.Sc. Biological Sciences degree is structured to facilitate the study of a broad range of disciplines, including molecular biology, morphology, genetics, cell biology, biodiversity, evolution, physiology, and much more. The organisms under study in this theme are equally diverse, ranging from microbes to invertebrates, vertebrates, plants, and fungi. This program allows students to develop a highly flexible course portfolio and may include courses from a variety of life sciences departments. When declaring a Major or Honours degree in the biological sciences, students will enter the B.Sc. Biological Sciences program. Students in this program have the option to select one of two concentrations: Molecular, Cellular, and Systems Biology or Ecology and Evolutionary Biology.

molecular, cellular, and systems biology concentration

By selecting a concentration in Molecular, Cellular, and Systems Biology students will develop a knowledge and understanding of the molecular, cellular and physiological mechanisms that underpin how organisms function and respond to a changing environment. By focusing on courses in cell and systems biology, students will learn the fundamental principles and important advances in a rapidly growing area of biology. Students can concentrate on molecular structures and processes of cellular life or choose to study higher levels of biological organization, learning how cellular and physiological systems integrate to shape whole organism responses to environmental challenges in a changing world. Students will be exposed to modern research techniques in lab classes and will be taught by instructors and faculty with active research programs employing cutting-edge research principles and practices within the Department of Biological Sciences.

ecology and evolutionary biology concentration

Ecology is the study of interactions between organisms and their environment, both in natural settings and human-influenced habitats. These interactions may apply pressures that influence the natural selection of character traits, ultimately driving evolution, a concept that is a unifying framework for biology. As a result, evolutionary principles permeate research and teaching at all levels of biological organization. In our society, ecology and evolutionary biology provide scientific links to the living world, theorizing why it is shaped the way it is today. Ecologists study interactions among all organisms from the microscopic to the global scale, integrating the impact of environmental factors on the interactions between individuals, populations, communities, and ecosystems, linking these to survival, reproduction, and natural selection within variable environments. Principles of evolution are required to understand a wide range of practical applications including, the evolution of pathogens such as coronaviruses and avian influenza, the domestication of wild species and consequences of genetic modifications, the identification of natural products, long-term responses to environmental change, and human biology. Students in this concentration will be taught by instructors and active researchers and be exposed to important principles and modern research techniques to explore the intricate relationships within a diverse range of ecosystems across the globe.

Programs

Degree/Diploma	Years to Completion	Total Credit Hours	Has Co-op Option
Biological Sciences, B.Sc. Honours (https://catalog.umanitoba.ca/undergraduate-studies/science/biological-sciences/biological-sciences-bsc-honours/)	4	120	Yes
Biological Sciences, B.Sc. Major (https://catalog.umanitoba.ca/undergraduate-studies/science/biological-sciences/biological-sciences-bsc-major/)	4	120	Yes

Biological Sciences Minor (https://catalog.umanitoba.ca/undergraduate-studies/science/biological-sciences/biological-sciences-minor/)	18