

Learning Outcomes

LO	Description
LO 1	LO 1 Demonstrate fundamental university-level competence in scientific disciplines related to biology such as mathematics, physics, chemistry, and computer science, and an understanding of how they are applied to the study of biological systems.
LO 1.1	LO 1.1 Describe foundational knowledge in mathematics, chemistry, physics, and computer science.
LO 1.2	LO 1.2 Analyze biological systems by using foundational knowledge from disciplines such as mathematics, physics, chemistry, and computer science to assess how biological systems work.
LO 2	LO 2 Discuss the major areas of biology and analyze how these are integrated with each other and all sciences.
LO 2.1	LO 2.1 Explain how molecules and cells contribute to the function of biological systems.
LO 2.2	LO 2.2 Explain the biological principles that define the function of whole organisms.
LO 2.3	LO 2.3 Explain the biological principles that define the relationships between and within populations, communities, and ecosystems.
LO 2.4	LO 2.4 Apply their cornerstone knowledge about the levels of biological organization to advance their understanding of discipline-specific areas and/or core concepts in biology, such as environmental biology, ecology, evolution, botany, microbiology, zoology, and/or cellular and molecular biology.
LO 2.5	LO 2.5 Discuss the historical and social context of the study of biological systems.
LO 3	LO 3 Apply interdisciplinary knowledge to scientific investigation, including but not limited to knowledge from the intersecting fields of chemical biology, biochemistry, computational biology and bioinformatics, and Indigenous science.
LO 3.1	LO 3.1 Discuss related disciplines such as chemical biology, biochemistry, computational biology and bioinformatics and explain how these provide insight into biological systems.
LO 3.2	LO 3.2 Assess related disciplines such as chemical biology, biochemistry, computational biology and bioinformatics to identify, formulate and analyze information in order to reach substantiated conclusions.
LO 3.3	LO 3.3 Understand the value of integrating Indigenous scientific scholarship with Western scientific scholarship by including different perspectives from the First Nations, Métis and Inuit in the research process

LO 4	LO 4 Apply evidence-based approaches to understand the mechanisms involved in global environmental challenges
LO 4.1	LO 4.1 Apply sustainability concepts within the context of climate change, ecosystem services, water resources, reconciliation ecology, and the conservation and regeneration of natural systems.
LO 4.2	LO 4.2 Integrate our shared responsibilities to sustainability as it pertains to the biosphere and the natural environment within professional practice.
LO 4.3	LO 4.3 Analyse synergistic relations between components within complex natural systems
LO 5	LO 5 Safely perform research activities, use appropriate laboratory skills and apply data analysis.
LO 5.1	LO 5.1 Carry out experiments with applicable attention to health and safety risks, industry standards and environmental and societal considerations
LO 5.2	LO 5.2 Safely perform simple scientific procedures and measurements with proficiency and competency.
LO 5.3	LO 5.3 Explain the importance of implementing positive and negative controls in experimentation as well as the necessity of reproducibility, accuracy and statistical analysis in experimentation
LO 6	LO 6 Exhibit scientific literacy and demonstrate critical thinking and knowledge by gathering, interpreting and analyzing scientific information and critically evaluating published biological works.
LO 6.1	LO 6.1 Use library resources and other appropriate sources to gather information, identify and recognize limits to knowledge, areas of speculation, and interpretation and explain the limits of knowledge that lead to uncertainty, erroneous interpretation, and bias
LO 6.2	LO 6.2 Select an appropriate methodology and tools to test a hypothesis based on theoretical knowledge, while recognizing methodological limitations and ways in which different approaches complement each other.
LO 6.3	LO 6.3 Collect, organize and interpret data from experimental protocols; access large datasets for secondary analyses; apply statistical processes to data to determine correlations or similarities/differences; and use relevant computational tools to store, analyse, or represent data.
LO 7	LO 7 Communicate biological information in an audience-appropriate manner. Present and support an argument using analysis of primary and secondary data/sources, and proper citation of evidence.
LO 7.1	LO 7.1 Communicate effectively in written or oral form using formats such as essays, presentations, summaries, reviews or critiques of original research literature, and responses to technical and non-technical written instructions.
LO 7.2	LO 7.2 Prepare laboratory reports using appropriate laboratory documentation, including the documentation of experimental observations and data in a comprehensive and appropriate manner.
	LO 7.3 Use a variety of communication tools including digital presentation, blogs and posters to document,

LO 7.3	illustrate, and communicate experimental and other scientific data in a comprehensive manner that is appropriate to the target audience.
LO 7.4	LO 7.4 Devise a communication strategy to convey information regarding the environment and the welfare of humans as a whole to a target audience, which can include individuals without formal STEM training.
LO 8	LO 8 Develop a professional practice for solving biological problems that is socially impactful, equitable, and responsible.
LO 8.1	LO 8.1 Discuss the principles of equity, diversity and inclusion (EDI) and how these can be implemented in STEM fields and in professional practice.
LO 8.2	LO 8.2 Identify barriers that lead to underrepresentation of equity-seeking groups in STEM fields and develop a professional practice that aims to mitigate these challenges.
LO 8.3	LO 8.3 Assess the needs of various stakeholders when considering STEM applications, including the unique requisites and wishes of specific communities and government policy and regulations.
LO 8.4	LO 8.4 Describe ethics as it pertains to biology applications, including research integrity and ethics, and consideration of the impact of biology applications on individuals and communities.
LO 8.5	LO 8.5 Explain how to integrate foundational knowledge in biology to applications in diverse professions and career opportunities.