



Guidelines for RPBio/BIT Course Assessment

The following descriptions are used as a guide to help applicants choose courses to meet the education requirements for registration with the College of Applied Biology. Other courses may be acceptable to the Credentials Committee upon review. However, full course syllabus may be required to make an accurate determination. The decision on whether to accept a course ultimately resides with the Credentials Committee.

Communications

First year or higher courses that focus on communication skills may include technical writing, scientific writing, or English composition. The aim of this requirement is to ensure the applicant has the ability to provide clear and concise communications which can be interpreted by people at all levels of a decision making process.

More specifically the graduating student should demonstrate competency in some or all of the following topic areas:

- Development of skills in research and writing of academic essays or reports
- Technical writing skills including memos, briefing notes, technical reports and bulletins
- Development of grammatical skills, organizational skills and appropriate use of vocabulary
- Prepare and deliver oral presentations

Numeracy (Mathematics)

Mathematics courses need to be at a first year or higher university level. Introductory courses in calculus, applied calculus, finite math, or linear algebra will generally meet this requirement. Technical math courses may not meet the requirement unless they transfer to an equivalent first year math course at a college or university through a recognized transfer agreement.

Chemistry

Chemistry courses can be survey-level first year courses. Courses in chemistry should cover classification of matter, periodic properties of elements, atomic and molecular structure, stoichiometry, chemical reactions, thermochemistry, chemical bonding and an introduction to organic chemistry. Completion of the lab component is not mandatory.

Applied Biology

A course in applied biology will focus on the application of biological, ecological or socioeconomic principles, including law and governance, to the management or conservation of biological resources, elements or systems. The course can focus on a specific group of organisms or consider broader ecosystem-level issues, however, the majority of the course content (i.e. >80%) must consider biological resources, elements or systems, not topics related to the management or conservation of abiotic resources or the more general idea of environmental sustainability.

Courses that typically meet the requirements for this subject category include Conservation Biology, Environmental Biology, Wildlife Management, Fisheries Management, Range Management, Natural Resource Policy, or Landscape Ecology.

The following list represents the general range of topics of Applied Biology.

- Discussion of the application of biological and ecological principles on the use, management or conservation of biological resources
- Discussion of the management or conservation of biological resources
- Discussion of law or governance with direct application to biological resources
- Discussion of the principles of sustainability in the context of biological resources

Ecology

A course in ecology will consider the relationships between living organisms and the abiotic systems within which they occur. Courses focused on the subject of ecology can consider a broad range of content from the description and distribution of biomes at the ecosystem level to the factors and theory underlying population and community dynamics. Courses in specific areas of ecology such as population, community or microbial ecology are acceptable as are courses that take a more general perspective on ecology or ecosystem-level processes.

The following list represents the general range of topics of Ecology.

- The relationships between living organisms and the abiotic systems within which they occur
- Description and distribution of biomes at the ecosystem level
- Understanding of the factors and theory underlying population and community dynamics

Genetics

Courses in genetics should cover structure and function of genes, chromosomes and genomes, biological variation resulting from recombination, mutation, and selection, population genetics, use of genetic methods to analyze protein function, gene regulation and inherited disease.

Examples of courses that meet this criteria include: Genetics, Molecular Genetics, or Genomics.

Systematics or Classification

A course in systematics or classification will focus on the nomenclature, identification, and categorization of organisms from within one or more taxonomic groups. Course content often includes a description of the unique anatomy or other differentiating characteristics of the organisms under study. Courses in Systematics or Classification may require students to develop a collection of specimens (e.g. herbarium) or develop the skills to identify individual species or genera from a broader set of related organisms.

Examples of courses that typically meet this subject category include Invertebrate Zoology, Vertebrate Zoology, Vascular Plants, Non-Vascular Plants, Ornithology, Herpetology, Mammalogy, Phylogenetics, Forest Classification and Silvics.

The following list represents the general range of topics of systematics or classification.

- Nomenclature, identification and categorization within one or more taxonomic group
- Description of unique anatomy or other differing characteristics
- Development of a collection of specimens or development of skills to identify species

Cellular

A cellular course should include cellular chemistry, bioenergetics, enzyme production and function, membranes and cell signalling, membrane transport processes, signal transduction mechanisms, extracellular structures (adhesions, junctions, etc.), chemotrophic energy metabolism, intracellular compartments, phototrophic metabolism, structural basis of cellular information, sexual reproduction, gene expression – transcription and protein synthesis, regulation of gene expression, cytoskeletal systems, as well as motility and contractility. Courses that would meet this requirement include Cell Biology, Molecular Biology, and Biochemistry.

The following list represents the general range of topics of Cellular biology.

- Cell chemistry, bioenergetics, enzyme structure and function
- Membrane transport
- Membranes and signal transduction mechanisms
- Extracellular structures (adhesions, junctions, etc.)
- Intracellular compartments
- Chemotrophic energy metabolism, phototrophic metabolism, structural basis of cellular information
- Nucleic acid structure and function – replication, transcription, translation and regulation of gene expression
- Cytoskeleton systems, motility and contractility

Physiology

A course in physiology will focus on the relationship between the structure and functioning of individual organisms relative to the environments they occupy. The majority of course content (i.e. >80%) should consider the physiology of the organism in the context of environmental responses and/or the interaction between anatomical structure and life history including adaptive behaviour. The course can include the study of a single taxonomic group or a broader perspective across a number of Kingdoms.

The following list represents the general range of topics of cell, animal, or plant physiology courses.

Cell Physiology Course

- Structure and function of the cytoskeleton
- Structure and function of the cell membrane
- Structure and function of cell organelles
- Topics on cell dynamics and bioenergetics
- Topics on regulation of cellular activities

Animal Physiology Course (including human physiology)

- Principles of homeostasis
- Discussions of cardiovascular systems
- Discussions of respiratory system
- Discussion of osmoregulatory system
- Discussions of endocrine system
- Discussions of excitable membranes of nerve and muscle
- Discussions of reproduction

Plant Physiology Course

- Mechanisms and regulation of functional processes contributing to assimilation, transport and utilization of water, mineral nutrients and carbon
- Understanding of cell division, sexual and asexual reproduction
- Understanding of differentiation and functions of various tissue types
- Understanding of the action of major growth regulators and photomorphogenesis

Evolution

Courses in evolution will cover the contemporary theory of evolution, such as variation, descent, natural selection, adaptation, speciation, and extinction on both micro- and macro-evolutionary scales. Topics include origins of living systems; species and their origins and extinctions; adaptation and constraints; systematics; evolutionary ethics.

Examples of courses that may meet this criteria will include: Evolution, Diversity and Evolution, Evolutionary Genetics, and Ecology and Evolution.

Numeracy (Statistics)

A course in statistics will include applications of parametric and non-parametric statistical methods.

The following list represents the general range of topics found in a Statistics course. It is not expected that all topics will be addressed during a major or degree. However, it is expected that graduating students will engage with enough topics to gain fundamental knowledge necessary to be competent in this area.

- Descriptive statistics and probability
- Types of distributions
- Hypothesis testing on means and proportions
- Experimental and sampling design
- Analysis of variance, regression and correlation
- Understand or conduct survival analyses

Biology courses (general)

Biology courses must include a majority (>50%) of biological concepts, theory, or practice, from a range of disciplines such as geography, environmental science, forestry and forest sciences, ecological restoration, and environmental engineering.

Science courses (general)

Science courses must include a majority (>50%) of scientific concepts, theory, or practice, and may include subject areas such as physics, chemistry, mathematics, geology, geography, environmental science, forestry and forest sciences, ecological restoration, and engineering.