# Biochemistry (BIOC)

Institute of Biochemistry
Faculty of Science

BIOC 2200 [0.5 credit] (formerly 63.220*)
**Cell Physiology and Biochemistry**
A lecture and laboratory course on cellular functions and their inter-relationships. It introduces topics including thermodynamics, membrane structure and function, transport mechanisms, basic metabolic pathways, energy production and utilization, communications between cells. (Also listed as BIOL 2200.)
Precludes additional credit for BIOL 2200. Credit will not normally be given for BIOC 2200 or equivalent taken after BIOC 3100.
Prerequisites: BIOL 1003 and or equivalent, CHEM 1000 or permission of the Institute.
Lectures three hours a week, laboratory or tutorial four hours a week.

BIOC 2909 [0.5 credit] (formerly 63.299*)
**Co-operative Work Term Report 1**
This course provides practical experience for students enrolled in the co-operative option. To receive course credit, students must receive a satisfactory evaluation from their work term employer; and present a written report describing their work term project. Graded Sat/Uns.
Prerequisites: registration in the Biochemistry co-operative option and permission of the Institute.
Four-month work term.

BIOC 3005 [0.5 credit] (formerly 63.305*)
**Practical Biochemistry**
A laboratory and tutorial course introducing the basics of experimental biochemistry and illustrating the theory and concepts dealt with in BIOC 3100.
Prerequisites: CHEM 2200 or CHEM 2203 and CHEM 2204; CHEM 2100 or CHEM 2101 or BIOC 2200/BIOL 2200 with a grade of C- or better, or permission of the Institute. BIOC 3100 or equivalent is recommended as a co-requisite.
Laboratory four hours a week plus biweekly assignments.

BIOC 3100 [1.0 credit] (formerly 63.310)
**General Biochemistry**
Chemistry and metabolism of proteins, lipids, carbohydrates and nucleic acids. Mechanism of action of enzymes. Metabolic control mechanisms and inter-relations. Biological oxidation. Biosynthesis of structural, storage and informational compounds.
Prerequisites: CHEM 2200 or CHEM 2203 and CHEM 2204; CHEM 2100 or CHEM 2101 or BIOC 2200/BIOL 2200 with a grade of C- or better, or permission of the Institute. A course in genetics is strongly recommended.
Lectures three hours a week.

BIOC 3909 [0.5 credit] (formerly 63.399*)
**Co-operative Work Term Report 2**
This course provides practical experience for students enrolled in the co-operative option. To receive course credit, students must receive a satisfactory evaluation from their work term employer; and present a written report describing their work term project. Graded Sat/Uns.
Prerequisites: registration in the Biochemistry co-operative option and permission of the Institute.
Four-month work term.

BIOC 4001 [0.5 credit] (formerly 63.401*)
**Methods in Biochemistry**
The course deals with the principles and applications of modern biochemical methodology, including use of radioisotope tracers, ultracentrifugation, electrophoresis and ion-exchange chromatography.
Prerequisite: BIOC 3005 or permission of the Institute.
Lectures and discussion two hours, laboratory six hours a week.

BIOC 4002 [0.5 credit] (formerly 63.402*)
**Biomacromolecules**
Biochemistry of polysaccharides, proteins and nucleic acids. Discussion of experimental approaches to purification and conformational studies of biomacromolecules, their interaction in solutions, function and regulation of enzymes. Workshop sessions include discussion of experimental design and interpretation, and solving of related numerical problems.
Prerequisite: BIOC 3100 or permission of the Institute.
Lectures two hours, workshop two hours a week.

BIOC 4004 [0.5 credit] (formerly 63.404*)
**Industrial Biochemistry**
A course illustrating the application of biochemistry to the production of biological compounds useful in nutrition, medicine, and the food and chemical industries. The course also reviews the general strategies for efficient production of these compounds by controlling the activities of living cells or enzymes.
Prerequisite: BIOC 3100 or permission of the Institute.
Lectures three hours a week.

BIOC 4005 [0.5 credit] (formerly 63.405*)
**Biochemical Regulation**
A half-credit in biochemical regulation. Topics include regulation at the transcriptional, translational and metabolic level. Regulation of cell and subcellular organelle function and other timely topics may also be included. A detailed course outline is available from the instructor in any given year.
Precludes additional credit for BIOC 4003.
Prerequisite: BIOC 3100.
Lectures three hours a week.

BIOC 4006 [0.5 credit] (formerly 63.406*)
**Bioinformatics**
The use of computers to solve biochemical problems. Topics may include data and software acquisition, sequence analyses, genomics, biomolecular interaction and kinetics, metabolic simulation, molecular modeling of biomolecules and biodiversity.
Prerequisites: BIOC 3100, or permission of the Institute.
Lecture one hour a week, computer workshop three hours a week.

BIOC 4007 [0.5 credit] (formerly 63.407*)
**Membrane biochemistry**
Biochemical and biophysical aspects of biomembrane structure and function. Topics may include: membrane lipids and proteins, lipid polymorphism, model membranes, liposomes, membrane biogenesis, the membrane cytoskeleton, membrane trafficking, membrane fusion, exocytosis and signal transduction across membranes.
Prerequisite: BIOL 2200 or BIOC 2200 or BIOC 3100 (taken concurrently), or permission of the Institute.
Lectures two hours a week and workshop two hours a week.

BIOC 4200 [0.5 credit]
**Immunology**
The organization and function of the immune system, including the anatomy of the immune system, the properties and behaviour of cells of the immune system, and the molecular and genetic bases of the immune response.
Precludes additional credit for BIOL 4302 (BIOC 4302).
Prerequisites: BIOL 2201 or BIOL 3201; or permission of the Department. (Also listed as BIOL 4200.)
Lectures three hours a week.

BIOC 4201 (BIOL 4201)
**Animal Cell Culture: Methods and Applications**
This laboratory course is complementary to BIOC 4200 (BIOL 4200). It deals with the theory and practice of animal cell culture; the use of cultured cells in studies of immune function; and the applications of products of the immune system, such as antibodies.
Precludes additional credit for BIOC 4302 (BIOL 4302).
Pre-requisites: BIOC 4200 (BIOL 4200), which may be taken concurrently, or permission of the Department.
Laboratory four hours per week.

BIOC 4202 [0.5 credit] (formerly 63.422*)
**Mutagenesis and DNA Repair**
A mechanistic study of mutagenesis and DNA repair. Topics will include DNA structure perturbations, spontaneous and induced mutagenesis, the genetics and biochemistry of DNA repair and recombination, and the role of mutations in the development of genetic disease and cancer. (Also listed as BIOL 4202).
Prerequisites: BIOL 2200 or BIOC 2200 or BIOC 3100 (taken concurrently); BIOL 3104, or permission of the Institute.
Lectures two hours a week and workshop two hours a week.

BIOC 4400 [0.5 credit] (formerly 63.440*)
**The Cell Cycle**
A course on the molecular cell biology of the eukaryotic cell cycle. Topics will include regulation of cell proliferation and cell death, and the molecular basis for morphological remodeling during cell division and death. (Also listed as BIOL 4400.)
Prerequisites: BIOL 3201, or BIOC 2200 and BIOC 3100.

BIOC 4708 [0.5 credit] (formerly 63.478*)
**Principles of Toxicology**
This course identifies the basic theorems of toxicology with examples of current research problems. Toxic risk is defined as the product of intensive hazard and extensive exposure. Each factor is assessed in scientific and social contexts and illustrated with many types of experimental material. Also offered at the graduate level, with additional or different requirements, as BIOL 6402 and CHEM 5708, for which additional credit is precluded.
Prerequisite: BIOC 3100 or permission of the Institute.
Lectures three hours a week.

BIOC 4901 [0.5 credit] (formerly 63.491*)
**Selected Topics in Biochemistry**
Selected topics of current interest in biochemistry are offered upon approval by the Director in consultation with members of the Institute.

BIOC 4907 [1.0 credit] (formerly 63.497)
**Honours Essay and Research Proposal**
An independent research study using library resources. The candidate will prepare a critical review of a topic approved by a faculty adviser. Evaluation will be based on a report and an oral defence of the report.
Precludes additional credit for BIOC 4908.
Prerequisite: fourth-year standing in an Honours Biochemistry program and permission of the Institute.

BIOC 4908 [1.0 credit] (formerly 63.498)
**Research Project**
Students carry out a research project approved by the Director, under the supervision of a faculty member of the Institute, in either the Biology or Chemistry departments. A report must be submitted to the supervisor by the last day of classes, and will be examined by committee.
Precludes additional credit for BIOC 4907.
Prerequisites: BIOC 3005 and BIOC 3100 or equivalent, and eligibility to continue in Honours Biochemistry or in Biochemistry and Biotechnology.
Lectures and associated work average at least eight hours a week.

BIOC 4909 [0.5 credit] (formerly 63.499*)
**Co-operative Work Term Report 3**
This course provides practical experience for students enrolled in the co-operative option. To receive course credit, students must receive a satisfactory evaluation from their work term employer; and present a written report describing their work term project. Graded Sat/Uns.
Prerequisites: registration in the Biochemistry co-operative option and permission of the Institute.
Four-month work term.

# Biology (BIOL)

Faculty of Science
Faculty of Arts and Social Sciences

*Notes:*
More detailed information regarding Biology courses taken in second and later years, and topics for Honours research projects (BIOL 4908), may be obtained from *Outlines of Advanced Biology and Biochemistry courses to be offered in the fall/winter session 2003-2004* and *Suggested Topics for BIOL 4908 Research Projects 2003-2004*. These information booklets may be obtained from the College of Natural Sciences Administrative Office. All students are strongly advised to consult these information booklets when planning their future course patterns.

Students should note that BIOL 1003 and BIOL 1004 are intended primarily for students wishing to major in Biology or take a Science degree. Other students who wish to take Biology courses should consider BIOL 1902, BIOL 1903 and/or BIOL 2106.

BIOL 1003 [0.5 credit] (formerly 61.103)
**Introductory Biology I**
A lecture and laboratory course focusing on the cell. The course emphasizes the organization of cells, cellular metabolism, classical and molecular genetics and the reproduction of cells and organisms.
Precludes additional credit for BIOL 1000, BIOL 1002, or the combination of BIOL 2009 and BIOL 2300.
Prerequisite: OAC Biology (or equivalent), or OAC Chemistry (or equivalent), or CHEM 0100.
Lectures three hours a week, laboratory or tutorial three hours a week.

BIOL 1004 [0.5 credit] (formerly 61.104)
**Introductory Biology II**
A lecture and laboratory course focusing on organisms and populations. The course emphasizes diversity of life forms, evolution and ecology.
Precludes additional credit for BIOL 1000, BIOL 1002, or the combination of BIOL 2009 and BIOL 2300.
Prerequisite: BIOL 1003 or equivalent.
Lectures three hours a week, laboratory or tutorial three hours a week.

BIOL 1902 [0.5 credit] (formerly 61.192)
**Natural History**
A course designed primarily for students in non-Biology programs to investigate the natural history of plants and animals, and the communities in which they occur. Particular attention is paid to the Ottawa region, but appropriate examples from other locales are also included. This course is acceptable only as a Free Elective in all Science programs and B.A. Biology programs.
Lectures three hours a week.

BIOL 1903 [0.5 credit] (formerly 61.193)
**The Natural History of Ontario**
A study of Ontario's biodiversity. In addition to examining the makeup of the different communities of plants and animals found in Ontario, the course explores their adaptations to the forces that in uence their distribution. This course is acceptable only as a Free Elective in all Science programs and B.A. Biology programs.
Prerequisite: BIOL 1902.
Lectures three hours a week.

BIOL 2001 [0.5 credit] (formerly 61.201)
**Animals: Form and Function**
An investigation of invertebrates and vertebrates to relate their structure, function, behaviour and interactions with plants.
Precludes additional credit for BIOL 2000.
Prerequisites: BIOL 1003 and BIOL 1004 or permission of the Department.
Lectures three hours a week, laboratory or tutorial four hours a week.