

Required Courses:

	Credits
BIOL 151 General Biology I	4
BIOL 152 General Biology II	4

Elective Courses:

15 credit hours. Must be selected from biology major offerings.

The following courses cannot be counted among the 15 elective hours:

BIOL 465	Biology Seminar
BIOL 475	Biology Lab Techniques
BIOL 485	Research in Biology
BIOL 495	Advanced Topics in Biology

Biology Course Descriptions

Courses are offered each semester unless otherwise designated.

BIOL 195, 295, 395, 495 – Special Topics (1-12)**BIOL 198, 298, 398, 498 – Tutorial (1-3)**

BIOL 100 – Principles of Biology (4) Three hours lecture and one two-hour lab weekly. One semester course providing an understanding of biological systems from the cellular to ecosystem level. Emphasis is placed on how biology plays a role in students' lives. For non-majors. Fall and Spring. Gen Ed: SB & LB credit.

BIOL 101 – Evolution and Ecology (3) Most introductory biology courses focus on cellular processes or human anatomy and physiology. Topics of ecology, evolution, and biodiversity are not explored in detail or omitted altogether. Evolution and Ecology helps students understand major biological concepts through the lens of evolutionary principles. This course takes a different approach to understanding biology, emphasizing concepts over details and scientific reasoning over terminology. Topics include natural and sexual selection, genetics, evolution of sex and mating strategies, population ecology, community ecology, macroevolution. Gen Ed: SB credit.

BIOL 105 – Introduction of Human Genetics (3) Human genetics, including transmission of genes, genetic ratios, chromosomal defects, sex determination, population considerations, introduction to DNA and gene functions, and moral dilemmas facing society. Non-majors only. Fall and Spring. Gen Ed: SB credit.

BIOL 106 – Environmental Biology (3) Concepts related to the physical and biological environments, populations and communities, current environmental problems. Laboratory and field experiences are an integral part of the course. Non-majors only. Fall and Spring. Gen Ed: SB & LB credit.

BIOL 107 – Human Biology (3) Emphasis on cellular function, nutrition, reproduction and other aspects of the body under normal and abnormal conditions. Non-majors only. Fall and Spring. Gen Ed: SB credit.

BIOL 108 – Vertebrate Life (3) Life history of animals with backbones: evolution, distribution, behavior, anatomic adaptations, growth and development, and population dynamics. Special emphasis on vertebrates of North America. Non-majors only. Fall. Gen Ed: SB credit.

BIOL 111 – Adirondack Ecology (3) General ecological principles including energy flow, biogeochemical cycling, population dynamics and community ecology using the Adirondack region as a backdrop. Natural history and identification of Adirondack plants and animals will be incorporated. Laboratory and field experiences are integral components of this course. Non-majors only. Spring. Gen Ed: SB & LB credit.

BIOL 112 – Connections in Biology (3) Connections in Biology is a learning experience that connects the major concepts in biology to the life of the student. The connections will vary but will likely include issues of human health (stem cell research, cancer, nutrition), populations (human population growth), genetics (genetic engineering and its impact of ecosystems), and ecology (loss of rainforests and fisheries). The course will use the excellent resources that are available to students with the text "Biology: Concepts and Connections." These resources include CD ROM based activities and access to an award winning Web site: The Biology Place. The course will include number of active learning exercises facilitated by your instructor. Gen Ed: SB credit.

BIOL 116 – Behavioral Ecology (3) Animal Behavior from the internal mechanisms to the evolutionary causes which led to them. No prerequisites. For non-majors. Spring only. Gen Ed: SB credit.

BIOL 120 – Microbes and Human Welfare (4) Three hours lecture and one two-hour lab weekly. Morphology and physiology of microorganisms, their important in the cause of disease and their role in important industrial processes. For non-majors. Fall and Spring. Gen Ed: SB & LB credit.

BIOL 125 – Biological Concepts (4) Two hours lecture and one two-hour lab weekly. Biological Concepts is designed for students who are not science majors and plan to enter the teaching profession. There is an accompanying laboratory, which is required. The course is designed to provide students an in depth understanding of the major themes and concepts of biology including cell structure and function, genetics, evolution, biodiversity and ecology. Fall and Spring. Gen Ed: SB & LB credit.

BIOL 145 – Biotechnology and Society (3) An exploration of the science and history of biotechnology, with applications ranging from identifying genes to modifying the genetic material of whole organisms. For non-majors. Spring. Gen Ed: SB credit.

BIOL 151 – General Biology I (4) The focus of this course is on cellular processes. Topics include cell structure, photosynthesis and respiration, cell division and genetics, and evolution. Lab required. Fall only. Gen Ed: SB & LB credit.

BIOL 152 – General Biology II (4) Evolutionary processes and resulting biodiversity, animal and plant morphology and physiology, and ecological relationships. Lab required. Spring only. Gen Ed: SB & LB credit.

BIOL 209 – Winter Ecology (3) This will be an interdisciplinary course which looks at all aspects of winter. We will start with a look at the physics of seasons, snow crystals, glaciers, and temperature. Then we will look at Plant and animal adaptations to the cold. Included in this will be experiments on how plants and insects can freeze solid yet survive. Also we will do a tracking lab. The last part of the course will cover human adaptations to winter including local customs as well as Eskimo cultures. Trips to Ottawa and the Adirondacks are planned. Prerequisite: FW credit. Gen Ed: WI credit.

BIOL 210 – Human Anatomy and Physiology (4) Basic principles of human anatomy and physiology with special emphasis on the mechanisms of homeostasis and the interrelationships of structure and function. Lab required. Non-majors only. Gen Ed: SB & LB credit.

BIOL 300 – Ecology (3) Physical environment of terrestrial and fresh-water ecosystems, interspecific and intraspecific relationships, speciation, demography, growth and regulation of populations, energy flow, community organization and development. Prerequisites: BIOL 151 or 125, and 152. Fall and Spring.

BIOL 303 – Plant Physiology (4) Biological processes of plants and the role various structures (cells, tissues, and organs) play in them. Relationship between functions and reactions of plants and those of other organisms. Significant research discussed. Prerequisites: BIOL 151 or 125, and 152. Lab Required. Fall only.

BIOL 304 – Plant Protection and the Environment (3) Plant biology as it relates to agricultural practices of the present and the past. Prerequisites BIOL 151 or 125, and 152. Summer only.

BIOL 305 – Comparative Anatomy of the Vertebrates (4) Similarities and differences in structural organization of vertebrate animals. Laboratory work includes detailed dissections of various systems of lamprey, spiny dogfish shark and cat. Lab required. Prerequisites: BIOL 151 or 125, and 152. Spring only.

BIOL 309 – Marine Mammals and Seabirds (3) This is an 18 day field course starting at the beginning of August at the Huntsman Marie Science Centre, St. Andrews, New Brunswick. Marine mammals and seabirds will be observed under natural conditions through frequent field trips at sea and shore. Passamaquoddy Bay and the Bay of Fundy are excellent locations for siting harbor and grey seals, harbor porpoises, minke, fin, and humpback whales, and numerous avian species including Atlantic puffins, razorbills, black guillemots, and northern gannets. Further, a three day trip to Grand Manan Island will allow us to observe the incredibly rare northern right whale (there are only 300 in the world). There is a strong emphasis on field research and each student will complete an independent research project. Lectures and labs will introduce the evolution, zoogeography, morphology, ecology, physiology, and

behavior of diving air-breathing vertebrates. Estimated cost is approximately \$1000 which includes travel to and from New Brunswick (from Potsdam), food, lodging, access to an on-site aquarium, and more than four whale and bird watching boat trips. For more info contact Dr. Jason Schreer (SUNY Potsdam), schreejf@potsdam.edu, (315) 267-2290.

BIOL 311 – Genetics (4) Principles of genetics, including classic Mendelian studies, chromosomal considerations and biochemical approaches to understanding the genetic material and how it functions. Prerequisites: BIOL 151 or 125, and 152. Fall and Spring.

BIOL 312 – Insect Ecology (4) Study of insects: anatomy, physiology, development, behavior; social insects; and insect control. Systematic coverage of major insect groups. Prerequisites: BIOL 151 or 125, and 152. Lab required. Fall only. Gen Ed: WI credit.

BIOL 315 – Ornithology (3) Study of birds with emphasis on field identification. Prerequisites: BIOL 151 or 125, and 152. Field trips required. Spring only.

BIOL 319 – Evolutionary Biology (3) Evolutionary Biology examines the mechanisms that have resulted in the rich diversity of life. Students will explore connections between natural selection and genetics, population biology, form and function, sexual selection, development, the fossil record and human evolution. Prerequisites: BIOL 151 or 125, and 152.

BIOL 320 – Microbiology (4) Morphological, physiological genetic, and biotechnological concepts of bacteria, fungi and viruses. Laboratory emphasizes sterile culture techniques and current technology. Prerequisites: BIOL 151 or 125, and 152, and CHEM 105 and 106. Lab required. Fall.

BIOL 321 – Cell Structure (3) Consideration of cells from standpoint of morphology at level of light and electron microscopes, cytodifferentiation, histochemistry and recent advances in cytological techniques. Prerequisites: BIOL 151 or 125, and 152. Spring or Fall.

BIOL 325 – Morphology of Lower Plants and Algae (4) Evolutionary trends, life cycles and economic importance of nonflowering plants. Recent changes in classification and systematics are presented. Prerequisites: BIOL 151 or 125, and 152. Lab required. Fall.

BIOL 326 – Morphology of Higher Land Plants (3) Interrelationships, life cycles, and economic significance of seed plants. Role of plant cells, tissues and organs in relation to biological processes of plants. Modern techniques in plant systematics are presented. Prerequisites: BIOL 151 or 125, and 152. Lab required. Spring.

BIOL 330 – Natural History of Lower Vertebrates (4) Life histories, systematics, behavior, ecological relationships, distribution, reproduction, and evolution of protochordates, fish, amphibians, and reptiles. Emphasis on species of northeastern United States and Canada. BIOL 151 or 125, and 152. Lab required. Spring.

BIOL 331 – Natural History of Higher Vertebrates (4) Life histories, systematics, behavior, distribution, reproduction and evolution of birds and mammals. Emphasis on species of northeastern United States and Canada. Prerequisites: BIOL 151 or 125, and 152. Lab required. Spring.

BIOL 333 – Biogeography (3) Biomes of the world past and present. Emphasis on evolutionary, ecological and geographic factors and principles which determine distribution of plants and animals. Prerequisites: BIOL 151 or 125, and 152. Fall. Gen Ed: SI credit.

BIOL 334 – Biology of Woody Plants (3) Identification and ecological and silvicultural characteristics, natural history, distribution and economic uses of native and introduced woody plants (trees, shrubs and vines). Laboratory exercises and field trips will include visits to diverse natural habitat types in the area, as well as the Botanical Gardens in Montreal and some private lands.

BIOL 336 – Biology of the St. Lawrence River (4) A basic course in river biology. Topics will include aquatic and semi-aquatic plant and animal life, habitat composition and variation and various physical aspects of the aquatic environments. Emphasis will be placed on field projects. Summer.

BIOL 350 – Biotic Communities of South Florida (3) Two week field trip to south Florida to visit unique biotic communities including subtropical hardwood forests, pine-palmetto scrub, mangroves, coral reefs, and several freshwater wetland communities such as cypress domes, wet sawgrass prairie and deepwater sloughs. Participants will

see first-hand the ecological problems that beset this part of the country, including water diversion for agriculture, intense urbanization, and the introduction of numerous exotic plants and animals, and will meet with scientists and agency officials charged with management responsibilities for this unique region. Limit to 14 students. Prerequisites: BIOL 300 or permission of instructor. Spring.

BIOL 351 – Biology of Northern Ecosystems (3) Intensive primer on the structure and function of ecological communities, focusing on ecosystems occurring in the northern forest and coastal regions of North America. The course will include an extended field trip to visit terrestrial, wetland, and aquatic biotic communities from northern New York through northern New England and the Canadian Maritime Provinces. Methods of sampling plants, invertebrates and vertebrates will be demonstrated. Individual plant collections will be required. Prerequisites: BIOL 151 or 125, and 152. Summer.

BIOL 355 – Invertebrate Biology (3) A survey of the invertebrate animals: their form, function, ecology, behavior and evolution. Prerequisites: BIOL 151 or 125, and 152. Spring, alternate years. Gen Ed: WI credit.

BIOL 360 – Neurobiology (3) Morphology of neurons, synapses, spinal cord and brain stem; physiological factors: neurotransmitters, reflex pathways, neuroendocrinology and biological rhythms. Fall or Spring.

BIOL 375 – Behavioral Evolution (4) Upper level animal behavior course with a laboratory. Primary literature and independent laboratory projects will help students understand the scientific process. Prerequisites: BIOL 151 or 125, and 152. Fall, alternate years.

BIOL 400 – Field Ecology (4) A field-oriented course utilizing local terrestrial, wetland and aquatic ecosystems to illustrate and apply concepts presented in BIOL 300. This course emphasizes making observations of the natural world, recording them systematically and generating hypotheses to be tested experimentally. Methods of collecting data will be presented and will include identification of local plants and animals. Prerequisites: BIOL 300. Fall. Gen Ed: WI credit.

BIOL 402 – Conservation Biology (3) The application of scientific principles to understanding and solving the conservation problems facing most of the Earth's ecosystems and species. This discipline is both derived from and nested within such areas of biological science as ecology, wildlife and fisheries management, zoology and botany and draws heavily on expertise from physiologists, microbiologists, molecular biologists and population geneticists. This course will be a mix of lecture, discussions, field trips, lab and classroom exercises and one large project. Prerequisite: BIOL 300 or permission of instructor. Spring alternate years.

BIOL 407 – Cell Physiology (4) Metabolic reactions and physiology of plant and animal cells together with studies of molecular, biochemical, and histological aspects of these cells. Lectures may be taken without laboratory. Prerequisites: BIOL 151 or 125, and 152, and CHEM 341. Fall.

BIOL 409 – Limnology (3) Adaptations and ecological relationships of freshwater organisms. Physical and chemical properties of water will also be examined, Emphasis will be placed on local ecosystems such as Adirondack lakes, streams, and the St. Lawrence River. Prerequisite BIOL 151 or 125, and 152.

BIOL 410 – Human Physiology (4) Basic principals of human physiology, locomotion, digestion, respiration, circulation, endocrine and neural control mechanisms, reproduction, and biological rhythms. Prerequisite: BIOL 151 or 125, and 152. Spring.

BIOL 315 – Virology (3) Basic physical, chemical and biological properties of plant, animal and bacterial viruses. Prerequisite: BIOL 320. Fall or Spring.

BIOL 420 – Medical Microbiology (3) Principles of immunology, pathogenesis, prevention and control of bacterial, fungal, viral and protozoan diseases. Prerequisite: BIOL 320. Spring.

BIOL 425 – Techniques in Molecular Biology (3) Experimental approach to structure and function of biologically active molecules in living systems and their integration. Prerequisites: BIOL 151 or 125, and 152, CHEM 341, 342 and permission. Spring.

BIOL 426 – Immunobiology (3) Higher vertebrates immune response. Structure of immune system, cellular phagocytosis, antigen-antibody interaction, regulation of the immune response and immunological techniques. Prerequisites: BIOL 151 or 125, and 152, and one semester of Organic Chemistry or permission. Fall or Spring.

BIOL 429 – Physiology Lab (2) Use of laboratory techniques to understand physiological mechanisms at the molecular, cellular and organismal level. Prerequisites: CHEM 341 and concurrent enrollment in or previous completion of BIOL 407, 410 or 440. Fall and Spring.

BIOL 431 – Developmental Biology (3) Fundamentals of embryogenesis using molecular, biochemical and organismal methods of study. Development of animals and plants will be considered, with emphasis on cellular and tissue levels of organization. Prerequisites: BIOL 151 or 125, and 152. Spring. Gen Ed: WI credit.

BIOL 440 – Comparative Animal Physiology (4) Functions of organs, organ systems and entire organisms of selected vertebrate examples. Major topics: respiration and metabolism, osmoregulation, circulation, digestion and nutrition, sensory phenomena, reproduction and endocrinology, temperature regulation and adaptation to various environments. Prerequisites: BIO 311, CHEM 341. Fall or Spring.

BIOL 455 – Molecular Genetics (3) An in depth examination of the molecular aspects of gene control, including control of replication, transcription, and translation. Prerequisite: BIOL 311. Spring, alternate years. Gen Ed: WI credit optional.

BIOL 475 – Biology Laboratory Techniques (1) Experience in laboratory instruction under supervision and guidance of staff member. Prerequisite: 15 semester hours of biology and permission. Fall and Spring.

BIOL 480 – Advanced Topics in Biology (1-3) Individual and group study of problems in biology. Prerequisite: 15 semester hours of biology. Fall and Spring.

BIOL 483 – Current Topics in Biology (2-3) Investigations of topics of current interest with class discussions and oral presentations. Topics vary from instructor to instructor. Fall and Spring. Gen Ed: SI credit. Prerequisites: FS, BIOL 125 or 151 and BIOL 152.

BIOL 485 – Research in Biology (1-3) Designing, performing, interpreting and summarizing research project under supervision and guidance of staff member. Prerequisite: determined by nature of project, and senior standing or permission. Fall and Spring.

Department of Chemistry

Chair and Contact Person for All Majors and Minors:

Maria Hepel
Stowell 302, (315) 267-2267 (hepelmr@potsdam.edu)

Professor:

Maria Hepel

Associate Professors:

David Gingrich, Anthony Molinero, Martin Walker

Assistant Professor:

Fadi Bou-Abdulah

Procedures for Declaring a Major or Minor:

Students should consult with the Department of Chemistry chair. An adviser will be assigned to ensure that requirements are completed.

Health Professions:

Both Chemistry and Biochemistry are among majors commonly selected to prepare for careers in the Health Professions such as medical school. See the Pre-Professional Programs section on page 64 for more detailed information about course selection.

3-2 Double Degree Program in Chemistry and Engineering

This program prepares students who have educational and career interests in both chemistry and engineering. The student spends the first three years enrolled at SUNY Potsdam. During the second and third years the student's course load includes engineering courses cross-registered at Clarkson University. The fourth and fifth years are full-time at

Clarkson University. At the end of the fifth year the student receives both a B.A. degree from SUNY Potsdam in chemistry and a B.S. degree from Clarkson University in the engineering field of his or her choice, explained on pages 62-63.

First-year students must register for PHYS 103, MATH 151 and CHEM 105 during the first semester in order to complete all requirements in three years.

Chemistry Major (B.A.)

33 credit hours required.

Required Courses:

	Credits
CHEM 105 General Chemistry 1: Lecture and Lab	4
CHEM 106 General Chemistry 2: Lecture and Lab	4
CHEM 311 Quantitative Analysis: Lecture and Lab	4
CHEM 341 Organic Chemistry 1: Lecture and Lab	4
CHEM 342 Organic Chemistry 2: Lecture and Lab	4
CHEM 308 Chemistry Topics	1
CHEM 309 Seminar in Chemistry	1
CHEM 451 Physical Chemistry 1: Lecture and Lab	4
CHEM 452 Physical Chemistry 2: Lecture and Lab	4

Elective Course:

Under advisement from the department's
elective course offerings. 3

Cognate Requirements:

MATH 151 Calculus I	4
MATH 152 Calculus II	4
*PHYS 103 University Physics I	4
PHYS 204 University Physics II	4

*With the permission of the chair, PHYS 101, 102 may be substituted for PHYS 103, 204.

Recommended Coursework Outside the Major:

Consult with a department adviser.

Special Notes:

1. Students graduating with a chemistry major (B.A.) must complete 30 credit hours in the major with at least a 2.0 in each course.
2. Students interested in the Chemical Engineering Double Degree Program should initiate contact with the Chemistry Department as soon as possible.
3. Since both calculus and physics are prerequisites for CHEM 451 and 452, students considering chemistry, biochemistry, medicine and related fields are urged to start the cognate sequences as soon as possible.
4. Students may not double major in chemistry and biochemistry.

Chemistry Major (B.S.)

48-49 credit hours required

Required Courses:

	Credits
CHEM 105 General Chemistry 1: Lecture and Lab	4
CHEM 106 General Chemistry 2: Lecture and Lab	4
CHEM 308 Chemistry Topics	1
CHEM 309 Seminar in Chemistry	1
CHEM 311 Quantitative Analysis: Lecture and Lab	4
CHEM 341 Organic Chemistry 1: Lecture and Lab	4