

# BIOLOGY (BIOL)

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## BIOL 111 Plants and People 4.00

Course designed to integrate the science of plants with a wide range of societal issues including genetically modified foods, medicines, invasive species, and rain gardens. Laboratory includes hands-on experiments in applied botany that utilize the University greenhouse. No prerequisite. Does not count towards the Biology major. (Lecture three hours, laboratory two hours.)

### Typically Offered:

- On-campus: Select Semesters;

## BIOL 115 Human Biology 4.00

University Studies course investigating the structure and function of the human body as related to areas of health and disease. Designed to meet the University Studies requirement for laboratory science. Does not count toward the Biology major. Not open to those having taken BIOL 270, or 280. (Lecture three hours, laboratory two hours).

### University Studies Requirements:

- Natural Sciences - Lab

### Typically Offered:

- On-campus: Spring
- Online: Fall & Summer

## BIOL 123 Concepts In Biology 4.00

Introduction for non-Biology majors to important biological concepts including chemistry, cell biology, genetics, evolution, plant and animal form and function, and ecology. Laboratory exercises are integrated with lectures and designed to be experimental and inquiry driven. Fulfills the University Studies requirement for laboratory science. Does not count toward the Biology major. (Lecture three hours, laboratory two hours.)

### University Studies Requirements:

- Natural Sciences - Lab

### Typically Offered:

- On-campus: Spring
- Online: Summer

## BIOL 130 Principles of Biology I 4.00

Introduction to important principles of chemistry, cellular, molecular, and evolutionary biology, and the diversity of life. Laboratory experiments are inquiry driven. Intended as the first of a two-course sequence for biology majors, and students with a strong interest in the life sciences. Fulfills the University Studies laboratory science requirement. (Lecture three hours, laboratory two hours.)

### University Studies Requirements:

- Natural Sciences - Lab

### Typically Offered:

- On-campus: Fall & Spring;

## BIOL 132 Principles of Biology II 4.00

The second course in a two-course sequence intended for Biology majors or minors, and other students with a strong interest in the life sciences. Introduces students to the development, structure and function of both plants and animals and the basic principles of ecology. Laboratory exercises are integrated with lectures and designed to be experimental and inquiry driven. (Lecture three hours, laboratory two hours, recitation 1 hour).

### Prerequisites:

BIOL 130 or permission of instructor.

### Typically Offered:

- On-campus: Fall & Spring;

## BIOL 170 Biological Inquiry for Teachers 2.00

This course uses inquiry-based science methods to answer open-ended biological questions that have environmental connections. This course is required of Elementary Education majors and satisfies environmental science requirements for the Wisconsin Teaching Licensure and the UW-Superior University Studies program. Lecture one hour, laboratory two hours.

### University Studies Requirements:

- Natural Sciences - Environmental

### Typically Offered:

- On-campus: Fall & Spring
- Online: Fall, Spring, & Summer

## BIOL 189 Biology Elective 1.00-99.00

Transfer credits ONLY from another accredited institution not equivalent to a UW-Superior course.

## BIOL 189ES Biology Elective Environmental Science 1.00-12.00

Transfer credits ONLY from another accredited institution not equivalent to a UW-Superior course.

## BIOL 189LS Biology Elective Lab Science 1.00-12.00

Transfer credits ONLY from another accredited institution not equivalent to a UW-Superior course.

## BIOL 251 Honey Bee Biology and Scientific Beekeeping 2.00

Provides a basic understanding of Honey Bee Biology and how apiculture science can be used to establish best practices in sustainable beekeeping. Topics include an introduction to sustainable beekeeping as well as honey bee anatomy, reproduction, social behavior, communication, orientation and navigation, and colony management. Recommended: Biology major, Environmental Science major, Chemistry major. No course prerequisites. (Lecture one hour, Apiary one hour).

### Typically Offered:

- On-Campus: Fall;

**BIOL 270 Human Anatomy & Physiology I 4.00**

First semester of a two-semester sequence investigating the structure and function of human body systems and mechanisms for maintaining homeostasis within and across each system. Examination of tissues and the integumentary, skeletal, muscular, nervous, and sensory systems. . (Lecture three hours, laboratory two hours.)

**Prerequisites:**

BIOL 130 or permission of instructor.

**Typically Offered:**

- On-Campus: Fall;

**BIOL 280 Human Anatomy & Physiology II 4.00**

Continuation of a two-semester sequence investigating the structure and function of human body systems and mechanisms for maintaining homeostasis within and across each system. Examination of the endocrine, digestive, cardiovascular, respiratory, urinary, and reproductive systems. (Lecture three hours, laboratory two hours.)

**Prerequisites:**

BIOL 270 or instructor consent.

**Typically Offered:**

- On-campus: Spring;

**BIOL 289 Biology Elective 1.00-50.00**

Transfer credits ONLY from another accredited institution not equivalent to a UW-Superior course.

**BIOL 289ES Biology Elective Environmental Science 1.00-12.00**

Transfer credits ONLY from another accredited institution not equivalent to a UW-Superior course.

**University Studies Requirements:**

- Natural Sciences - Environmental

**BIOL 289LS Biology Elective Lab Science 1.00-12.00**

Transfer credits ONLY from another accredited institution not equivalent to a UW-Superior course.

**BIOL 300 Marine Biology 3.00**

Introduction to the biology and ecology of marine plants and animals, coral reefs, the deep sea, rocky shores, marine mammals, fisheries, aquaculture, pollution, and the conservation of marine resources.(Lecture three hours).

**Prerequisites:**

BIOL 330 or 340 or Permission of Instructor

**Typically Offered:**

- On-campus: Fall, Odd Years;

**BIOL 303 Forest Ecology and Management 4.00**

Overview of major factors affecting forests, including disturbance, succession, wildlife, harvest systems, and ecosystem management. Emphasis on forests of the western Great Lakes region. Field trips develop identification and measurement skills and test ecological hypotheses. One weekend field trip. (Lecture three hours, laboratory two hours.

**Prerequisites:**

Successful completion of BIOL 330 or BIOL 340, or permission of instructor.

**Typically Offered:**

- On-campus: Select Semesters;

**BIOL 305 Evolution 3.00**

A view of the scope, significance and mechanisms of evolutionary concepts in modern biology. (Lecture three hours.)

**Prerequisites:**

Successful completion of BIOL 330 or BIOL 340, or permission of instructor.

**Typically Offered:**

- On-campus: Spring;

**BIOL 312 Biogeography and Conservation 3.00**

Study of geographical distributions of plants and animals in the context of spatial and temporal factors influencing species distributions, patterns of species richness, and endemism. Themes related to the conservation of biodiversity will be emphasized including island biogeography, landscape and metapopulation processes, phylogeography and conservation genetics. (Lecture three hours.) BIOL 340 and BIOL 305 recommended.

**Prerequisites:**

Successful completion of BIOL 330 or BIOL 340, or permission of instructor.

**Typically Offered:**

- On-campus: Spring, Odd Years;

**BIOL 315 Plant Physiology 4.00**

Study of functions and physiological properties of plants, from the molecular scale up through ecosystem scale of biological organization. Main topics include water and nutrient transport, cell structure and function, nutrient relationships, photosynthesis, growth and development, and metabolism. Lab exercises emphasize experimental approaches using modern technology. (Lecture three hours, laboratory three hours.)

**Prerequisites:**

Successful completion of BIOL 330 or BIOL 340, and CHEM 106, or permission of instructor.

**Typically Offered:**

- On-campus: Select Semesters;

**BIOL 316 Medical Terminology 2.00**

Study of basic medical terminology. Prefixes, suffixes, word roots, combining forms, special endings, plural forms, abbreviations, and symbols are emphasized. A programmed learning, word-building systems approach is used to learn, construct, and analyze new terms as they relate to the function and location of body systems. No prerequisite.

**Typically Offered:**

- On-campus: Spring;

**BIOL 318 Immunology 3.00**

Studying the relationship between cellular form and function to determine how macromolecules direct what a cell does. Current research techniques will be utilized to investigate how this dynamic interplay balances health versus disease. Critical processes such as proliferation, survival, and signaling pathways will be explored. (Lecture three hours.)

**Prerequisites:**

Successful completion of BIOL 330 or instructor permission

**Typically Offered:**

- On-campus: Spring, Even Years;

**BIOL 325 Plant Taxonomy 4.00**

Provides the skills and background to identify flowering plants of northern Wisconsin and Minnesota. Lecture topics focus on floral structure, classification, and distribution of plant families of regional importance, while labs focus on identification of living plant materials using dichotomous keys. Each student will prepare a plant collection. (Lecture three hours, laboratory two hours.)

**Prerequisites:**

Successful completion of BIOL 330 or BIOL 340, or permission of instructor.

**Typically Offered:**

- On-campus: Spring, Odd Years;

**BIOL 330 Genetics 4.00**

Integrating the principles and techniques of Mendelian and molecular genetics to emphasize how biological information is inherited and expressed. Students will also investigate the primary research literature and receive instruction in scientific writing. (Lecture three hours, laboratory two hours.)

**Prerequisites:**

Successful completion of CHEM 105 and BIOL 130 and BIOL 132 or BIOL 270. (Note: pre-Health program students are not required to take BIOL 132)

**Typically Offered:**

- On-campus: Spring;

**BIOL 335 Aquatic Entomology 3.00**

Introduction to the identification and ecological relationships of freshwater insects and related invertebrates of the north central United States. (Lecture two hours, laboratory two hours.)

**Prerequisites:**

Successful completion of BIOL 330 or BIOL 340, or permission of instructor.

**BIOL 340 Ecology 4.00**

Introduction to fundamental principles of ecology which explores the nature and dynamics of interactions between organisms and their environment. Applied ecology in local ecosystems, standard field techniques and analysis of ecological data will be emphasized. Students will conduct a simple ecological research project and write a corresponding scientific report. CHEM 105 is recommended. (Lecture three hours, laboratory three hours.)

**Prerequisites:**

Successful completion of BIOL 132 or permission from the instructor

**Typically Offered:**

- On-Campus: Fall;

**BIOL 350 Limnology 4.00**

Study of freshwater biology including the physical and chemical attributes of the environment as well as plants and animals found in lakes and streams. CHEM 105 and BIOL 340 is recommended. (Lecture three hours, laboratory two hours.)

**Prerequisites:**

Successful completion of BIOL 330 or BIOL 340, or permission of instructor.

**Typically Offered:**

- On-campus: Fall, Even Years;

**BIOL 355 Microbiology 4.00**

Exploring how the structure, function and genetics of microorganisms (bacteria, viruses, fungi and protozoa) influence our everyday world. This includes microbes relevant to human health and industry; and the biological and chemical defenses we use to regulate them. The laboratory involves isolation and biochemical identification of soil bacteria and determination of antimicrobial properties. (Lecture three hours, laboratory two hours.)

**Prerequisites:**

CHEM 105 and either BIOL 330 or BIOL 340.

**Typically Offered:**

- On-campus: Spring;

**BIOL 360 Parasitology 4.00**

The structure, habits, life cycles, classifications and identification of parasites and the diseases they cause. (Lecture three hours, laboratory two hours)

**Prerequisites:**

Successful completion of BIOL 330 or BIOL 340, or permission of instructor.

**Typically Offered:**

- On-campus: Spring, Odd Years;

**BIOL 365 Entomology 4.00**

The study of the anatomy, physiology, classification and identification of hexapods (insects). Includes a survey of hexapod orders, their economic and medical importance, and ecological topics. Lecture three hours, laboratory two hours.)

**Prerequisites:**

Successful completion of BIOL 330 or BIOL 340, or permission of instructor.

**Typically Offered:**

- On-campus: Select Semesters;

**BIOL 367 Ornithology 4.00**

An introduction to the study of birds. General principles of classification, structure, distribution, migration, life histories, and habits are covered in lecture and text. Laboratory periods devoted largely to identification of birds in the field. (Lecture three hours, laboratory two hours.)

**Prerequisites:**

Biology 330 or 340 is required

**Typically Offered:**

- On-campus: Spring, Even Years;

**BIOL 380 Vertebrate Biology 4.00**

Life histories, habits, habitats, distribution, classification, and recognition of common vertebrates of the north central United States. (Lecture three hours, laboratory two hours.)

**Prerequisites:**

Successful completion of BIOL 330 or BIOL 340, or permission of instructor.

**Typically Offered:**

- On-campus: Fall, Even Years;

**BIOL 382 Ichthyology 4.00**

An introduction to the classification, structure, physiology, distribution, and life histories of fishes. (Lecture three hours, laboratory two hours.)

**Prerequisites:**

BIOL 330 or 340 or Permission of Instructor

**Typically Offered:**

- On-campus: Fall, Odd Years;

**BIOL 389 Biology Elective 1.00-12.00**

Transfer Credits ONLY from another accredited institution not equivalent to a UW-Superior course.

**BIOL 399 Cancer Biology 3.00**

Investigating the cellular, molecular and genetic origins of the human diseases classified together as cancer. Utilizing both scientific and popular literature, historical context will be provided and current research aimed at improving both diagnostic and therapeutic options will be explored. Topics include carcinogenesis, oncogenes, tumor suppressors, microenvironment influence, migration, invasion and metastasis.

**Prerequisites:**

BIOL 330 or permission of instructor

**Typically Offered:**

- On-campus: Fall, Even Years;

**BIOL 400 Animal Physiology 4.00**

A study of normal and abnormal functions and vital processes of organ systems and how these processes are important to animals as they adapt to their environments.(Lecture three hours, laboratory two hours.)

**Prerequisites:**

Successful completion of BIOL 330 or BIOL 340, or permission of instructor.

**Typically Offered:**

- On-campus: Select Semesters;

**BIOL 405 Neurobiology 3.00**

Introduction to the structure and function of the nervous system, including neuroanatomy, neurophysiology, and systems neurobiology. Topics include the properties of neurons, glia, and the mechanisms and organization underlying neural signaling; the reward pathway and addiction, sleep, memory; and diseases and disorders of the nervous system. Discussions of neurobiological methods and reading of current neurobiological literature will be included.

**Prerequisites:**

Successful completion of one course from each of the following bracketed groups: [PSYC 350 or BIOL 330] and [PSYC 275 or BIOL 330 or BIOL 340] or permission of instructor.

**Typically Offered:**

- On-campus: Spring, Even Years;

**BIOL 412 Developmental Biology 4.00**

A comparative analysis of animal embryonic development. Classical embryology will be integrated with genetic regulation of development. Lecture 3 hours, Laboratory 2 hours

**Prerequisites:**

Prerequisite for BIOL 412 is successful completion of BIOL 330 or consent of instructor

**Typically Offered:**

- On-Campus: Fall;

**BIOL 420 Field Biology 1.00**

Study of plants and animals in nature through field trips and observation. Topics change each semester. (Laboratory two hours.)

**Prerequisites:**

Successful completion of BIOL 330 or BIOL 340, or permission of instructor.

**Typically Offered:**

- On-campus: Spring, Even Years;

**BIOL 431 Animal Behavior (Ethology) 3.00**

An introduction to animal behavior with special attention to behavioral mechanisms and the function of behavior. (Optional concurrent enrollment in BIOL 432.)

**Prerequisites:**

Successful completion of BIOL 330 or BIOL 340, or permission of instructor.

**Typically Offered:**

- On-campus: Spring, Odd Years;

**BIOL 432 Animal Behavior Laboratory 1.00**

Project-oriented course designed to explore the experimental aspects of animal behavior. May be used to satisfy Senior Experience requirement for Biology major.

**Prerequisites:**

BIOL 431 is a corequisite for this class

**Typically Offered:**

- On-campus: Select Semesters;

**BIOL 440 Cell Biology 4.00**

Study of the subcellular structures, protein synthesis & processing, signal transduction, cell cycle, and cell death pathways. Emphasis is placed on research techniques, data analysis and modern application of cellular and molecular biology. There is a heavy emphasis on critical thinking scientific literacy and writing of lab reports in this course. (Lecture three hours, laboratory two hours.)

**Prerequisites:**

Successful completion of BIOL 330 and CHEM 106 or permission instructor

**Typically Offered:**

- On-campus: Select Semesters;

**BIOL 465 Laboratory Techniques in Biochemistry and Cell/Molecular Biology 1.00-2.00**

Principles and practices of techniques used in biochemistry and in cell and molecular biology. Includes protein isolation and analysis, enzyme kinetics, carbohydrate analysis, immunological techniques for analysis, and techniques of gene cloning and manipulation. Recommended: CHEM 462, BIOL 355 AND BIOL 440 or concurrent enrollment. (Lecture one hour, laboratory three hours) Cross-listed as: BIOL/CHEM 465.

**Prerequisites:**

BIOL 330 and CHEM 360 or instructor consent are pre-requisites for this class

**Typically Offered:**

- On-campus: Spring, Even Years;

**BIOL 484 Fish Population Ecology and Management 4.00**

Focuses on two important ecological questions regarding fish populations: 1) What factors cause changes in the size of fish populations? 2) What factors influence the total number of species found in a particular environment? These questions are addressed by investigating how individual fish allocate time and resources in response to environmental conditions, and how different allocation schemes influence individual fitness. May be used to satisfy Senior Experience requirement for Biology major. (Lecture three hours, laboratory two hours.)

**Prerequisites:**

Successful completion of BIOL 330 or 340, MATH 102 or MATH 113 or equivalent are prerequisites

**Typically Offered:**

- On-campus: Select Semesters;

**BIOL 489 Biology Elective 9.00**

Transfer credits ONLY from another accredited institution not equivalent to a UW-Superior course.

**BIOL 489ES Biology Elective Environmental Science 1.00-12.00**

Transfer credits ONLY from another accredited institution not equivalent to a UW-Superior course.

**BIOL 489LS Biology Elective Lab Science 1.00-12.00**

Transfer credits ONLY from another accredited institution not equivalent to a UW-Superior course.

**BIOL 491 Senior Research 1.00-4.00**

A course developed in cooperation with faculty or area research laboratories designed to provide students with practical experience in experimental biology. Candidates for this course must outline a research problem and complete a Contract for Independent Learning prior to registration. (May be repeated for a total of four credits.) Instructor consent required. May be used to satisfy Senior Experience requirement for Biology major.

**Typically Offered:**

- On-campus: Fall & Summer;

**BIOL 492 Biology Seminar 1.00**

Study of a topic through literature research. Student studies a topic and effectively summarizes the available information in written and oral form. Presentation techniques are emphasized. May be used to satisfy Senior Experience requirement for Biology major.

**Typically Offered:**

- On-campus: Fall & Spring;

**BIOL 496 Internship 1.00-4.00**

On-the-job experience with local agencies (e.g. Wisconsin DNR) that provides students with opportunities to apply their skills to practical problems. In collaboration with a faculty sponsor, students must complete a Contract for Independent Learning prior to registration. May be used to satisfy Senior Experience requirement.

**Typically Offered:**

- On-campus: Fall & Spring;

**BIOL 497 Senior Year Experience 1.00**

This course provides instruction to develop and deliver an oral presentation in a scientific conference format to serve as a culminating experience for the Biology major. Presentation topics are connected to a capstone project completed in BIOL 491 Research in Biology or BIOL 496 Internship, either of which must be taken as a pre-requisite or co-requisite course. Meets in face-to-face format 2 hours per week.

**Typically Offered:**

- On-campus: Fall & Spring;