

BIOLOGY (BIOL)

BIOL 105 General Biology (3 crs)

Prerequisite: No credit if taken after BIOL 223.

- No credit toward biology major or minor. This course cannot serve as a prerequisite for 300-level biology courses.

An integrated presentation of important topics and ideas in modern biology. Designed to serve as a broad introduction to the life sciences.

Attributes: LE-K1 Natural Sciences
Lecture/Discussion Hours: 3
Lab/Studio Hours: 0

BIOL 106 Exploring the Living World (2 crs)

- No credit toward biology major or minor.

A lab and discussion course introducing students to various modes of inquiry in modern biology, ranging from the molecular to the ecological. Students will work in groups to develop, conduct and write up findings of original research projects.

Attributes: LE-K1 Natural Sciences, LE-K1L Natural Sciences with Lab, LE-S3 Creativity, Special Course Fee Required
Lecture/Discussion Hours: 1
Lab/Studio Hours: 2

BIOL 130 Human Sexual Biology (3 crs)

- Credit may not be earned in both BIOL 130 and WMNS 130. No credit toward biology major or minor.

Structure, function, control, and coordination of the human reproductive organ system. Formation and function of sex cells. Problems of lactation, fertility, sterility, sexuality, birth control challenges, and human population.

Attributes: LE-K1 Natural Sciences
Lecture/Discussion Hours: 3
Lab/Studio Hours: 0

BIOL 149 The Big Picture in Bioinformatics (1 cr)

Prerequisite: Limited to Bioinformatics majors or consent of instructor.

Explores how a liberal education relates to bioinformatics, the impacts of the field on society, and ethical expectations of the discipline. Provides an overview of bioinformatics looking at the differences between being a user and a developer along with additional technical topics.

Lecture/Discussion Hours: 1
Lab/Studio Hours: 0

BIOL 151 Biology of Humans (4 crs)

Prerequisite: No credit if taken after or concurrently with BIOL 214.

- No credit toward biology major or minor.

Basic principles and processes of the human body. Emphasis on human origin and evolution, biomolecules, cells, organ systems and disorders, reproduction, genetics, and the role of humans in the biosphere.

Attributes: LE-K1 Natural Sciences, LE-K1L Natural Sciences with Lab
Lecture/Discussion Hours: 3
Lab/Studio Hours: 2

BIOL 180 Environmental Biology and Conservation (3 crs)

Prerequisite: No credit if taken after or concurrently with GEOG 178 or GEOL 204.

- Satisfies Wisconsin conservation requirement for teaching certification in science and social science.

An introduction to natural resource conservation. Problems associated with the use and abuse of America's resources are studied in an ecological framework. Resource management methods are explored.

Attributes: LE-I1 Integration, LE-R3 Civic and Environmental Issues, Field Trip(s) Required
Lecture/Discussion Hours: 3
Lab/Studio Hours: 0

BIOL 181 Environmental Biology and Conservation Lab (1 cr)

Prerequisite: Must be taken with BIOL 180.

- No credit toward biology major or minor if taken after Biol 223.

Laboratory science course intended to be taken with Biology 180, Environmental Biology and Conservation, in order to receive laboratory science credit. Labs and field trips have students explore problems and solutions associated with environmental and conservation of natural resource issues.

Attributes: LE-K1 Natural Sciences, LE-K1L Natural Sciences with Lab, Field Trip(s) Required, Special Course Fee Required
Lecture/Discussion Hours: 0
Lab/Studio Hours: 2

BIOL 183 Ecology of Sustainable Food Systems (3 crs)

- No credit toward biology major or minor. High school or college biology or environmental science course(s) helpful but not required.

An introduction to the ecological impacts and sustainability of various forms of agricultural systems. Emphasis is on contemporary and regional issues. Students will complete a service learning project with a not-for-profit community organization that applies course concepts.

Attributes: LE-K1 Natural Sciences, LE-R3 Civic and Environmental Issues, Service-Learning, Half 15 Hours
Lecture/Discussion Hours: 3
Lab/Studio Hours: 0

BIOL 195 Plants and Society (4 crs)

- No credit toward biology major or minor.

An introduction to the biology of plants and their use by humans for food, beverage, spices, commercial products, and medicine.

Attributes: LE-K1 Natural Sciences, LE-K1L Natural Sciences with Lab

Lecture/Discussion Hours: 3

Lab/Studio Hours: 2

BIOL 196 Human Nutrition (3 crs)

- No credit toward biology major or minor.

Introduction to nutrition including coverage of nutrients-functions and sources; digestion and absorption; food guides; obesity and energy needs; diet and chronic disease; hunger in the world and United States; organic foods; sport nutrition; nutrition.

Attributes: LE-K1 Natural Sciences

Lecture/Discussion Hours: 2

Lab/Studio Hours: 1

BIOL 214 Human Anatomy and Physiology I (4 crs)

Prerequisite: Grade of C or above in: CHEM 105 and CHEM 106, or CHEM 115, or CHEM 151

- No credit toward biology major or minor or pre-professional health science minor unless BIOL 314 is taken.

The fundamentals of bodily function are studied at the cellular, tissue, organ, and organ system levels. Integration of physiological function and anatomical structure will be highlighted in the skeletal, muscular, nervous, and endocrine systems.

Attributes: LE-K1 Natural Sciences, LE-K1L Natural Sciences with Lab

Lecture/Discussion Hours: 3

Lab/Studio Hours: 2

BIOL 221 Foundations of Biology I (4 crs)

Prerequisite: MATH 109 or placement into MATH courses above 109; CHEM 115, or CHEM 105 and CHEM 106, or concurrent enrollment.

Introduction to cell biology, genetics, evolution, and microbiology.

Attributes: LE-K1 Natural Sciences, LE-K1L Natural Sciences with Lab

Grading Basis: No S/U Grade Option

Lecture/Discussion Hours: 3

Lab/Studio Hours: 3

BIOL 222 Foundations of Biology II (3 crs)

Prerequisite: Grade of C or above in BIOL 221.

- Concurrent enrollment in BIOL 223 is strongly recommended.

Introduction to evolution, organismal form and function, and ecology.

Grading Basis: No S/U Grade Option

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 223 Foundations of Biological Inquiry (2 crs)

Prerequisite: Grade of C or above in BIOL 221.

- Concurrent enrollment in BIOL 222 is strongly recommended.

Introduction to inquiry methods in biology focusing on scientific methods including experimental design, data collection and analysis, and critical thinking.

Attributes: LE-S3 Creativity

Grading Basis: No S/U Grade Option

Lecture/Discussion Hours: 1

Lab/Studio Hours: 2

BIOL 250 Microbiology (3 crs)

Prerequisite: BIOL 151, BIOL 214 or BIOL 221. No credit if credit has been earned in BIOL 361.

- No credit toward liberal arts biology major or minor.

Study of the attributes of several microbial groups and their interactions with human systems in the disease process.

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 291 Special Topics in Introductory Biology (1-3 crs)

Prerequisite: No credit if taken after BIOL 221.

Biological topics of current and special interest not typically covered in an introductory biology course, and of special interest to students and faculty.

BIOL 296 Student Academic Experience (1-2 crs)

Prerequisite: Eight credits in biology

Consent: Instructor Consent Required

- No more than two credits can be counted toward a biology major or minor. A total of four credits may be taken between this course and BIOL 496.

Experience for qualified students, selected and supervised by faculty members, to facilitate teaching and learning in a specific course. Students enhance their knowledge of biology and their ability to communicate that knowledge to other students.

Attributes: Service-Learning, Full 30 Hours

Repeat: Course may be repeated for a maximum of 4 credits

Grading Basis: S/U Only Grade Basis

BIOL 305 Molecular and Cell Biology (4 crs)

Prerequisite: Grades of C or above in BIOL 221, BIOL 222, and BIOL 223; and CHEM 109 or CHEM 115 or consent of instructor.

Current concepts in molecular/cell biology including structure/function of cells and cell organelles, gene function/regulation, and cell signaling.

Attributes: Undergraduate/Graduate Offering

Grading Basis: A-F Grades Only

Lecture/Discussion Hours: 4

Lab/Studio Hours: 0

BIOL 306 Infectious Disease Biology (3 crs)

Prerequisite: BIOL 221; and CHEM 109 or CHEM 115. Minimum junior standing.

Introduction to the realities of pathogens and parasites in our lives and their relationship to hosts, reservoirs, and environmental factors. Discussion of emerging and re-emerging diseases within the context of human, veterinary, wildlife, and planetary health.

Attributes: Undergraduate/Graduate Offering

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 307 Cell and Molecular Biology Laboratory (2 crs)

A lab course introducing various technical aspects of cell and molecular biology. Techniques include cell culture, cell separation, extraction and separation of macromolecules, immunoassay, enzyme assays, immunofluorescence, PCR, and DNA sequencing.

Grading Basis: A-F Grades Only

Lecture/Discussion Hours: 0

Lab/Studio Hours: 4

BIOL 308 Evolution (3 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223.

An introduction to evolution, including: origin and impact of the theory of evolution, origin of life, genetics and natural selection, molecular evolution, speciation, adaptation, systematics, fossil record, biogeography, species interactions, and human evolution.

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 311 General Entomology (4 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223.

Study of the structure, function, diversity, ecology, and management of insects. Field collection and laboratory identification of terrestrial and aquatic insects of Wisconsin.

Attributes: Undergraduate/Graduate Offering, Field Trip(s) Required

Lecture/Discussion Hours: 2

Lab/Studio Hours: 4

BIOL 314 Human Anatomy and Physiology II (4 crs)

Prerequisite: BIOL 214 with a grade of C or above. Minimum sophomore standing.

The fundamentals of bodily function are studied at the cellular, tissue, organ, and organ system levels. Integration of physiological function and anatomical structure will be highlighted in the cardiovascular, respiratory, excretory, digestive, and reproductive systems.

Lecture/Discussion Hours: 3

Lab/Studio Hours: 2

BIOL 315 Reproductive Physiology (3 crs)

Prerequisite: BIOL 222 and BIOL 223.

Examination of the principles and mechanisms of reproduction in human. Social aspects of reproduction, including reproductive biotechnologies and reproductive health will also be discussed.

Attributes: Undergraduate/Graduate Offering

Grading Basis: A-F Grades Only

Lecture/Discussion Hours: 3 Hours

Lab/Studio Hours: 0 Hours

BIOL 317 Human Physiology (4 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223; CHEM 109 or CHEM 115.

Analysis of how the human body's systems function and work together to maintain a stable internal environment.

Lecture/Discussion Hours: 3

Lab/Studio Hours: 3

BIOL 318 Plant Form and Function (4 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223.

Study of the classification, structure, function, development, and behavior of plants in an evolutionary and experimental context.

Lecture/Discussion Hours: 3

Lab/Studio Hours: 3

BIOL 319 Animal Form and Function (5 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223 or Grades of C or above in BIOL 221 and IDIS 125. No credit if taken after or concurrently with BIOL 317, 350, or 380

An examination of the comparative biology of animals including their evolution, reproduction, development, physiology, and behavior. Laboratories include an experimental approach to the study of animal form and behavior.

Lecture/Discussion Hours: 4

Lab/Studio Hours: 2

BIOL 320 Studies in Tropical Environments (3 crs)

Consent: Instructor Consent Required

Extended travel to study the biological diversity and natural history of terrestrial and aquatic organisms from a tropical environment. Emphasis on human impacts to tropical ecosystems.

Attributes: Special Course Fee Required Varies by Term/Section

Repeat: Course may be repeated

Lecture/Discussion Hours: 1

Lab/Studio Hours: 4

BIOL 321 Ecology (3 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223, or GEOL 312, or GEOG 200.

Core concepts and theories in ecology at the individual, population, community, and ecosystems levels and their applications.

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 323 Genetics (3 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223, or consent of instructor.

Basic principles of heredity and variation; genetic systems, structure and roles of nucleic acids, mutation, allelism, genes in development, genes in populations, and genetics in human life; genetic engineering and genomics.

Attributes: Undergraduate/Graduate Offering

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 324 Genetics Inquiry (2 crs)

Prerequisite: BIOL 305 or 323; CHEM 109 or 115; or consent of instructor.

A lab/discussion course involving methods of genetic and genomic analysis.

Lecture/Discussion Hours: 1

Lab/Studio Hours: 2

BIOL 325 Plant Systematics (4 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223.

Principles of classification, nomenclature, and determining evolutionary relationships among plants; survey of plant diversity including mosses, ferns, conifers, and flowering plants. Field identification of local flora.

Attributes: Field Trip(s) Required

Lecture/Discussion Hours: 3

Lab/Studio Hours: 3

BIOL 328 Conservation Biology (4 crs)

Prerequisite: GEOG 178 or BIOL 180, and one introductory (100 or 200-level) biology lab course [includes: BIOL 151, BIOL 181, BIOL 221, or BIOL 222 (if taken with or after BIOL 223)]. Minimum junior standing.

Scientific basis for conserving biological diversity. Explore global efforts in research, education, and advocacy for conserving genes, species, and ecosystems and their ecological and evolutionary processes. Applied engagement in habitat restoration, conservation research, and education.

Attributes: Service-Learning, Half 15 Hours, Field Trip(s) Required, Special Course Fee Required

Lecture/Discussion Hours: 3

Lab/Studio Hours: 3

BIOL 329 Biological Field Experiences (1-2 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223. Minimum junior standing.

Consent: Instructor Consent Required

• *Capstone for Environmental Science minors or comprehensive majors in Ecology and Environmental Biology.*

Group participation and collaboration with the community to engage in hands-on work experience or environmental education focusing on protecting/teaching about Wisconsin biodiversity through projects in habitat restoration, research, and education.

Attributes: Service-Learning, Full 30 Hours, Capstone Course, Field Trip(s) Required

Repeat: Course may be repeated for a maximum of 3 credits

BIOL 332 Field Botany (3 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223.

Field study of the flora and vegetation of Wisconsin. Includes sight recognition of plants, identification of unknown plants using keys, plant communities, an introduction to plant taxonomy, and specimen preparation.

Attributes: Field Trip(s) Required, Special Course Fee Required Varies by Term/Section

Lecture/Discussion Hours: 2

Lab/Studio Hours: 2

BIOL 338 Vegetation Ecology (4 crs)

Prerequisite: Minimum junior standing.

Patterns and processes in vegetation, with an emphasis on the natural vegetation of Wisconsin. Laboratories will include field methods and an introduction to multivariate statistical analyses.

Attributes: Field Trip(s) Required, Special Course Fee Required

Lecture/Discussion Hours: 2

Lab/Studio Hours: 4

BIOL 343 Applied Bioinformatics I (4 crs)

Prerequisite: DS 250, BIOL 323

Addresses tools and applications used in the analysis of biological sequence data. Topics include navigation of biological sequence databases, sequence-similarity searches, domain and motif prediction, sequence alignment, phylogenetic analyses, molecular evolution, and analysis of differential gene expression. Covers the biological and mathematical theory underlying these analyses, and provides practical, hands-on experience with computational tools implementing them.

Lecture/Discussion Hours: 4

Lab/Studio Hours: 0

BIOL 345 Invertebrate Zoology (4 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223.

An introduction to invertebrate animals with emphases on phylogenetic relationships, form, function, and ecology. Laboratory sessions include field trips for the purpose of collecting invertebrate animals and experiments to learn about the biology of invertebrates.

Attributes: Field Trip(s) Required, Special Course Fee Required

Lecture/Discussion Hours: 2

Lab/Studio Hours: 4

BIOL 350 Systems Neuroscience (4 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223, or grade of C or above in BIOL 319

How networks of neurons form the basis of higher brain function including sensory, motor, and integrative functions.

Lecture/Discussion Hours: 3

Lab/Studio Hours: 1

BIOL 351 Systems Neuroscience Lab (3 crs)

Prerequisite: Grade of C or above in BIOL 318 or BIOL 319, or consent of instructor

Methods to study systems of neurons as they relate to behavior and cellular mechanisms including electrophysiology, histology and immunocytochemistry.

Grading Basis: A-F Grades Only

Lecture/Discussion Hours: 2

Lab/Studio Hours: 2

BIOL 356 Vertebrate Biology (4 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223.

A course designed to provide a comparative overview of vertebrate diversity. Topics include the anatomy, physiology, behavior, and ecology of fishes, amphibians, reptiles, birds, and mammals within an evolutionary context. For students seeking a general understanding of vertebrate biology and skills in field identification.

Attributes: Field Trip(s) Required, Special Course Fee Required

Lecture/Discussion Hours: 3

Lab/Studio Hours: 3

BIOL 358 Cellular and Developmental Neuroscience (4 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223.

In-depth examination of molecular, cellular and developmental processes in the nervous system. Exposure to the primary literature. Students design, implement and interpret experiments in laboratory. Students will write a proposal based on work in laboratory.

Grading Basis: A-F Grades Only

Lecture/Discussion Hours: 3

Lab/Studio Hours: 2

BIOL 359 Biology of Stress (3 crs)

Prerequisite: BIOL 222 with a minimum grade of C; OR IDIS 125 with a minimum grade of C AND BIOL 221 with a minimum grade of C

• *Credit for this course can be applied toward the Biology major or minor and the Neuroscience major or minor.*

Exploration of stress response, an important survival mechanism that is found in all vertebrates. Includes an overview of stress, recent literature related to the biological aspects of stress, the wider implications of stress in our society and the ways that we can cope with and minimize stress in our lives.

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 361 Biology of Microorganisms (5 crs)

Prerequisite: BIOL 221, and one year of chemistry.

Study of microbial taxonomy, physiology, genetics, ecology, and morphology with environmental, industrial, agricultural, and medical applications.

Attributes: Undergraduate/Graduate Offering

Lecture/Discussion Hours: 3

Lab/Studio Hours: 4

BIOL 362 Field Zoology (3 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223.

Field trips and laboratories concerned with habitat observation, collection, and identification of local animals, with emphasis on the invertebrates and cold-blooded vertebrates.

Attributes: Field Trip(s) Required, Special Course Fee Required Varies by Term/Section

Lecture/Discussion Hours: 2

Lab/Studio Hours: 2

BIOL 365 Animal Behavior (4 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223, or one year of college zoology, or consent of instructor.

Study of animal behavior with emphasis on evolutionary approaches; topics include feeding adaptations, predator-prey interactions, habitat selection, communication, sociality, and mating strategies. Students work together on lab/field exercises and conduct a semi-independent research project.

Attributes: Field Trip(s) Required

Lecture/Discussion Hours: 2

Lab/Studio Hours: 4

BIOL 371 Medical Mycology (3 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223, and one semester of college chemistry. Minimum junior standing.

An introduction to the medically important fungi. Topics include fungal structure; superficial, cutaneous, and systemic mycoses; mechanisms of disease; host response to fungal infections and treatment/prevention.

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 374 Marine Biology (3 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223.

This course emphasizes evolutionary adaptations to the marine environment and interactions among marine organisms with their habitats. Communities studied include coral reefs, deep sea benthos, plankton, nekton, and intertidal assemblages. We rely heavily upon activities and discussion of the primary literature to make inferences about fundamental biological processes within the context of life in marine environments. Students will also be asked to consider the biological basis of major issues in marine conservation.

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 376 Aquatic Ecology (3-4 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223. Minimum junior standing.

•Two Saturday field trips are required.

Ecology of aquatic organisms in lakes and streams. Emphasis is placed on processes shaping the structure and dynamics of freshwater communities. Laboratory experiments and field trips required.

Attributes: Field Trip(s) Required, Special Course Fee Required

BIOL 379 Biology of Fishes (4 crs)

Prerequisite: BIOL 319

Anatomy, physiology, taxonomy, behavior, ecology, and evolution of fishes. Laboratory and field study of local freshwater species.

Attributes: Field Trip(s) Required, Special Course Fee Required

Lecture/Discussion Hours: 3

Lab/Studio Hours: 2

BIOL 380 Endocrinology (4 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223; CHEM 109 or CHEM 115.

Study of the relationships between histophysiology, chemistry, and disorders of the endocrine system; its interrelationships with the nervous system and how both contribute to bodily homeostasis.

Attributes: Undergraduate/Graduate Offering

Lecture/Discussion Hours: 3

Lab/Studio Hours: 3

BIOL 383 Biostatistics (4 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223; MATH 111 or MATH 114.

Practical applications of statistics are used to learn concepts and to develop skills. Graphical analysis, parameter estimation, and formal tests of hypotheses performed in the context of real biological studies using powerful statistical software.

Lecture/Discussion Hours: 3

Lab/Studio Hours: 2

BIOL 384 Biological Investigation (1-3 crs)

Consent: Instructor Consent Required

Designed for students participating in undergraduate/faculty collaborative research projects.

Repeat: Course may be repeated

Lecture/Discussion Hours: 1-3

Lab/Studio Hours: 0

BIOL 385 Undergraduate Seminar (1 cr)

Prerequisite: Minimum senior standing.

Presentation of current research topics in student-selected subareas of biology.

Attributes: Capstone Course

Lecture/Discussion Hours: 1

Lab/Studio Hours: 0

BIOL 386 Biology Research Methods (1-3 crs)

Prerequisite: Grades of C or above in BIOL 222 and BIOL 223.

Consent: Instructor Consent Required

Introduction to scientific inquiry. Focus on philosophy of science, nature of scientific data, methods of data collection, analysis of data and peer reviewed literature, and communication of scientific results.

Lecture/Discussion Hours: 1-3

Lab/Studio Hours: 0

BIOL 390 Biological Immersion Experience (1-4 crs)

Consent: Instructor Consent Required

Project-based, field intensive, biological immersion experience focusing on the nature of environmental controls on floral and faunal distribution within a geographic region. Societal influence and interaction with the biological realm will be emphasized.

Attributes: Field Trip(s) Required

Repeat: Course may be repeated for a maximum of 8 credits

Grading Basis: A-F Grades Only

BIOL 393 Junior Seminar in Bioinformatics (1 cr)

Prerequisite: Limited to Bioinformatics majors, junior standing, and BIOL 149; or instructor consent

Investigation and preparation for careers, internships, or graduate school in the field of bioinformatics through guest speakers, discussion, and preparation of professional materials.

Lab/Studio Hours: 0

Seminar: 1

BIOL 395 Directed Studies (1-3 crs)

Prerequisite: Minimum sophomore standing.

Consent: Department Consent Required

Directed study of a question or problem of biological interest, approved by the supervising faculty and the department chair.

Attributes: Special Course Fee Required Varies by Term/Section

Repeat: Course may be repeated

BIOL 396 Honors Research (1-7 crs)

Prerequisite: 12 credits and 3.50 GPA in biology courses. Minimum junior standing.

Individual research project under the direction of a research adviser.

Repeat: Course may be repeated for a maximum of 7 credits

BIOL 399 Independent Study - Juniors (1-3 crs)

Prerequisite: Minimum junior standing.

Consent: Department Consent Required

Independent study projects under the direction of a faculty member.

Repeat: Course may be repeated

BIOL 400 Medical Microbiology (3 crs)

Prerequisite: BIOL 361

An introduction to microorganisms that cause disease. Topics will include the biology and ecology of medically important fungi, parasites, viruses and bacteria; mechanisms of disease; host responses to microbial infections; treatment and prevention of various disease.

Attributes: Undergraduate/Graduate Offering

Grading Basis: A-F Grades Only

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 402 Current Topics in Virology and Immunology (4 crs)

Prerequisite: BIOL 361

Lectures and readings in immunology and virology. Emphasis on the mode of thinking and reasoning that led to earlier solutions. Discussions of current advances in the fields.

Attributes: Undergraduate/Graduate Offering

Lecture/Discussion Hours: 4

Lab/Studio Hours: 0

BIOL 405 Advanced Cell and Molecular Lab (4 crs)

Prerequisite: BIOL 305, BIOL 323, and CHEM 326 or instructor consent.

A lab/discussion course teaching methods in molecular/cell biology research using prokaryotic and eukaryotic systems, focusing on DNA/RNA analyses.

Lecture/Discussion Hours: 2

Lab/Studio Hours: 4

BIOL 409 Molecular Genetics (4 crs)

Prerequisite: BIOL 305, BIOL 323, and CHEM 352 or CHEM 452.

Molecular genetics comprehensively integrates biochemistry, molecular, and cellular biology and serves as the culminating biochemistry/molecular biology course. Topics include genomics, developmental genetic systems, organelle genomes, evolutionary genetics, immunogenetics, and medical genetics.

Lecture/Discussion Hours: 4

Lab/Studio Hours: 0

BIOL 423 Collaborative Research in Biology (3 crs)

Prerequisite: Minimum GPA of 3.0 in the biology major, and completion of at least one upper-division (300-level or higher) biology course. Minimum junior standing. Limited to biology majors and minors.

Consent: Instructor Consent Required

- *BIOL 383 is highly recommended prior to enrollment in this course.*

Students design and implement collaborative research projects to address special topics identified by the instructor. Student researchers will develop hypotheses and design studies to test them. The course emphasizes teamwork, data interpretation, and communication.

Attributes: Field Trip(s) Required

Repeat: Course may be repeated

Grading Basis: A-F Grades Only

BIOL 443 Applied Bioinformatics II (4 crs)

Prerequisite: BIOL 343

Application of bioinformatics skills and knowledge to develop and implement a research plan to answer a biological question using an advanced analysis of a large data set (such as whole genome-level data). Reading and understanding primary bioinformatics literature.

Attributes: LE-I1 Integration

Lecture/Discussion Hours: 4

Lab/Studio Hours: 0

BIOL 485 Issues in Biology (2 crs)

Prerequisite: Limited to biology majors and minors. No credit if taken after BIOL 385 or BIOL 497. Minimum senior standing.

Senior groups will use their education to locate and evaluate research on selected issues. Groups will produce a scholarly background paper, a creative presentation, and lead a discussion.

Attributes: Capstone Course

Lecture/Discussion Hours: 2

Lab/Studio Hours: 0

BIOL 489 Biology Honors Thesis (1 cr)

Prerequisite: Must have a resident, total, and biology GPA of at least 3.50

Consent: Instructor Consent Required

- *Student must have a research mentor prior to enrollment.*

Research and writing/preparation of Honors Thesis. Students are expected to make substantial intellectual contributions to the development, implementation, or scholarly interpretation of the project.

BIOL 490 Biological Field Studies (1-4 crs)

Prerequisite: One introductory and one upper-division biology course.

Consent: Instructor Consent Required

Extended travel to study field biology. Students record notes and data in the field and submit final written and/or oral reports. Field identification quizzes may also be required.

Attributes: Special Course Fee Required Varies by Term/Section

Repeat: Course may be repeated for a maximum of 4 credits

BIOL 491 Special Topics (1-3 crs)

Prerequisite: Minimum junior standing.

Lectures, laboratory, or field study covering specific areas not normally discussed in regular classes, and of special interest to students or faculty.

Repeat: Course may be repeated

BIOL 496 Student Academic Apprenticeship (1-2 crs)

Prerequisite: Sixteen credits in biology. Minimum junior standing. Limited to biology majors.

Consent: Instructor Consent Required

- *No more than two credits can be counted toward a biology major, comprehensive major or minor. A total of four credits may be taken between this course and BIOL 296. Note: only one S/U course can be applied to a standard major and up to two S/U courses can be applied to a comprehensive major.*

For qualified students, selected and supervised by faculty members, to facilitate teaching and learning in a specific course. Apprentices enhance their knowledge of biology and their ability to communicate that knowledge to other students.

Attributes: Service-Learning, Full 30 Hours, Capstone Course

Repeat: Course may be repeated for a maximum of 4 credits

Grading Basis: S/U Only Grade Basis

BIOL 497 Senior Research Presentation (1 cr)

Prerequisite: BIOL 395 or BIOL 399 or BIOL 499 or consent of instructor. Limited to biology majors and minors. Minimum senior standing. No credit if taken after BIOL 385 or BIOL 485.

Capstone for biology majors involved in field or laboratory research. Student will present independent research through an oral presentation or poster given at Student Research Day.

Attributes: Capstone Course

Lecture/Discussion Hours: 1

Lab/Studio Hours: 0

BIOL 498 Internship in Biology (1-3 crs)

Prerequisite: Minimum junior standing.

Consent: Department Consent Required

- Up to three credits may count in any of the comprehensive or standard majors in biology or biology minors.

Provides supervised on-the-job experience in a biologically-related area of interest.

Attributes: Service-Learning, Full 30 Hours, Internship

Repeat: Course may be repeated for a maximum of 6 credits

Grading Basis: S/U Only Grade Basis

BIOL 499 Independent Study - Seniors (1-3 crs)

Prerequisite: Minimum senior standing.

Consent: Department Consent Required

Independent study projects under the direction of a faculty member.

Repeat: Course may be repeated

BIOL 505 Molecular and Cell Biology (4 crs)

Prerequisite: Grades of C or above in BIOL 221, BIOL 222, and BIOL 223; and CHEM 104 or CHEM 109 or CHEM 115 or consent of instructor

- Dual-listed with BIOL 305. No credit after BIOL 305, BIOL 302, 304, 502 or 504

Current concepts in molecular/cell biology including structure/function of cells and cell organelles, gene function/regulation, and cell signaling.

Grading Basis: A-F Grades Only

Lecture/Discussion Hours: 4

Lab/Studio Hours: 0

BIOL 506 Infectious Disease Biology (3 crs)

Prerequisite: BIOL 111 or BIOL 221; and CHEM 104 or CHEM 109 or CHEM 115.

- Dual-listed with BIOL 306. Credit may not be earned in both courses.

Introduction to the realities of pathogens and parasites in our lives and their relationship to hosts, reservoirs, and environmental factors. Discussion of emerging and re-emerging diseases within the context of human, veterinary, wildlife, and planetary health.

Grading Basis: No S/U Grade Option

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 511 General Entomology (4 crs)

Prerequisite: BIOL 100 or BIOL 211 or grades of C or above in BIOL 222 and BIOL 223.

- Dual-listed with BIOL 311. Credit may not be earned in both courses.

Study of the structure, function, diversity, ecology, and management of insects. Field collection and laboratory identification of terrestrial and aquatic insects of Wisconsin.

Attributes: Field Trip(s) Required

Grading Basis: No S/U Grade Option

Lecture/Discussion Hours: 2

Lab/Studio Hours: 4

BIOL 515 Reproductive Physiology (3 crs)

Prerequisite: BIOL 222 and BIOL 223.

- Dual-listed with BIOL 315. Credit may not be earned in both courses.

Examination of the principles and mechanisms of reproduction in human. Social aspects of reproduction, including reproductive biotechnologies and reproductive health will also be discussed.

Grading Basis: No S/U Grade Option

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 523 Genetics (3 crs)

Prerequisite: No credit if taken after BIOL 300/500

- Cross-listed with BIOL 323. Credit may not be earned in both courses.

Basic principles of heredity and variation; genetic systems, structure and roles of nucleic acids, mutation, allelism, genes in development, genes in populations, and genetics in human life; genetic engineering and genomics.

Grading Basis: No S/U Grade Option

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 561 Biology of Microorganisms (5 crs)

Prerequisite: BIOL 111 or BIOL 221, and one year of chemistry. No credit if taken after credit earned in BIOL 250.

• *Dual-listed with BIOL 361. Credit may not be earned in both courses.*

Study of microbial taxonomy, physiology, genetics, ecology, and morphology with environmental, industrial, agricultural, and medical applications.

Grading Basis: No S/U Grade Option

Lecture/Discussion Hours: 3

Lab/Studio Hours: 4

BIOL 580 Endocrinology (4 crs)

Prerequisite: BIOL 211 or grades of C or above in BIOL 222 and BIOL 223; CHEM 104 or CHEM 109 or CHEM 115.

• *Dual-listed with BIOL 380. Credit may not be earned in both courses.*

Study of the relationships between histophysiology, chemistry, and disorders of the endocrine system; its interrelationships with the nervous system and how both contribute to bodily homeostasis.

Grading Basis: No S/U Grade Option

Lecture/Discussion Hours: 3

Lab/Studio Hours: 3

BIOL 600 Medical Microbiology (3 crs)

Prerequisite: BIOL 361/561

An introduction to microorganisms that cause disease. Topics will include the biology and ecology of medically important fungi, parasites, viruses and bacteria; mechanisms of disease; host responses to microbial infections; treatment and prevention of various disease.

Grading Basis: A-F Grades Only

Lecture/Discussion Hours: 3

Lab/Studio Hours: 0

BIOL 602 Current Topics in Virology and Immunology (4 crs)

Prerequisite: BIOL 361/561

• *Dual-listed with BIOL 402. Credit may not be earned in both courses.*

Lectures and readings in immunology and virology. Emphasis on the mode of thinking and reasoning that led to earlier solutions. Discussions of current advances in the fields.

Grading Basis: No S/U Grade Option

Lecture/Discussion Hours: 4

Lab/Studio Hours: 0

BIOL 704 Research Techniques (2 crs)

Consent: Instructor Consent Required

Emphasis on experimental design and specific techniques appropriate to the various subdisciplines in biology.

Repeat: Course may be repeated for a maximum of 6 credits

Grading Basis: No S/U Grade Option

Lecture/Discussion Hours: 2

Lab/Studio Hours: 0

BIOL 791 Directed Studies (1-3 crs)

Consent: Instructor Consent Required

Lectures, laboratory, or field study covering specific areas not normally included in regular classes, and of special interest to students and/or faculty.

Repeat: Course may be repeated for a maximum of 7 credits

Grading Basis: No S/U Grade Option

BIOL 797 Independent Study (1-3 crs)

Consent: Department Consent Required

Independent study projects under direction of a faculty member.

Repeat: Course may be repeated for a maximum of 6 credits

Grading Basis: No S/U Grade Option

BIOL 799 Thesis (1-6 crs)

• *Full-time equivalent.*

A description of acceptable topics and the precise nature of the thesis requirement is provided in the departmental program descriptions.

Repeat: Course may be repeated for a maximum of 6 credits

Grading Basis: PR Only Grade Basis