

Biology Courses (BIOL)

Courses

BIOL 1012 (840:012). Life: The Natural World — 3 hrs.

Examines living organisms with an emphasis on how the natural world functions as a system and how plants and animals, including humans, interact. Declared biology majors cannot receive either university or elective credit for this course. Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics. (Fall and Spring)

BIOL 1013 (840:013). Life: The Natural World - Lab — 1 hr.

Activities illustrating the importance, origins, and maintenance of biodiversity with a focus on the interactions among organisms and between organisms and the environment. Declared biology majors cannot receive either university or elective credit for this course. Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics. Prerequisite(s) or corequisite(s): BIOL 1012 (840:012). (Fall and Spring)

BIOL 1014 (840:014). Life: Continuity and Change — 3 hrs.

Introduction to contemporary topics in biology. Emphasis on study of gene structure and function and applications of biology to human concerns. Declared biology majors cannot receive either university or elective credit for this course. Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics. (Fall and Spring)

BIOL 1015 (840:015). Life: Continuity and Change - Lab — 1 hr.

Process of science and application of biology to human concerns stressed through student activities involving basic life science concepts encompassing cell structure and function, human genetics, and disease transmission. Emphasis on assisting students in understanding role of biology in our present society. Lab, 2 periods. Declared biology majors cannot receive either university or elective credit for this course. Prerequisite(s): student must have satisfied university entrance requirements in English and Mathematics. Prerequisite(s) or corequisite(s): BIOL 1014 (840:014) or equivalent. (Fall and Spring)

BIOL 1033 (840:033). Principles of Microbiology — 4 hrs.

Basic concepts and practical applications of microbiology in daily life; health and disease including basic aspects of immunology and host-microbe interactions. Designed for students majoring in areas other than the sciences. For biology majors and minors counts only for university elective credit. Sections may be offered exclusively for nurses in training. Discussion, 3 periods; lab, 2 periods. (Fall)

BIOL 2051 (840:051). General Biology: Organismal Diversity — 4 hrs.

Study of organismic biology emphasizing evolutionary patterns and diversity of organisms and interdependency of structure and function in living systems. Discussion, 3 periods; lab, 2 periods. Prerequisite(s): BIOL 2051 (840:051) and BIOL 2052 (840:052) cannot be taken concurrently. (Fall and Spring)

BIOL 2052 (840:052). General Biology: Cell Structure and Function — 4 hrs.

Introduction to the properties and functions of biological molecules, organization of living cells, production and utilization of energy, and development of multicellular organisms. Discussion, 3 periods; lab, 2 periods. Prerequisite(s): BIOL 2051 (840:051) and BIOL 2052 (840:052) cannot be taken concurrently. (Fall and Spring)

BIOL 3100 (840:100). Evolution, Ecology and the Nature of Science — 3 hrs.

Unifying principles of biology: how organisms interact with each other and the environment, the genetic continuity of life, and how past history affects life. Readings and student-led discussions explore concepts in detail. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); CHEM 1110 (860:044) and CHEM 1120 (860:048), or CHEM 1130 (860:070). BIOL 3100 (840:100) and BIOL 3140 (840:140) cannot be taken concurrently. (Fall and Spring)

BIOL 3101 (840:101). Anatomy and Physiology I — 4 hrs.

Structure and function of organ systems of human body. For students in allied health fields or other university-approved programs. Others must have consent of department head. For Biology majors and minors, counts only for university elective credit. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); CHEM 1110 (860:044) and CHEM 1120 (860:048), or CHEM 1130 (860:070), or consent of department head. (Fall, Spring, Summer)

BIOL 3102 (840:102). Anatomy and Physiology II — 4 hrs.

Continuation of BIOL 3101 (840:101). For students in allied health fields or other university-approved programs. Discussion, 3 periods; lab, 2 periods. Prerequisite(s): C- or better in BIOL 3101 (840:101) or BIOL 3106 (840:106). (Fall, Spring, Summer)

BIOL 3106 (840:106). Vertebrate Anatomy — 4 hrs.

Consideration of the origin and evolution of vertebrates and comparison of vertebrate structure and function. Discussion, 2 periods; lab, 4 periods. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); CHEM 1110 (860:044) and CHEM 1120 (860:048), or CHEM 1130 (860:070). (Spring)

BIOL 3107. Environmental Physiology — 3 hrs.

Introduction to how animals physiologically adapt to the various unique environmental conditions in which they live. Lecture, 3 hours. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); CHEM 1110 (860:044) and CHEM 1120 (860:048), or CHEM 1130 (860:070). (Variable)

BIOL 3108 (840:108). Vertebrate Histology — 4 hrs.

Microscopic study of cells and tissues from various vertebrate organ systems. Integration of gross anatomy and physiology through illustrating how microscopic ultrastructure is related to organ function. Discussion, 2 periods; lab, 4 periods. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); CHEM 1110 (860:044) and CHEM 1120 (860:048), or CHEM 1130 (860:070). (Variable)

BIOL 3112 (840:112). Invertebrate Zoology — 4 hrs.

Morphology, physiology, phylogeny, taxonomy, and ecology of the invertebrates. Discussion, 2 periods; lab, 4 periods. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); CHEM 1110 (860:044) and CHEM 1120 (860:048), or CHEM 1130 (860:070). (Variable)

BIOL 3118. Marine Biology — 3 hrs.

Study of the diversity of life in the ocean, including marine ecology, physiology, and current issues in oceanography. Discussion, 3 periods. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); CHEM 1110 (860:044) and CHEM 1120 (860:048), or CHEM 1130 (860:070). (Variable)

BIOL 3120 (840:120). Plant Diversity and Evolution — 4 hrs.

Form and function in vegetative and reproductive organs in all plant divisions, from algae to flowering plants, and their importance in

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evolutionary thought and plant classification. Lecture, 3 periods; lab, 2 periods. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); CHEM 1110 (860:044) and CHEM 1120 (860:048), or CHEM 1130 (860:070). (Spring)

BIOL 3140 (840:140). Genetics — 4 hrs.

Analytical approach to classical, molecular, and population genetics. Discussion, 3 periods; lab, 2 periods. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); CHEM 1110 (860:044) and CHEM 1120 (860:048), or CHEM 1130 (860:070). BIOL 3100 (840:100) and BIOL 3140 (840:140) cannot be taken concurrently. (Fall and Spring)

BIOL 3147 (840:147). Cancer and Emerging Infectious Diseases — 3 hrs.

Cellular and molecular study of cancer, its epidemiology, standard and novel cancer treatments, examination of emerging and re-emerging infectious diseases, their causative organisms, and human immune responses to them. Discussion, 3 periods. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); CHEM 1110 (860:044) and CHEM 1120 (860:048), or CHEM 1130 (860:070). (Spring)

BIOL 3151 (840:151). General Microbiology — 4 hrs.

Physiology, morphology, taxonomy, immunology, and pathogenicity of microbes, with applications to medicine, agriculture, sanitation, and industry. Discussion, 2 periods; lab, 4 periods. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); CHEM 1110 (860:044) and CHEM 1120 (860:048), or CHEM 1130 (860:070). (Fall and Spring)

BIOL 3160 (840:160). Field Zoology of Vertebrates — 4 hrs.

Identification and natural history of Iowa vertebrates. Emphasis on field trips. Discussion, 2 periods; lab and field work, 6 periods. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); CHEM 1110 (860:044) and CHEM 1120 (860:048), or CHEM 1130 (860:070). (Spring)

BIOL 3170 (840:170). Entomology — 3 hrs.

Introduction to biology of insects. Discussion, 2 periods; lab, 2 periods. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); CHEM 1110 (860:044) and CHEM 1120 (860:048), or CHEM 1130 (860:070). (Variable)

BIOL 3174 (840:174). Field Biology: _____ — 1-3 hrs.

Selected topics in field biology, emphasizing hands-on techniques for field observation, and testing of evolutionary and ecological hypotheses. Offered both on- and off-campus in flexible format. Topics and hours listed in Schedule of Classes. May be repeated for credit on different topic. Prerequisite(s): vary with topic. (Variable)

BIOL 3179 (840:179). Cooperative Education — 1-6 hrs.

Up to 12 hours of ungraded credit (credit/no credit basis) may be taken as university electives. (Fall, Spring, Summer)

BIOL 3181 (840:181). Investigations in Life Science — 4 hrs.

Introduction to significant life science concepts and models of effective teaching related to elementary school life science. Topics include cellular structure and function, inheritance, plant systems, and human systems. Discussion and/or lab, 5 periods. Prerequisite(s): SCI ED 1200 (820:032). (Odd Falls)

BIOL 3185 (840:185). Readings in Biology — 1-3 hrs.

Independent readings in biology from selected list approved in advance. Maximum of 3 hours for biology major or minor. Prerequisite(s): consent of department. (Fall, Spring, Summer)

BIOL 3189 (840:189). Seminar — 1-2 hrs.

(Variable)

BIOL 3190 (840:190). Undergraduate Research in Biology — 1-3 hrs.

Research activities under direct supervision of Biology faculty members. Credit determined prior to registration based upon student proposal with agreement of faculty advisor. May be repeated for maximum of 4 hours. Prerequisite(s): BIOL 2051 (840:051); BIOL 2052 (840:052); sophomore standing; consent of department. (Fall, Spring, Summer)

BIOL 3191 (840:191). Senior Thesis — 1 hr.

Senior research thesis. Open only to and required for students pursuing the B.S. Biology or B.A. Biology Honors Emphasis. Prerequisite(s): consent of department head. (Fall, Spring, Summer)

BIOL 4105/5105 (840:105g). Wildlife Ecology and Management — 4 hrs.

Applied population management of game and nongame wildlife. Lab emphasizes field techniques, population modeling, and habitat management planning. Discussion, 3 periods; lab, 3 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Odd Falls)

BIOL 4108/5108. Biodiversity Conservation Policy — 3 hrs.

Review of laws and policies affecting endangered species, ecosystem management, and biodiversity conservation in the United States. Discussion, 3 periods; lab, 2 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Even Springs)

BIOL 4114/5114 (840:114g). Comparative Animal Physiology — 4 hrs.

Physical and chemical basis of cellular/organ functions across various animal phyla. Discussion, 3 periods; lab, 3 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); CHEM 2040 or CHEM 2210 (860:120); junior standing. (Even Falls)

BIOL 4116/5116 (840:116g). Neurobiology — 3 hrs.

Survey of vertebrate nervous systems. Examination of several levels of organization ranging from molecules to neurons to larger systems in the brain. Discussion, 3 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); CHEM 2040 or CHEM 2210 (860:120); junior standing. (Spring)

BIOL 4121/5121 (840:121g). Plant Biotechnology — 4 hrs.

Highlights the theory and applications of plant tissue cultures, genetic engineering (including use of plants for production of antibodies and vaccines), marker-assisted selection, and genomics. Lab component gives students practical experience with the biotechnology applications discussed in lecture. Discussion, 2 periods; lab, 4 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Odd Falls)

BIOL 4122/5122 (840:122g). Plant Physiology — 4 hrs.

How plants work: uptake and use of water and materials, synthesis and transport of organic compounds, growth and development, and responses to environment. Lecture, 3 periods; lab, 3 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); CHEM 2040 or CHEM 2210 (860:120); junior standing. (Variable)

BIOL 4127/5127 (840:127g). Bioinformatics Applications for Biology — 3 hrs.

Introduction to computer based analyses and management applications for molecular biological data. Topics include bioinformatics history, instrumentation, PC applications, resources, data bases, and discussions of genomics and proteomics applications. Discussion, 3 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Variable)

BIOL 4128/5128 (840:128g). Cell Biology — 4 hrs.

Foundation in cell structure, organization, and function, with emphasis on signal transduction, cell trafficking and cell cycle control. Lab will emphasize developing laboratory skills and improving analytical and writing abilities. Discussion, 3 periods; lab, 3 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); CHEM 2040 or CHEM 2210 (860:120); junior standing. (Spring)

BIOL 4129/5129 (840:129g). Genomics — 3 hrs.

Genome sequencing, analysis of sequence variation, sequencing for disease diagnosis, comparative genomics, personal genomics, the epigenome in disease development, analysis of gene expression. Discussion, 2 periods; lab, 2 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Even Falls)

BIOL 4137/5137 (840:138g). Vertebrate Physiology — 4 hrs.

Study of functional mechanisms for cellular processes in select vertebrate organ systems. Discussion, 3 periods; lab, 3 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); CHEM 2040 or CHEM 2210 (860:120); junior standing. (Odd Falls)

BIOL 4142/5142 (840:142g). Evolutionary Biology — 3 hrs.

Conceptual overview of evolutionary theory, mechanisms of evolutionary process, speciation and major evolutionary events. Discussion, 3 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Spring)

BIOL 4144/5144 (840:144g). Virology — 4 hrs.

Introduction to virus structure, replication, genetics, pathogenicity, host interactions, detection, epidemiology, evolution, and virology methods. Health, agriculture, research and industry applications. Discussion, 3 periods; lab, 2 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Even Springs)

BIOL 4146/5146 (840:146g). Developmental Biology of Animals — 4 hrs.

Major concepts and central questions of animal development and controlling mechanisms. Laboratory emphasis on experimental inquiry and developmental anatomy. Discussion, 3 periods; lab, 2 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Fall)

BIOL 4150/5150 (840:150g). Immunology — 4 hrs.

Focus on multiple levels of human immunity, from organs/cells to molecular events. Basic immunology and relationships between immunology and various disease states. Laboratory experiences include many commonly-used immunology techniques. Discussion, 3 periods; lab, 3 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Fall)

BIOL 4157/5157 (840:157g). Biostatistics — 3 hrs.

Introduction to methods used to analyze and interpret quantitative biological data. Emphasis on parametric statistics; use of "R" software for data analysis and presentation. Lecture, 2 hours; lab, 2 hours. Prerequisite(s): MATH 1140 (800:046), or MATH 1120 (800:056) and MATH 1130 (800:044), or MATH 1420 (800:060), or equivalent; BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Fall)

BIOL 4164/5164 (840:164g). Mammalogy — 4 hrs.

Biology of mammals, including evolutionary history, zoogeography, ecology, and diversity. Laboratory emphasis on identifications, natural history, and field techniques. Lecture, 3 periods; lab and field, 3 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Fall)

BIOL 4166/5166 (840:166g). Plant Systematics — 4 hrs.

Classification and identification of vascular plants, with emphasis on evolution of species and larger groups. Discussion, 2 periods; lab and field work, 4 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Odd Falls)

BIOL 4167/5167 (840:167g). Conservation Biology — 3 hrs.

Biodiversity and threats to it, extinction, conservation of endangered species, protected areas, ex situ conservation, private land conservation, ecological economics. Lecture/discussion, 3 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Spring)

BIOL 4168/5168 (840:168g). Ecology — 4 hrs.

Principles of organismal adaptation, species interactions, and population, community, and ecosystem structure/dynamics. Lab emphasizes student-led experiments, data analysis, and scientific writing. Lecture/discussion, 3 periods; lab, 3 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Fall)

BIOL 4172/5172 (840:172g). Developmental Plant Anatomy — 4 hrs.

Structure and function of flowering plants, with emphasis on cell and organ development. Lecture, 2 periods; lab, 4 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Even Falls)

BIOL 4180/5180 (840:180g). Restoration Ecology — 4 hrs.

Ecological principles applied to restoration of degraded ecosystems. Lab covers hands-on techniques in regional restoration and reconstruction. Discussion, 3 periods; lab, 3 periods. Prerequisite(s): BIOL 3100 (840:100); BIOL 3140 (840:140); junior standing. (Odd Springs)

BIOL 4198 (840:198). Independent Study — 1-6 hrs.

(Fall, Spring, Summer)

BIOL 6202 (840:202). Graduate Colloquium and Scientific Skills — 2 hrs.

Regular presentations by students, faculty members, or visitors on biological topics combined with instructional guidance to build scientific literacy, writing, and statistical skills. Taken each semester for four semesters for maximum of 8 hours. Discussion, 2 periods. (Fall and Spring)

BIOL 6230 (840:230). Special Problems in Biology — 1-6 hrs.

Credit determined at registration. (Problems in biology other than those for theses or in regular curricular offerings.) May be repeated. Prerequisite(s): BIOL 6292 (840:292) recommended; consent of department. (Fall, Spring, Summer)

BIOL 6240 (840:240). Advanced Cellular and Molecular Biology — 3 hrs.

Selected topics concerning understanding of function of living organisms at molecular and cellular level: regulatory mechanisms, recombinant DNA techniques, gene expression, and genetics of diseases. Lecture/discussion, 3 periods. May be repeated on different topic. Prerequisite(s): consent of instructor. (Odd Springs)

BIOL 6250 (840:250). Advanced Physiology and Development — 3 hrs.

Selected topics concerning understanding of organ, organ system, and organism structure and function: immune system, cellular signaling mechanisms, photosynthesis, and cell motility and development. Lecture/discussion, 3 periods. May be repeated on different topic. Prerequisite(s): consent of instructor. (Odd Falls)

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BIOL 6260 (840:260). Advanced Ecology — 3 hrs.

Selected topics of ecology, concerning the understanding of relationships among organisms, and between organisms and their environments (natural or artificial): physiological ecology, conservation biology, and aquatic ecology. Lecture/discussion, 3 periods. May be repeated on different topic. Prerequisite(s): consent of instructor. (Even Springs)

BIOL 6270 (840:270). Advanced Systematics and Evolutionary Biology — 3 hrs.

Selected topics concerning understanding of systematic and evolutionary relationships among organisms and evolutionary biology: evolutionary theory, systematics, and origin of life. Lecture/discussion, 3 periods. May be repeated on different topic. Prerequisite(s): consent of instructor. (Even Falls)

BIOL 6289 (840:289). Seminar — 1 hr.

May be repeated for credit. (Variable)

BIOL 6292 (840:292). Research Methods in Biology — 1 hr.

Introduction to research methods in biology. Emphasis on literature review, proposal preparation, and manuscript style. Discussion, 1 period. (Fall and Spring)

BIOL 6297 (840:297). Practicum — 2 hrs.

May be repeated. (Variable)

BIOL 6299 (840:299). Research.

Prerequisite(s): consent of department. (Fall, Spring, Summer)

BIOL 629R (840:29R). Directed Research.

(Fall, Spring, Summer)