

Biology, Pharmacology, and Toxicology (BIOL, PCTX)

BIOL 091 Professional Practice I Cr. 0.
BIOL 092 Professional Practice II Cr. 0.
BIOL 093 Professional Practice III Cr. 0.
BIOL 094 Professional Practice IV Cr. 0.
BIOL 095 Professional Practice V Cr. 0.

BIOL 100 Introduction to the Biological

World Cr. 3. Principles of biological organization from molecules through ecosystems. Emphasis on processes common to all organisms and on concepts related to problems of current importance. No credit towards a degree in IU Allied Health. Credit given for only one of the following: BIOL 100, BIOL 250, or BIOL N200. (fall, spring, summer)

BIOL 100L Introduction to the Biological

World Laboratory Lab 2, Cr. 1. P or C: BIOL 100. Laboratory exercises and experiments that illustrate selected principles of biology.

BIOL 105 Medical Terminology Cr. 1.

Emphasis on learning the meanings of the more common word elements associated with medicine and applying that knowledge to define medical terms. (fall, spring)

BIOL 108 Biology of Plants Class 3,

Lab. 2, Cr. 4. P: placement at or above ENG W131 and MA 153 (or equivalents) and exemption from or completion of ENG R150. Introduction to growth, functioning, structure, heredity, and diversity of plants and their interactions with the environment. Designed for agriculture and prepharmacy majors. (fall)

BIOL 109 Biology of Animals Class 3,

Lab. 2, Cr. 4. P: placement at or above ENG W131 and MA 153 (or equivalents) and exemption from or completion of ENG R150. Introduction to the structure, functioning, heredity, development, classification and evolution of animals, and their interactions with the environment. Designed for agriculture and prepharmacy majors and certain options in Allied Health. (spring)

BIOL 117 Principles of Ecology and Evolution Class 3, Lab. 3, Cr. 4.

P: placement at or above ENG W131 and MA 153 (or equivalents) and exemption from or completion of ENG R150. Principles of organismic and evolutionary biology; a phylogenetic synopsis of the major groups of organisms from viruses to vertebrates;

an introduction to genetic, evolutionary, and ecological processes; population biology; community ecology; and behavior. This course is open only to science majors. Instructor's permission required for non-biology majors. (fall)

BIOL 119 Principles of Structure and Function Class 3, Lab. 3, Cr. 4.

P: placement at or above ENG W131 and MA 153 (or equivalents) and exemption from or completion of ENG R150.

Introduction to the structure and function of biological organisms at the cellular and organismal levels. Principles of cell structure, function, and information; energy flow within cells; structure of function of plants and animals; integration of physiological processes; development of plants and animals. This course is open only to science majors. Instructor's permission required for non-biology majors. (spring)

BIOL 200 Pathology Cr. 3. P: 203–204.

A survey of the changes that occur in the diseased state to include general concepts of disease, causes of disease, and their clinical presentation. The course will emphasize the study of disease processes in the whole organism and include specific systemic pathology. (fall, spring)

BIOL 203 Human Anatomy and Physiology Class 2, Lab. 2, Cr. 3.

P: placement at or above ENG W131 (or equivalent) and exemption from or completion of ENG R150. One year high school biology and/or one year high school chemistry or equivalent. A survey of normal structure and function of the human organism. The human is treated as an open system with the capacity to transport material, transform energy, and maintain a homeostatic state. The capacities and limitations of the human to cope with changes in the environment are emphasized. All major systems of the human body and their functions are examined in relation to the living organism. Integrated into the study of the human organism are laboratory exercises that emphasize the essentials of human anatomy and physiology. (fall, spring, summer)

BIOL 204 Human Anatomy and Physiology Class 2, Lab. 2, Cr. 3. P: 203.

Continuation of BIOL 203. (fall, spring, summer)

BIOL 209 Microbiology for Dental Hygiene Students Class 3, Lab. 2, Cr. 4.

P: one semester of biology and one semester of chemistry. An introductory foundation in general and medical microbiology with emphasis on dental microbiology. Host-parasite relationships between humans and microbes (bacteria, viruses, protozoa, and fungi) are explored with emphasis on epidemiologic principles of disease transmission, treatment, and prevention. In the laboratory, sterile techniques and methods for isolating microbes are learned, the structure and function of microbes isolated from the human body (e.g., oral cavity) are studied, and disinfection and sterilization principles are explored. (spring)

BIOL 215 Basic Human Anatomy Class 2, Lab. 4, Cr. 4.

P: placement at or above ENG W131 and MA 153 (or equivalent) and exemption from or completion of ENG R150. Introduction to anatomy using cadavers and anatomical models for investigations. Emphasis is given to the interrelationships of bones, muscles, nerves, and blood vessels from a regional approach. Specifically designed for students for whom BIOL 203–204 is not accepted. (fall)

BIOL 216 Basic Mammalian Physiology

Class 3, Lab. 3, Cr. 4. P: one semester of chemistry. R: 215. Introduction to physiology emphasizing homeostasis and interrelationships of body functions, cells to systems. Includes selected functional anatomy. Specifically designed for students in IU Allied Health programs, nursing, and physical education for whom BIOL 203–204 is not accepted. (spring)

BIOL 217 Intermediate Ecology Class 2,

Lab. 3, Cr. 3. P: 117 and 119 or equivalent. Ecological principles of populations, communities, and ecosystems; interaction of biotic and abiotic factors regulating population and community structure; case studies, field studies, and simulation models of life history attributes, competition, predation, parasitism, and mutualism. This course is open only to science majors. Instructor's permission required for non-biology majors. (fall)

BIOL 218 Genetics and Molecular

Biology Class 3, Lab. 3, Cr. 4. P: 117, 119, and CHM 116 or permission of instructor.

The course will cover the principles of classical and molecular genetics. Mendelian inheritance, linkage, gene interaction and chromosomal aberrations, nucleic acids structure, gene function (replication, transcription, and translation), mutation and repair, regulation of gene expression, genetic engineering. The laboratory experiments include linkage mapping in *Drosophila*, allozyme variation in fish, DNA extraction, electrophoresis, restriction enzyme analysis, gene isolation by polymerase chain reaction (PCR). This course is open only to science majors. Instructor's permission required for non-biology majors. (spring)

BIOL 219 Principles of Functional

Biology Class 2, Lab. 3, Cr. 3. P: 117, 119, and CHM 116 or permission of instructor.

This course will cover selected topics in both plant and animal physiology: photosynthesis, respiration, nutrition, solute and water transport, plant and animal hormones, neural control in animals, osmoregulation, and reproduction. Some laboratory time will be devoted to smallgroup discussions. This course is open only to science majors. Instructor's permission is required for non-biology majors. (spring)

BIOL 220 Microbiology for Allied Health

Professionals Class 3, Lab. 2, Cr. 4. P: 203, CHM 104 or 111. The biology of microorganisms (bacteria, viruses, fungi, protozoa, and algae) and their interactions with humans. Emphasis on microbes with medical and/or public health significance. Specific areas of study include characteristics, metabolism, and genetics of bacteria; host-parasite interactions; factors affecting human health and disease states; principles of disinfection and sterilization; epidemiology of infectious disease with emphasis on transmission, prevention, and treatment; and nosocomial infection risks and prevention. This course is designed for nursing and Allied Health students. (fall, spring, summer)

BIOL 250 Women and Biology Cr. 3.

P: sophomore standing. For nonmajors. An examination of modern concepts in biology. The scientific method will be examined and feminist criticisms of science will be discussed. The topics of reproduction and

development, heredity, and ecology will be used as focal points for an in-depth discussion of the conceptual framework of biology and feminist criticism thereof. Cannot be used for Group A or B elective for biology majors. Credit given for only one of the following: BIOL 100, BIOL 250, or BIOL N200.

BIOL 295 Special Assignments Class

0-3, Lab. 0-6, Cr. 1-3 (V.T.) Special work such as directed reading, library research, and laboratory or field research. The field in which studies are performed will be indicated on the student's record. The substance of the project must be agreed upon by the student and a faculty member and approved by the chair. (fall, spring, summer)

BIOL 304 Major Ideas in Biology Cr. 3

P: an introductory course in biology. Major ideas in biology such as immunization, spontaneous generation, inheritance, evolution, genetic engineering, and ecology will be examined. Students will analyze the methodology and results that lead to understanding these ideas. Small-group discussion, oral presentations, and written papers will be used to study the impact of these ideas on other areas such as economics, politics, or religion. Cannot be used as a group A or B elective for biology majors.

BIOL 315 Developmental Anatomy

Class 2, Lab. 4, Cr. 4. P: 119 or 109. Comparative study of the vertebrate embryology and adult anatomy of selected vertebrates, including humans. (spring)

BIOL 326 Heredity: A Human Perspective

Cr. 3. P: 100, junior standing, and completion of General Education Area I or instructor's permission. Advances in genetics will be examined using diverse topics such as cloning and alteration of human genes and/or embryos, genetic screening, and genetic manipulation of other organisms. Students will gain understanding of basic methods utilized by geneticists and learn to critically analyze published data. Reading the discussions related to ethical, social, political, and economic issues will help assess the impact of current developments in genetics. Research on a selected topic leading to an oral presentation and a term paper will provide opportunities for

synthesis. Some hands-on laboratory experience will also be an integral part of this course. Cannot be used as a group A or B elective for biology majors.

BIOL 327 Biology of Aging Cr. 3. This course presents a basic understanding of how the human body ages from the biological standpoint. The student will gain an understanding of biological and physiological changes associated with aging in various organ systems. Discussions of potential intervention strategies and ways to extend the quality of life during aging will be presented. The course is primarily geared toward the student interested in obtaining a certificate in gerontology; it cannot be used as a biology elective for biology majors.

BIOL 334 Clinical Pathophysiology Cr. 4. P: 203–204 or equivalent. A functional study of pathophysiology of major physiological systems of a human with special emphasis on clinical applications for baccalaureate nursing and allied health professionals. Major topics to be covered include fluid and electrolyte balance, medical genetics, and the pathophysiology of the cardiovascular, respiratory, digestive, hepatic, endocrine, immune, renal, and neural systems.

BIOL 335 Animal Behavior Cr. 3. P: 117, 119, or equivalent. Instinct vs. learning; genetics and development of learning; neurobiology; behavioral ecology: habitat selection, mating systems, foraging behavior; sociobiology and human behavior.

BIOL 336 Animal Behavior Lab Lab. 3, Cr. 1. C: 335 or permission of instructor. Discussion of methods for collecting and assessing behavioral data; experiments examining learning, thermoregulation, foraging, and habitat use. Experiments will be conducted as group projects.

BIOL 345 Vertebrate Biology Class 3, Lab. 3, Cr. 4. P: 117, 119. Vertebrate diversity and the manner in which species are designed for their particular lifestyles, the relatedness and origins of the major vertebrate taxa, the basic vertebrate body plan, adaptations for feeding and locomotion, natural history of selected vertebrates, current conservation issues regarding vertebrates. Field experiences will include two weekend day trips.

BIOL 349 Environmental Science Cr. 3.

P: junior or senior class standing. Examines current major environmental issues through an investigation of the scientific and political aspects of human population growth, degradation of natural resources, and environmental regulations. Cannot be used as a Group A or B elective for biology majors. (spring)

BIOL 350 Plant Physiology Class 3,

Lab. 3, Cr. 4. P: 108 and one semester of general chemistry. Basic physiological processes and their relationship to plant structure and function. Laboratory experiments provide personal experience with a broad range of physiological phenomena.

BIOL 381 Cell Biology Cr. 3. P: 119. R:

one semester of organic chemistry or permission of instructor. Details of cell structure and function, biochemical aspects of energy and information flow in eukaryotic and prokaryotic cells, cellular differentiation and function of specialized eukaryotic cells. Course open only to science majors. (fall)

BIOL 382 Laboratory in Cell Biology

Lab. 3, Cr. 1. C: 381. Experimental methods in cell biology with emphasis on biochemical methods for exploring cell structure and function. Cell division and differentiation will also be addressed. (fall)

BIOL 434 Marine Community Ecology

Class 2, Lab. 1, Cr. 3. P: one year of college biology; second semester may be taken concurrently. Lecture involves a survey emphasizing tropical marine communities including coral reefs, mangrove estuaries, turtle grass, and hard and soft substrate intertidal communities. Community processes such as predation, competition, mutualism, zonation, and behavior are discussed as well as physical-chemical factors such as tides, currents, waves, and salinity. Course includes a required field trip to a marine biological station over spring break for the lab portion. Student required to pay for expenses associated with field trip. Prerequisite for field trip: swimming/snorkeling ability; use of scuba gear is optional. (spring)

BIOL 437 General Microbiology Class 3, Lab 3, Cr. 4. P: 117 and 119 or equivalents; P or C: CHM 255. An examination of microbial diversity that emphasizes the interrelationship between bacteria and their environments. Special emphasis is given to metabolic diversity, control of microbial growth and interactions of pathogenic microorganisms with their hosts. The laboratory is designed to complement the lecture and emphasizes pure culture techniques, isolation and identification of unknown organisms, measurement and control of microbial growth and studies of human commensal organisms.

BIOL 445 Aquatic Biology Class 2, Lab. 3, Cr. 3. P: 117 and one year of general chemistry. Introduction to the roles of physical and chemical factors, predation, and competition in determining the abundance of freshwater organisms and regulating the productivity of lake ecosystems. Laboratories emphasize field work and group or individual projects at the Crooked Lake Biological Station. (fall)

BIOL 455 Animal Physiology Cr. 3. P: 219 and CHM 255. Analysis of selected vertebrate and invertebrate physiological systems as an introduction to animal physiology. Neural and hormonal mechanisms of cellular communication and the roles played by these mechanisms in the action of specialized tissues; systemic and comparative physiology of respiration, circulation, muscle contraction, osmo-regulation, and sensory transduction. Emphasis on relationships between system function and underlying cellular mechanisms. Students also must enroll in

BIOL 456. (spring)

BIOL 456 Laboratory in Animal Physiology Lab. 3, Cr. 1. C: 455. P: CS 106. Laboratory exercises stress the mechanisms of physiological processes and the analysis of these processes in quantitative terms. (spring)

BIOL 491 Senior Biology Seminar Cr. 1. Students critique and discuss seminar presentations. Each student must select a topic and give an oral presentation on it. Open only to senior biology majors. (fall, spring)

Dual Level, Undergraduate-Graduate

BIOL 502 Conservation Biology Cr. 3.

P: 217 and 218. An investigation of the foundations of conservation biology and emergent topics within the field: conservation ethics, the Endangered Species Act, island biogeography, effective population size, minimum viable populations, edge effects, managing for threatened species, and refuge design.

BIOL 505 Biology of Invertebrate

Animals Class 2, Lab. 3, Cr. 3. P: 109 or 117 and 119. A survey of the invertebrate animals, their morphology, physiology, ecology, and phylogeny.

BIOL 506 Human Molecular Genetics

Cr. 3. P: 218; one semester of organic chemistry or biochemistry or signature of instructor. A molecular characterization of the human genome, cloning human disease genes, the molecular basis of human genetic disorders that are due to biochemical defects and chromosomal abnormalities, molecular approaches in diagnosis of human disorders, mapping of human genes, and gene therapy. (spring)

BIOL 509 Molecular Biology and

Applications Cr. 3. P: 218, and CHM 254 or CHM 533, or consent of instructor. Up-to-date recombinant DNA methods will be covered; how molecular biology methods have enhanced our understanding of basic biological functions and structures; the applicability of molecular biology in pharmaceuticals, vaccine production, agriculture, bioremediation, and synthesis of commercial products. (fall)

BIOL 515 Molecular Genetics Cr. 3.

P: 218, 381, and one semester of organic chemistry. A molecular approach to the problems of structure, duplication, mutation, and phenotypic expression of genetic material.

BIOL 516 Molecular Biology of Cancer Cr.

3. P: 218, 381 or graduate student standing. A detailed course examining the molecular mechanisms controlling the growth of animal cells. Emphasis will be placed on current experimental approaches to defining the molecular basis of growth regulation in developing systems and the uncontrolled proliferation of cells in

metabolic disorders, such as cancer.

BIOL 533 Medical Microbiology Cr. 3.

P: 437. Host-parasite relationships, immunology, bacteria, and viruses associated with infectious diseases.

BIOL 537 Immunobiology Cr. 3. P: 437.

Readings and discussion in the structural, cellular, and genetic basis of the immune response.

BIOL 540 Biotechnology Cr. 3. P: 217

and 381 or consent of instructor. Examines research, techniques, and applications for several technologies situated at currently recognized biological frontiers, including recombinant DNA technology, hybridoma technology, protein engineering, agricultural research, and microbiological engineering.

BIOL 543 Population Ecology Class 3,

Lab. 2, Cr. 4. P: 217, 218, and 219. A

statistics course is recommended.

Interactions that determine the dynamics, abundance, and persistence of natural populations. Topics include competition, predation and disease, metapopulations, computer simulation and data analysis, discussions of classical and current literature. (spring)

BIOL 544 Principles of Virology Cr. 3.

P: 218. Introduction to the molecular biology of animal, plant, and bacterial viruses. Interaction of viruses and the host cell, viral replication, mechanisms of viral pathogenesis, immunology, chemotherapy, viral genetics, oncology, and vaccines.

BIOL 546 Principles of Virology

Laboratory Lab. 3, Cr. 1. P or C: 544. Basic experimental techniques applied for selected bacteriophages; cultivation and manipulation of animal viruses including animal cell cultures, cell fusion, cytopathic effects, kinetics of replication, viral genetics, immunology, interferon, cell transformation, macromolecules, and ultra structure.

BIOL 556 Physiology I Cr. 3. General and

comparative physiology. Principles of physiology. Nerve and muscle, temperature regulation, ion and water balance. The critical evaluation of original research papers.

BIOL 558 Laboratory in Physiology

Lab. 6, Cr. 2. P or C: 556. The laboratory exercises are designed to illustrate fundamental physiological principles and to introduce the student to important physiological techniques.

BIOL 559 Endocrinology Cr. 3. The study of hormone function. Consideration will be given to the role of hormones in growth, development, metabolism, homeostasis, and reproduction.

BIOL 565 Immunobiology Laboratory

Lab 3, Cr. 1. P or C: 537. A survey course in laboratory experiments and demonstrations using classical immunological techniques and modern immunoassays with up-to-date technological equipment. The laboratory supplements the lecture portion of BIOL 537 but is not required. Typical assays include immuno-double diffusion Ouchterlony methodology, immunofluorescence identification of cell surface antigens, cytokine and mitogen stimulated proliferation of immune cells, ELISA assays, and PAGE with Western blotting.

BIOL 566 Developmental Biology Cr. 3.

P: 218. Principles of development with emphasis on concepts and experimental evidence for underlying mechanisms, including molecular, cellular, and supracellular approaches.

BIOL 567 Laboratory in Developmental

Biology Lab. 2, Cr. 1. P or C: 566 or consent of instructor. Descriptive and experimental study of the development of animals. Laboratories do not necessarily follow lecture material.

BIOL 569 Cellular Neurobiology Cr. 3.

P: 219 and CHM 116. A study of the nerve cells and their interactions. Includes discussions of the cellular basis of the integral function of the nervous system. The main topics are nervous excitation, synaptic transmission, nervous plasticity, development of neuronal interactions, transmitter receptors including opiate receptors, sensory transduction, and the cellular basis of brain function.

BIOL 579 Fate of Chemicals in the Environment Class 3, Lab 2, Cr. 4. P: 217 and a course in organic chemistry. An investigation of the fate and transport of chemicals in the environment, including air, soil/sediment, and water. Special consideration will be given to the degradation of chemicals by microorganisms and to methods to maximize their activities (bioremediation).

BIOL 580 Evolution Cr. 3. P: 217 or equivalent. A study of evolution as a basic concept of the biological sciences; an examination of current methods of experimentation within areas, as well as evidences for the possible mechanisms of evolutionary change.

BIOL 582 Ecotoxicology Cr. 3. P: 217, 218, and 219. An investigation into the effects of environmental pollutants on ecosystem structure and function. The fate of pollutants in the environment is considered as it relates to the direct and indirect effects of chemicals on biota. Also considered are regulatory aspects of ecotoxicology. (spring)

BIOL 584 Molecular Biology and Applications Laboratory Lab. 3, Cr. 1. P or C: 509. A lab consisting of mini-projects that emphasize the applications of several molecular biological techniques, such as Southern blotting, DNA-DNA hybridization, purification and cloning of genes into plasmid vectors, genetic engineering and PCR amplification. Applications emphasized include DNA fingerprinting in humans, evolution, and systematics by comparing 18S and 16S rDNA from different species, and genetic engineering of yeast with genes encoding beta carotene.

BIOL 586 Topics in Behavior and Ecology Cr. 3. P: an ecology course or consent of instructor. May be repeated for credit with a different topic. In-depth examination of topics in ecology and behavior not treated extensively in other courses, e.g., behavioral ecology of reproduction, foraging ecology and behavior, and the behavioral ecology of defense against predators.

BIOL 592 The Evolution of Behavior Cr. 3. P: 580 or equivalent or consent of instructor. An investigation of behaviors as adaptations: specializations of sensory and motor mechanisms involved in behavior,

animal communication systems, behavioral ecology, patterns of behavior as solutions to ecological problems such as predator avoidance and resource exploitation. Emphasis will be on theoretical principles; examples will be broadly comparative.

BIOL 595 Special Assignments

Class 2–8, Lab. 0–12, Cr. 1–4. (V.T.)

P: consent of instructor; open only to science majors. Independent study or research or presentation of material not available in the formal courses of the department. The field in which work is offered will be indicated on the student's record. Research projects must be agreed upon by the student and a faculty member and approved by the chair. May be repeated for credit.

BIOL 598 Biology of Fish Class 3, Lab. 3,

Cr. 4. P: 217, 218, and 219. A

comprehensive study of fish biology that covers topics from physiology to ecology to fisheries management. Lectures include discussions of controversial issues and current research from primary literature. Additionally, the class will participate in several field collecting trips, sometimes in association with state fish biologists, and complete an independent student research project. (fall)

Pharmacology and Toxicology

PCTX 201 Introductory Pharmacology

Cr. 3. P: BIOL 203 or equivalent; CHM 104 or equivalent. C: BIOL 204 or equivalent; all course equivalencies are to be determined by the instructor. An introduction to the pharmacological basis of therapeutics. This course involves an integration of knowledge of anatomy, physiology, microbiology, and chemistry with the biological and selected chemical and physical actions and reactions of drugs. Primarily for students in nursing and other paramedical programs. (fall, spring, summer)