Course Descriptions

BI 105. Introductory Cell Biology. An introduction to the basic principles of cell biology for freshmen pharmacy students. The course will cover introductory chemistry, biochemistry, cell structure, metabolism, genetics, and embryology. Will not count for credit toward a major in biology. Only available to COPHS students. (U) (3)

BI 111. Contemporary Issues in Biology. This is a topic-driven course designed to illustrate the central connection between biology and current societal issues. Various broad biological issues will be addressed such as biodiversity, global climate change, infectious diseases, cancer, sustainability, human population growth, and invasive species. In addition to coverage of background information, a portion of the course will be dedicated to problem-based activities and class discussions. This course is open only to biology majors or exploratory natural science students in their first semester. (U) (3)

BI 210. Genetics – Fundamentals. This course introduces students to basic principles of transmission and molecular genetics. Topics include meiosis, transmission genetics, gene expression, and mutations. Laboratories emphasize basic techniques along with experimental design and scientific communication. Prerequisites: BI202. (U) (4)

BI 220. Cellular and Molecular Biology – Fundamentals. This course introduces students to basic properties and functions of cells. Topics include macromolecules, bioenergetics, membrane function, intracellular transport, cell communication, photosynthesis, respiration, cell reproduction, and the relationship between structure and function of diverse cell types. Laboratories emphasize basic skills and techniques along with experimental design and scientific communication. Prerequisites: BI111 or second-year Butler status. (U) (4)

BI 230. Ecology and Evolutionary Biology – Fundamentals. This course introduces students to basic theory of ecology and evolutionary biology. Laboratories emphasize experimental design, statistical analysis, and scientific communication. Prerequisites: BI111 or second-year Butler status. (U) (5)

BI 257. Human Anatomy and Physiology. A course for non-major students to relate structure and function in the human body. Prerequisite: Any NW-BI course or two of the following: BI 201, 202, and 203. (U) (5)

BI 299. Biology Seminar. Attendance at and participation in the biology seminar series, including pre- and post-seminar reports. Biology majors are expected to complete this course during their second year in the major. Prerequisites: second-year Butler status. Pass/Fail credit. (U) (1)

BI 301. Principles of Zoology. A survey of the basic principles of animal biology, covering the major animal groups, their evolutionary relationships and their structural and functional characteristics. Prerequisite: BI 201 and BI 202 or 203. (U) (4)

BI 302. Principles of Botany. A survey of the basic principles of plant biology, covering the major plant groups, their evolutionary relationships, and their structural and functional characteristics. Prerequisite: BI 201 and BI 202 or 203. (U) (4)

BI 306. Mammalogy. This course will address the taxonomy, ecology, evolution, behavior, and economic importance of mammals. The laboratory portion of the course will emphasize the taxonomy of mammals and the observation and trapping/handling of small mammals. Prerequisite: BI 201 and BI 202 or 203. (U) (4)
BI 307. *Vertebrate Biology.* Phylogeny, taxonomy, behavior and life histories of the vertebrates. Prerequisite: BI 201 and BI 202 or 203. (U) (4)

BI 308. *Tropical Field Biology.* Introduction to the habitats, distribution and ecology of tropical fauna. Includes a field trip to a tropical habitat during the semester. Prerequisite: permission of the instructor. (U) (3)

BI 309. *Local Flora.* Collection, identification, classification, uses and ecology of Indiana flowering plants. Learning the use of identification keys will be stressed. Prerequisite: BI 201 and BI 202 or 203 or any NW-BI course. (U) (3)

BI 310. *Evolution.* Analysis of organic evolution, the mechanisms of evolutionary changes and the evolution of higher forms of life. Prerequisite: BI 201 and BI 202 or 203. (U) (3)

BI 311. *Biology of Algae and Fungi.* The biology of algae and fungi including structure, life histories, classification, physiology, ecology, and experimental aspects of algae and fungi. Prerequisites: BI 201 and BI 202 or 203. (U) (4)

BI 320. *Animal Behavior.* The adaptive behavior of animals is approached from physiological, developmental, ecological and evolutionary perspectives. Prerequisite: BI 201 and BI 202 or 203. (U) (4)

BI 323. *Principles of Immunology.* Basic concepts and techniques of immunology. Open to Pharmacy and P.A. majors only. Prerequisites: BI 202 and BI 201 or 203 or BI 105 or permission of the instructor. (U) (2)

BI 325. *Principles of Pathogenic Microbiology.* A course designed to provide students with a foundation in pathogenic microbiology. It will address microbiological concepts/principles regarding the mechanisms of infection and disease of major organ systems as well as their control. Open only to COPHS students. Prerequisite: BI 202 and BI 201 or 203 or BI 105. (U) (3)

BI 339. *Philosophy of Biology.* A study of philosophical problems in biology. The course explores both theoretical problems within biology, like the evolution of altruism and problems of taxonomy, and philosophical problems that are influenced by biological theory, including the nature of morality and the status of religious belief. Prerequisite: Any two of the following: BI 201, 202, or 203 or BI 105 or permission of instructor. (U) (3)

BI 350. *Cell Biology.* The structure and function of cells, including the properties of macromolecules, membrane structure, cell organelles, cell metabolism and energy relationships, cell division and gene expression. Lecture and laboratory. Prerequisite: BI 202 and BI 203. (U) (4)

BI 357. *General Genetics.* An introduction to the basics of both classical and modern genetics, with emphasis on human heredity. Prerequisites: BI 203. (U) (4)

BI 401, 402, 403. *Independent Study.* Open to juniors and seniors who wish to do research with a biological sciences faculty member in an area of the animal and plant sciences. Permission of the faculty member and the chairman of the biological sciences department required. (U) (1,2,3)

BI 405, 406, 407, 408, 409. *Topics in Biology.* Study of a current biological topic. Prerequisites: Two of the following: BI 201, 202, or 203 or permission of the instructor. (U) (1,2,3,4,5)

BI 411. *Principles of Physiology.* Analysis of the functions of all major systems of the vertebrates with emphasis on mammalian physiology. Prerequisites: BI 202 and BI 201 or 203. (U) (4)

BI 413. *Vertebrate Histology and Microtechnique.* A study of the structure of vertebrate tissues and the techniques used in microscope slide preparations. Prerequisite: BI 202 and BI 201 or 203 or permission of the instructor. (U) (4)
**BI 418. Population and Community Ecology.** Fundamental concepts of ecology and their application to environmental problems, illustrated by field and laboratory investigations. Prerequisites: BI 201 and BI 202 or 203. (U) (4)

**BI 419. Conservation Biology.** This course will focus on the biological principles that must be the anchor for the management and/or preservation of native flora and fauna. Conservation biology, however, is by necessity a multidisciplinary endeavor, and the course also deals with the social, political, and economic factors that weigh on conservation decisions. Prerequisite: BI 201 and BI 202 or 203. (U) (4)

**BI 421. Landscape Ecology.** This course will focus on ecological patterns and processes at the landscape level. An emphasis will be placed on spatial analyses of native flora and fauna using geographic information systems software applications. Students will conduct individual research projects. Prerequisite: BI 201 and BI 202 or 203. (U) (4)

**BI 430. Developmental Biology.** A study of embryonic development from the formation of gametes, through fertilization, and up to the development of the multicelled organism. Emphasis will be on the anatomical changes during development and on the cellular and molecular events causing these changes. Lecture and laboratory. Prerequisite: BI 202 and 203 or permission of the instructor. (U) (4)

**BI 431. Plant Development.** An introduction of the cellular and molecular mechanisms important in the development of members in the plant kingdom, from multi-cellular algae to flowering plants. The laboratory will include techniques important in investigating developmental phenomena such as scanning electron microscopy and tissue culture. Prerequisites: BI 203 and BI 201 or 202. (U) (4)

**BI 432. Plant Physiology.** Introduction to how plants work, including housekeeping functions (photosynthesis, mineral nutrition, water relations, metabolism), growth and reproduction, defenses, and responses to the environment. Laboratories include necessary anatomy but emphasize biochemistry and molecular biology. Prerequisites: BI 202 and BI 201 or 203, and CH 106 or CH 107. (U) (4)

**BI 435. Molecular Genetics.** Molecular structure, biochemical function of the gene as illustrated by the original research literature, viruses and eukaryotes cells. Prerequisite: BI 202 and 203 and CH 361. (U) (3)

**BI 436. Genomics, Bioinformatics and Gene Evolution.** This course will introduce students to the new, rapidly expanding fields of genomics, proteomics, and bioinformatics, as well as the overarching field of systems biology. The students will also learn what these new approaches reveal about how genes and genomes evolve. Prerequisites: BI 202 and 203. (U) (4)

**BI 438. Microbiology.** Basic principles of microbiology and associated laboratory techniques. Lecture, demonstration and laboratory. Prerequisites: BI 202 and 203 and college chemistry. (U) (4)

**BI 440. Practical Molecular Biology.** Theory and practice of methods used to study genes and their expression. Laboratory emphasizes gene isolation and sequence analysis. Two lectures, two 3-hour laboratories per week. Prerequisite: BI 202 and 203 or CH 352. (U) (4)

**BI 480. Biology Capstone.** This course provides a capstone experience, a chance to put into practice the knowledge and analytical skills learned as a Biology major. The course will explore a specific area of Biology through reading and discussion of the scientific literature and preparation of a review paper. Open only to senior biology majors. (U) (3)
BI 490. Internship in Biological Sciences. A course offering the student supervised work/research experience in a setting pertinent to the major area of study but outside the department. Permission of the department head is required. (U) (3)

BI 499. Honors Thesis. (U) (3)

*Designates courses that will soon be phased out and replaced by advanced courses.