Biology

Bruyninckx, Karns, Osterhage, Rubino.

**Major:** Biology courses – 161, 162 or 163; 185; 221; 231; 301; 302; 471 (culminating experience); four others, two of which must be at the 300 level, but not to include 307, 308, 309, 357, 370, or 380.
Cognate courses – Chemistry 161 or equivalent; Che 185.
Comprehensive evaluation with passing grade. Total of 8.50 major course credits, plus 3 cognates = 11.50.
No more than 1 credit of any combination of Bio 308, 309 and 380 can count towards graduation.

Minor: Biology courses – 161 or equivalent; 185; any three others, but not to include 301, 302, 307, 308, 309, 370, or 380. Total of 5 minor courses.

All courses (except 301, 302) include an integrated laboratory experience.

**Bio 160. Special Topics.**

**Bio 161. Heredity and Evolution.** An introduction to the scientific study of life with an emphasis on evolution, ecology and classical genetics. The nature and practice of science will be examined throughout the course. For prospective pre-health-profession students and science majors. Partially satisfies the Natural World LADR. Not open to students with prior credit in Bio 162, 163 or 165. Prerequisite/corequisite: Che 161 or equivalent.

**Bio 165. Concepts of Biology.** An historical approach to explore the development of primary topics in modern biology such as mechanisms of inheritance and diversification of life on Earth via the process of evolution. The nature and practice of science will be examined throughout the course. Does not require college-level chemistry. Partially satisfies Natural World LADR. Not open to students with prior credit in Bio 161 or equivalent.

**Bio 185. Cells and Systems.** An introduction to the scientific study of life with emphasis on the chemistry of life, cells, and physiology. For prospective natural science majors. Prerequisites: 161, 162, or 163 and either Che 161 or equivalent.


**Bio 221. Genetics.** A survey of molecular, organismal, and population genetics. Laboratory work illustrates basic genetic principles and modern laboratory techniques. Prerequisites: 185. Prerequisite/corequisite: Che 161 or equivalent.

**Bio 226. Aquatic Biology.** A study of the ecology and evolution of the organisms that live in freshwater ecosystems, emphasizing ecological relationships and the importance of water resources to life on Earth. Students will visit local and regional wetlands, creeks, streams, rivers and lakes. Field studies will emphasize aquatic collecting techniques, identification of organisms and environmental research methods. Prerequisites: an introductory course in biology or chemistry is helpful but not required. Offered Spring Term alternate years.

**Bio 227. Herpetology.** A study of the biology of amphibians and reptiles. Topics covered include classification, evolution, ecology, physiology, behavior, and conservation. Emphasis on the amphibians and reptiles of southeastern Indiana and field research methods. Prerequisite: 161, 162, or 163.
Bio 231. Biodiversity. An introduction to the biological diversity of earth. Topics covered include analysis of the form and function of the major taxonomic groups: protists, fungi, plants, and animals, the origin of life, the evolutionary history of life on earth, and principles of biological classification. Prerequisite: 185.

Bio 234. Plant Taxonomy. Identification of higher plants with emphasis on the native flora; emphasis on the use of keys, principles of classification, field work, and herbarium methods. Prerequisite: 161, 162, or 163.

Bio 260. Special Topics.

Bio 301. Junior Seminar. Preparation of an Independent Study proposal including a bibliography, literature review and an oral presentation. Prerequisites: 4 courses in biology or junior standing. Graded Pass/Fail. 0.25 unit.

Bio 302. Senior Seminar. Oral presentation and discussion of primary literature research articles; presentation of the results of student Independent study projects. Prerequisite: 4 courses in biology or senior standing. Graded Pass/Fail. 0.25 unit.

Bio 307. Directed Study. .50 unit.

Bio 308. Directed Research. Field or laboratory research performed under the direction of a professor. Prerequisite: permission of directing professor. Graded Pass/Fail. .25 unit.

Bio 309. Directed Research. Field or laboratory research performed under the direction of a professor. Prerequisite: permission of directing professor. Graded Pass/Fail. 0.5 unit.


Bio 313. Plant Anatomy and Physiology. Study of vascular plant structure and function as adaptations to the terrestrial environment. Lectures, discussions, laboratories, and field trips. Prerequisite: 231.

Bio 314. Molecular Biology. A detailed survey of gene structure, function, regulation, and replication as well as the experimental techniques used to understand these phenomena. Prerequisite: 221.

Bio 315. Ecology. Study of interactions of organisms and their environments; emphasis on energy flow, nutrient cycling, and equilibrium processes in ecosystems. Lectures, field projects, preparation of scientific reports, and laboratories. Prerequisite: 161, 162, or 163.

Bio 316. Animal Behavior. A study of the behavior of animals, with emphasis on the ecology and evolution of behavior and the applicability of the principles of animal behavior to humans.

Bio 317. Vertebrate Comparative Anatomy. A study of the biology of the vertebrates, including the evolutionary history and structure and function of the major vertebrate groups. Emphasis in lab on dissection of representative vertebrates. Prerequisite: 161, 162, or 163. Offered alternate years.

Bio 318. Research Methods in Biology. Techniques for conducting investigations in the biological sciences: scientific reasoning, literature reviews, design of experiments, analysis of data (including statistical analysis), oral and written presentation of results and the preparation of research proposals. Prerequisite: consent of instructor.

Bio 326. Developmental Biology. Development of organisms with an emphasis on vertebrates. Laboratories will combine modern molecular analyses and classical descriptions of organismal development. Prerequisite: 221.

Bio 328. Immunology. Introduction of both theories and techniques in the field of immunology. Prerequisite: 221.
**Bio 332. Evolution.** An analysis of the process of evolution. Topics cover the history of evolutionary thought, evidence for the evolution of life, mechanisms of evolutionary change, and the history of life on earth. Special emphasis will be placed on current research and developing an experimental evolutionary approach. Lectures, discussions, field and laboratory experiments. Prerequisite: 231.

**Bio 333. Microbiology.** A study of the structure and function of bacteria and related organisms. Prerequisite: 221.

**Bio 336. Cell Biology.** A study of the evolution, structure, and functioning of cells. Topics include membranes, bioenergetics, intracellular sorting, the cytoskeleton, cell communication, and cellular mechanisms of development. Laboratory emphasis on the methodology of cell biology. Prerequisite: 221.

**Bio 357. Internship.** Off-campus supervised experience in biology.

**Bio 360. Special Topics.**

**Bio 370. Directed Study.**

**Bio 380. Directed Research.** Field or laboratory research performed under the direction of a professor. Prerequisite: Permission of directing professor. Graded Pass/Fail.

**Bio 465. Capstone Seminar.** Course content will reflect the topic for the annual Capstone. Open to all juniors and seniors and may be repeated once for credit. Students may enroll in only one Capstone seminar in a given term.

**Bio 471. Independent Study.** Individual investigation of a topic of special relevance to a student’s interest in the biological sciences; may take the form of a laboratory or field scientific investigation, library research, or practical experience in the biological sciences resulting in written and oral reports. Prerequisite: Five courses in biology, senior standing, and permission of the directing professor.

**Bio 499. Comprehensive Evaluation.**