

BIOLOGY (BIOL)

BIOL 400G Plant Physiology 4 Hours

A study of the general principles by which plants function. Three areas discussed are transport and translocation of water and solutes, metabolism with special emphasis on photosynthesis, and plant growth and development.

Recent Term(s) Offered: None

BIOL 403G Molecular Basis of Cancer 3 Hours

Biological and molecular features of oncogenesis and clinical cancer, focusing on specific molecular events underlying carcinogenesis, metastasis and angiogenesis. Case study learning will be integrated into the course to engage students in understanding the societal implications of cancer.

Recent Term(s) Offered: None

BIOL 404G Electron Microscopy 4 Hours

A course in the fundamentals of electron microscopy including basic theory, techniques for specimen preparation and photography, and operation of the electron microscope. Lecture, two hours; laboratory, four hours.

Course Fee: \$20

Recent Term(s) Offered: fall 2019; fall 2020; fall 2021

BIOL 405G Aquatic Insect Diversity 2 Hours

The taxonomy and biology of the insects commonly encountered in freshwater habitats.

Recent Term(s) Offered: spring 2019; spring 2021

BIOL 407G Virology 3 Hours

Study of bacterial, animal and plant viruses. Emphasis on the molecular aspects of replication, expression, regulation and pathogenesis.

Recent Term(s) Offered: spring 2019; spring 2021; summer 2021

BIOL 411G Cell Biology 3 Hours

A lecture series emphasizing the morphological and chemical make-up of cells, the physical and chemical properties of the cell, and modern techniques for investigation of cellular functions.

Recent Term(s) Offered: spring 2019; summer 2019; summer 2020; spring 2021; summer 2021

BIOL 412G Lab Cell Biology 1 Hour

A laboratory course correlated with BIOL 411G.

Course Fee: \$20

Recent Term(s) Offered: spring 2019

BIOL 446G Biochemistry I 3 Hours

Biochemical compounds and their role in metabolism.

Recent Term(s) Offered: winter 2019; summer 2019; winter 2020; summer 2020; winter 2021; spring 2021; summer 2021; fall 2021

BIOL 447G Lab Biochemistry I 2 Hours

Selected experiments which illustrate biochemical principles. Five hours per week.

Course Fee: \$35

Recent Term(s) Offered: fall 2021

BIOL 450G Recombinant Gene Technology 3 Hours

Discovery-based laboratory emphasizing application of basic techniques to solve student-defined problems. Problems in characterization and expression of genetic material are explored. Laboratory, six hours.

Course Fee: \$20

Recent Term(s) Offered: None

BIOL 456G Ichthyology 4 Hours

Fishes of the world, their physiology, structure, behavior, and ecology. Emphasis on the collection and identification of freshwater species of Kentucky. Lecture, two hours; laboratory, four hours.

Recent Term(s) Offered: fall 2019

BIOL 457G Herpetology 4 Hours

An introduction to the classification and biology of reptiles and amphibians.

Recent Term(s) Offered: spring 2020

BIOL 458G Fisheries Management 4 Hours

A study of the factors affecting fish populations. Topics covered include life history traits, sampling techniques, management practices, and policies regulating the management of fish populations. Off-campus and overnight weekend field trips are required.

Course Fee: \$25

Recent Term(s) Offered: fall 2020

BIOL 459G Mammalogy 3 Hours

Taxonomy, life history and ecology of the mammals. Laboratory work includes field studies and collection and study of specimens. Lecture two hours; laboratory two hours.

Recent Term(s) Offered: spring 2019; spring 2021

BIOL 460G Parasitology 4 Hours

The morphology, physiology, life histories, control and economic significance of representative species. Lecture, two hours; laboratory, four hours.

Course Fee: \$20

Recent Term(s) Offered: None

BIOL 464G Endocrinology 3 Hours

Endocrinology is the study of hormones. This course will provide a general survey of endocrinology, with specific emphasis upon the physiology of the endocrine system among different vertebrate groups, including humans.

Recent Term(s) Offered: fall 2019; fall 2021

BIOL 467G Biochemistry II 3 Hours

The reactions of living systems and an introduction to the mechanisms and energetics of metabolism. Lecture.

Recent Term(s) Offered: spring 2020

BIOL 470G Pathogenic Microbiology 4 Hours

A study of the organisms causing disease with emphasis on bacteria. Includes pathogenic bacteria, viruses, rickettsiae, fungi and protozoa. Lecture, two hours; laboratory, four hours.

Recent Term(s) Offered: spring 2020

BIOL 475G Independent Topics/Biology 1-3 Hours (repeatable max of 6 hrs)

Significant problems and developments of current interest in biology.

Recent Term(s) Offered: summer 2020; summer 2021

BIOL 485G Field Biology 1-4 Hours

An intensive field experience on a biological or ecological topic.

Recent Term(s) Offered: None

BIOL 490G Plants as Alternative Therapeutics 3 Hours

An exploration of plants used in traditional systems of medicine with emphasis on their pharmacological implications as evidenced in modern clinical research. The therapeutic actions of phytochemicals, vis-a-vis different human illnesses (cardiovascular, gastrointestinal, respiratory, autoimmune psychosomatic disorders; cancer, AIDS, skin diseases, etc.) will be examined.

Recent Term(s) Offered: summer 2019; summer 2020; summer 2021

BIOL 495G Molecular Genetics 3 Hours

A study of the molecular basis of genetics and heredity of prokaryotic and eukaryotic organisms.

Recent Term(s) Offered: summer 2019; fall 2019; summer 2020; fall 2020; fall 2021

BIOL 496G Plant Biotechnology 4 Hours

A course designed to illustrate the current advances in plant biotechnology and their potential application in agriculture, health and environment.

Recent Term(s) Offered: None

BIOL 497G Aquatic Field Ecology 4 Hours

An integrated study of aquatic ecosystem structure and function emphasizing the physical and chemical properties of water and application of biological field methods. This course requires off-campus and overnight travel.

Course Fee: \$20

Recent Term(s) Offered: fall 2020

BIOL 500 Introduction to Graduate Studies and Research in Biology 3 Hours

Introduction to research techniques and experimental design, with an emphasis on on-going research at WKU. Also includes an introduction to research-related resources at WKU.

Recent Term(s) Offered: spring 2019; fall 2019; spring 2020; fall 2020; spring 2021; fall 2021

BIOL 501 Biological Perspectives 3-4 Hours

Designed to acquaint graduate students with advances in the biological sciences and practical applications of biological principles. Lecture, three hours; or lecture, three hours, laboratory, two hours.

Recent Term(s) Offered: spring 2020; fall 2020

BIOL 503 Contemporary Research in Biology 1 Hour (repeatable max of 3 hrs)

Participants will present a research article on a topic of their choice to the class. A critical appraisal of the research approach, methods, results, and interpretation of results will be stressed. Requires participation in critical discussions of all presentations.

Recent Term(s) Offered: spring 2019; spring 2020; fall 2021

BIOL 505 Aquatic Insect Ecology 3 Hours

Ecological functions, evolutionary adaptations, and indicators of environmental quality of aquatic insects.

Recent Term(s) Offered: fall 2021

BIOL 507 Science Concepts for Elementary Teachers 3 Hours

This course provides basic background to the KY Core Contents in science that elementary teachers are required to teach along with discipline-specific strategies and best-practices that can be implemented in the classroom. National Boards 'Big Ideas', inquiry learning and implementation of math and science will be integrated into this course to provide beginning teachers the tools necessary to conduct dynamic science classes.

Course Fee: \$20

Recent Term(s) Offered: None

BIOL 515 Advanced Ecology 3 Hours

Essential dynamic features of plant and animal populations. Covers the theoretical and empirical aspects of single populations, or pairs of interacting populations, and of whole communities.

Recent Term(s) Offered: spring 2019; spring 2021

BIOL 516 Investigations/Biology 1-3 Hours (repeatable max of 3 hrs)

Research project completed under faculty supervision. Not applicable to MS thesis option. Note: Permission of research project director required.

Recent Term(s) Offered: spring 2019; fall 2019; spring 2020; summer 2020; fall 2020; spring 2021; summer 2021; fall 2021

BIOL 518 Population Ecology 2 Hours

Investigation of the theories and models used to describe and predict populations. Includes applications in population projection and harvesting, as well as two-species interactions.

Recent Term(s) Offered: spring 2020

BIOL 519 International Wildlife Management and Policy 2 Hours

Exploration of the major wildlife management models used in various countries, emphasizing North America, Europe and Africa. Economic ramifications of these models and international treaty obligations relating to the wildlife trade are investigated.

Recent Term(s) Offered: winter 2019

BIOL 522 Biological Systematics 3 Hours

Study of systematic theory and practice with a focus on current controversies. Taxonomic methods will be evaluated with an emphasis upon the use of taxonomic tools to reconstruct evolutionary relationships.

Recent Term(s) Offered: spring 2020

BIOL 523 Biological Symbioses and Host-Parasite Associations 3 Hours

Exploration of biological symbioses, emphasizing patterns and processes of biological coevolution. Host-parasite systems are explored in detail, with a focus on classic and current coevolutionary and cospeciation systems.

Recent Term(s) Offered: fall 2020

BIOL 524 Evolution and Ecological Genetics 3 Hours

Advanced treatment of natural selection as a mechanism of evolution. Interaction of ecological, behavioral and genetic systems in driving evolutionary change at various levels of organization is emphasized.

Recent Term(s) Offered: spring 2019; spring 2020; spring 2021

BIOL 526 Physiological Ecology 3 Hours

Study of the physiological adaptations of organisms that enhance their survival and/or permit them to exploit extreme environments.

Recent Term(s) Offered: spring 2019

BIOL 527 Advanced Vertebrate Functional Morphology 3 Hours
Examine mechanistic designs underlying organismal morphology, physiology driving designs, and behaviors that impact function. Topics include comparative anatomy, adaptation, ecomorphology, ecophysiology, biological application of mechanical engineering principles, and organismal performance.

Recent Term(s) Offered: fall 2019; fall 2021

BIOL 532 Behavioral Ecology 3 Hours

An investigation of animals in reference to their evolution and interactions with others emphasizing behavior related to their survival and reproduction in a natural context.

Recent Term(s) Offered: summer 2019; fall 2019; fall 2021

BIOL 533 Behavioral Ecology Laboratory 2 Hours

A field and laboratory investigation of the methodology to study the actions of animals in reference to their evolution, environment and interactions with other organisms.

Recent Term(s) Offered: None

BIOL 534 Chemical Ecology 3 Hours

The study of chemical ecology emphasizes the concepts and evolution of chemical signals, the methods for identification, the mechanisms by which such signals act, their functions and applications.

Recent Term(s) Offered: spring 2020; summer 2021

BIOL 535 Analytical Biochemistry 3 Hours

An overview of the science of modern analytical and instrumental techniques with emphasis on techniques relevant to measurements in biochemistry and biology.

Equivalent(s): CHEM 535

Recent Term(s) Offered: fall 2021

BIOL 543 Environmental Science Concepts 3 Hours

Explores the inter-relationship among the science and technical disciplines that contribute to our understanding of the environment as a whole. Introduces research methods and core environmental science concepts. Prepares students to examine environmental science questions with an interdisciplinary outlook.

Recent Term(s) Offered: spring 2021

BIOL 545 Animal Communication 3 Hours

An investigation of the principles and mechanisms by which animals produce and receive signals for each sensory modality (sound detection, vision, chemoreception, and electroreception).

Recent Term(s) Offered: winter 2019; winter 2020; winter 2021

BIOL 550 Introduction to Biological Applications in Homeland Security 3 Hours

An introductory course in biological principals for students in Homeland Security with a limited biology background. Topics include cell structure/function, cellular information and energy flow, immune function, cellular and population genetics.

Recent Term(s) Offered: None

BIOL 552 Biological Applications in Homeland Security I 3 Hours

An advanced study of biological phenomena relevant to Homeland Security Concerns. Focus on the recognized groups of pathogenic organisms to human and selected crops. Topics to be covered are types of pathogens, pathogenicity and virulence, control and detection, and dispersal mechanisms. Immune response to infectious disease will be covered in depth with special attention toward understanding the functionality of the antibody.

Prerequisite(s): BIOL 550 or permission of instructor

Corequisite(s): BIOL 553

Recent Term(s) Offered: None

BIOL 553 Laboratory: Biological Applications in Homeland Security I 1 Hour (repeatable max of 3 hrs)

The laboratory will provide students with knowledge in laboratory safety and manipulation, identification, and enumeration of microbial and viral cultures.

Prerequisite(s): BIOL 550

Corequisite(s): BIOL 552

Recent Term(s) Offered: None

BIOL 555 Laboratory: Biological Applications in Homeland Security II 1 Hour (repeatable max of 3 hrs)

The laboratory will provide students with knowledge in laboratory immunological methodologies and analytical methods in DNA forensics.

Prerequisite(s): (BIOL 552 and BIOL 553) or permission of instructor

Corequisite(s): EOHS 572

Recent Term(s) Offered: None

BIOL 560 Advanced Cell Biology 3 Hours

Lecture-discussion course designed to understand structure and function of differentiated cells of multicellular organisms. Textbook readings, review articles and current research papers will be incorporated into lectures and discussions.

Recent Term(s) Offered: summer 2019; fall 2019; fall 2021

BIOL 562 Advanced Biochemistry 3 Hours

Survey of biochemical research areas where significant advances have been made in recent years. Textbook readings, review articles and current research papers will be incorporated into lectures and discussions.

Equivalent(s): CHEM 562

Recent Term(s) Offered: None

BIOL 566 Advanced Molecular Genetics 3 Hours

Consideration of the molecular mechanisms for replication, gene expression and regulation of development.

Recent Term(s) Offered: spring 2019; spring 2020; spring 2021

BIOL 568 Advanced Microbiology 3 Hours

Study of microbial metabolic and genetic diversity, phylogeny and evolution, and ecology, including a consideration of research methodologies applicable to microorganisms. Lecture, three hours; laboratory, two hours.

Recent Term(s) Offered: fall 2020

BIOL 569 Professional Work/Career Experience in Biology 1-3 Hours (repeatable max of 3 hrs)

Practical experience in a supervised work situation with a cooperative business, industry, non-governmental, or governmental agency, emphasizing application of advanced knowledge and skills in specified areas of biology.

Recent Term(s) Offered: None

BIOL 570 Advanced Immunology 3 Hours

Cellular, biochemical, and molecular mechanisms of the immune response of multicellular organisms. Emphasis is on current scientific literature in the field.

Recent Term(s) Offered: None

BIOL 577 Advanced Marine Biology 3 Hours

Marine organisms are examined within a framework of basic biological principles and processes that are fundamental to all forms of life in the sea, including evolution, ecology, biodiversity, biogeography, behavior, and physiology.

Recent Term(s) Offered: fall 2020

BIOL 579 Mechanistic Toxicology 3 Hours

A course that examines how toxic substances interact with living organisms, while integrating aspects of biochemistry, anatomy and physiology, ecology, and health. Emphasis is placed on the effects of xenobiotics on human systems, particularly the mechanisms of action, detoxification and adverse effects on target organs.

Recent Term(s) Offered: summer 2019; summer 2020

BIOL 582 Biometry 3 Hours

Application of statistical and techniques to problems in biological sciences. Emphasis is placed on hypothesis testing, use of linear models, randomization techniques, and non-parametric methods.

Recent Term(s) Offered: fall 2020; spring 2021

BIOL 583 Advanced Biostatistics 3 Hours

Advanced analysis of biological data, including multivariate methods, multiple model inference, and Monte Carlo methods.

Prerequisite(s): BIOL 582

Recent Term(s) Offered: None

BIOL 598 Graduate Seminar 2 Hours

Oral presentation on selected topics in biology.

Recent Term(s) Offered: spring 2019; fall 2019; spring 2020; fall 2020; spring 2021; fall 2021

BIOL 599 Thesis Research/Writing 1-6 Hours (repeatable max of 9 hrs)

Thesis research and writing directed by faculty committee.

Recent Term(s) Offered: spring 2019; summer 2019; fall 2019; spring 2020; summer 2020; fall 2020; spring 2021; summer 2021; fall 2021

BIOL 600 Maintaining Matriculation 1-6 Hours (repeatable max of 6 hrs)

Continued enrollment for thesis completion.

Recent Term(s) Offered: fall 2019

BIOL 601 Internship in College Instruction 1 Hour (repeatable max of 2 hrs)

Designed for prospective teachers of biology. Staff direction in preparing and giving lectures. Includes analyses of presentation and techniques.

Recent Term(s) Offered: None

BIOL 675 Independent Advanced Topics/Biology 1-3 Hours

(repeatable max of 6 hrs)

Selected topics in Biology.

Recent Term(s) Offered: spring 2019; fall 2019; spring 2020; summer 2020; fall 2020; spring 2021; fall 2021