

# BIOLOGY (BIOL)

## **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: summer 2024*

## **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.

*Recent Term(s) Offered: fall 2022*

## **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: summer 2022*

## **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 2022; summer 2022; spring 2023; summer 2023; winter 2024; spring 2024; summer 2024*

## **BIOL 412G Lab Cell Biology 1 Hour**

A laboratory course correlated with BIOL 411G.

*Recent Term(s) Offered: spring 2023; spring 2024*

## **BIOL 446G Biochemistry I 3 Hours**

Biochemical compounds and their role in metabolism.

*Recent Term(s) Offered: winter 2022; spring 2022; fall 2022; spring 2023; fall 2024*

## **BIOL 447G Lab Biochemistry I 2 Hours**

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

*Recent Term(s) Offered: fall 2022; fall 2024*

## **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.

*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: None*

## **BIOL 457G Herpetology 4 Hours**

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

*Recent Term(s) Offered: spring 2022; spring 2024*

## **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.

*Recent Term(s) Offered: None*

## **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 2023*

## **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 2023*

## **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 2023*

## **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 2022; spring 2024*

## **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 2022; summer 2023; summer 2024*

## **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 2022; fall 2022; summer 2023; fall 2023; fall 2024*

## **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 travel.

*Recent Term(s) Offered: summer 2022; fall 2022; summer 2024; fall 2024*

**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 2022; fall 2022; spring 2023; fall 2023; spring 2024; fall 2024*

**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: fall 2024*

**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 2022; spring 2023; spring 2024*

**BIOL 505 Aquatic Insect Ecology 3 Hours**

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

*Recent Term(s) Offered: fall 2023*

**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 2023*

**BIOL 516 Investigations/Biology 1-4 Hours (repeatable max of 4 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 2022; summer 2022; fall 2022; spring 2023; fall 2023; spring 2024; fall 2024*

**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 2022*

**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 2022*

**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 2022; spring 2024*

**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 2022; fall 2024*

**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 2022; spring 2024*

**BIOL 525 Advanced Insect Biodiversity 3 Hours**

This course examines the diversity of one of the most fascinating groups of organisms on the planet- the insects. Their evolution, basic structure, and growth are covered as well as lifestyles, particularly in groups with unusual behaviors or effects on humans.

**Restriction(s):** Enrollment is limited to students in Biology (056)

*Recent Term(s) Offered: summer 2023; fall 2023*

**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: None*

**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 2023*

**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 2022; fall 2023*

**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 2023*

**BIOL 535 Analytical Biochemistry 3 Hours**

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

**Prerequisite(s):** (CHEM 446G or CHEM 446) or (BIOL 446G or BIOL 446) or permission of instructor

**Equivalent(s):** CHEM 535

*Recent Term(s) Offered: spring 2023; winter 2024*

**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: fall 2022*

**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 2022; winter 2023; winter 2024*

**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: winter 2022; summer 2022; fall 2023; summer 2024*

**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: None*

**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 2022*

**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 575 Independent Advanced Topics/Biology 1-3 Hours (repeatable max of 6 hrs)**

Selected topics in Biology.

*Recent Term(s) Offered: fall 2024*

**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: spring 2024; fall 2024*

**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 2022; summer 2023; summer 2024*

**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 2022; spring 2023; fall 2024*

**BIOL 598 Graduate Seminar 2 Hours**

Oral presentation on selected topics in biology.

*Recent Term(s) Offered: spring 2022; fall 2022; winter 2023; spring 2023; fall 2023; spring 2024; fall 2024*

**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 2022; summer 2022; fall 2022; spring 2023; summer 2023; fall 2023; spring 2024; summer 2024; fall 2024*

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

Continued enrollment for thesis completion.

*Recent Term(s) Offered: summer 2023*