

BIOLOGICAL SCIENCE (BIOL)

BIOL 501 Discoveries in Current Biology 3 Credit Hours

Current issues in biology based on an inquiry approach to learning with a primary emphasis on laboratory, field observations, and discussion. Students will help to develop the specific topics within the subject areas that include the environment, heredity, and health. Projects will have direct applications for classroom teaching. Lecture and laboratory. Permission of College of Education, Health, and Human Services advisor. Teacher experience. (S).

BIOL 508 Invasive Species Ecology 3 Credit Hours

This course will examine the biological, ecological and societal impacts of invasive species. Major issues including characteristics of invasive species, invaded communities, origins and success rates of invaders, economic and health effects, methodologies and regulatory strategies for dealing with invasive species will be discussed. Students will investigate an invasive species and make oral and written reports.

Prerequisite(s): BIOL 304 or BIOL 320

BIOL 515 Aquatic Ecosystems 3 Credit Hours

An introduction to aquatic ecosystem ecology. Course topics include physical and chemical properties of water and how this contributes to a unique ecological environment, freshwater and marine biomes and their ecology, and threats that face these systems. Some weeks instruction will take place in the field. Some local travel may be required. (AY).

Prerequisite(s): BIOL 130 and (CHEM 124 or GEOL 118 or ESCI 118)

Restriction(s):

Can enroll if Class is Graduate

BIOL 519 Behavior and Evolution 3 Credit Hours

An in depth examination of how evolutionary processes shape behavior, focusing on the influence of natural, sexual, and kin selection. Topics include behavioral genetics, natural selection, sexual selection, kin selection, optimality, game theory, evolutionary stable strategies, phylogenetics, and the comparative method. Additional assignments will distinguish this course from the undergraduate version.

Restriction(s):

Can enroll if Class is Graduate

BIOL 520 Advanced Field Ecology 1 to 4 Credit Hours

An intense study of organisms and ecosystems at an advanced level, utilizing ecological habitats in a local or remote setting. Students will learn data collection and hypothesis testing as applied to investigations of behavior, biotic interactions, and biodiversity patterns in a focal ecosystem. The course may require travel. See current schedule of classes for destination and travel dates. Hours are variable depending on the field location. Repeats allowed if different location. (OC).

Restriction(s):

Can enroll if Class is Graduate

BIOL 522 Conservation Biology 3 Credit Hours

This course is a study of the historical and current preservation of global biodiversity. The value of biodiversity, extinction, threats to biodiversity, and both ex situ and in situ conservation strategies are considered. A student may not receive credit for both BIOL/ESCI 422 and BIOL 522. (W, AY)

Restriction(s):

Can enroll if Class is Graduate

BIOL 524 Integrative and Comparative Zoology 3 Credit Hours

Study of the organismal biology, evolution, and natural history of a representative focal animal group designated for the semester. Lecture topics include morphology, classification, diversity, evolutionary history, anatomy, physiology, movement, reproduction, behavior, communication, ecology, and conservation. Practical work includes species identification, collection study, field methods, and behavioral observation. Students develop individual projects. Three hours lecture plus local field trips. Course may be repeated for credit when focal animal group varies. See current schedule of courses for focal animal group. Students cannot receive credit for both Biology 424 and Biology 524. (AY).

Prerequisite(s): BIOL 130

Restriction(s):

Can enroll if Class is Graduate

BIOL 545 Restoration Ecology 3 Credit Hours

Restoration Ecology is an interdisciplinary course that develops theories and practices that help rehabilitate impaired ecosystems towards a sustainable state. Bioremediation and phytoremediation are some approaches to be discussed. Short-term site management is discussed, often including continued resource or recreational use, with the eventual site sustainability in mind. (F, AY)

Restriction(s):

Can enroll if Class is Graduate

BIOL 552 Med & Env Toxicology 3 Credit Hours

Mechanistic concepts of toxicology at the cellular and molecular levels. The course is taught from a human health perspective focusing on contemporary problems and environmental associations. Three hours lecture.

Prerequisite(s): BIOL 140 and CHEM 225 and (BIOL 301 or BIOL 303 or BIOL 385 or BIOL 370 or BIOL 455 or BIOL 470)

Restriction(s):

Can enroll if Level is Rackham or Graduate

BIOL 556 Behavioral Ecology 3 Credit Hours

An in depth examination of what processes shape behavior, focusing on the influence of ecology and evolution. Topics include behavioral ecology and genetics, natural and sexual selection, kin selection, optimality modeling, game theory modeling, evolutionary stable strategies, life-history traits, demographics, ecological interactions (predator, prey, parasitism, mutualism, competition), phylogenetics, the comparative method and both parametric and non-parametric statistics. Students cannot receive credit for both BIOL 456 and BIOL 556. Students seeking undergraduate credit should elect BIOL 456. (YR).

Restriction(s):

Cannot enroll if Class is Undergraduate NCFD or Freshman or Sophomore or Junior or Senior

BIOL 557 Behavioral Ecology Lab 2 Credit Hours

An experimental approach to examining behavior in a scientific and objective way, focusing on the influence of ecology and evolution. Topics include experimental design, hypothesis testing, statistical analysis, ethological methods, behavioral ecology and genetics, natural and sexual selection, kin selection, optimality modeling, game theory modeling, evolutionary stable strategies, life-history traits, demographics, ecological interactions (predator, prey, parasitism, mutualism, competition), phylogenetics, the comparative method and both parametric and non-parametric statistics. (YR).

Prerequisite(s): BIOL 556*

BIOL 561 Advances in Cell Biology 2 Credit Hours

Normal and environmentally changing circumstances regulate genes and proteins affecting many important cellular processes. This course will link recent discoveries in cell biology to organisms and the environment that the cell inhabits. Lectures will discuss the roles of organelle and membrane structure and function, gene regulation, metabolism, immunology, and cellular pathology. (OC).

Prerequisite(s): BIOL 140 and CHEM 225 and (BIOL 301 or BIOL 303 or BIOL 304 or BIOL 306 or BIOL 307 or BIOL 309 or BIOL 310 or BIOL 311 or BIOL 312 or BIOL 313 or BIOL 315 or BIOL 320 or BIOL 326 or BIOL 333 or BIOL 335 or BIOL 350 or BIOL 351 or BIOL 360 or BIOL 361 or BIOL 370 or BIOL 380 or BIOL 385 or BIOL 390 or BIOL 405 or BIOL 406 or BIOL 414 or BIOL 416 or BIOL 420 or BIOL 450 or BIOL 455 or BIOL 459 or BIOL 470 or BIOL 471 or BIOL 472 or BIOL 473 or BIOL 474 or BIOL 485 or BIOL 489 or BIOL 490 or BIOL 495 or BIOL 497 or BIOL 498 or BIOL 499 or BIOL 501 or BIOL 514 or BIOL 515 or BIOL 545 or BIOL 552 or BIOL 590)

Restriction(s):

Can enroll if Class is Senior or Graduate

Can enroll if Level is Rackham or Graduate

BIOL 590 Topics in Biology 1 to 4 Credit Hours

Current topics in Biology. One to four credit hours. (OC)

Restriction(s):

Can enroll if Class is Graduate

*An asterisk denotes that a course may be taken concurrently.

Frequency of Offering

The following abbreviations are used to denote the frequency of offering:

(F) fall term; (W) winter term; (S) summer term; (F, W) fall and winter terms; (YR) once a year; (AY) alternating years; (OC) offered occasionally