

# BIOB - Biology-General

## **BIOB 100IN Organism Function: 3 Credits (3 Lec)**

(F, Sp) This course examines biological origins and diversity of life on Earth, emphasizing biodiversity of principal biomes, origins of biodiversity, and exploring form, function, and adaptation of relevant biological systems, including photosynthesis, nutrition and immunity. The course also explores relevant ecological relationships among organisms with an emphasis on animals and plants. Offered fall and spring.

## **BIOB 104 Scientific Thinking: 1 Credits (1 Lec)**

(Sp) This course will help students develop scientific thinking skills that will help them learn science and answer questions in everyday life. The course will cover fundamental elements of scientific reasoning, such as how to test hypotheses, interpret correlations, and find hidden variables in uncontrolled experiments. In addition, this course will explore how cognitive limitations, mental biases, attitudes, political beliefs, and heuristics can interfere with rational thinking. Offered in spring.

## **BIOB 105CS Introduction to Biotechnology: 3 Credits (3 Lec)**

(F) Introduction to an ever-growing industry. Course is designed to demonstrate the significance of biotechnology in today's world. Lecture series presented by research professors, social scientists, and industrial experts.

## **BIOB 110CS Plant Science: 3 Credits (3 Lec)**

Provides an understanding of basic plant science principles and the related environmental components that impact society. Current questions in plant biology, agriculture, and ecology are used to develop problem-solving skills and integrative thinking.

## **BIOB 140R Honors Molecular Biology: 4 Credits (2 Lec, 2 Lab)**

PREREQUISITE: Restricted entry through the Honors Program. An introduction to molecular biology research with an emphasis on how gene expression is regulated in cells and organisms. Hands-on learning of basic techniques in cell and molecular biology will culminate in an independent research project. PREREQUISITE: Restricted entry through the Honors Program. An introduction to molecular biology research with an emphasis on how gene expression is regulated in cells and organisms. Hands-on learning of basic techniques in cell and molecular biology will culminate in an independent research project

## **BIOB 160 Principles of Living Systems: 4 Credits (3 Lec, 1 Lab)**

COREQUISITE: CHMY 121IN and CHMY 122IN or CHMY 141.

(F, Sp) Introduction to cellular organization and function. Topics covered include synthesis and function of macromolecules, cell organelles and structure, energy transformations in living systems, respiration, photosynthesis, the cell cycle, classical genetics, molecular genetics, and biotechnology. Common final

## **BIOB 170IN Principles of Biological Diversity: 4 Credits (3 Lec, 1 Lab)**

(F, Sp) This course examines the biology, ecology, and evolutionary relationships among living organisms. All forms of life will be considered, from single celled prokaryotes to multicellular eukaryotic plants and animals. Offered fall and spring.

## **BIOB 205 Methods in Biotechnology: 4 Credits (4 Lab)**

PREREQUISITE: BIOB 105CS. This course will challenge students in the biotech major to learn a series of essential molecular techniques focusing on research and faculty interaction. The techniques learned will be highly applicable to the biotech industry, giving students a post-graduation competitive edge

## **BIOB 260 Cellular and Molecular Biology: 5 Credits (3 Lec, 2 Lab)**

PREREQUISITE: CHMY 141 or CHMY 151. (F, Sp) Introduction to biological macromolecules, cell structures and function, and gene structure and expression. The laboratory portion will include both wet labs and computer-based modules

## **BIOB 280 Miracle molds, magic mushrooms: Fungi in our world: 3 Credits (3 Lec)**

PREREQUISITE: BIOB 100, 110, 170 or BIOM 103 A presentation of the fungi and their roles in nature and in shaping past and present civilizations. The historical and practical significance of fungi as decayers, as pathogens, as food, and as sources of mind-altering chemicals will be emphasized

## **BIOB 290R Undergraduate Research: 1-6 Credits (1-6 Other)**

PREREQUISITE: Sophomore standing and consent of instructor. Directed undergraduate research. Course will address responsible conduct of research Repeatable up to 99 credits.

## **BIOB 291 Special Topics: 1-4 Credits (1-4 Lec, 1-4 Other)**

PREREQUISITE: None required but some may be determined necessary by each offering department. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number Repeatable up to 12 credits.

## **BIOB 305 Science Communication in Ecology: 1 Credits (1 Lec)**

(Sp) Junior standing. Assists professionals in communicating about their work and findings with a variety of audiences. Students will practice making presentations, writing short blog or news release posts, and interacting with individuals. The focus will be on writing and verbal communication, but with some discussion of visual methods including video. Offered in spring, on demand.

## **BIOB 318 Biometry: 3 Credits (3 Lec)**

PREREQUISITE: C- or better in any 100 level or above Math course. (F) Analysis and interpretation of biological data. Topics include: measures of center and spread, probability, analysis of frequency data and proportions, comparing numerical values, comparing means of two or more groups, linear regression, correlation and modern statistical methods

## **BIOB 375 General Genetics: 3 Credits (3 Lec)**

PREREQUISITE: BIOB 160, BIOB 260, or BIOM 360. Introduction to classical and molecular genetics of eukaryotes, with emphasis on transmission genetics, the structure and regulation of genes, and mechanisms of genetic change

## **BIOB 410 Immunology: 3 Credits (3 Lec)**

PREREQUISITE: Junior or senior standing and BIOB 160 or BIOB 260 or BIOM 363 (BIOB260 or BIOM363 are strongly recommended). (F, Sp) Fundamentals of cellular and molecular immunology including consideration of structure, genetics and function of immunoglobulin, T-cell receptors and major histocompatibility antigens; regulation of the immune response; transplantation and immunological diseases

## **BIOB 420 Evolution: 3 Credits (3 Lec)**

PREREQUISITE: BIOB 375 or BIOH 320. (F, Sp) For seniors in biology. Evolutionary theory is presented and takes two principle directions, the study of evolutionary history and the study of the biological mechanism of evolution including mutation, genetic drift, migration, and natural selection

## **BIOB 424 Ethical Practice of Science: 3 Credits (3 Lec)**

PREREQUISITE: Junior standing and at least one three-hundred level series of any science course. (Sp) Examines the evolution of the scientific process with specific focus on the ethical responsibilities of scientists and to examine policies and procedures developed by the scientific community to ensure integrity in the research process. Co-convened with BIOB 524

## **BIOB 425 Adv Cell & Molecular Biology: 3 Credits (3 Lec)**

PREREQUISITE: BIOB 260, BIOH 320, and BCH 380 or BCH 441. In-depth study of cell structure and function. This course is co-convened with BIOB 525

**BIOB 428R Molecular neurological disease: 3 Credits (3 Lec)****BIOB 430 Plant Biotechnology: 3 Credits (2 Lec, 1 Lab)**

COREQUISITE: BIOB 375. (Sp) Humans have historically altered plants to meet food and fiber needs. Our ability to transfer genes from organism to organism is accelerating this process. The principles of plant genetic engineering will be discussed along with hands-on laboratory

**BIOB 438 Developmental Mechanisms: 3 Credits (2 Lec, 1 Lab)**

PREREQUISITE: BIOB 425. This course will focus on the molecular and cellular mechanisms which drive developmental processes

**BIOB 441 Advanced Eukaryotic Genetics: 3 Credits (3 Lec)**

PREREQUISITE: BIOB375. Advanced Eukaryotic Genetics will root recent genetic findings into a classical genetic context, with a primary goal of empowering students to read and interpret classical and current literature in the field of genetics and apply genetic analysis to research problems

**BIOB 476R Gene Construction: 4 Credits (1 Lec, 3 Lab)**

PREREQUISITE: BCH 380 and BCH 441. The goals are to provide upper level students with the opportunity of designing and building their own genes. The goal of the course is to use this design experience to learn basic techniques in cell and molecular biology

**BIOB 480 Conservation Genetics: 3 Credits (3 Lec)**

PREREQUISITE: BIOB 375 or BIOH 320, and BIOB 420, and STAT 216Q. (F) Introduces the theory and practice of conservation genetics, focusing primarily on animals. Case studies will be used liberally, and emphasis will be placed on interpreting genetic data. Readings will include primary literature. Co-convened with BIOE 548. Offered in the fall

**BIOB 484 Population Genetics: 3 Credits (3 Lec)**

PREREQUISITE: BIOB 375. BIOB 420. Introduction to theory and empirical data on genetics of populations. Topics covered include modeling natural and artificial selection, nonrandom mating, gene flow and effective population size as factors influencing the maintenance of genetic variation in populations. The approach emphasizes the development of simple mathematical models to illustrate fundamental conceptual issues in the field

**BIOB 490R Undergraduate Research: 1-4 Credits (1 Other)**

PREREQUISITE: Junior or Senior standing and approval of instructor and approval of department head. Undergraduate research which may culminate in a research paper, journal article, or undergraduate thesis. Course will address responsible conduct of research  
Repeatable up to 12 credits.

**BIOB 491 Special Topics: 1-4 Credits (1-4 Lec)**

PREREQUISITE: Course prerequisites as determined for each offering. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand  
Repeatable up to 12 credits.

**BIOB 492 Independent Study: 1-3 Credits (1 Other)**

PREREQUISITE: Junior standing, consent of instructor and approval of department head. Directed research and study on an individual basis  
Repeatable up to 6 credits.

**BIOB 494 Seminar/Workshop: 1 Credits (1 Other)**

PREREQUISITE: Junior standing, consent of instructor, and as determined for each offering. Topics offered at the upper division level which are not covered in regular courses. Students attend and write critiques of seminar presentations by professional biologists  
Repeatable up to 4 credits.

**BIOB 497 Educational Methods: Biology: 2 Credits (4 Lab)**

PREREQUISITE: Junior or senior standing, consent of instructor and department head. (F, Sp) Provides deeper contact with a subject for those considering an academic profession. This provides experience in a teaching laboratory under detailed academic supervision in recognition that teaching enhances learning. Includes the preparation, organization, presentation of materials, and student evaluation  
Repeatable up to 4 credits.

**BIOB 498 Internship/Cooperative Edu: 1-6 Credits (1-6 Other)**

PREREQUISITE: Junior standing, consent of instructor and approval of department head. An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field  
Repeatable up to 6 credits.

**BIOB 499 Senior Thesis/Capstone: 2 Credits (2 Other)**

PREREQUISITE: Senior standing in the Cell Biology & Neuroscience Department or in the Plant Sciences & Plant Pathology Department and consent of instructor. Senior capstone course. Students are expected both to present and to discuss advanced topics from the current biomedical literature. These topics will expand upon material presented in regular courses in the biomedical science curriculum. Students will write at least one major paper

**BIOB 524 Ethical Practice of Science: 3 Credits (3 Other)**

(Sp) This course exposes students to the ethical issues and federal requirements they will likely encounter throughout their careers and helps develop skills for resolving ethical issues encountered in scientific research. Co-convened with BIOB 424.

**BIOB 525 Adv. Cell & Molecular Biology: 3 Credits (2 Lec, 1 Other)**

PREREQUISITE: BIOB 260 and BCH 380 or BCH 441, and BIOB 375 or BIOH 320 In-depth study of cell signaling, structure and function. This course is co-convened with BIOB 425

**BIOB 530 Plant Biotechnology: 3 Credits (2 Lec, 1 Lab)**

Humans have historically altered plants to meet food and fiber needs. Our ability to transfer genes from organism to organism is accelerating this process. The principles of plant genetic engineering will be discussed along with hands-on laboratory. Students will design and analyze the results of plant biotechnology experiments.

**BIOB 591 Special Topics: 1-4 Credits ()**

Course prerequisites as determined for each offering.