

Special Topics (BIOS 48X1, 48X2, 48X3) and Project Labs Course Descriptions

Summer/Fall 2021 Special Topics and Project Labs

BIOS 4803 ROS Nutrition (Rosbruck)

ASYN

Prerequisite: APPH 1040/1050

Credit hours: 3

Description: The course is a study of human nutrition as an applied science and covers nutrition physiology: metabolism, energy production, biochemical aspects, role of nutrients, weight control mechanisms, fitness and consumerism.

BIOS 4803 MCG Programming in the Biological and Health Sciences (McGrath)

Meets: TR 12:30-1:45

Prerequisite: BIOS 1107 or BIOS 1207 or BIOL 1510 or BIOL 1511

Credits: 3

Description: Computational skills has become an essential tool for biological research. This lecture course will introduce students to the process of coding using the Python scripting language. We will then apply these skills towards fundamental biological issues, including collecting, analyzing, and visualizing biological data sets, working with genomic, genetic variation, and protein sequences, and modeling biological processes. Students will become familiar with common open source Python modules, many that were designed by biologists. Students will leave this class with the ability to customize their analysis of large-scale datasets common to biological research today.

BIOS 4590 A and AL – Research Project Lab (Jiang)

Meets: M 3:30-4:20, M 12:30-3:15; W 12:30-3:15

Prerequisite: SR standing

Corequisite: BIOS 4460 Communicating Biological Research

Credits: 3

Description: Causes and Consequences of Biodiversity

Students will gain experience in designing, implementing, and communicating a biology research project, and practical training in modern approaches for biological research. This section will have a scientific theme of *Causes and Consequences of Biodiversity*. Students will design and run projects to explore how various ecological factors influence one or multiple dimensions of biodiversity (e.g., genetic diversity, species diversity, functional diversity, phylogenetic diversity) and/or how changes in biodiversity influence ecological properties at the species, community, or ecosystem levels.

BIOS 4590 B and BL – Research Project Lab (Lobachev)

Meets: T 3:30-4:20, T 12:30-3:15, R 12:30-3:15

Prerequisite: SR standing

Corequisite: BIOS 4460 Communicating Biological Research

Credits: 3

Description: This course is designed for upper-level undergraduate students interested in learning modern molecular biology techniques and applying them to study biological processes in model organisms. No previous experience working in the lab is required. Modern approaches and tools used for modification of genetic information will be presented. As a result of this training, students will learn how to work with *E. coli* and baker yeast, to carry out plasmid and genomic DNA extractions, to design and set up PCR reactions, to do restriction digestion analysis, to clone genes, to create mutation alleles on plasmids and in the chromosomal genes and to analyze the effect of these mutations *in vivo*. The course will include traditional lectures, laboratory time and individual projects. During individual projects students working as a team will carry out their own investigation of the effect of mutations in particular genes on chromosomal metabolism. The course is thus an essential resource for students of colleges of science who seek to expand their knowledge of modern molecular genetics tools.