Course Descriptions for BIOS Project Labs (BIOS 4590) and Special Topics (BIOS 48X1, 48X2, 48X3)

Summer 2022 Special Topics

BIOS 4803 ROS Nutrition (Rosbruck)
ASYN
Prerequisite: APPH 1040/1050
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.

Fall 2022 Special Topics and Project Lab Descriptions

BIOS 4801 – Selected Subjects in Ornithology (Mendelson)
Prerequisites: Prerequisite: BIOS 1107 or BIOS 1207 or BIOL 1510 or BIOL 1511
Description: The fossil record of birds and their ancestors continues to rapidly advance our understanding of the evolution of these unique animals and allows for a timely review of some of their more salient characteristics among Reptilia. Using a framework based almost entirely on student-led presentations and discussions, we will consider topics such as the evolution of feathers, development of feathers, thermal physiology, behavior, evolution of reproductive strategies, as well as contemporary conservation concerns.

BIOS 4803 ROS Nutrition (Rosbruck)
ASYN
Prerequisite: APPH 1040/1050
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 Proteomics: Technologies and applications (Torres)
Credit hours: 3
Prerequisites: BIOS 1107 or BIOS 1207 or BIOL 1510 or BIOL 1511
Description: This course is designed for undergraduate and graduate level students interested in understanding fundamental aspects underlying the study of proteins at the omics level (proteomics), including technologies and their application to biological problems. Particular emphasis will be devoted to a review of primary literature covering specific applications in fundamental as well as translational (i.e. medical) research.

BIOL 4590 – Research Project Lab (Agarwal) – Drugs from the sea: -omics for marine sponges
Prerequisite: SR standing
Corequisite: BIOS 4460 Communicating Biological Research
Credits: 3
Description: This course is designed to offer a hands-on approach to investigate the microbiome (community biology) and metabolome (pharmaceutical chemistry) from marine sponges, one of the most ancient living organisms on earth which offer an unparalleled biological and chemical diversity. The course will offer broad training in biological and chemical sciences. As a result of this training, students will learn how to do taxonomic assignments, work with *E. coli,* to carry out genomic DNA extractions, to design and set up PCR reactions, to clone genes, and to do community analyses using genomic tools. The students will also learn mass spectrometry for metabolomics and bioassays for antibiotic discovery. The course will include traditional lectures, laboratory time, and individual projects. During individual projects, students working in teams of two will carry out their own investigations and present their findings via in-class presentations. A manuscript will be developed cataloging the learning outcomes and findings from this course. The course is thus an essential resource for students who seek to expand their knowledge of modern molecular biology and chemistry tools.

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BIOS 4590 – Research Project Lab (Lobachev)
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.