Special Topics Electives – Fall 2019

APPH 3803 A – Nutrition (Rosbruck)
Meets: Asynchronously (online)
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.

BIOL 4803 C - Programming in the Biological and Health Sciences (McGrath)
Meets: TR 12:00-1:15
Prerequisite: BIOL 1510 or BIOL 1511 or equivalent
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.

BIOL 4803 D - Community Ecology (Jiang)
Meets: TR 4:30-5:45
Prerequisites: BIOL 2335 or 2337 or equivalent
Credits: 3
Description: This is a two credit course suitable for both undergraduate and graduate students interested in learning more about community ecology beyond those covered in the sophomore-level General Ecology. We will examine species interactions and their roles in regulating the structure and dynamics of ecological communities. Classroom discussion of readings from the primary literature, including both classic and recent scientific articles, will be a major component of the course. The main goal of this course is to introduce you to important concepts and issues in community ecology; by the end of the course you should have a basic understanding of the current knowledge on how ecological communities operate. We will not cover each and every aspect of community ecology, but instead focus on selected issues and questions that have had large influences in the field. Another goal of this course is to practice and refine your skills in critically reading and effectively presenting scientific papers.

(see next page for Project Lab descriptions)

Project Labs

BIOL 4590 C – Research Project Lab (Agarwal) – Drugs from the sea: -omics for marine sponges
Meets: MW 12:10-12:50, W 3:00-3:50
Prerequisite: SR standing
Corequisite: BIOL 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.

BIOL 4590 D – Research Project Lab (Lobachev)
Meets: TR 12:00-12:40, T 3:00-3:50
Prerequisite: SR standing
Corequisite: BIOL 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.