Special Topics Biology Electives for Spring 2016

BIOL 4803 RNA Biology and Biotechnology (Storici)
Meets: TR 9:35-10:55
Prerequisite: BIOL 1510/1511
Credit hours: 3
This grad/undergrad course introduces students to the fundamental concepts of RNA biology and to state-of-the-art biotechnologies that use RNA for medical and industrial applications. It is now clear that most of genomic DNA is transcribed into RNA, about 2% of which encodes proteins, while all the rest is transcribed into non-coding RNA. RNA impacts almost every aspect of gene expression and regulation and its malfunction is associated with many types of human diseases. Understanding the biology of RNA is an essential investigation for basic, medical, pharmaceutical, agricultural and environmental research. RNA-based techniques are becoming increasingly useful in gene therapy and applied research. These topics will be covered in depth with lectures, workshops, seminars, and debates.

BIOL 4803 Human Evolutionary Genomics (Lachance)
Meets: MWF 10:05-10:55
Prerequisite: BIOL 1510/1511
Credit hours: 3
In this grad/undergrad course, students will discuss primary literature and use computational tools to investigate how evolution has shaped global patterns of human genetic variation. This class integrates genetics, evolutionary biology, anthropology, computation biology, and bioinformatics. During the three weekly class meetings, time will be spent on lecture to learn concepts of evolutionary genomics, on discussion of cutting edge research in human genomics, and on exercises where computation tools are applied to real world datasets.

BIOL 4803 Conservation Biology (Mendelson, Goodisman, Green)
Meets: MWF 12:05-12:55 pm
Prerequisite: BIOL 2335/2337
Credit hours: 3
This course explores major approaches in conservation biology, the ecological principles behind conservation initiatives, and the interdisciplinary challenges arising from social, political and economic factors in conservation efforts. The goal of this class is to explore conservation issues from different levels, ranging from genetics to ecosystems and from small to broad scales. Students will gain competency in analyzing primary literature, identifying uncertainties in conservation science, and discussing the tools needed to implement effective conservation strategies.

BIOL 4803 Microbial Symbiosis (Stewart)
Lectures: MWF 2:05-2:55 pm
Prerequisites: BIOL 3880 Introductory Microbiology
Course Description: Microbial symbioses affect almost all life on this planet. Key eukaryotic organelles, including the mitochondrion and chloroplast, evolved from bacteria living inside ancient host cells. Today, similar associations between microbes and plants and animals occur in every major biome, playing critical roles in ecosystem productivity, the evolution of new species, and human health and agriculture. This course explores core topics in the study of bacteria-eukaryote symbioses, including partner recognition and communication, molecular adaptations to intracellular lifestyles, symbiont-symbiont interactions and metabolic synergism, and the role of symbiosis in bacterial genome evolution. Course lectures and discussions will draw heavily from the primary literature, focusing on the most recent discoveries in the field, key methodological advancements, and on diverse associations ranging from hydrothermal vent symbioses to the human microbiome.

BIOL 4803 Health, Genes, and Society (Gibson)
Meets: TR 9:35-10:55
Prerequisite: JR or SR standing
Course Description: The objective of this course is to provide students with an alternative perspective on health and wellness to that offered by standard cell/molecular biology or engineering classes. The emphases will be on evidence-based changes in healthcare practices, where relevant, discussing implications of contemporary genetics. A large component of the course will be student-driven projects addressing contemporary healthcare needs chosen by small teams. There are three sub-sections. (1) Health care models from epidemiology to molecular medicine: introduction to health and wellness, including comparative practices, the impact of socioeconomic status on health outcomes, and race and gender disparities; the epidemiological transition, and contrasting the roles of medicine and international public health programs for global health. (2) Health behavior and its impact on well-being, focusing on smoking, drinking, eating, exercise, and stress reduction. (3) Personalized medicine, examining the impacts of social media and predictive health initiatives (including the Emory-GT Center for Health Discovery and Well Being) and discussing the ethics and practicality of parental choice in reproduction.