SPRING 2017 INQUIRIES IN BIOLOGICAL SCIENCES OFFERINGS

BIOL 2299: Inquiries in Biological Sciences, Section 1 (34721)
Dr. Kostia Bergman
Mon, Weds, Thurs: 1:35-2:40
**Topic: Epidemics and Infectious Disease**
Epidemics have affected the lives of numerous individuals and even the course of human history. Detailed investigations of the incidents and their causes contributed greatly to our understanding of the germ theory of disease and made possible the dramatic growth of the human population and the relative security of our modern world. Despite the progress, recent events have made us all aware that we must constantly maintain vigilance to keep up with the evolution of pathogens. Reading, discussing, evaluating and presenting primary research will enhance your science literacy skills and prepare you for more rigorous independent research in your future courses.

BIOL 2299: Inquiries in Biological Sciences, Section 2 (34722)
Dr. Melissa McElligott
Mon, Weds, Thurs: 1:35-2:40
**Topic: Stem Cells (Service Learning Section)**
In this course we will investigate the biology of stem cells, discuss their potential with regard to treating neurodegenerative disorders, and discuss the ethical implications surrounding stem cells. Our course will survey many different topics that relate to stem cells including, human development, cell cycles, cell differentiation, stem cell potency, genetics, and gene expression. In addition, we will look closely at the anatomy and physiology of the human nervous system so that we can more fully understand the potential that stem cells have for neural repair and regeneration. While our textbook has some important foundational material to understand these concepts, we will be supplementing with review articles and primary research papers to investigate these topics. Reading, discussing, evaluating and presenting primary research will enhance your science literacy skills and prepare you for more rigorous independent research in your future courses.

BIOL 2299: Inquiries in Biological Sciences, Section 3 (37582)
Dr. Kirsten Fertuck
Mon, Weds, Thurs: 1:35-2:40
**Topic: Biochemical Toxicology**
We are exposed on a daily basis to an extremely diverse set of chemicals, either intentionally as food additives or medications, or unintentionally as environmental pollutants. The methods for determining how these chemicals can interact with our cellular macromolecules are diverse as well, and take advantage of our expanding knowledge of the structure and function of chromosomes and proteins. While many of these experimental approaches have produced results that have had a significant positive impact on our health and wellbeing, in other cases researchers disagree about the predictive power of the methods that are currently in use. We will explore some of the main controversies surrounding these approaches, and identify the sources of uncertainty
that lead experts to disagree about whether certain chemicals that we are exposed to have meaningful biological impacts.

BIOL 2299: Inquiries in Biological Sciences, Section 4 (34724)
Dr. Susan Powers-Lee
Mon, Weds, Thurs: 1:35-2:40

**Topic: Genes and Diet**
We will explore recent concepts and controversies at the intersection of human genes and diet, viewing them through the lens of biochemistry. The course will focus on how variations in our four genomes affect our dietary outcomes and our health: the nuclear genome; the epigenome; the mitochondrial genome, and the microbiome, the genes from the bacterial cells that outnumber human cells 10:1 and that account for 99% of the unique genes in our bodies. Topics will include: how recent evolutionary history is linked to an impending global pandemic of obesity/diabetes and to variations in how humans handle specific foods; causes and treatments for coronary vascular disease; food allergies and intolerances; prion diseases; and, the value/effects of dietary supplements and artificial sweeteners. Course meetings will be part lecture and part discussion. The course format includes: reading and analyzing the scientific literature; carrying out and presenting on a research project; and, exams/quizzes on the various topic areas.

BIOL 2299: Inquiries in Biological Sciences, Section 5 (37907)
Dr. Dagmar Sternad
Mon, Weds: 2:50-4:30

**Topic: Control of Human Movement: Skill and Loss of Skill in Disease**
How do humans manage their actions and interactions with the physical world? How do we learn the many complex skills that make up our daily life, such as drinking a cup of coffee or, for that matter, skateboarding? This question becomes even more vital when such skills are lost, such as in Parkinson Disease or after a stroke. To develop interventions that restore or reverse the degradation of functional behavior requires a rigorous understanding of the healthy neuro-mechanical system. The field of movement neuroscience aims to reveal fundamental principles of how the brain controls our movements. The systems approach uses behavioral, electromyographic, and brain imaging methods to analyze human movements. The class combines lectures with a discussion-based approach. We will read many different sources and review leading-edge scientific literature. We will learn from hands-on lab experiences, and design and present our own research projects.

BIOL 2299: Inquiries in Biological Sciences, Section 6 (34725) HONORS SECTION
Dr. Melissa McElligott
Mon, Weds: 2:50-4:30

**Topic: Stem Cells**
In this course we will investigate the biology of stem cells, discuss their potential with regard to treating neurodegenerative disorders, and discuss the ethical implications surrounding stem cells. Our course will survey many different topics that relate to stem cells including, human development, cell cycles, cell differentiation, stem cell potency, genetics, and gene expression. In addition, we will look closely at the anatomy and
physiology of the human nervous system so that we can more fully understand the potential that stem cells have for neural repair and regeneration. While our textbook has some important foundational material to understand these concepts, we will be supplementing with review articles and primary research papers to investigate these topics. Reading, discussing, evaluating and presenting primary research will enhance your science literacy skills and prepare you for more rigorous independent research in your future courses.

BIOL 2299: Inquiries in Biological Sciences, Section 7 (34726)
Dr. Justin Crane
Mon, Weds: 2:50-4:30
**Topic: Metabolic Dysfunction in Health and Disease**
We will explore metabolism and energy balance and the problems that can occur in several disease states. We will work starting from the cellular and molecular level and then translate these changes up to the whole body. The course will focus on several health problems associated with cellular alterations in peripheral tissue energy metabolism and mitochondrial function. These areas include aging, type 2 diabetes and atherosclerosis. Topics will include the role of nutrition and physical activity in these processes, as well as pharmaceutical interventions to treat the underlying disorders. Course meetings will be part lecture, part discussion and part student presentation and group work. The course format includes reading and analyzing the scientific literature, developing and presenting research projects and exams/quizzes on various topic areas.

BIOL 2299: Inquiries in Biological Sciences, Section 8 (36166)
Dr. Jamie Bunce
Mon, Weds, Thurs: 1:35-2:40
**Topic: Neuroscience of Aging**
We will explore the neurobiology of aging from various perspectives including how the brain changes with age and how these transformations affect behavior, to neurodegenerative disorders that are associated with advanced age (e.g., Alzheimer's Disease) and best practices to preserve mental well-being as we get older. In the classroom, students will actively engage in discussions and activities pertaining to topics covered. Students will also be introduced to the current scientific literature and will become proficient in reading, interpreting and evaluating primary research and review articles via presentations and debates. Throughout the semester, students will be challenged to relate topical content to the overarching biological concepts of evolution, structure and function, information transfer, pathways and systems. Overall, this course aims to engender a skill set encompassing critical thinking, scientific literacy and an ability to relate topics to the big (biological) picture. These skills will serve as a foundation for students to build upon in future courses.