

FALL 2008 CHEMISTRY / BIOLOGY ELECTIVES

SC311 Marine and Atmospheric Chemistry (3-0-3)

Assoc. Prof. D. O'Sullivan

An introduction to chemical processes that influence the chemistry of marine waters and the atmospheric marine boundary layer. The course will begin with the composition of seawater and progress towards an understanding of the biogeochemical cycles of important elements in oceanic systems, including the chemistry of tropospheric ozone and aerosol formation. The impact these processes have on current and future Naval operations will be discussed.

SC325 Advanced Organic Chemistry (3-0-3)

Assoc. Prof. C. Kinter

Building on the foundation of SC225-6, this course will apply fundamental topics such as stereochemistry, conformation, structure, bonding and mechanisms to advanced topics with an emphasis upon how these influence the biological activity of compounds. We will explore how understanding these principles can allow the design of compounds to solve biomedical challenges, particularly those of military significance, including fatigue, infectious disease and biological terrorism. Classroom discussion will be complemented by experimentation, which will include preparation and testing of biologically active compounds. *Prereq: SC226*

SC485B Organometallic Chemistry and Catalysis (3-0-3)

Asst. Prof. A. MacArthur

The use of transition-metal catalysts to construct strong C-C, C-N, and C-O bonds in a variety of compounds has had an enormous impact on the pharmaceutical, polymer, and fuel industries in recent years. This course will provide an inorganic, metallo-centric survey of organometallic chemistry. The topics to be discussed include the synthesis and properties of organometallic reagents, as well as the reaction conditions, mechanistic pathways and importance of these transition-metal complexes in a wide-range of synthetic pathways and industrial reactions. *Prereq: SC226 and SC356.*

SC485E CBRNE: Chemical, Biological, Radiological/Nuclear & Explosives (3-0-3)

LT E. Wilfong and LCDR P. Kaiser, USN

Chemical, biological, radiological, nuclear and explosive (CBRNE) events refer to the uncontrolled release of chemicals, biological agents or radioactive contamination into the environment or explosions that cause widespread damage. The number of nations and non-national terrorist and criminal organizations capable of developing, possessing and deploying CBRNE weapons is steadily increasing. Since September 11th 2001 and the subsequent anthrax attacks, there has been renewed concern about domestic and foreign CBRNE events. This course will focus on the basics of key biological, chemical, radiological, nuclear and high yield explosives including discussions of the physiological consequences of exposure, prophylactic and post-exposure treatment options, production, weaponization/dissemination and current and future technologies for the detection of agents.

SPRING 2009 CHEMISTRY / BIOLOGY ELECTIVES

SC336 Biochemistry II (3-0-3)

Asst. Prof. J. Schlessman

This course will provide advanced treatment of topics covered in SC335, such as biomolecular structure, bioenergetics and enzyme kinetics, and cover the following new material as well: biosynthesis of amino acids, nucleotides and cofactors; photosynthesis and plant metabolic cycles; signal transduction; molecular genetics; regulation of eukaryotic and prokaryotic gene expression. There will be an introduction to virology, immunology and the metabolism of specialized cells. *Prereq: SC335.*

SC425 Bioorganic and Medicinal Chemistry (3-0-3)

Assoc. Prof. C. Gutteridge

This course will explore the biological aspects of a variety of naturally-occurring and synthetic organic compounds. We will learn how pharmacologically active compounds (drugs) are discovered and how they work, and review some state-of-the-art research being carried out in this area by the military to maximize combat effectiveness. Additionally we will explore the biosynthesis of several complex organic compounds and how genetic engineering of the enzymes involved can enable production of novel compounds. Selected topics will be explored in the laboratory. *Prereq: SC226 and SC335*

SC486A Electrochemical Applications (3-0-3)

Asst. Prof. R. Calhoun

This course will offer insight into a broad spectrum of modern applications of electrochemistry. The beginning of the course will discuss some elementary theory and include basic techniques such as voltammetry and amperometry. However, advanced topics such as fuel cells, electrogenerated chemiluminescence (ECL), and scanning electrochemical microscopy (SECM) will be discussed and demonstrated.

SC486D Advanced Physical Chemistry (3-0-3)

Prof. M. L. Campbell

This course will expand on the topics covered in the physical chemistry sequence. Topics include lasers, perturbation theory, angular momentum coupling, atomic spectroscopy involving jj coupled atoms, the Zeeman effect, spectroscopy of polyatomics including transition probabilities, molecular orbital theory of polyatomics, group theory and molecular reaction dynamics including transition state theory. Topics such as transport properties, nuclear magnetic resonance, x-ray crystal structures, interferometry, supersonic jet spectroscopy, and zero kinetic energy (ZEKE) photoelectron spectroscopy might be covered based on class interest. *Prereq: SC346*