FALL 2021 (AY22) CHEMISTRY / BIOLOGY ELECTIVES

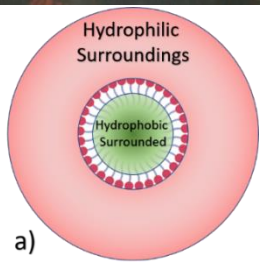
SC412: Environmental Chemistry (3-0-3)
Assoc. Prof. Ron Siefert
Many analytical chemistry techniques can be used to learn more about the chemistry of our environment. In this course students will be exposed to specific applications of these techniques to various environmental systems (i.e. water, air, soil, etc.). Topics to be explored may include the bio- and geo-chemical cycles, the effect of military activities on the environment, and the use of "green chemistry" in industry.
Prerequisites: SC262 or SC264 or permission of the department chair

SB/SC485B: Applications of Molecular Biology and Biochemistry (2-2-3)
Asst. Prof. Leighanne Basta
This course will delve into the methodology of cloning, protein overexpression, protein purification, and assay development. Students will learn about experimental methods in molecular biology and biochemistry by reading primary literature and will put those practices into action as they perform similar experiments toward generating and assaying mycobacterial cell wall biosynthetic enzymes. Counts as a chemistry major elective.
Prerequisites: SB251 and SC226.

SC485C: Art Conservation Chemistry (3-0-3)
Assoc. Prof. Joseph Lomax

This course will deal with the chemical aspects of art conservation as well as the philosophy and ethics of science involved in art conservation. Pre-req: SC226, SC216. Conservation of art deals not only with its structure and shape—that is, its three-dimensional identity—but the fourth dimension, time, as well. What is known about the art goes back to its creation, and how the artist's intent can be preserved goes beyond the lifespan of the artist. Knowledge of chemistry informs the conservation and knowledge of conservation involves the chemist. This course hopes to create a fuller appreciation of the complexity of art through a knowledge of the artwork as seen by a chemist. Taking chemical topics such as heterogeneity and solubility, organic and inorganic pigments, light and color, acids and bases, reduction and oxidation, we will use many examples from art conservation and chemical analogies to gain deeper understanding of the practical aspects of art conservation and chemistry.

We are exceptionally fortunate to have many world-class museums with art conservation programs. Conditions allowing, we intend to have speakers come to talk about their work in art conservation, and be able to visit a museum (or perhaps two) in the Washington/Baltimore/Annapolis area.



SC485D: Natural Product Chemistry (3-0-3)
Prof. Debra Dillner
Organic compounds isolated from plants have been productive leads in determining new medical treatments. Chemists have learned from folk medicine which plants have healing properties and then isolated the active components. This has led to pharmaceuticals ranging from pain killers to anti-cancer compounds. Some are used exactly as found in nature and others have been modified in the laboratory to make even better pharmaceuticals. In this course, we will look at how these compounds are isolated and identified. We'll also see how drug companies have taken these compounds and tried to make better drugs.
Prerequisites: SC225, SC261

SPRING 2022 (AY22) CHEMISTRY / BIOLOGY ELECTIVES

SC416 Analytical Chemistry in Forensic Investigations (3-0-3)
Prof. Graham Cheek

This course will address the types of sample collection techniques used in criminal investigations, as well as the chemical and instrumental methods used to determine the presence of substances associated with illicit activities. Emphasis will be placed on specific forensic investigative techniques such as DNA fingerprinting, drug detection, arson investigations (petroleum residues), bombings (explosives residues) and characterization of fibers and paint.
Prerequisites: SC361

SC336 Biochemistry II (3-0-3)
Instructor: Assoc. Prof. Daniel Morse

This course will expand and build on topics from SC335, such as biomolecular structure, bioenergetics and enzyme kinetics, to cover biosynthesis of amino acids, nucleotides and cofactors; photosynthesis and plant metabolic cycles; signal transduction; molecular genetics; regulation of eukaryotic and prokaryotic gene expression.
Prerequisites: SC335

SB/SC486B: Molecular Virology (3-0-3)
Assistant Prof. Ina O'Carroll

This course will explore the genetic and structural diversity of viruses and the molecular basis of viral infections. We will examine 1) structures of virus particles and the features that allow them to enter cells, 2) the extraordinary diversity of viral genomes and genetic tricks they use to replicate in host cells, 3) the assembly of virus particles, 4) how infected cells antagonize viral infections, and 5) vaccines and treatments against viral infections. Counts as a chemistry major elective.
Prerequisites: SB251 and SC335 (or permission from instructor).

SC486C: Polymer Synthesis: From ATRP to Ziegler-Natta (3-0-3)
Professor Shirley Lin

Although the age of synthetic polymers began only in the mid-20th century, by 2015 more than 320 million tons of commodity plastics were manufactured world-wide. In the span of a mere 60 years, synthetic polymers have become an integral part of our lives, appearing in diverse applications ranging from precision drug delivery systems to smart bullet-proof vests. During this course, we will investigate the science behind the production of both large-scale commodity and high-performance polymers and explore the cutting edge of macromolecular design. Students will have opportunities for hands-on experience with polymeric materials throughout the semester.
Prerequisites: SC226, SC262, SC356 or instructor permission

SC486D: Current Topics in Organic Chemistry (3-0-3)
Professor Craig Whitaker

Current Topics in Organic Chemistry – From Sarin Gas and Novichok Poisoned Underpants to Bomb Sniffing Dogs and Smart Polymers

Organic compounds are very important to our daily life. Recent world events have illustrated that chemical threats/advances are very real and come from a wide range of organic structures. Timely design, synthesis, detection, and identification of these materials is of great importance. This course will focus initially on introducing current real world issues ranging from new lethal chemicals (synthetic and naturally occurring), assessing toxicity, neutralizing deadly compounds, smart polymers and spectroscopic techniques to reveal the true nature of the organic materials and how they affect the world around us. Additionally, Warren Buffet recently said "one easy way to become worth 50 percent more than you are now – at least – is to hone your communication skills." So students in this course will analyze journal articles, design laboratory experiments and also learn how to effectively present information in an appropriate and engaging style. *Prerequisite*: SC226, SC262