

*UMBC Department of Chemistry and Biochemistry*  
**Electives for Spring 2017**

**CHEM 401 Chemical and Statistical Thermodynamics**, Dr. Rick Wormsbecher

Area: Physical Chemistry. *Chemicals react and rearrange. Fluids boil, freeze, and evaporate. Solids melt and deform. Rubber stretches and retracts. Proteins fold. We will study the forces that drive these (and other) processes. Statistical thermodynamics gives us a set of tools for modeling molecular behavior and how it is realized in the macroscopic realm. Most importantly, statistical thermodynamics gives a language for interpreting experiments.*

**CHEM 405L Advanced Inorganic Chemistry Lab**, Dr. Marie-Christine Daniel-Onuta

Area: Inorganic Chemistry. *The core skills that will be emphasized in the course are anaerobic synthesis and advanced characterization methods. These methods will be applied to inorganic complexes important in biological/medicinal inorganic chemistry and nanomaterials. This interdisciplinary course aims to combine traditional inorganic chemistry concepts/methods with areas of inorganic chemistry not covered in lower-level courses.*

**CHEM 455 Biomedical Chemistry\***, Dr. Katherine Seley-Radtke

Areas: Organic Chemistry, Biochemistry. *This survey course provides an introduction to drug design, discovery and development processes from a biological, organic chemistry and mechanistic standpoint. Basic principles of drug design and development, including modern rational approaches, various drug targets, the design and mechanistic features of various classes of inhibitors and prodrugs, DNA interactive drugs, toxicity, development of resistance, and patent issues will be covered.*

**CHEM 490 Applied Analytical Chemistry Project**, Dr. William LaCourse

Area: Analytical Chemistry. *This course provides hands-on experience in the discovery design process. Students learn the progression of a project from defining the problem, collecting relevant information, generating ideas, developing a plan, producing a solution, presenting their ideas to others for feedback, improving designs, and delivering a product; this is done in collaboration with an industry partner who will provide project ideas, an industry mentor(s) and support for the projects.*

**CHEM 490, Bio and Bio-Inspired Materials\***, Dr. Mark Allen

Areas: Inorganic Chemistry, Biochemistry. *Bio and Bio-Inspired Materials is a lecture and literature based course designed to focus on how soft organic biomolecules interact with organic and inorganic materials. The course has 4 units including biomolecules (proteins etc), biomineralization (how biology makes inorganic minerals), bio-inspired synthesis (how we can mimic biology in material preparation) and biomaterials (how materials interface with biology).*

**CHEM 490, Organic Synthetic Methods**, Dr. Marcin Ptaszek

Area: Organic Chemistry. *This course presents the important methods of modern organic synthesis, with emphasis on their applications for synthesis of complex molecules. The classical and modern methods for carbon-carbon and carbon-heteroatom bond formation, functional groups transformations, as well as reduction and oxidation will be discussed, with the emphasis on their scope and limitations. The course will be broadly illustrated with pertinent examples from the current original literature.*

**CHEM 490 Structural Biology\***, Dr. Elsa Garcin

Area: Biochemistry. *This class comprises lectures, hands-on practicals (computer and in the lab), and paper reading. In this class, we explore structural biology and how to use the information it provides to understand how macromolecules (proteins, nucleic acids) work, interact, and are regulated. We also delve into structure-based drug design and study specific cases based on recent literature.*

\*Approved as an elective for the undergraduate major in Biochemistry

### **Important Curricular Changes Beginning Fall 2015**

CHEM420 is no longer required for the B.S. degree in Chemistry - Current B.S. majors should take two advanced electives (for students who have already taken CHEM420, this can count as one of the advanced electives)

CHEM405 will only be offered in fall semesters and CHEM405L will only be offered in spring semesters

Students who declare a B.S. Chemistry major beginning Fall 2015 will be required to take CHEM405L and one advanced elective

CHEM401 will be offered in the spring rather than the fall