

CHEM 4200 Bioorganic Chemistry and Chemical Biology

Course Description:

This course will introduce bioorganic chemistry and chemical biology to senior undergraduate students who have learned basic organic chemistry courses. The course has two modules. First module is bioorganic chemistry: chemical structures, reactions, synthesis, and functions of biomolecules. The lecturer will first introduce four types of biomolecules, namely peptides and proteins, lipids, carbohydrates, and nucleic acids to chemistry students, with a focus on their molecular structures, higher-order structures and organizations, and the organic reactions to synthesize or to transform these molecules in a synthetic laboratory or inside cells. Enzymes, a special group of proteins will also be introduced to the audience, together with cofactors and coenzymes as one example of proteins possessing catalytic power. The second module of the course will focus on chemical biology, including current technologies developed and selected research projects in this field. Through this course, students will be able to apply their basic organic chemistry knowledge to complicated biological molecules, and deepen their understanding on molecules in life, from an organic chemist's point of view. This course will be distinct from an introductory biochemistry course by focusing on the organic chemistry aspects of the molecules in life, i.e. molecular structures, higher-order structures, functional groups, transformations, reactions and syntheses.

Pre-requisite:

CHEM3220

Main Course Outline (for reference only):

Module I

The structure, reaction and function of biomolecules. The lecturer will first introduce four types of biomolecules, peptides and proteins, lipids, carbohydrates, and nucleic, with a focus on their molecular structures, higher-order structures and organizations, and the organic reactions to synthesize or to transform these molecules in a synthetic laboratory or inside cells. The mechanisms of bioreactions. Enzymes, a special group of proteins will also be introduced to the audience, together with cofactors and coenzymes as one example of proteins possessing catalytic power.

Module II

Recent advances of chemical biology, including newly developed technologies and research topics, through literature reviews and guest lectures.