BIOCHEMISTRY CONCENTRATION, CHEMISTRY MAJOR, BACHELOR OF SCIENCE - BIOC

Program Description

This concentration provides for a documented specialization within the Chemistry major and provides students a chemistry-focused option that complements the Molecular and Cellular Biology concentration within Biology. A biochemistry-focused education prepares students for careers in a wide range of areas including, but certainly not limited to, medicine (research and practice), environmental sciences, and agriculture. Biochemistry is a popular major for students interested in attending medical school or pursuing other healthcare professional careers.

American Chemical Society Certification

Saint Mary's College is an American Chemical Society (ACS) approved school in chemistry. For those students interested in a more intensive chemistry program, an ACS-certified curriculum is available. Interested students should contact the department chair for information.

MAJOR REQUIREMENTS (64 HOURS)

Code	Title	Credits
Required		
CHEM 121 & 121L	Principles of Chemistry I and Principles of Chemistry I Laboratory	4
CHEM 122 & 122L	Principles of Chemistry II and Principles of Chemistry II Laboratory	4
CHEM 221 & 221L	Organic Chemistry I and Organic Chemistry I Laboratory	4
CHEM 222 & 222L	Organic Chemistry II and Organic Chemistry II Laboratory	4
CHEM 311	Thermodynamics	3
CHEM 324	Biochemistry	3
CHEM 332	Analytical Chemistry	3
CHEM 342	Bio-Inorganic Chemistry	3
CHEM 361	Advanced Laboratory I	4
CHEM 362	Advanced Laboratory II	4
CHEM 424	Advanced Biochemistry	3
CHEM 495	Senior Seminar	1
Required Supporting Courses		
PHYS 121 & 121L	General Physics I: Mechanics and Waves and General Physics I Lab	4
PHYS 122 & 122L	General Physics II: Temperature, Electricity, and Light and General Physics II Laboratory	4
MATH 131	Calculus I	4
MATH 132	Calculus II for STEM majors	4
BIO 155 & 155L	Foundations of Molecular Biology and Foundations of Molecular Biology Laboratory	2
BIO 157 & 157L	Foundations of Cellular Biology and Foundations of Cellular Biology Laboratory	2
Select one of the following:		**4**
BIO 221 & 221L	Introduction to Genetics and Introduction to Genetics Laboratory	
BIO 317 & 317L	Microbiology and Microbiology Laboratory	
Total Credits		**64**

Advanced Writing Proficiency

Each student writes a formal paper consisting of a research topic of her choosing. The formal paper is an in-depth presentation of chemistry and reflects a command of the subject appropriate to a senior chemistry major. Students will work closely with a department faculty member to meet this requirement. It is due by the end of the fall semester of the student's senior year.

Senior Comprehensive

The Senior Comprehensive consists of a poster presentation at the Physical Sciences Poster Session and a 15-minute oral presentation at the Physical Sciences Symposium. The public presentations are on a chemistry topic of the student's choosing and may or may not be related to the research topic of the formal paper. Both presentations are given in the spring semester of the senior year and include a question and answer period. The goal for students is to demonstrate their ability to orally communicate data/results to a scientific audience in formats that they are most likely to experience as professional scientists.

Student Learning Outcomes

Undergraduate students upon graduation with a B.S. degree in Chemistry with a Biochemistry Concentration:

- Search the relevant literature, evaluate the results of the search, and apply this knowledge to design experiments to solve problems at the interface of biology and chemistry;
- Become proficient in the foundational concepts of general and organic chemistry, including equilibrium, kinetics, and reactivity, and apply these concepts to biological systems;
- Evaluate how the structure of biological macromolecules such as proteins and nucleic acids relates to function and predict how changes in structure will impact function;
- Explain how energy is stored, transformed, and utilized in biological systems;
- Demonstrate understanding of how information is stored, retrieved, and transmitted in biological systems.