CHEMICAL BIOLOGY, BA

Degree: Bachelor of Arts (BA)
Major: Chemical Biology

Program Overview

The BA program in chemical biology is intended for pre-professional students who plan careers in medicine, dentistry, veterinary medicine, or pharmacy, and for individuals seeking careers that utilize chemistry to solve problems affecting living systems. A key component of the major is its flexibility; it requires fewer courses than the Chemistry, BA degree and includes six credit hours of technical electives. Many chemical biology BA majors participate in undergraduate research through CHEM 397/CHEM 398 in the Department of Chemistry or in other science departments, including those in the medical school.

Learning Outcomes

- Students will be able to demonstrate proficiency in the content knowledge of the main sub disciplines of chemical biology including general, organic, analytical, physical, and biochemistry.
- Students will be able to solve chemistry problems, and design, carry out, record and analyze the results of chemical experiments.
- Students will be able to utilize peer-reviewed scientific literature effectively, and evaluate technical articles critically.
- Students will be able to design and carry out experiments in a safety-focused manner.
- Students will be able to utilize ethically sound judgements when working with scientific results.

Undergraduate Policies

For undergraduate policies and procedures, please review the Undergraduate Academics section of the General Bulletin.

Accelerated Master's Programs

Undergraduate students may participate in accelerated programs toward graduate or professional degrees. For more information and details of the policies and procedures related to accelerated studies, please visit the Undergraduate Academics section of the General Bulletin.

Program Requirements

Students seeking to complete this major and degree program must meet the general requirements for bachelor's degrees and the Unified General Education Requirements. Students completing this program as a secondary major while completing another undergraduate degree program do not need to satisfy the school-specific requirements associated with this major.

Code	Title	Hours
Required Chemistry Courses:		
CHEM 105	Principles of Chemistry I	3
CHEM 106	Principles of Chemistry II	3
CHEM 113	Principles of Chemistry Laboratory	2
CHEM 301	Introductory Physical Chemistry I	3
or CHEM 335	Physical Chemistry I	
CHEM 304	Quantitative Analysis Laboratory	2
CHEM 306	Biochemistry Laboratory	3
CHEM 310	Foundations of Analytical Chemistry	3
CHEM 322	Laboratory Methods in Organic Chemistry	3-4
or CHEM 233 & CHEM 234	Introductory Organic Chemistry Laboratory I and Introductory Organic Chemistry Laboratory II	
CHEM 323	Organic Chemistry I	3-6
or CHEM 223 & CHEM 224	Introductory Organic Chemistry I and Introductory Organic Chemistry II	
CHEM 328	Introductory Biochemistry I	3
CHEM 398	Undergraduate Research/Senior Capstone Project	3 - 6
Additional Required Courses:		
BIOL 214	Genes, Evolution and Ecology	3
BIOL 214L	Genes, Evolution and Ecology Lab	1
BIOL 215	Cells and Proteins	3
BIOL 215L	Cells and Proteins Laboratory	1
MATH 125	Math and Calculus Applications for Life, Managerial, and Social Sci I	4
or MATH 121	Calculus for Science and Engineering I	
MATH 126	Math and Calculus Applications for Life, Managerial, and Social Sci II	4
or MATH 122	Calculus for Science and Engineering II	
PHYS 115	Introductory Physics I	4
or PHYS 121	General Physics I - Mechanics	
PHYS 116	Introductory Physics II	4
or PHYS 122	General Physics II - Electricity and Magnetism	
Technical Electives [a]		6
Total Hours		**61-68**

a The technical electives may be chosen more widely from any of the physical sciences, math, or engineering courses. A maximum of 6 credot jpirs of CHEM 397 may be taken as technical electives. Further additional units of CHEM 397 may be taken as free electives. Students may wish to group their electives into "tracks" of specialization in order to tailor their degree to a particular area of chemistry.

Departmental Honors

Chemical biology majors who have excellent academic records may participate in the Honors in Chemical biology program. To graduate with honors in chemical biology, a student must satisfy the following requirements:

a. A combined GPA of 3.50 in chemistry, physics, and mathematics and an overall GPA of 3.20

b. A minimum of 6 credit hours of CHEM 397 , or chemical research done under another course number with departmental approval

c. A thesis approved by the department’s undergraduate affairs committee based on the level of research, quality of the manuscript, and chemical content

Sample Plan of Study

First Year

Fall		Hours
CHEM 105	Principles of Chemistry I	3
BIOL 214	Genes, Evolution and Ecology	3
BIOL 214L	Genes, Evolution and Ecology Lab	1
MATH 121 or MATH 125	Calculus for Science and Engineering I or Math and Calculus Applications for Life, Managerial, and Social Sci I	4
Academic Inquiry Seminar, Breadth, or Elective course [a]		3
Open Elective		3
	Hours	**17**
Spring		
CHEM 106	Principles of Chemistry II	3
CHEM 113	Principles of Chemistry Laboratory	2
BIOL 215	Cells and Proteins	3
BIOL 215L	Cells and Proteins Laboratory	1
MATH 122 or MATH 126	Calculus for Science and Engineering II or Math and Calculus Applications for Life, Managerial, and Social Sci II	4
Academic Inquiry Seminar, Breadth, or Elective course [a]		3
	Hours	**16**

Second Year

Fall		
CHEM 223 or CHEM 323	Introductory Organic Chemistry I or Organic Chemistry I	3
CHEM 233	Introductory Organic Chemistry Laboratory I	2
CHEM 322	Laboratory Methods in Organic Chemistry	3
Breadth, or Elective course [a]		3
CHEM Elective		3
	Hours	**14**
Spring		
CHEM 224 or CHEM 324	Introductory Organic Chemistry II or Organic Chemistry II	3
CHEM 306	Biochemistry Laboratory	3
CHEM 328	Introductory Biochemistry I	3
Breadth, or Elective course [a]		3
Open Elective		3
	Hours	**15**

Third Year

Fall		
CHEM 301 or CHEM 335	Introductory Physical Chemistry I or Physical Chemistry I	3
CHEM 304	Quantitative Analysis Laboratory	2
PHYS 115 or PHYS 121	Introductory Physics I or General Physics I - Mechanics	4
Breadth, or Elective course [a]		3
CHEM Elective		3
	Hours	**15**
Spring		
PHYS 116 or PHYS 122	Introductory Physics II or General Physics II - Electricity and Magnetism	4
CHEM 310	Foundations of Analytical Chemistry	3
Breadth, or Elective course [a]		3
CHEM Elective		3
Open Elective		3
	Hours	**16**

Fourth Year

Fall		
Breadth, or Elective course [a]		3
Open Electives		12
	Hours	**15**
Spring		
CHEM 398	Undergraduate Research/Senior Capstone Project	3-6
Breadth, or Elective course [a]		3
Open Electives		6-9
	Hours	**15**
	Total Hours	**123**

a Unified General Education Requirement.