

BS IN BIOCHEMISTRY

The Bachelor of Science (B.S.) degree in biochemistry is the professional degree in the field of biochemistry and requires a minimum of 120 hours of course work and upon completion, students meet the minimum standards of the American Chemical Society as specified by its Committee on Professional Training. Degree recipients are therefore certified by the American Chemical Society and are eligible for full membership in the world's largest scientific society.

Biochemistry majors focus on the intersection of the fields of biology and chemistry to study living organisms at the cellular and molecular levels. It is easy to see how biochemistry applies to biological problems such as medicine and understanding diseases, but biochemistry is central to many other fields, as well, including agriculture (fertilizers, pesticides and herbicides), food science (food safety and preservation, and flavor chemistry), cosmetics, and forensics (DNA analysis).

The B.S. degree in Biochemistry provides students with a strong foundation

- in the traditional subdisciplines of chemistry- analytical, biochemistry, inorganic, organic, and physical- with the B.S. degree in biochemistry having a more biological chemistry related focus
- in laboratory skills emphasizing hands-on training with advanced instrumentation in modern facilities
- in research working with faculty on projects that span the entire field of chemistry and biochemistry

Prepares students to

- continue their studies in graduate school toward the Masters or Ph.D. in chemistry or biochemistry
- enter professional programs such as law, business, medicine, and forensic or veterinary science
- gain employment with significant responsibility in laboratories in the chemical, pharmaceutical, biotech, clinical and allied professional industries.

Students pursuing a chemistry or biochemistry major may not elect the P/NC option in major or related courses, or prerequisites for these courses, except as noted in specific course descriptions. Students pursuing a BS/BA in Biochemistry cannot double major with a BS/BA in Chemistry, or minor in Chemistry. The minor in Green Chemistry and Engineering or the certificate in Analytical Chemistry are permitted.

For the bachelor of science degree in biochemistry, 49 hours of CHEM courses are required. The following required courses must be included:

CHEM 1230 General Chemistry I
 CHEM 1240 General Chemistry II
 CHEM 1280 General Chemistry Lab I
 CHEM 1290 General Chemistry Lab II
 CHEM 2410 Organic Chemistry I
 CHEM 2420 Organic Chemistry II
 CHEM 2480 Organic Chemistry Laboratory I for Majors: Separations and Elementary Synthesis
 CHEM 2490 Organic Chemistry Laboratory II for Majors: Synthesis and Identification
 CHEM 3310 Analytical Chemistry

CHEM 3360 Analytical Chemistry Laboratory
 CHEM 3510 Biochemistry I
 CHEM 3520 Biochemistry II
 CHEM 3560 Biochemistry Laboratory
 CHEM 3610 Inorganic Chemistry I
 CHEM 4300 Instrumental Analysis
 CHEM 4560 Biophysical Chemistry Laboratory - WAC
 CHEM 4570 Biophysical Chemistry
 One advanced laboratory: (CHEM 3910, CHEM 4880, or CHEM 4910)
 One advanced biochemistry course: (CHEM 4500, CHEM 4510, CHEM 4520, CHEM 4530, CHEM 4580, or CHEM 4980 (with a biochemistry focus))

The following related courses are also required:

MATH 1750 and MATH 1760, MATH 1830 and MATH 1840, or MATH 1850 and MATH 1860 (Calculus I and II)
 PHYS 2070 and PHYS 2080, or PHYS 2130 and PHYS 2140 (Physics I and II)
 BIOL 2170 and BIOL 3030 (Fundamentals of Life Science: Biomolecules, Cells, and Inheritance and Cell Biology)

A minimum cumulative GPA of 2.5 in chemistry is required for graduation with this degree.

Below is a plan of study. Consult your degree audit for your program requirements.

First Term		Hours
CHEM 1230	General Chemistry I	4
CHEM 1280	General Chemistry Lab I	1
Select one of the following:		4
MATH 1750	Calculus For The Life Sciences With Applications I	
MATH 1830	Calculus I For Mathematicians, Scientists And Educators	
MATH 1850	Single Variable Calculus I	
ENGL 1110	College Composition I	3
NSM 1000	Natural Sciences & Mathematics	2
Arts/Humanities Core		3
Hours		17
Second Term		
CHEM 1240	General Chemistry II	4
CHEM 1290	General Chemistry Lab II	1
CHEM 1910	Survey Of Research	1
Select one of the following:		3-4
MATH 1760	Calculus For The Life Sciences With Applications II	
MATH 1840	Calculus II For Mathematicians, Scientists And Educators	
MATH 1860	Single Variable Calculus II	
ENGL 1130	College Composition II: Academic Disciplines And Discourse	3
Social Sciences Core		3
Hours		15-16

Third Term

CHEM 2410	Organic Chemistry I	3
CHEM 2480	Organic Chemistry Laboratory I for Majors: Separations and Elementary Synthesis	2
CHEM 3310	Analytical Chemistry	2
Select one of the following:		5
PHYS 2070	General Physics I	
PHYS 2130	Physics For Science And Engineering Majors I	
Arts/Humanities Core		3
Hours		15

Fourth Term

CHEM 2420	Organic Chemistry II	3
CHEM 2490	Organic Chemistry Laboratory II for Majors: Synthesis and Identification	2
CHEM 3360	Analytical Chemistry Laboratory	2
Select one of the following		5
PHYS 2080	General Physics II	
PHYS 2140	Physics For Science And Engineering Majors II	
Social Sciences Core		3
Hours		15

Fifth Term

CHEM 3510	Biochemistry I	3
BIOL 2170	Fundamentals of Life Science: Biomolecules, Cells, and Inheritance	4
Diversity of US		3
Elective		6
Hours		16

Sixth Term

CHEM 3520	Biochemistry II	3
CHEM 3910	Undergraduate Research II	1
CHEM 3560	Biochemistry Laboratory	2
CHEM 3610	Inorganic Chemistry I	3
BIOL 3030	Cell Biology	3
Non-US Diversity		3
Hours		15

Seventh Term

CHEM 4570	Biophysical Chemistry	4
CHEM 4300	Instrumental Analysis	2
CHEM 4560	Biophysical Chemistry Laboratory - WAC	2
Select one of the following:		2
CHEM 3910	Undergraduate Research II	
CHEM 4910	Undergraduate Research III	
CHEM 4880	Advanced Laboratory III	
Elective or select one of the following: ¹		3-4
CHEM 4500	Advanced Biological Chemistry	
or select one advanced biochemistry course in spring semester		
Hours		13-14

Eighth Term

Elective or one advanced biochemistry course if not taken in the fall: ¹		3-4
CHEM 4510	Protein Chemistry	
CHEM 4520	Enzymology	
CHEM 4530	Nucleic Acid Chemistry	
CHEM 4580	Bioinorganic Chemistry	
CHEM 4980	Special Topics In Chemistry	
Electives to reach 120 hours		11-12
Hours		14-16
Total Hours		120-124

¹ Listed twice because courses offered in different semesters; only need one course.

See course catalog for pre- and co-requisites.

Courses which satisfy the College and University degree requirements can be determined by running a degree audit and looking at the list of courses presented as satisfying the requirement. Always try to take courses in which you have an interest.

- PLO1. Demonstrate a mastery of foundational concepts in math, physics and chemistry.\n
- PLO 2. Demonstrate a mastery of concepts in biochemistry and biology, including energy transduction in living systems, macromolecular structure and function, and biological information storage and flow, and the importance of evolution and homeostasis.
- PLO 3. Make observations, formulate hypotheses, understand the conceptual basis and practical application of fundamental biochemical and molecular biological laboratory techniques and instrumentation, design and carry out experiments, analyze and interpret data, and use equations, models and statistics to test and apply these concepts
- PLO 4. Communicate technical information clearly and accurately in written, oral and visual formats.
- PLO 5. Locate and use information in the primary literature and research databases.\n
- PLO 6. Critically read, assess, and evaluate scientific publications, presentations and data.\n
- PLO 7. Understand and observe proper safety, ethical, and professional practices.\n
- PLO 8. Apply the concepts and practices of chemistry and biochemistry to areas outside the laboratory, including health and policy issues.\n