

BIOCHEMISTRY, B.S.

Objectives

The Bachelor of Science in Biochemistry degree program provides the student with a flexible program that builds upon a solid fundamental knowledge in chemistry and biochemistry. Students work with their advisors/chairperson to select upper division elective courses in emphasis areas like health sciences—which include but are not limited to medicine, pharmacy, dentistry, optometry—and areas such as forensics, environmental chemistry, education, etc.

Students may elect to receive an American Chemical Society (ACS) certified degree for the Biochemistry degree program by taking specific courses outlined below. The ACS-certified degree, approved by the Committee on Professional Training of the American Chemical Society (ACS), is designed to prepare the student not only for immediate entry into the profession of biochemistry at the Bachelor's level but also for graduate study toward advanced degrees.

Student learning outcomes for the biochemistry major:

- Students will be able to apply essential concepts in chemistry and biochemistry.
- Students will be able to complete an experiment in the chemistry/biochemistry laboratory using safe and proper technique.
- Students will be able to analyze and present data in written and oral formats.
- Students will be able to argue why chemistry and the application of green chemistry principles is an integral activity for addressing social issues such as economic, health and/or environmental problems.

Major Requirements

Code	Title	Semester Hours
Lower Division Requirements		
CHEM 110	General Chemistry I	3
CHEM 111	General Chemistry I Lab	1
CHEM 112	General Chemistry II	3
CHEM 113	General Chemistry II Lab	1
CHEM 190	World of Chemistry and Biochemistry	1
CHEM 220	Organic Chemistry I	3
CHEM 221	Organic Chemistry I Lab	1
CHEM 222	Organic Chemistry II	3
CHEM 223	Organic Chemistry II Lab	1
or CHEM 225	Organic Chemistry II Lab for Molecular Sciences	
BIOL 101	General Biology I	3
BIOL 111	General Biology I Lab	2
BIOL 201	Cell Function	3
BIOL 202	Genetics	3
MATH 131	Calculus I	4
MATH 132	Calculus II	4
PHYS 1100	Introduction to Mechanics	4
PHYS 2100	Introduction to Electricity and Magnetism	4
Subtotal		44
Upper Division Requirements		
CHEM 340	Physical Chemistry	3

CHEM 341	Physical Chemistry Lab	1
CHEM 360	Analytical Chemistry and Lab	4
CHEM 370	Biochemistry	3
CHEM 371	Biochemistry Lab	1
CHEM 372	Advanced Biochemistry	3
CHEM 373	Advanced Biochemistry Lab	1
CHEM 390	Chemistry Seminar	1
CHEM 391	Chemistry Seminar	1
CHEM 490	Chemistry Seminar	1
CHEM 491	Chemistry Seminar	1
Select twelve semester hours of any of the following upper division chemistry electives or upper division biology electives approved by and selected in conjunction with your academic advisor/chairperson:		12
BIOL 330	Embryology and Development	
BIOL 351	General Physiology	
BIOL 353	Plant Physiology	
BIOL 355	Plants, Pharmacy, and Medicine	
BIOL 356	Cell Biology	
BIOL 359	Cell Biology Laboratory	
BIOL 361	General Microbiology	
BIOL 367	Biological Databases	
BIOL 368	Bioinformatics Laboratory	
BIOL 437	Plant Development	
BIOL 439	Molecular Biology Applications	
BIOL 443	Molecular Biology	
BIOL 445	Endocrinology	
BIOL 449	Immunology	
BIOL 478	Molecular Biology of the Genome	
BIOL 479	Molecular Mechanisms of Disease	
Subtotal		32
Total Semester Hours		76

Notes:

A grade of at least C (2.0) is required in each of the CHEM courses. With approval of the Chairperson, MATH 122 Calculus for the Life Sciences I and MATH 123 Calculus for the Life Sciences II may be substituted for MATH 131 Calculus I and MATH 132 Calculus II, and PHYS 2500 General Physics I and PHYS 2550 General Physics II may be substituted for PHYS 1100 Introduction to Mechanics and PHYS 2100 Introduction to Electricity and Magnetism. An average of C (2.0) is required for the BIOL, MATH, and PHYS courses.

Except for CHEM 390 Chemistry Seminar and CHEM 490 Chemistry Seminar, a minimum cumulative grade point average of C (2.0) is required in the upper division major requirements for graduation. All upper division courses must be completed at LMU. Strongly recommended for those intending graduate study: CHEM 397 Directed Research/CHEM 497 Directed Research. A maximum of 12 semester hours of Chemistry/Biochemistry Internship and/or Directed Research (CHEM 393 Chemistry/Biochemistry Internship, CHEM 397 Directed Research, CHEM 493 Chemistry/Biochemistry Internship, CHEM 497 Directed Research) may be included toward the total baccalaureate requirement. CHEM courses with Credit/No Credit grading do not count toward the upper division elective requirements of the major.

To be eligible for the Dean's list, students must have completed 14 semester hours at LMU for that semester.

Biochemistry Curriculum

(124 S.H.)

Course	Title	Semester Hours
First Year		
Fall		
BIOL 101	General Biology I	3
BIOL 111	General Biology I Lab	2
CHEM 110	General Chemistry I	3
CHEM 111	General Chemistry I Lab	1
CHEM 190	World of Chemistry and Biochemistry	1
MATH 131	Calculus I	4
FFYS 1000 or RHET 1000	First Year Seminar or Rhetorical Arts	4
ORNT 1000	First Year Forum	0
Semester Hours		18
Spring		
CHEM 112	General Chemistry II	3
CHEM 113	General Chemistry II Lab	1
MATH 132	Calculus II	4
PHYS 1100	Introduction to Mechanics	4
RHET 1000 or FFYS 1000	Rhetorical Arts or First Year Seminar	3-4
Semester Hours		15-16
Sophomore Year		
Fall		
BIOL 201	Cell Function	3
CHEM 220	Organic Chemistry I	3
CHEM 221	Organic Chemistry I Lab	1
PHYS 2100	Introduction to Electricity and Magnetism	4
University Core		4
Semester Hours		15
Spring		
BIOL 202	Genetics	3
CHEM 222	Organic Chemistry II	3
CHEM 223 or CHEM 225	Organic Chemistry II Lab or Organic Chemistry II Lab for Molecular Sciences	1
CHEM 360	Analytical Chemistry and Lab	4
University Core		4
Semester Hours		15
Junior Year		
Fall		
CHEM 340	Physical Chemistry	3
CHEM 341	Physical Chemistry Lab	1
CHEM 370	Biochemistry	3
CHEM 371	Biochemistry Lab	1
CHEM 390	Chemistry Seminar	1
University Core		4
University Core		4
Semester Hours		17
Spring		
CHEM 372	Advanced Biochemistry	3
CHEM 373	Advanced Biochemistry Lab	1
CHEM 391	Chemistry Seminar	1
CHEM Upper Division Elective		3
University Core		4
University Core		4
Semester Hours		16

Senior Year

Fall

CHEM 491	Chemistry Seminar	1
CHEM/BIOL Upper Division Elective		3
University Core/Elective ¹		4
Upper Division Elective		3-4
Elective		3-4
Semester Hours		14-16

Spring

CHEM 490	Chemistry Seminar	1
CHEM/BIOL Upper Division Elective		3
CHEM/BIOL Upper Division Elective		3
Upper Division Elective		3-4
Elective		3-4
Dean's list requires minimum 14 semester hours.		
Semester Hours		13-15
Minimum Semester Hours		123-128

¹

Biochemistry majors are required to complete 32 semester hours of core courses to satisfy the University Core requirements.

Note:

Students electing to receive an American Chemical Society (ACS) certified degree for the Biochemistry degree program must successfully pass CHEM 330 Inorganic Chemistry and any CHEM Upper Division Elective that has a laboratory component. Please consult with your academic advisor on which specific courses meet this laboratory requirement.