Pacific Union College

Major in Biotechnology: B.S.

BIOL-03

2024-2025

Major Course Requirements

A minimum of 108.5 hours (55.5-62.5 upper-division hours)

➤ *Required Core Courses (78.5 hours):*

BIOL 121+122+123	Biological Foundations I,II,III	5+5+5
BIOL 221+ 222	Intro to Research Methods I,II	2+2
BIOL 320	Cellular and Molecular Biology	4
BIOT 345+L	Biotechnology I+Lab	2+1
BIOT 445+L	Biotechnology II+Lab	1+2
BIOT 490	Biotechnology Capstone	1
BIOT 494	Biotechnology Internship	4
CHEM 111+12+13+L	General Chemistry I, II, III+Lab	5+5+5
CHEM 324+L	Analytical Chemistry I+Lab	2+1
CHEM 371+72+73+L	Organic Chemistry I, II, III+Lab	4+4+4
CHEM 481+482	Biochemistry I,II	4+4
BIOT 397	Biotechnology Seminar	0.5
SCIE 290	Sophomore Seminar	1
One of the following courses:		5
MICR 134	General Microbiology (5)	
MICR 366	Medical Microbiology (5)	

➤ *Required Core Electives (16 hours):*

At least 16 hours from the following:		16
(Include at least one BIOL course and one CHEM course)		
BIOL 348	Systems Physiology (5)	
BIOL 354	Genetics (4)	
BIOL 430	Neuroscience (4)	
BIOL 419	Developmental Biology (3)	
BIOL 426	Histology (5)	
BIOL 469	Immunology (4)	
CHEM 225	Chemical Modeling (2)	
CHEM 426L	Integrated Chemistry Lab (1-4)	
CHEM 482L	Biochemistry II Lab	
CHEM 483	Biochemistry III (3)	
CHEM 485	Topics: Biophysical Chemistry (3)	

➤ *Required Cognate Courses (15 hours):*

PHYS 111+12+13	General Physics I,II,III (4+4+4)	12
RELT 390 Christian Bioethics		3

This major fulfills the general education requirements in Science (section V).

Student Learning Outcomes

Students will:

- Identify and explain general biological and chemical principles.
- Describe and employ the scientific process and techniques, especially as these apply to biotechnology.
- Successfully communicate in both oral and written scientific format and be information literate.
- Develop a personal ethic that considers the ramifications of biotechnology-related decisions (right-making and wrong-making) and to take action rooted in society's best interest.

Occupational Information

What can I do with this major?

The PUC Biotechnology Program provides students with opportunities to be trained in basic and advanced biochemical techniques to analyze proteins, DNA and RNA, which will help prepare them to work professionally in biomedical, pharmaceutical, criminal investigative, agricultural and other related industries. Experience will be gained in material analysis (high pressure liquid chromatography, gas chromatography, mass spectrometry), protein analysis (enzyme-linked immunosorbent assay, immunocytochemistry, western blotting), and nucleic acid analysis (polymerase chain reaction, gene sequencing, Southern and northern blotting). Students will learn how to design and implement scientific experiments, interpret data, and communicate their conclusions with colleagues orally and in writing. Additionally, ethical and philosophical issues related to research and applications in biotechnology will be thoroughly examined

Additional Education Required?

The goal of this program is to train students to work as lab technicians in biotechnology research and development and academic settings by emphasizing hands-on experience and expertise. However, the program is also intended to fully prepare students to pursue more advanced MS and PhD degrees in biotechnology, thus enabling them to obtain more prestigious positions as administrators, primary investigators and medical professionals.

Job Outlook

Employment of biological technicians is projected to grow 5 percent from 2014 to 2024. Greater demand for biotechnology research is expected to increase the need for these workers. Employment of forensic science technicians is projected to grow 27 percent from 2014 to 2024. Biotechnology cuts a wide swath across a number of industries; agriculture, pharmaceuticals and medicine, manufacturing, and more. Specific occupations may experience greater demand and higher salaries than others. Visit www.bls.gov for more details. For a thorough examination of the biotechnology sector in California, visit www.labormarketinfo.edd.ca.gov/Biotechnology_in_California.html

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General Education Requirements

To view general education requirements for this major, please refer to page A-01, Summary of General Education Requirements: B.S. Degree.

How to Construct Your Own Program

1. Consult with your academic advisor.
2. Consider your aptitudes, interests, and available courses.
3. Schedule major courses and cognates first.
4. Fill the rest of your schedule with G.E. requirements.
5. For the freshman year include English I and II and Religion courses. Also include Basic Algebra I+II unless waived by previous work.

What the Degree Includes

A total of 192 quarter hours including:

1. A minimum of 60 upper division hours.
2. General Education requirements.
3. Major requirements.
4. Minimum 2.0 GPA, overall and major.

For More Information

Visit our website: www.puc.edu/academics/departments/biology

email: biology@puc.edu

Sample Four-Year Program

This sample curriculum shows you how a program may be constructed, emphasizing the science components. Your program may differ, but be sure to consult your advisor.

First Year	**F**	**W**	**S**
Biological Foundations I,II,III	5	5	5
General Chemistry I,II,III	5	5	5
Religion Courses	3	-	3
College English I,II	-	4	4
General Education/Electives	3	3	-
	16	17	17

Second Year	**F**	**W**	**S**
Organic Chemistry I,II,III	4	4	4
Introduction to Research Methods I,II	2	2	-
Introduction to Statistics	4	-	-
Biotechnology I*	-	3	-
Microbiology	-	-	5
General Education/Electives	6	7	7
Sophomore Seminar	-	1	-
	16	17	16

Third Year	**F**	**W**	**S**
General Physics I,II,III	4	4	4
Analytical Chemistry	3	-	-
Cell & Molecular Biology	-	4	-
Christian Bioethics	-	-	3
Biotechnology Electives*	4	4	4
General Education/Electives	5	4	5
	16	16	16

Fourth Year	**F**	**W**	**S**
Biotechnology Internship	4	-	-
Biochemistry I,II	4	4	-
Biotechnology II	-	3	-
Biotechnology Seminar	-	0.5	-
Biotechnology Electives**	-	-	4
Biotechnology Capstone	-	-	1
Senior Assessment Seminar	-	-	0.2
General Education/Electives	8	9	11
	16	16.5	16.2

* *Depending on your schedule, you may take Biotechnology I in the second or third year.*

** *See the front of this sheet for a list of Biotechnology elective options.*