Pacific Union College

Major in Biochemistry: B.S.

CHEM-03

2023-2024

Major Course Requirements

A minimum of 102 hours (52 upper-division hours)

➤ *Required Core Courses (59 hours):*

CHEM 111+L	General Chemistry I+Lab	4+1
CHEM 112+L	General Chemistry II+Lab	4+1
CHEM 113+L	General Chemistry III+Lab	4+1
CHEM 324+L	Analytical Chemistry I+Lab	2+1
CHEM 371+L	Organic Chemistry I+Lab	3+1
CHEM 372+L	Organic Chemistry II+Lab	3+1
CHEM 373+L	Organic Chemistry III+Lab	3+1
CHEM 396	Science Seminar	.5
CHEM 397	Chemistry Seminar	.5
CHEM 426L	Integrated Chemistry Lab (x3)	1+1+1
CHEM 451	Thermodynamics	4
CHEM 452	Kinetics	2
CHEM 481	Biochemistry I	4
CHEM 482	Biochemistry II	4
CHEM 483+L	Biochemistry III+Lab	3+2
CHEM 490	Senior Capstone	1
At least one of the following courses:		2
CHEM 225	Chemical Modeling (2)	
CHEM 325	Analytical Chemistry II (3)	

➤ *Required Core Electives (6 hours):*

Additional upper-division CHEM courses	6

➤ *Required Cognate Courses (39 hours):*

BIOL 111+12+13	Biological Foundations I,II,III	5+5+5
MATH 131+132	Calculus I,II	4+4
PHYS 111+12+13	General Physics I,II,III	4+4+4
At least one of the following courses:		4
BIOL 320	Cell & Molecular Biology (4)	
BIOL 354	Genetics (4)	
BIOL 469	Immunology (4)	

Pre-medical and pre-dental students:
Consult with your academic advisor for recommended cognates.

Student Learning Outcomes

Students can:

- Apply quantitative or qualitative theories of molecular behavior to chemical problems.
- Be able to synthesize, purify, characterize, and analyze substances.
- Be skilled in accessing and utilizing chemical data and in communicating it orally and in writing.

Occupational Information

What can I do with this major?

Graduates with a bachelor's degree in chemistry have the necessary skills for entry-level employment as chemists in quality control, environmental, forensic, and research laboratories in private, industrial and government settings. They may also apply their degree in science-related jobs in sales, marketing, and middle management. Opportunities in the educational sector include employment in informal education arenas such as museums and content preparation for secondary teaching. The bachelor's degree in chemistry prepares the graduate for entry into professional and graduate schools.

Additional Education Required?

Some chemists with a bachelor's degree will seek to continue their education in graduate school to pursue advanced degrees leading to careers in chemical research, industry, forensic chemistry, patent law, scientific writing and secondary and college teaching.

Some graduates will use their bachelor's degree as a stepping stone to pursue professional education in preparation for careers in health professions such as dentistry, medicine, optometry, pharmacy, and veterinary medicine.

Job Outlook

Employment of biochemists and biophysicists is expected to grow by 19% in the decade 2012-2022. This is higher than average growth. The aging population and demand for new lifesaving drugs and procedures will drive demand for biochemists involved in biomedical research. Job prospects for secondary science teachers appear good for the next decade.

Median salaries for chemists, 2012:

	B.S.	M.S.	Ph.D.
Industry	$76,700	$93,500	$121,100
Government	$74,039	$83,785	$112,320
Academia	$42,000	$53,000	$73,000

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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, Religion, and PE 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

Chemistry Department
Pacific Union College
One Angwin Avenue
Angwin, CA 94508
707-965-7600

Website: www.puc.edu/chemistry

Sample Four-Year Program

This sample curriculum is designed to show you how a program may be constructed and to help you select a proper sequence of courses in the major. It is not likely that these courses can always be taken in the order given. Your advisor will help you design a personalized program of studies.

First Year	**F**	**W**	**S**
General Chemistry	5	5	5
College English I,II	4	4	-
Religion Courses	-	3	3
Biological Foundations*	5	5	5
General Education/Electives	2	-	3
	16	17	16

Second Year	**F**	**W**	**S**
Organic Chemistry	4	4	4
Calculus I,II**	4	4	-
General Physics	4	4	4
Exercise Science Activity Courses	1	1	1
General Education/Electives	3	3	7
	16	16	16

Third and Fourth Years	**F**	**W**	**S**
Biochemistry I,II,III	4	4	3
Biochemistry II,III Labs	-	1	2
Integrated Chemistry Lab	-	1	1
Analytical Chemistry I+Lab	3	-	-
Chem Modeling or Analytical Chem II	-	2	-
Analytical Chemistry III+Lab	-	-	3
Seminar	-	.5	.5
Capstone	-	1	-
Thermodynamics	4	-	-
Kinetics	-	-	2
Physical Chemistry Lab	1	-	-
Chemistry Elective	3	3	-
Biology Elective	-	-	4
Senior Assessment Seminar	-	-	.2
General Education/Electives	17	20	18
	32	32.5	33.7

* *Can be taken in second year.*

** *If math preparation is inadequate, take Trigonometry/College Algebra during the first year to prepare for Calculus. Calculus must be taken before Thermodynamics & Kinetics.*