Major Course Requirements

A minimum of 104 hours (52 upper-division hours)

**Required Core Courses (59 hours):**
- CHEM 111+112+113 General Chemistry 5+5+5
- CHEM 324 +L Analytical Chemistry I + Lab 2+1
- CHEM 326 +L Analytical Chemistry III+ Lab 2+1
- CHEM 371+372+373 Organic Chemistry 4+4+4
- CHEM 396 Science Seminar .5
- CHEM 397 Chemistry Seminar .5
- CHEM 450L Physical Chemistry Lab 1
- CHEM 451 Thermodynamics 3
- CHEM 452 Kinetics 3
- CHEM 481 Biochemistry I 4
- CHEM 482 Biochemistry II 4
- CHEM 482L Biochemistry II Lab 1
- CHEM 483 Biochemistry III 3
- CHEM 483L Biochemistry III Lab 2
- CHEM 490+L Senior Capstone + Lab 1+1

At least one of the following courses:
- CHEM 225 Chemical Modeling (2)
- CHEM 325 Analytical Chemistry II (2)

**Required Core Electives (6 hours):**
- At least 6 hours from the following:
  - Additional upper-division CHEM courses

**Required Cognate Courses (39 hours):**
- BIOL 111+112+113 Biological Foundations 5+5+5
- MATH 131+132 Calculus 4+4
- PHYS 111+112+113 General Physics 4+4+4

At least one of the following courses:
- BIOL 320 Cell & Molecular Biology (4)
- BIOL 354 Genetics (4)
- BIOL 469 Immunology (4)

Pre-medical and pre-dental students:
See 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 bachelor's degree chemists 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:**

<table>
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<tr>
<th></th>
<th>B.S.</th>
<th>M.S.</th>
<th>Ph.D.</th>
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<tr>
<td>Industry</td>
<td>$76,700</td>
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Pacific Union College
Major in Biochemistry: B.S.

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. Counsel with your 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
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.

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<th>First Year</th>
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<tbody>
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<td>College English I, II</td>
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<td>Calculus**</td>
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<td>General Physics</td>
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* 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.