BS BIOCHEMISTRY

Program Learning Objectives

1. Understand and apply the fundamental concepts of chemistry in the following areas: calculation and estimation, structure, and properties of atoms, ions and molecules, chemical bonding and chemical reactivity.
2. Use techniques and modern tools to conduct, design, analyze, and interpret experiments in chemistry and biochemistry.
3. Communicate effectively with the scientific community.
4. Apply concepts of math, physical and biological sciences to chemical problems.
5. Integrate the concepts, skills and attitudes from a general education with his/her major program to understand and explain the impact of chemistry, science and technology on issues in global, economic, environmental, and societal contexts.

Degree Requirements and Curriculum

In addition to the program requirements on this page, students must also satisfy requirements outlined in more detail in the Minimum Requirements for Graduation section of this catalog, including:

- 60 units of upper division courses
- Graduation Writing Requirement (GWR)
- 2.0 GPA
- U.S. Cultural Pluralism (USCP)

Note: No major, support or concentration courses may be selected as credit/no credit.

MAJOR COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
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<tbody>
<tr>
<td>CHEM 124</td>
<td>General Chemistry for Physical Science and Engineering I (B3 &amp; B4)</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 125</td>
<td>General Chemistry for Physical Science and Engineering II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 126</td>
<td>General Chemistry for Physical Science and Engineering III</td>
<td>4</td>
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<tr>
<td>CHEM 203</td>
<td>Undergraduate Seminar I</td>
<td>1</td>
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<tr>
<td>CHEM 216</td>
<td>Organic Chemistry I</td>
<td>5</td>
</tr>
<tr>
<td>CHEM 217</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 218</td>
<td>Organic Chemistry III</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 221</td>
<td>Organic Chemistry Laboratory II</td>
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<tr>
<td>CHEM 303</td>
<td>Undergraduate Seminar II</td>
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<tr>
<td>CHEM 324</td>
<td>Organic Chemistry Laboratory II</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 331</td>
<td>Quantitative Analysis</td>
<td>5</td>
</tr>
<tr>
<td>CHEM 351</td>
<td>Physical Chemistry I</td>
<td>3</td>
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<tr>
<td>CHEM 352</td>
<td>Physical Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 353</td>
<td>Physical Chemistry III</td>
<td>3</td>
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<tr>
<td>CHEM 354</td>
<td>Physical Chemistry Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 371</td>
<td>Biochemical Principles</td>
<td>5</td>
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<tr>
<td>CHEM 372</td>
<td>Metabolism</td>
<td>4</td>
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<tr>
<td>CHEM 373</td>
<td>Molecular Biology</td>
<td>3</td>
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<tr>
<td>CHEM 403</td>
<td>Undergraduate Seminar III: Senior Project</td>
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</tr>
<tr>
<td>CHEM/BIO 475</td>
<td>Molecular Biology Laboratory</td>
<td>3</td>
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</table>

Select from the following:
- BIO 476 Gene Expression Laboratory
- CHEM 474 Protein Techniques Laboratory

Polymers and Coatings Concentration (18 units)

Select from the following:

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<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>CHEM/BIO 476</td>
<td>Molecular Biology Laboratory</td>
<td>3</td>
</tr>
</tbody>
</table>

Approved Advanced Biochemistry Electives (12 units)

One course must be a lecture, and at least two courses must be from List A.

List A:

- BIO/CHEM 308 Genetic Engineering Technology (Area F) 1
- CHEM 349 Chemical and Biological Warfare
- ENVE 324 Introduction to Air Pollution
- SCM 335 Nuclear Science and Society
- SCM 360 Selected Environmental Issues of California’s Central Coast

- CHEM 252 Laboratory Glassblowing
- CHEM 302 Marine Chemistry
- CHEM 341 Environmental Chemistry: Water Pollution
- CHEM 357 Physical Chemistry III Lab
- CHEM 377 Chemistry of Drugs and Poisons
- CHEM 400 Special Problems for Advanced Undergraduates 5
- CHEM 401 Advanced Undergraduate Research 6
- CHEM 405 Advanced Physical Chemistry
- CHEM 414 Advanced Organic Chemistry - Mechanisms
- CHEM 419 Bioorganic Chemistry
- CHEM 420 Advanced Organic Chemistry - Synthesis
- CHEM 439 Instrumental Analysis
- CHEM 441 Bioinformatics Applications
- CHEM 444 Polymers & Coatings I
- CHEM 445 Polymers & Coatings II
- CHEM/MATE 446 Surface Chemistry of Materials
- CHEM 447 Polymers and Coatings Laboratory I
- CHEM 448 Polymers and Coatings Laboratory II
- CHEM 449 Polymers and Coatings Internship
- CHEM 450 Polymers and Coatings III
- CHEM 451 Polymers and Coatings Laboratory III
- CHEM 454 Functional Polymeric Materials
- CHEM 458 Instrumental Organic Qualitative Analysis
- CHEM 463 Honors Research
- CHEM 465 College Teaching Practicum
- CHEM 466 Learning Assistant Seminar
- CHEM 470 Selected Advanced Topics
- CHEM 474 Protein Techniques Laboratory
- CHEM 477 Biochemical Pharmacology
- CHEM 481 Inorganic Chemistry
- CHEM 484 Inorganic Chemistry Laboratory
- CHEM 485 Cooperative Education Experience 5
**Concentration**

Students may select the following concentration instead of advanced approved biochemistry electives in Major Courses

- Polymers and Coatings (http://catalog.calpoly.edu/collegesandprograms/collegeofsciencemathematics/chemistrybiochemistry/bsbiochemistry/polymersandcoatingsconcentration)

**General Education (GE) Requirements**

- 72 units required, 16 of which are specified in Major and/or Support.
- See the complete GE course listing (http://catalog.calpoly.edu/generalrequirementsbachelorsdegree/#generaleducationtext).
- Minimum of 12 units required at the 300 level.

**Area A**

**Communication**

A1  Expository Writing  4
A2  Oral Communication  4
A3  Reasoning, Argumentation and Writing  4

**Area B**

**Science and Mathematics**

B1  Mathematics/Statistics (8 units in Support)  0
B2  Life Science (4 units in Support)  0
B3  Physical Science (4 units in Major)  0
B4  One lab taken with either a B2 or B3 course

**Area C**

**Arts and Humanities**

C1  Literature  4
C2  Philosophy  4
C3  Fine/Performing Arts  4
C4  Upper-division elective  4
Area C elective  (Choose one course from C1-C5)  4

**Area D/E**

**Society and the Individual**

D1  The American Experience (Title 5, Section 40404 requirement)  4
D2  Political Economy  4
D3  Comparative Social Institutions  4
D4  Self Development (CSU Area E)  4
D5  Upper-division elective  4

**Area F**

**Technology**

F  Upper-division elective  4

Total units  56

1  Required in Major/Support.

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1  Required in Major/Support; also satisfies GE.

2  Students should take CHEM 331 as soon as possible after completing CHEM 126.

3  Consultation with advisor is recommended prior to selecting approved electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.

4  These courses also satisfy Area F requirements.

5  No more than 2 units may apply toward Approved Advanced Biochemistry Electives.

6  No more than 4 units may apply to Approved Advanced Biochemistry Electives.