BS CHEMISTRY

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>
</thead>
<tbody>
<tr>
<td>CHEM 124</td>
<td>General Chemistry for Physical Science and Engineering I</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>
</tr>
<tr>
<td>CHEM 203</td>
<td>Undergraduate Seminar I</td>
<td>1</td>
</tr>
<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>
<td>2</td>
</tr>
<tr>
<td>CHEM 303</td>
<td>Undergraduate Seminar II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 324</td>
<td>Organic Chemistry Laboratory III</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>
</tr>
<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>
</tr>
<tr>
<td>CHEM 354</td>
<td>Physical Chemistry Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 357</td>
<td>Physical Chemistry III Lab</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 371</td>
<td>Biochemical Principles</td>
<td>5</td>
</tr>
<tr>
<td>CHEM 403</td>
<td>Undergraduate Seminar III: Senior Project</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 439</td>
<td>Instrumental Analysis</td>
<td>5</td>
</tr>
<tr>
<td>CHEM 481</td>
<td>Inorganic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 484</td>
<td>Inorganic Chemistry Laboratory</td>
<td>2</td>
</tr>
</tbody>
</table>

Select from the following: 3

Polymers and Coatings Concentration (18 units)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO/CHM 308</td>
<td>Genetic Engineering Technology (B7)</td>
<td></td>
</tr>
<tr>
<td>or CHEM 349</td>
<td>Chemical and Biological Warfare</td>
<td></td>
</tr>
<tr>
<td>or ENVE 324</td>
<td>Introduction to Air Pollution</td>
<td></td>
</tr>
<tr>
<td>or SCM 335</td>
<td>Nuclear Science and Society</td>
<td></td>
</tr>
<tr>
<td>or SCM 360</td>
<td>Selected Environmental Issues of California’s Central Coast</td>
<td></td>
</tr>
</tbody>
</table>

Bioinformatics Applications

Molecular Biology Laboratory

Laboratory Glassblowing

Marine Chemistry

Environmental Chemistry: Water Pollution

Metabolism

Molecular Biology

Chemistry of Drugs and Poisons

Advanced Undergraduate Research 4

Advanced Physical Chemistry

Advanced Organic Chemistry - Mechanisms

Bioorganic Chemistry

Advanced Organic Chemistry - Synthesis

Nutritional Biochemistry

Polymers & Coatings I

Polymers & Coatings II

Surface Chemistry of Materials

Polymers and Coatings Laboratory I

Polymers and Coatings Laboratory II

Polymers and Coatings Internship

Polymers and Coatings III

Polymers and Coatings Laboratory III

Functional Polymeric Materials

Instrumental Organic Qualitative Analysis

Honors Research

College Teaching Practicum

Learning Assistant Seminar

Selected Advanced Topics

Protein Techniques Laboratory

Biochemical Pharmacology

Cooperative Education Experience 5

Cooperative Education Experience 5

The Learn By Doing Lab Teaching Practicum

Support Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 161</td>
<td>Introduction to Cell and Molecular Biology (B2 &amp; B4)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus I (B1)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 142</td>
<td>Calculus II (B1)</td>
<td>4</td>
</tr>
</tbody>
</table>

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

MATH 143  Calculus III  4
MATH 241  Calculus IV  4
Select from the following:  3-4
CSC 232  Computer Programming for Scientists and Engineers
CSC 234  C and Unix
CSC 235  Fundamentals of Computer Science for Scientists and Engineers I
MATH 206  Linear Algebra I
MATH 244  Linear Analysis I
STAT 218  Applied Statistics for the Life Sciences
STAT 312  Statistical Methods for Engineers
PHYS 141  General Physics IA  4
PHYS 132  General Physics II  4
PHYS 133  General Physics III  4
Physics elective (200-level and above)  3

GENERAL EDUCATION (GE)
(See GE program requirements below.)  56

FREE ELECTIVES
Free Electives  6  5-9
Total units  180

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 No more than 6 units may apply to approved advanced chemistry electives.
5 No more than 2 units may apply to approved advanced chemistry electives.
6 If a General Education (GE) course is used to satisfy a Major or Support requirement, additional units of Free Electives may be needed to complete the total units required for the degree.

Concentration
Students may select the following concentration instead of advanced approved chemistry electives in Major Courses.

- Polymers and Coatings (http://catalog.calpoly.edu/collegesandprograms/collegeofsciencemathematics/chemistrybiochemistry/bschemistry/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

Area B  Math, Science, and Quantitative Reasoning
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
B7  Upper-division elective  4

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  Society and the Individual
D1  The American Experience (Title 5, Section 40404 requirement)  4
D2  Political Economy  4
D3  Comparative Social Institutions  4
D5  Upper-division elective  4

Area E  Lifelong Learning and Self-Development
E  Lower-division elective  4
Total units  56

1 Required in Major/Support; also satisfies GE.