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</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>CHEM 124</td>
<td>General Chemistry for Physical Science and Engineering I (B3 &amp; B4)</td>
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<tr>
<td>CHEM 125</td>
<td>General Chemistry for Physical Science and Engineering II</td>
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<td>CHEM 126</td>
<td>General Chemistry for Physical Science and Engineering III</td>
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<tr>
<td>CHEM 203</td>
<td>Undergraduate Seminar I</td>
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<tr>
<td>CHEM 216</td>
<td>Organic Chemistry I</td>
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<td>CHEM 217</td>
<td>Organic Chemistry II</td>
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<td>CHEM 218</td>
<td>Organic Chemistry III</td>
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<tr>
<td>CHEM 221</td>
<td>Organic Chemistry Laboratory II</td>
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<td>CHEM 303</td>
<td>Undergraduate Seminar II</td>
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<td>CHEM 324</td>
<td>Organic Chemistry Laboratory III</td>
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<td>CHEM 331</td>
<td>Quantitative Analysis</td>
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<td>CHEM 351</td>
<td>Physical Chemistry I</td>
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<td>CHEM 352</td>
<td>Physical Chemistry II</td>
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<td>CHEM 353</td>
<td>Physical Chemistry III</td>
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<tr>
<td>CHEM 354</td>
<td>Physical Chemistry Laboratory</td>
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<td>CHEM 357</td>
<td>Physical Chemistry III Lab</td>
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<td>CHEM 371</td>
<td>Biochemical Principles</td>
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<tr>
<td>CHEM 403</td>
<td>Undergraduate Seminar III: Senior Project</td>
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<td>CHEM 439</td>
<td>Instrumental Analysis</td>
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<tr>
<td>CHEM 481</td>
<td>Inorganic Chemistry</td>
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</table>

Select from the following:

- CHEM 484 | Inorganic Chemistry Laboratory | 2 |
- CHEM 495 | Cooperative Education Experience | 5 |

Polymers and Coatings Concentration (18 units)

- CHEM 441 | Bioinformatics Applications | 4 |
- CHEM 475 | Molecular Biology Laboratory | 4 |
- CHEM 252 | Laboratory Glassblowing | 4 |
- CHEM 302 | Marine Chemistry | 4 |
- CHEM 341 | Environmental Chemistry: Water Pollution | 4 |
- CHEM 372 | Metabolism | 4 |
- CHEM 373 | Molecular Biology | 4 |
- CHEM 377 | Chemistry of Drugs and Poisons | 4 |
- CHEM 400 | Special Problems for Advanced Undergraduates | 5 |
- CHEM 401 | Advanced Undergraduate Research | 6 |
- CHEM 405 | Advanced Physical Chemistry | 6 |
- CHEM 414 | Advanced Organic Chemistry - Mechanisms | 6 |
- CHEM 419 | Bioorganic Chemistry | 6 |
- CHEM 420 | Advanced Organic Chemistry - Synthesis | 6 |
- CHEM 444 | Polymers & Coatings I | 6 |
- CHEM 445 | Polymers & Coatings II | 6 |
- CHEM 446 | Surface Chemistry of Materials | 6 |
- CHEM 447 | Polymers and Coatings Laboratory I | 6 |
- CHEM 448 | Polymers and Coatings Laboratory II | 6 |
- CHEM 449 | Polymers and Coatings Internship | 6 |
- CHEM 450 | Polymers and Coatings III | 6 |
- CHEM 451 | Polymers and Coatings Laboratory III | 6 |
- CHEM 454 | Functional Polymeric Materials | 6 |
- CHEM 458 | Instrumental Organic Qualitative Analysis | 6 |
- CHEM 463 | Honors Research | 6 |
- CHEM 465 | College Teaching Practicum | 6 |
- CHEM 466 | Learning Assistant Seminar | 6 |
- CHEM 470 | Selected Advanced Topics | 6 |
- CHEM 474 | Protein Techniques Laboratory | 6 |
- CHEM 477 | Biochemical Pharmacology | 6 |
- CHEM 485 | Cooperative Education Experience | 6 |
- CHEM 495 | Cooperative Education Experience | 6 |
- CHEM 528 | Nutritional Biochemistry | 6 |
- SCM 302 | The Learn By Doing Lab Teaching | 6 |
- ENGR 322 | Practicum | 6 |
- SCM 451 | Ethics in the Sciences | 6 |

Approved Advanced Chemistry Electives (15 units)

- BIO/CHM 308 | Genetic Engineering Technology (Area F) | 6 |
- or CHEM 349 | Chemical and Biological Warfare | 6 |
- or ENVE 324 | Introduction to Air Pollution | 6 |
- or SCM 335 | Nuclear Science and Society | 6 |
- or SCM 360 | Selected Environmental Issues of California's Central Coast | 6 |
- BIO/CHM 441 | Bioinformatics Applications | 6 |
- BIO/CHM 475 | Molecular Biology Laboratory | 6 |
- CHEM 252 | Laboratory Glassblowing | 6 |
- CHEM 302 | Marine Chemistry | 6 |
- CHEM 341 | Environmental Chemistry: Water Pollution | 6 |
- CHEM 372 | Metabolism | 6 |
- CHEM 373 | Molecular Biology | 6 |
- CHEM 377 | Chemistry of Drugs and Poisons | 6 |
- CHEM 400 | Special Problems for Advanced Undergraduates | 6 |
- CHEM 401 | Advanced Undergraduate Research | 6 |
- CHEM 405 | Advanced Physical Chemistry | 6 |
- CHEM 414 | Advanced Organic Chemistry - Mechanisms | 6 |
- CHEM 419 | Bioorganic Chemistry | 6 |
- CHEM 420 | Advanced Organic Chemistry - Synthesis | 6 |
- CHEM 444 | Polymers & Coatings I | 6 |
- CHEM 445 | Polymers & Coatings II | 6 |
- CHEM/MATE 446 | Surface Chemistry of Materials | 6 |
- CHEM 447 | Polymers and Coatings Laboratory I | 6 |
- CHEM 448 | Polymers and Coatings Laboratory II | 6 |
- CHEM 449 | Polymers and Coatings Internship | 6 |
- CHEM 450 | Polymers and Coatings III | 6 |
- CHEM 451 | Polymers and Coatings Laboratory III | 6 |
- CHEM 454 | Functional Polymeric Materials | 6 |
- CHEM 458 | Instrumental Organic Qualitative Analysis | 6 |
- CHEM 463 | Honors Research | 6 |
- CHEM 465 | College Teaching Practicum | 6 |
- CHEM 466 | Learning Assistant Seminar | 6 |
- CHEM 470 | Selected Advanced Topics | 6 |
- CHEM 474 | Protein Techniques Laboratory | 6 |
- CHEM 477 | Biochemical Pharmacology | 6 |
- CHEM 485 | Cooperative Education Experience | 6 |
- CHEM 495 | Cooperative Education Experience | 6 |
- CHEM 528 | Nutritional Biochemistry | 6 |
- SCM 302 | The Learn By Doing Lab Teaching | 6 |
- ENGR 322 | Practicum | 6 |
- SCM 451 | Ethics in the Sciences | 6 |

SUPPORT COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>SC0 202</td>
<td>The Learn By Doing Lab Teaching</td>
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<tr>
<td>ENGR 322</td>
<td>Practicum</td>
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<tr>
<td>SCM 451</td>
<td>Ethics in the Sciences</td>
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<tr>
<td>Course</td>
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<tr>
<td>BIO 161</td>
<td>Introduction to Cell and Molecular Biology (B2 &amp; B4)</td>
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<td>MATH 141</td>
<td>Calculus I (B1)</td>
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<td>MATH 142</td>
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<td>Calculus III</td>
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<td>MATH 241</td>
<td>Calculus IV</td>
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<tr>
<td>CSC 232</td>
<td>Computer Programming for Scientists and Engineers</td>
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<td>CSC 234</td>
<td>C and Unix</td>
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<tr>
<td>CSC 235</td>
<td>Fundamentals of Computer Science for Scientists and Engineers</td>
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<tr>
<td>MATH 206</td>
<td>Linear Algebra I</td>
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<td>MATH 244</td>
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<td>STAT 218</td>
<td>Applied Statistics for the Life Sciences</td>
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<tr>
<td>STAT 312</td>
<td>Statistical Methods for Engineers</td>
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<tr>
<td>PHYS 141</td>
<td>General Physics IA</td>
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<td>PHYS 132</td>
<td>General Physics II</td>
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<td>PHYS 133</td>
<td>General Physics III</td>
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<tr>
<td>Physics elective (200-level and above)</td>
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</tbody>
</table>

**GENERAL EDUCATION (GE)**

(See GE program requirements below.)

**FREE ELECTIVES**

Free Electives 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. These courses also satisfy Area F requirements.
5. No more than 2 units may apply to approved advanced chemistry electives.
6. No more than 4 units may apply to approved advanced chemistry electives.

**Concentration**

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

- Polymers and Coatings (http://catalog.calpoly.edu/collegesandprograms/collegeofsciencesmathematics/chemistrybiochemistry/bsochemistry/polymerandsandcoatingsconcentration)

**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.