# CHEMISTRY (BS)

## 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 (https://catalog.calpoly.edu/academic-standards-policies/general-requirements-bachelors-degree/#generaleducationtext) section of this catalog, including:

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

Note: No Major, Support or Concentration courses may be selected as credit/no credit. In addition, no more than 12 units of cooperative or internship courses can count towards your degree requirements.

| Code | Title | Units |
|---|---|---|
| **MAJOR COURSES** | | |
| CHEM 1103 | Research Methods I | 1 |
| CHEM 1120 | Fundamentals of Chemical Structure and Properties (5A & 5C) [1] | 4 |
| CHEM 1122 | Fundamentals of Chemical Reactivity | 4 |
| CHEM 2201 | Undergraduate Research | 1 |
| or CHEM 2203 | Research Methods II | |
| CHEM 2220 | Inorganic Chemistry I: D-Block Chemistry | 3 |
| CHEM 2221 | Inorganic Chemistry I Laboratory | 1 |
| CHEM 2242 | Organic Chemistry I | 5 |
| CHEM 3302 | Undergraduate Seminar II | 1 |
| CHEM 3330 | Foundations of Chemical Analysis | 4 |
| CHEM 3352 | Biochemistry (Upper-Division 2/5) [1] | 4 |
| CHEM 3380 | Foundations of Macromolecular Chemistry | 4 |
| CHEM 3392 | Physical Chemistry I | 3 |
| CHEM 3393 | Physical Chemistry Laboratory I | 1 |
| CHEM 4461 | Senior Project I | 1 |
| CHEM 4462 | Senior Project II | 1 |
| Advanced Lecture/Laboratory Subdiscipline Extension Electives | | |
| Select courses from two different subdisciplines from the following: | | 8-10 |
| Analytical | | |
| CHEM 4430 | Instrumental Analysis | |
| Biochemistry | | |
| CHEM 3356 | Genetic Information Processing | |
| Inorganic | | |
| CHEM 3320<br>& CHEM 3321 | Inorganic Chemistry II: Group Theory and Spectroscopy<br>and Inorganic Chemistry II Laboratory | |
| Organic | | |
| CHEM 2244 | Organic Chemistry II | |
| Physical Chemistry | | |
| CHEM 3394<br>& CHEM 3395 | Physical Chemistry II<br>and Physical Chemistry Laboratory II | |
| Polymers | | |
| CHEM 4480<br>& CHEM 4481 | Polymer Synthesis and Characterization<br>and Polymer Synthesis and Characterization Laboratory | |
| **Concentration or Advanced Elective Courses** | | **13-16** |
| (See Concentration below) | | |
| Advanced Electives [2,3] | | |

| | | |
|---|---|---|
| CHEM 2244 | Organic Chemistry II | |
| CHEM 3320 & CHEM 3321 | Inorganic Chemistry II: Group Theory and Spectroscopy and Inorganic Chemistry II Laboratory | |
| CHEM 3354 | Metabolism | |
| CHEM 3356 | Genetic Information Processing | |
| CHEM 3370 | Marine Chemistry | |
| CHEM 3372 | Environmental Chemistry | |
| CHEM 3374 | Chemical and Biological Warfare | |
| CHEM 3394 & CHEM 3395 | Physical Chemistry II and Physical Chemistry Laboratory II | |
| CHEM 4401 | Advanced Undergraduate Research [4] | |
| CHEM 4404 | Learning Assistant Seminar [5] | |
| CHEM 4415 | College Teaching Practicum | |
| CHEM 4420 | Inorganic Chemistry III: Transition Metals in Context | |
| CHEM 4430 | Instrumental Analysis | |
| CHEM 4432 | Advanced Techniques in Chemical Analysis | |
| CHEM 4440 | Advanced Organic Chemistry - Mechanisms | |
| CHEM 4442 | Advanced Organic Chemistry - Synthesis | |
| CHEM 4444 | Advanced Organic Chemistry Laboratory | |
| CHEM 4450 | Nutritional Biochemistry | |
| CHEM 4451 | Bioinformatics Applications | |
| CHEM 4452 | Physical Biochemistry Methods and Applications | |
| CHEM 4453 | Molecular Biology Techniques | |
| CHEM 4454 | Protein Techniques | |
| CHEM 4456 | Chemical Biology | |
| CHEM 4457 | Chemistry of Drugs and Poisons | |
| CHEM 4458 | Neurochemistry | |
| CHEM 4470 | Special Advanced Topics | |
| CHEM 4471 | Special Advanced Laboratory | |
| CHEM 4480 & CHEM 4481 | Polymer Synthesis and Characterization and Polymer Synthesis and Characterization Laboratory | |
| CHEM 4482 | Coatings and Formulations | |
| CHEM 4483 | Coatings and Formulations Laboratory | |
| CHEM 4484 | Functional Polymeric Materials | |
| CHEM 4485 | Cooperative Education Experience [5] | |
| CHEM 4486 | Surface Chemistry of Materials | |
| CHEM 4487 | Polymers and Coatings Internship | |
| CHEM 4490 | Computational Chemistry | |
| CHEM 4495 | Cooperative Education Experience [5] | |
| SCM/ENGR 3302 | The Learn By Doing Lab Teaching Practicum [5] | |
| **SUPPORT COURSES** | | |
| BIO 1151 | Life: Molecules and Cells (5B) [1] | 4 |
| MATH 1261 | Calculus I (2) [1] | 4 |
| MATH 1262 | Calculus II | 4 |
| MATH 2263 | Calculus III | 3 |
| PHYS 1141 | General Physics I | 4 |
| PHYS 1143 | General Physics II | 4 |
| **GENERAL EDUCATION (GE)** | | |
| (See GE program requirements below) | | 30 |
| **FREE ELECTIVES** | | |
| Free Electives [6, 7] | | 3-6 |
| **Total Units** | | **120** |

[1] Required in Major or Support; also satisfies General Education (GE) requirement.
[2] Courses taken to meet a Major requirement cannot be double-counted in the concentration or in the Advanced Electives.
[3] Consultation with advisor is recommended prior to selecting advanced electives; bear in mind your selections may impact pursuit of post-baccalaureate studies and/or goals.
[4] Maximum of 4 units may be applied toward Advanced Electives from CHEM 4401.
[5] Maximum of 2 units may be applied toward Advanced Electives from the following: CHEM 4404, CHEM 4485, CHEM 4495, or SCM/ENGR 3302.
[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.
[7] Free Electives may need to be at the 3000-4000 level to ensure completion of the required minimum of 40 units of upper-division courses.

## Concentrations

## Polymers and Coatings

| Code | Title | Units |
|---|---|---|
| **REQUIRED COURSES** | | |
| CHEM 4480 | Polymer Synthesis and Characterization | 3 |
| CHEM 4481 | Polymer Synthesis and Characterization Laboratory | 2 |
| CHEM 4482 | Coatings and Formulations | 3 |
| CHEM 4483 | Coatings and Formulations Laboratory | 2 |
| CHEM 4486 | Surface Chemistry of Materials | 3 |
| **Total Units** | | **13** |

## General Education (GE) Requirements

# General Education (GE) Requirements

- 43 units required, 13 of which are specified in Major and/or Support.
- If any of the remaining 30 Units 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.
- See the complete GE course listing (https://catalog.calpoly.edu/academic-standards-policies/general-requirements-bachelors-degree/#generaleducationtext).
- A grade of C- or better is required in one course in each of the following GE Areas: 1A (English Composition), 1B (Critical Thinking), 1C (Oral Communication), and 2 (Mathematics and Quantitative Reasoning).

| **Lower-Division General Education** | | |
|---|---|---|
| **Area 1** | **English Communication and Critical Thinking** | |
| 1A | Written Communication | 3 |
| 1B | Critical Thinking | 3 |
| 1C | Oral Communication | 3 |
| **Area 2** | **Mathematics and Quantitative Reasoning** | |
| 2 | Mathematics and Quantitative Reasoning (3 units in Support) [1] | 0 |
| **Area 3** | **Arts and Humanities** | |
| 3A | Arts | 3 |
| 3B | Humanities: Literature, Philosophy, Languages other than English | 3 |
| **Area 4** | **Social and Behavioral Sciences (Area 4 courses must come from at least two different course prefixes.)** | |
| 4A | American Institutions (Title 5, Section 40404 Requirement) | 3 |
| 4B | Social and Behavioral Sciences | 3 |
| **Area 5** | **Physical and Life Sciences** | |
| 5A | Physical Sciences (3 units in Major) [1] | 0 |
| 5B | Life Sciences (3 units in Support) [1] | 0 |
| 5C | Laboratory (may be embedded in a 5A or 5B course) (1 units in Major) [1] | 0 |
| **Area 6** | **Ethnic Studies** | |
| 6 | Ethnic Studies | 3 |
| **Upper-Division General Education** | | |

| | | |
|---|---|---|
| Upper-Division 2/5 | Mathematics and Quantitative Reasoning or Physical and Life Sciences (3 units in Major) [1] | 0 |
| Upper-Division 3 | Arts and Humanities | 3 |
| Upper-Division 4 | Social and Behavioral Sciences (Area 4 courses must come from at least two different course prefixes.) | 3 |
| **Total Units** | | **30** |

[1] Required in Major or Support; also satisfies General Education (GE) requirement.