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		
CHEM 124	General Chemistry for Physical Science and Engineering I (B1 & B3) [1]	4
CHEM 125	General Chemistry for Physical Science and Engineering II	4
CHEM 126	General Chemistry for Physical Science and Engineering III	4
CHEM 203	Undergraduate Seminar I	1
CHEM 216	Organic Chemistry I	5
CHEM 217	Organic Chemistry II	3
CHEM 218	Organic Chemistry III	3
CHEM 221	Organic Chemistry Laboratory II	2
CHEM 303	Undergraduate Seminar II	1
CHEM 324	Organic Chemistry Laboratory III	2
CHEM 331	Quantitative Analysis [2]	5
CHEM 351	Physical Chemistry I	3
CHEM 352	Physical Chemistry II	3
CHEM 353	Physical Chemistry III	3
CHEM 356	Physical Chemistry Laboratory (GWR)	2
CHEM 357	Physical Chemistry III Lab	1
CHEM 369	Biochemical Principles (Upper-Division B) [1]	5
CHEM 403	Undergraduate Seminar III: Senior Project	1
CHEM 439	Instrumental Analysis	5
CHEM 481	Inorganic Chemistry	3
CHEM 484	Inorganic Chemistry Laboratory	2
Select from the following:		15/18
Polymers and Coatings Concentration (18 units)		
Approved Advanced Chemistry Electives (15 units) [3]		
BIO/CHEM 308	Genetic Engineering Technology	
or CHEM 349	Chemical and Biological Warfare	
or ENVE 324	Introduction to Air Pollution	
or SCM 360	Selected Environmental Issues of California's Central Coast	
BIO/CHEM 441	Bioinformatics Applications	
BIO/CHEM 475	Molecular Biology Laboratory	
CHEM 302	Marine Chemistry	
CHEM 341	Environmental Chemistry: Water Pollution	
CHEM 372	Metabolism	
CHEM 373	Molecular Biology	
CHEM 377	Chemistry of Drugs and Poisons	
CHEM 401	Advanced Undergraduate Research [4]	
CHEM 405	Advanced Physical Chemistry	
CHEM 414	Advanced Organic Chemistry - Mechanisms	
CHEM 418	Neurochemistry	
CHEM 420	Advanced Organic Chemistry - Synthesis	
CHEM 428	Nutritional Biochemistry	
CHEM 432	Physical Biochemistry	
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	Advanced Organic Chemistry: Spectroscopy	
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 485	Cooperative Education Experience [5]	
CHEM 495	Cooperative Education Experience [5]	
SCM 302/ ENGR 322	The Learn By Doing Lab Teaching Practicum	
SUPPORT COURSES		
BIO 161	Introduction to Cell and Molecular Biology (B2 & B3) [1]	4
MATH 141	Calculus I (B4) [1]	4
MATH 142	Calculus II (GE Electives) [1]	4

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	
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 I	4
PHYS 142	General Physics II	4
PHYS 143	General Physics III	4
Physics elective (200-level and above)		3
GENERAL EDUCATION (GE)		
(See GE program requirements below.)		52
FREE ELECTIVES		
Free Electives		9-13
Total units		**180**

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

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

[3] Consultation with advisor is recommended prior to selecting Approved Advanced Chemistry 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 the degree.

Concentration

Students may select the following concentration instead of Advanced Approved Chemistry Electives in Major Courses:

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

General Education (GE) Requirements

- 72 units required, 20 of which are specified in Major and/or Support.
- If any of the remaining 52 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/generalrequirementsbachelorsdegree/#generaleducationtext).
- A grade of C- or better is required in one course in each of the following GE Areas: A1 (Oral Communication), A2 (Written Communication), A3 (Critical Thinking), and B4 (Mathematics/Quantitative Reasoning).

Area A	**English Language Communication and Critical Thinking**	
A1	Oral Communication	4
A2	Written Communication	4
A3	Critical Thinking	4
Area B	**Scientific Inquiry and Quantitative Reasoning**	
B1	Physical Science (4 units in Major) [1]	0
B2	Life Science (4 units in Support) [1]	0
B3	One lab taken with either a B1 or B2 course	
B4	Mathematics/Quantitative Reasoning (4 units in Support) [1]	0
Upper-Division B (4 units in Major) [1]		0
Area C	**Arts and Humanities**	
Lower-division courses in Area C must come from three different subject prefixes.		
C1	Arts: Arts, Cinema, Dance, Music, Theater	4
C2	Humanities: Literature, Philosophy, Languages other than English	4
Lower-Division C Elective - Select a course from either C1 or C2		4
Upper-Division C		4
Area D	**Social Sciences - Select courses in Area D from at least two different prefixes**	
D1	American Institutions (Title 5, Section 40404 Requirement)	4
D2	Lower-Division D	4
Upper-Division D		4
Area E	**Lifelong Learning and Self-Development**	
Lower-Division E		4
Area F	**Ethnic Studies**	
F	Ethnic Studies	4
GE Electives in Areas B, C, and D		
Select courses from two different areas; may be lower-division or upper-division courses.		
GE Electives (4 units in Support plus 4 units in GE) [1]		4
Total units		**52**

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