CHEMISTRY, BS, CERTIFIED BY THE AMERICAN CHEMICAL SOCIETY

Natural Sciences, Mathematics, and Engineering (nsme) (https://catalog.csub.edu/general-information/csub-information/school-natural-sciences-mathematics-engineering/)

Department of Chemistry and Biochemistry (https://catalog.csub.edu/general-information/csub-information/school-natural-sciences-mathematics-engineering/department-chemistry-biochemistry/)

Department Chair: Sarah Forester

Office: Science Building II, 273

Phone: (661) 654-2030

Email: chemistry@csub.edu

www.csub.edu/Chemistry (http://www.csub.edu/Chemistry/)

Program Maps for Natural Sciences, Mathematics, and Engineering (https://programmap.csub.edu/academics/interest-clusters/4e942a6e-b8e4-4b60-a1ae-334235acc581/)

Program Description

Modern chemistry occupies a central position among the sciences. The goal of chemical science is to discover the fundamental regularities by which matter in its multitude of aggregations interacts with energy in its many forms. Mathematical models and physical principles are utilized in the interpretation of chemical concepts. The organization of chemical knowledge leads to an understanding of natural phenomena in the real world of earth and life sciences.

Biochemistry is a continuously advancing field, vitally important to modern life sciences such as agriculture, biology, microbiology, medicine, pharmacy, and veterinary science. This field studies life in all biological systems, i.e., human, animal, plant, microorganisms, and viruses at the molecular level. Biochemistry is the discipline that explains the structures and the activities of living things at a sub-microscopic level combining principles of biology, chemistry, and physics. Biochemical understanding has served as the basis for major developments in health sciences related research, and significantly contributed to the formation of the biotechnology industry. The emerging knowledge has resulted in a revolution of our understanding of life forces and will have a continuously increasing impact on society.

The departmental academic program is designed to provide essential preparation for students to pursue professional careers and/or advanced studies in chemistry or related disciplines, such as Agricultural Chemistry, Biochemistry, Clinical Chemistry, Environmental Chemistry, and Forensics Chemistry. The department offers course work for chemistry majors to meet the requirements of medical and other professional schools in the health sciences, including dentistry, pharmacy, and veterinary medicine. It also cooperates with other departments and the School of Social Sciences and Education in developing a balanced program of academic and professional preparation for chemistry majors who seek teaching credentials.

Teaching Credential: Science Teacher Preparation Program Leading to a Degree in Natural Sciences, Primary Concentration in Chemistry

The California Commission on Teacher Credentialing (CCTC) has authorized CSUB to offer a single subject matter preparation program in Natural Sciences leading to a Bachelor of Arts degree. This course work satisfies the subject matter requirements for a “Secondary Teaching Credential in Science.” The program consists of three components: I. Primary Concentration (major); II. Secondary Concentration (minor); and III. Breadth (cognates). Program completion leads to a BA degree in Natural Sciences with a major in the area of primary concentration and a minor in the secondary concentration. Additional information may be obtained from the Chemistry Department office (661-654-2030).

For a detailed description of the course requirements, please turn to the Natural Sciences section in this catalog.

General Chemistry and Transfer Students

Students who have taken a full year of general chemistry and then transfer to CSUB will typically receive credit for CHEM 1000, 1001, 1100, and 1600. However, topics in CHEM 1100 and CHEM 1600 are covered in greater depth than in a typical general chemistry course and some students elect to take one or both courses even after completing general chemistry.

Academic Regulations

A grade of “C” in chemistry, cognate, and all other major/minor courses is the minimal grade acceptable for progression into subsequent chemistry courses and for graduation. Students who fail to achieve at least a “C” may repeat the course. If a course is satisfactorily completed, the prior unsatisfactory grade will no longer bar a student from continuing in the Chemistry program. Credit, no-credit courses are not acceptable for the major or minor.

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Code	Title	Units
General Education Requirements		
First-Year Seminar (FYS)		2
Lower Division Area A: Foundational Skills		9
Lower Division Area B: Natural Sciences [2]		3
Lower Division Area C: Arts and Humanities		6
Lower Division Area D: Social and Behavioral Sciences		3
Lower Division Area E: Student Enrichment and Lifelong Learning (SELF) [6]		0
Lower Division Area F: Ethnic Studies		3
American Institutions: Government and History		6

Junior Year Diversity & Reflection (JYDR)		3
Graduation Writing Assessment Requirement (GWAR) [7]		0
Upper Division Thematic Area C and D		6
General Education Capstone [2]		0
General Education Subtotal		*41*
Major Requirements [1]		
Lower Division [2]		
CHEM 1000	Foundations of Chemistry	3
CHEM 1001	Foundations of Chemistry Laboratory	2
CHEM 1100	Foundations of Analytical Chemistry	2
CHEM 1600	Foundations of Physical Chemistry	2
CHEM 2110	Foundations of Quantitative Chemical Analysis	3
CHEM 2200	Foundations of Inorganic Chemistry	2
or CHEM 2240	Foundations of Bioinorganic Chemistry	
CHEM 2300	Foundations of Organic Chemistry	3
CHEM 2400	Foundations of Biochemistry	2
CHEM 2900	Research Methods in Chemistry [3]	2
Upper Division [2]		
CHEM 3110	Advanced Quantitative Chemical Analysis	3
CHEM 3300	Intermediate Organic Chemistry	3
CHEM 3301	Organic Chemistry Laboratory I	2
CHEM 3310	Advanced Organic Chemistry	2
CHEM 3311	Organic Chemistry Laboratory II	2
CHEM 3400	Biochemistry of Metabolic Pathways	2
CHEM 3600	Physical Chemistry:Thermodynamics and Kinetics	3
CHEM 3610	Physical Chemistry: Quantum and Statistical Mechanics	3
CHEM 3908	Seminar in Chemical Literature	3
CHEM 4100	Chemical Separations	1
CHEM 4101	Chemical Separations Laboratory	1
CHEM 4110	Spectroscopy	1
CHEM 4120	Nuclear Magnetic Resonance	1
CHEM 4121	Spectroscopy Laboratory	1
CHEM 4200	Inorganic Chemistry	3
CHEM 4800	Honors Research	1-3
CHEM 4908	Senior Seminar in Chemistry	3
Select three additional units of the following:		3
CHEM 3401	Biochemistry Laboratory I	
CHEM 3500	Concepts of Food Analysis	
CHEM 3510	Food Science	
CHEM 4010	Symmetry and Group Theory	
CHEM 4020	Computational Chemistry	
CHEM 4400	Biochemistry of Nucleic Acids	
CHEM 4401	Biochemistry Laboratory II	
CHEM 4410	Protein Chemistry	
CHEM 4420	Plant Biochemistry	
CHEM 4500	Food Chemistry	
CHEM 4510	Advanced Nutrition and Metabolism	
CHEM 4700	Special Topics in Chemistry	
CHEM 4830	Instruction in Chemistry	
Cognates [2]		
Mathematics [4]		
Select one of the following:		8
MATH 2010 & MATH 2020	Calculus for the Biological and Chemical Sciences I and Calculus for Biological & Chemical Sciences II	
MATH 2310 & MATH 2320	Single Variable Calculus I for Engineers and Single Variable Calculus II for Engineers	
MATH 2510 & MATH 2520	Single Variable Calculus I and Single Variable Calculus II	
Physics [5]		
Select one of the following:		8
PHYS 2110 & PHYS 2120	College Physics I and College Physics II	
PHYS 2210 & PHYS 2220	Physics for Scientists and Engineers I and Physics for Scientists and Engineers II	
Major Subtotal		*75-77*
Additional Units Needed Towards Graduation		**1-2**
Total Units		**117-120**

1 The minimum GPA for these 77-78 units is 2.0
2 Satisfied in major or cognate
3 Satisfies Area B1
4 Satisfies Area B4
5 Satisfies Area B1/B3
6 The SELF requirement is met by completing a LD Area B, C, or D course with a S ELF component.
7 Can be satisfied by exam.