

BIOCHEMISTRY, BS

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/>)

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

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

Program Requirements

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	0
	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) ⁷	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) ⁸	0
	Upper Division Thematic Area C and D	6
	General Education Capstone ²	0
	<i>General Education Subtotal</i>	38
Major Requirements ¹		
<i>Lower Division ²</i>		
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 2300	Foundations of Organic Chemistry	3
CHEM 2400	Foundations of Biochemistry	2
CHEM 2940	Research Methods in Biochemistry ³	2
<i>Upper Division ²</i>		
CHEM 3300	Intermediate Organic Chemistry	3
CHEM 3301	Organic Chemistry Laboratory I	2
CHEM 3400	Biochemistry of Metabolic Pathways	2
CHEM 3401	Biochemistry Laboratory I	2
CHEM 3600	Physical Chemistry: Thermodynamics and Kinetics	3
CHEM 3948	Seminar in Biochemical Literature	3

CHEM 4400	Biochemistry of Nucleic Acids	2
CHEM 4948	Senior Seminar in Biochemistry	3
<i>Cognates ²</i>		
<i>Biology ⁴</i>		
BIOL 2010	Introductory Biology - Cells	4
BIOL 2110	Introductory Biology - Animals	4
or BIOL 2120	Introductory Biology - Plants	
<i>Mathematics ⁵</i>		
Select one of the following:		8
MATH 2010 & MATH 2020 I	Calculus for the Biological and Chemical Sciences 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	
<i>Physics ⁶</i>		
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	
<i>Major Subtotal</i>		60
Additional Requirements for the B.S. in Biochemistry		14-15
<i>Lower Division Requirements:</i>		
CHEM 2200	Foundations of Inorganic Chemistry	2-3
or CHEM 2240	Foundations of Bioinorganic Chemistry	
<i>Upper Division Requirements:</i>		
CHEM 3310	Advanced Organic Chemistry	2
CHEM 3311	Organic Chemistry Laboratory II	2
CHEM 4401	Biochemistry Laboratory II	2
Select 6 additional units from the following:		6
BIOL 3010	General Genetics	
BIOL 3020	General Physiology	
BIOL 3220	Human Pathophysiology	
BIOL 3410	General Microbiology	
BIOL 3420	Food Microbiology	
BIOL 3530	Immunology	
BIOL 3540	Hematology	
BIOL 3550	Advanced Human Physiology	
BIOL 4100	Evolution	
BIOL 4200	Medical Microbiology	
BIOL 4440	Molecular Genetics	
BIOL 4450	Genomics and Bioinformatics	
BIOL 4460	Evolutionary Genetics	
CHEM 3110	Advanced Quantitative Chemical Analysis	
CHEM 3500	Concepts of Food Analysis	
CHEM 3510	Food Science	
CHEM 3610	Physical Chemistry: Quantum and Statistical Mechanics	
CHEM 4010	Symmetry and Group Theory	
CHEM 4020	Computational Chemistry	
CHEM 4100	Chemical Separations	

CHEM 4101	Chemical Separations Laboratory
CHEM 4110	Spectroscopy
CHEM 4120	Nuclear Magnetic Resonance
CHEM 4121	Spectroscopy Laboratory
CHEM 4200	Inorganic Chemistry
CHEM 4410	Protein Chemistry
CHEM 4420	Plant Biochemistry
CHEM 4830	Instruction in Chemistry
CHEM 4500	Food Chemistry
CHEM 4510	Advanced Nutrition and Metabolism
CHEM 4700	Special Topics in Chemistry
CHEM 4800	Honors Research

Total Units **126-128**

¹ The minimum GPA for these 74-75 units is 2.0

² Satisfied in major or cognate

³ Satisfies Area B1

⁴ Satisfies Area B2/B3

⁵ Satisfies Area B4

⁶ Satisfies Area B1/B3

⁷ The SELF requirement is met by completing a LD Area C, or D course with a SELF component.

⁸ Can be satisfied by exam.