

# BIOCHEMISTRY, BACHELOR OF SCIENCE

## Requirements

### Total Course Requirements for the Bachelor's Degree

See the "Requirements for the Bachelor's Degree (<https://catalog.csudh.edu/general-information/baccalaureate-degrees-undergraduate-studies/>)" in the University Catalog for complete details on general degree requirements. A minimum of 40 units, including those required for the major, must be upper division.

### Elective Requirements

Completion of elective courses (beyond the requirements listed below) to reach a total of a minimum of 120 units.

### General Education Requirements (49 units)

See the "General Education (<https://catalog.csudh.edu/general-education/>)" requirements in the University Catalog or the Class Schedule for the most current information on General Education requirements and course offerings.

### Graduation Writing Assessment Requirement

See the "Graduation Writing Assessment Requirement (<https://catalog.csudh.edu/general-information/baccalaureate-degrees-undergraduate-studies/gwar-certifying-courses/>)" in the University Catalog.

### Minor Requirements

Single field major, no minor required.

### Major Requirements (81 units)

The following courses, or their approved transfer equivalents, are required of all candidates for this degree. A grade of "C" or better must be achieved in all courses.

Code	Title	Hours
<b>Lower Division Required Courses</b>		
BIO 120	Principles of Biology I	3
BIO 121	Principles of Biology Lab I	1
BIO 122	Principles of Biology II	3
BIO 123	Principles of Biology II Lab	1
CHE 110	General Chemistry I	5
CHE 112	General Chemistry II	5
CHE 230	Quantitative Analysis	4
MAT 191	Calculus I	5
MAT 193	Calculus II	5
PHY 130	General Physics I	5
PHY 132	General Physics II	5
<b>Upper Division Required Courses</b>		
CHE 310	Organic Chemistry I	4
CHE 311	Organic Chemistry Lab I	1
CHE 312	Organic Chemistry II	3
CHE 313	Organic Chemistry Laboratory II	2
CHE 320	Physical Chemistry I	5
CHE 322	Physical Chemistry II	3
CHE 420	Advanced Applic for Chemistry	2

CHE 450	Biochemistry I <sup>1</sup>	4
CHE 451	Biochemistry I Lab	1
CHE 452	Biochemistry II	4
CHE 453	Biochemistry II Lab	2
CHE 460	Chemical Literature	2
<b>Electives</b>		
Select six units from the following:		6
BIO 314	Developmental Biology	
BIO 315	Developmental Biology Lab	
BIO 320	Cell Biology	
BIO 340	Genetics <sup>2</sup>	

**Total Hours** **81**

<sup>1</sup> Major students may substitute this course for General Education Area E. Please contact the University Advisement Center to request the course substitution.

<sup>2</sup> Major students may substitute this course for General Education Area F2. Please contact the University Advisement Center to request the course substitution.

## Program Learning Outcomes

### Bachelor of Arts and Bachelor of Science Chemistry/ Bachelor of Science Biochemistry Program Learning Outcomes

1. general familiarity with the following areas in chemistry: analytical, biochemistry, inorganic, organic and physical.
2. developed formal (abstract) thinking skills as well as concrete thinking skills.
3. learned how to think critically and analyze chemical problems
4. the ability to work effectively and safely in a laboratory environment.
5. the ability to work in teams as well as independently.
6. the ability to communicate effectively, both orally and in writing.

## 4-Year Degree Roadmap

Course	Title	Hours
<b>First Year</b>		
<b>Fall</b>		
MAT 191	Calculus I ((satisfies GE Area B4))	5
GE Area A2 Composition I		3
GE Area E Lifelong Learning and Self-Development		3
CHE 110	General Chemistry I	5
<b>Hours</b>		<b>16</b>
<b>Spring</b>		
GE Area A2 Composition II		3
CHE 112	General Chemistry II	5
MAT 193	Calculus II	5
GE Area F Ethnic Studies		3
<b>Hours</b>		<b>16</b>
<b>Second Year</b>		
<b>Fall</b>		
BIO 120	Principles of Biology I	3
BIO 121	Principles of Biology Lab I	1
CHE 230	Quantitative Analysis	4
PHY 130	General Physics I	5
GE Area A3 Logic/Critical Thinking		3
<b>Hours</b>		<b>16</b>

Spring		
PHY 132	General Physics II	5
BIO 122	Principles of Biology II	3
BIO 123	Principles of Biology II Lab	1
GE Area A1 Oral Communication		3
HIS 101	History Of United States	3
POL 101	American Institutions	3
<b>Hours</b>		<b>18</b>

Third Year		
Fall		
CHE 310	Organic Chemistry I	4
CHE 311	Organic Chemistry Lab I	1
CHE 320	Physical Chemistry I	5
GE Area C or D		3
GE Area C or D		3
GWAR satisfying course		3
<b>Hours</b>		<b>19</b>
Spring		
GE Area C or D		3
GE Area C or D		3
CHE 322	Physical Chemistry II	3
CHE 420	Advanced Applic for Chemistry	2
CHE 312	Organic Chemistry II	3
CHE 313	Organic Chemistry Laboratory II	2
<b>Hours</b>		<b>16</b>

Fourth Year		
Fall		
GE Area B5 or D3		3
CHE 460	Chemical Literature	2
CHE 450	Biochemistry I	4
CHE 451	Biochemistry I Lab	1
Major Elective		3
<b>Hours</b>		<b>13</b>

Spring		
CHE 452	Biochemistry II	4
CHE 453	Biochemistry II Lab	2
Major Elective		3
GE Area B5 or D3		3
GE Area C3 Integrative Studies in the Humanities		3
<b>Hours</b>		<b>15</b>
<b>Total Hours</b>		<b>129</b>

Second Year		
Fall		
GE Area B5 or D3		3
Major Elective		3
CHE 450	Biochemistry I	4
CHE 460	Chemical Literature	2
CHE 451	Biochemistry I Lab	1
Elective to meet 120 units		2
<b>Hours</b>		<b>15</b>

Spring		
CHE 452	Biochemistry II	4
CHE 453	Biochemistry II Lab	2
Major Elective		3
GE Area B5 or D3		3
GE Area C3		3
<b>Hours</b>		<b>15</b>
<b>Total Hours</b>		<b>60</b>

## 2-Year Roadmap (transfer students)

Course	Title	Hours
First Year		
Fall		
CHE 310	Organic Chemistry I	4
CHE 311	Organic Chemistry Lab I	1
CHE 320	Physical Chemistry I	5
GWAR satisfying course		3
Elective to meet 120 units		2
<b>Hours</b>		<b>15</b>
Spring		
CHE 322	Physical Chemistry II	3
CHE 420	Advanced Applic for Chemistry	2
CHE 312	Organic Chemistry II	3
CHE 313	Organic Chemistry Laboratory II	2
GE Area C or D		3
Elective to meet 120 units		2
<b>Hours</b>		<b>15</b>