

# CHEMISTRY, B.S.

Credits: 122  
CIP Code: 400501

## Program Description

The Bachelor of Science Degree in Chemistry is a rigorous program in the quantitative physical sciences. It requires advanced mathematics and elementary physics for technical students and advanced courses in inorganic, analytical, organic, and physical chemistries and biochemistry.

## Admissions Requirements

Applicants to the Bachelor of Science Degree in Chemistry must meet the General Admissions Requirements of the University as published in this Catalog.

## Student Learning Outcomes

Graduates of the Chemistry Program will be able to:

1. Conduct accurate collection and interpretation of numerical data.
2. Use extrapolation, approximation, precision, accuracy, rational estimation, and statistical validity to solve problems.
3. Demonstrate proficiency in the scientific method of formulating hypothesis and arriving at appropriate answers and conclusions.
4. Describe appropriate chemical principles to include thermodynamics, equilibrium, kinetics, quantum mechanics, structures of materials, activities of substances, and synthesis.
5. Develop a mastery of a broad set of factual chemical knowledge concerning the properties of substances, molecules and atoms.

## Degree Requirements

In addition to the General Degree Requirements as published in this Catalog, students pursuing the Bachelor of Science Degree in Chemistry must complete all required and cognate courses with minimum final grades of "C".

Code	Title	Hours
<b>Required Undergraduate Courses</b>		
CCHE 111	Gen Chem 1 & Recitation	4
CCHE 111L	General Chemistry Lab	0
CCHE 111R		0
CCHE 112	Gen Chem II Lec & Recitation	4
CCHE 112L	General Chemistry II Lab	0
CCHE 112R		0
CCHE 211	Analytical Chemistry I	4
CCHE 211L	Analytical Chemistry Lab	0
CCHE 231	Organic Chemistry	4
CCHE 231L	Organic Chemistry Lab	0
CCHE 231R	Organic Chemistry Recitation	0
CCHE 232	Organic Chemistry	4
CCHE 232L	Organic Chemistry Lab	0
CCHE 232R	Organic Chemistry Recitation	0
CCHE 341	Physical Chemistry I	3
CCHE 341L	Physical Chemistry Lab	1
CCHE 341R	Physical Chemistry Recitation	0

CCHE 342	Physical Chemistry II	3
CCHE 342L	Physical Chemistry Lab	1
CCHE 342R		0
CCHE 400	Undergraduate Research	3
CCHE 412 & 412L	Instrumental Methods and Instrumentation Lab	4
CCHE 421	Advanced Inorganic Chemistry	3
CCHE 431	Advanced Organic Chemistry	3
CCHE 431L	Advanced Organic Chemistry Lab	1
CCHE 432	Methods of Structure Determin	3
CCHE 432L	Methods of Structural Det Lab	1
CCHE 480	Special Topics in Chemistry	4
CCHE 381	Chemistry Seminar	0
CCHE 382	Chemistry Seminar	1
CCHE 481	Chemistry Seminar	0
CCHE 482	Chemistry Seminar	1

### Cognate Courses

CMAT 111	Calculus I	4
CMAT 112	Calculus II	4
CMAT 211	Calculus III	4
CBIO 111	General Biology I & Lab	4
CBIO 111L		0
CMAT 212	Differential Equations	3
Select one of the following:		4
CPHY 111 & 111L	General & Modern Physics I and Gen. & Modern Physics I Lab	
CPHY 121 & 121L	Physics I: Mechanics and Physics I: Mechanics Lab	
Select one of the following:		4
CPHY 112 & 112L	General & Modern Physics II and Gen. & Modern Physics II Lab	
CPHY 123 & 123L	Physics III: Optics/Modern Phys and Physics III: Optics&Mod.PhyLab	

**Total Hours** 79

## General Education Courses

Code	Title	Hours
<b>Area A: Humanities/Fine Arts</b>		
Select at least one of the following:		3-6
CPHI 105	Critical Thinking	
CPHI 221	Introduction to Philosophy	
CREL 101	The Biblical Heritage	
CREL 103	Afr Amer Religious Experiences	
CREL 104	Afr Amer Religious Experience	
CREL 250	Comparative Religion	
CREL 251		
CART 150	Art Appreciation	
CHUM 228		
CHUM 230		
CMUS 119	World Music	
CMUS 120	Music Appreciation	
CSTA 252	Theater Appreciation	
CHIS 201	United States, Africa & World	

CHIS 211	History of the United States	
CHIS 202	United States, Africa & World	
CHIS 212	History of the United States	

**Area B: Social/Behavioral Sciences**

Select at least one of the following: 3-6

CPSY 211	General Psychology	
CPSY 218	Human Growth & Development	
CEDU 301		
CSCJ 215	Intro. to Sociology	
CSCJ 216	Intro. to Anthropology	
CSCJ 218	Contemporary Social Problems	
CSCJ 219	Social Movements	

**Area C: Natural Sciences/Mathematics/Statistics**

These courses are defined by cognates

Select nine credits of the following: 9

CMAT 111	Calculus I	
CMAT 112	Calculus II	
CMAT 211	Calculus III	
CMAT 212	Differential Equations	
CBIO 112	General Biology II & Lab	
CBIO 112L	General Biology II Lab	

One of the following:

CPHY 111 & 111L	General & Modern Physics I and Gen. & Modern Physics I Lab	
CPHY 121 & 121L	Physics I: Mechanics and Physics I: Mechanics Lab	

One of the following:

CPHY 112 & 112L	General & Modern Physics II and Gen. & Modern Physics II Lab	
CPHY 123 & 123L	Physics III: Optics/Modern Phys and Physics III: Optics&Mod.PhyLab	

**Area D: Communications**

CENG 105	College Composition I	3
CENG 106	College Composition II	3

**Area E: Financial and Technological**

CCIS 253	Intro. to Comp. Sim/Analysis	3
CBUS 250	Personal Finance <sup>1</sup>	3
or CECO 250	Principles of Economics	

**Total Hours** 27-33<sup>1</sup> A student may choose any CBUS or CECO at the 200 level.**Other University Requirements**

Code	Title	Hours
CGED 100	First Year Seminar	1
CGED 101	1st-Year Seminar	1
<b>Total Hours</b>		<b>2</b>

**Free Electives: 15 Credits**

Students are free to choose their own electives. However, these electives should be chosen in consultation with the advisor depending on the choice of minor or stackable credentials that a student may be seeking.

**Note: Students must complete all chemistry courses with a minimum final grade of "C". It is recommended in the program plan that students take CCHE 400 Undergraduate Research over three (3) semesters at 1.0 credit hour per semester. The Physics 121, 121L, 123 and 123L sequence is recommended for all students interested in graduate school.**

**Plan of Study for Bachelor of Science Degree in Chemistry**

(Students who are **not** prepared to complete calculus in their first year of study should arrange a revised plan of study in consultation with an advisor.)

Course	Title	Hours
<b>First Year</b>		
<b>First Semester</b>		
CCHE 111	Gen Chem 1 & Recitation	4
CCHE 111L	General Chemistry Lab	0
CCHE 111R		0
CBIO 111 & 111L	General Biology I & Lab and	4
CMAT 111	Calculus I (Area C)	4
CENG 105	College Composition I (Area D)	3
CGED 100	First Year Seminar	1
<b>Hours</b>		<b>16</b>
<b>Second Semester</b>		
CCHE 112	Gen Chem II Lec & Recitation	4
CCHE 112L	General Chemistry II Lab	0
CCHE 112R		0
CBIO 112 & 112L	General Biology II & Lab and General Biology II Lab (Area C)	4
CMAT 112	Calculus II (Area C)	4
CENG 106	College Composition II (Area D)	3
CGED 101	1st-Year Seminar	1
<b>Hours</b>		<b>16</b>
<b>Second Year</b>		
<b>First Semester</b>		
CCHE 231	Organic Chemistry	4
CCHE 231L	Organic Chemistry Lab	0
CCHE 231R	Organic Chemistry Recitation	0
CMAT 211	Calculus III (Area C)	4
Select one of the following:		4
CPHY 111 & 111L	General & Modern Physics I and Gen. & Modern Physics I Lab	
CPHY 121 & 121L	Physics I: Mechanics and Physics I: Mechanics Lab	
Core Elective (Humanities) Area A		3
<b>Hours</b>		<b>15</b>
<b>Second Semester</b>		
CCHE 232	Organic Chemistry	4
CCHE 232L	Organic Chemistry Lab	0
CCHE 232R	Organic Chemistry Recitation	0
CMAT 212 or CMAT 214	Differential Equations or Linear Algebra	3
Select one of the following:		4

CPHY 112 & 112L	General & Modern Physics II and Gen. & Modern Physics II Lab	
CPHY 123 & 123L	Physics III: Optics/Modern Phys and Physics III: Optics&Mod.PhyLab	
CCIS 253	Intro. to Comp. Sim/Analysis (Area E)	3
CBUS Business (Area E)		3
<b>Hours</b>		<b>17</b>

**Third Year****First Semester**

CCHE 211 & 211L	Analytical Chemistry I and Analytical Chemistry Lab	4
CCHE 341 & 341L	Physical Chemistry I and Physical Chemistry Lab	4
CCHE 381	Chemistry Seminar	0
Core Elective (Social/Behavioral Sciences) Area B		3
Free Elective (300 or 400 level)		3
CCHE 400	Undergraduate Research	1-3
<b>Hours</b>		<b>15-17</b>

**Second Semester**

CCHE 342	Physical Chemistry II	3
CCHE 382	Chemistry Seminar	1
Free Elective		3
Free Elective (300 or 400 level)		3
Core Elective (Hum, Soc/Beh Sci, or Comm) Area A or B or D or E		3
CCHE 400	Undergraduate Research	0-3
<b>Hours</b>		<b>13-16</b>

**Fourth Year****First Semester**

CCHE 421 & 421L	Advanced Inorganic Chemistry and	3
CCHE 431 & 431L	Advanced Organic Chemistry and Advanced Organic Chemistry Lab	4
CCHE 480	Special Topics in Chemistry	4
CCHE 400	Undergraduate Research	1-3
CCHE 481	Chemistry Seminar	0
Free Elective (300 or 400 level)		3
<b>Hours</b>		<b>15-17</b>

**Second Semester**

CCHE 412 & 412L	Instrumental Methods and Instrumentation Lab	4
CCHE 432 & 432L	Methods of Structure Determin and Methods of Structural Det Lab	4
CCHE 400	Undergraduate Research	1-3
CCHE 482	Chemistry Seminar	1
Free Elective (300 or 400 level)		3
Free Elective		3
<b>Hours</b>		<b>16-18</b>

<b>Total Hours</b>	<b>123-132</b>
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