

# BIOCHEMISTRY AND MOLECULAR BIOLOGY, B.S.

The Bachelor of Science with a major in biochemistry and molecular biology brings together the fields of biology, chemistry and biochemistry. Courses cover basic and advanced topics in these areas, preparing students for careers in medical or health sciences as well as future graduate studies or research on the intersection of the physical and life sciences. This degree is an ideal double major for many complementary areas of study, such as the sciences, mathematics, education and pre-health. Students gain a solid scientific foundation, written communication skills and understanding of computer programming relevant to the field.

## Learning Outcomes

1. Students will explain basic and advanced concepts in biology, chemistry, and biochemistry and apply them in problem solving.
2. Students will apply computer applications and information retrieval skills to experiments and data analysis. These skills are taught in CHEM 541L and CSCE 102.
3. Students will communicate effectively orally and in writing about biochemical concepts, problems, and solutions.

## Admissions

### Entrance Requirements

New freshmen who meet University admissions standards are eligible for admission to degree programs offered by the college. A student who wishes to enter the College of Arts and Sciences from another college on the Columbia campus must be in good standing and have a cumulative GPA of 2.00 or higher. A student who wishes to enter the College of Arts and Sciences from another USC campus must fulfill one of the following requirements:

1. Be in good standing, meet the admission requirements for a baccalaureate degree on the Columbia campus, and have a cumulative GPA of 2.00 or higher.
2. Be in good standing and have completed 30 semester hours with a GPA of 2.00 or higher on a USC campus.

Some programs in the College of Arts and Sciences have special admission requirements established by the department or committee that supervises the specific degree program, for example, Cardiovascular Technology, Biological Sciences, Chemistry, Biochemistry and Molecular Biology, Economics, Environmental Science, the Bachelor of Arts in Interdisciplinary Studies, and the Bachelor of Science in Interdisciplinary Studies. These requirements are listed in the sections of this bulletin that describe department and special degree programs.

## Degree Requirements (128 hours)

### Program of Study

Requirements	Credit Hours
1. Carolina Core Requirements	34-46
2. College Requirements	15-18
3. Program Requirements	3-16
4. Major Requirements	63-67

## Founding Documents Requirement

All undergraduate students must take a 3-credit course or its equivalent with a passing grade in the subject areas of History, Political Science, or African American Studies that covers the founding documents including the United State Constitution, the Declaration of Independence, the Emancipation Proclamation and one or more documents that are foundational to the African American Freedom struggle, and a minimum of five essays from the Federalist papers. This course may count as a requirement in any part of the program of study including the Carolina Core, the major, minor or cognate, or as a general elective. Courses that meet this requirement are listed here (<https://academicbulletins.sc.edu/undergraduate/founding-document-courses/>).

## 1. Carolina Core Requirements (34-46 hours)

### CMW – Effective, Engaged, and Persuasive Communication: Written (6 Hours)

*must be passed with a grade of C or higher.*

- any CC-CMW courses (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

### ARP – Analytical Reasoning and Problem Solving (8 hours)

*must be passed with a grade of C or higher*

- MATH 141\*
- MATH 142\*

### SCI – Scientific Literacy (8 hours)

*must be passed with a grade of C or higher*

- PHYS 211\* & PHYS 211L\*
- PHYS 212\* & PHYS 212L\*

### GFL – Global Citizenship and Multicultural Understanding: Foreign Language (0-6 hours)

Demonstration of proficiency in one foreign language equivalent to the minimal passing grade on the exit examination in the 122 course is required. Students can demonstrate this proficiency by successfully completing Phase II of the Proficiency Test or by successfully completing the 122 course, including the exit exam administered as part of that course. It is recommended that students complete the foreign language requirement with French, German, Japanese, Russian, or Spanish.

- CC-GFL courses (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

*It is strongly recommended that students continuing the study of a foreign language begin college-level study of that language in their first semester and continue in that language until their particular foreign language requirement is completed.*

### GHS – Global Citizenship and Multicultural Understanding: Historical Thinking (3 hours)

- any CC-GHS course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

## GSS – Global Citizenship and Multicultural Understanding: Social Sciences (3 hours)

- any CC-GSS course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

## AIU – Aesthetic and Interpretive Understanding (3 hours)

- any CC-AIU course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

## CMS – Effective, Engaged, and Persuasive Communication: Spoken Component <sup>1</sup> (0-3 hours)

- any overlay or stand-alone CC-CMS course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

## INF – Information Literacy <sup>1</sup> (0-3 hours)

- any overlay or stand-alone CC-INF course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

## VSR – Values, Ethics, and Social Responsibility <sup>1</sup> (0-3 hours)

- any overlay or stand-alone CC-VSR course (<https://academicbulletins.sc.edu/undergraduate/carolina-core-courses/>)

<sup>1</sup> **Carolina Core Stand Alone or Overlay Eligible Requirements** – Overlay-approved courses offer students the option of meeting two Carolina Core components in a single course. A maximum of two overlays is allowed. The total Carolina Core credit hours must add up to a minimum of 31 hours. Some programs may have a higher number of minimum Carolina Core hours due to specified requirements.

## 2. College Requirements (15-18 hours)

### Foreign Language (0-3 hours)

- only if needed to meet 122-level proficiency

### Analytical Reasoning (6 hours)

Course	Title	Credits
CSCE 102	General Applications Programming (*)	3
STAT 201	Elementary Statistics (*)	3
<b>Total Credit Hours</b>		<b>6</b>

### History (3 hours)

The College of Arts and Sciences requires one additional GHS course beyond the Carolina Core GHS requirement.

- If the Carolina Core GHS requirement is fulfilled by a **U.S. history** course, the College of Arts and Sciences history requirement must be fulfilled by a **non-U.S. history** course.
- If the Carolina Core GHS requirement is fulfilled by a **non-U.S. history** course, the College of Arts and Sciences history requirement must be fulfilled by a **U.S. history** course.

Please select the College of Arts and Sciences history requirement from the approved list of U.S. and non-U.S. history courses (<https://academicbulletins.sc.edu/undergraduate/arts-sciences/history-requirement/>).

## Social Science and Fine Arts or Humanities (6 hours)

- Social Science (3 hours)**
  - The College of Arts and Science requires one 3- hour Social Science Course (<https://academicbulletins.sc.edu/undergraduate/arts-sciences/courses-acceptable-social-science/>)
- Fine Arts/Humanities (3 Hours)**
  - A Bachelor of Science from the College of Arts and Sciences requires one 3-hour Fine Arts/Humanities Course (<https://academicbulletins.sc.edu/undergraduate/arts-sciences/courses-acceptable-fine-arts-humanities/>)

## 3. Program Requirements (3-16 hours)

### Supporting Courses (3 hours)

*must be passed with a grade of C or higher*

- MATH 241\*

### Cognate or Minor (0-18 hours)

This major does not require a cognate or minor.

An optional minor may be added to a student's program of study. A minor is intended to develop a coherent basic preparation in a second area of study. Courses applied toward general education requirements cannot be counted toward the minor. No course may satisfy both major and minor requirements. All minor courses must be passed with a grade of C or higher. At least half of the courses in the minor must be completed in residence at the University. A list of minor programs of study can be found at Programs A-Z. An optional additional major may also be added to a student's program of study. **Additional majors must include all major courses as well as any prescribed courses noted (\*) in the bulletin.** Prescribed courses noted in the bulletin may be shared with Carolina Core, College requirements, and Program requirements in the primary program.

A list of minor programs of study can be found at Programs A-Z (<https://academicbulletins.sc.edu/undergraduate/programs-az/>).

### Electives (0-13 hours)

**The Biochemistry and Molecular Biology Major requires electives only if needed to meet 128 credit hours.**

120 (or 128) degree applicable credits are required to complete any degree at UofSC. After the cognate, minor or second major is complete, any additional credits needed to reach 120 (or 128) total credits can be fulfilled by electives. No courses of a remedial, developmental, skill-acquiring, or vocational nature may apply as credit toward degrees in the College of Arts and Sciences. The College of Arts and Sciences allows the use of the Pass-Fail option on elective courses. Further clarification on inapplicable courses can be obtained from the College of Arts and Sciences.

## 4. Major Requirements (63-67 hours)

*a minimum grade of C is required in all major courses*

### Major Courses (54 hours)

Course	Title	Credits
BIOL 101	Biological Principles I	3
BIOL 101L	Biological Principles I Laboratory	1
BIOL 102	Biological Principles II	3

BIOL 102L	Biological Principles II Laboratory	1
BIOL 302	Cell and Molecular Biology	3
BIOL 302L	Cell and Molecular Biology Laboratory	1
BIOL 303	Fundamental Genetics	3
BIOL 550	Bacteriology	3
BIOL 550L	Bacteriology Laboratory	1
CHEM 141	Principles of Chemistry I	4
CHEM 142	Principles of Chemistry II	4
CHEM 322	Analytical Chemistry	3
CHEM 322L	Analytical Chemistry Laboratory	1
CHEM 333	Organic Chemistry I	3
CHEM 331L	Essentials of Organic Chemistry Laboratory I	1
CHEM 334	Organic Chemistry II	3
CHEM 332L	Essentials of Organic Chemistry Laboratory II	1
CHEM 541	Physical Chemistry	3
CHEM 541L	Physical Chemistry Laboratory	2
CHEM 545	Physical Biochemistry	3
CHEM 555	Biochemistry/Molecular Biology I	3
or BIOL 545	Biochemistry/Molecular Biology I	
CHEM 556	Biochemistry/Molecular Biology II	3
or BIOL 546	Biochemistry/Molecular Biology II	
CHEM 550L	Biochemistry Laboratory	1
or BIOL 541L	Biochemistry Laboratory	
<b>Total Credit Hours</b>		<b>54</b>

Note: Students transferring in to the major can substitute CHEM 111/CHEM 111L (or transfer equivalent) for CHEM 141 and CHEM 112/CHEM 112L (or transfer equivalent) for CHEM 142.

### Major Electives (9 hours)

Select 9 hours from 400-600 level electives in Biology or Chemistry.

Note: No more than 3 credits of research (BIOL 399 or CHEM 496) can be used to satisfy the elective requirement.

### American Chemical Society Certification Concentration (13 hours)

#### *Optional*

Students may choose to complete the American Chemical Society Certification Concentration in place of the Major Electives for an additional 4 credit hours and a total of 67 major requirements hours.

Course	Title	Credits
CHEM 511	Inorganic Chemistry	3
CHEM 621	Instrumental Analysis	3
CHEM 621L	Instrumental Analysis Lab	1
Select 6 hours of the following:		6
CHEM 496	Undergraduate Research	
CHEM 497	Undergraduate Research	
CHEM 498	Undergraduate Research	
CHEM 499	Undergraduate Research	

**Total Credit Hours** **13**

## Major Map

A major map is a layout of required courses in a given program of study, including critical courses and suggested course sequences to ensure a clear path to graduation.

Major maps are only a suggested or recommended sequence of courses required in a program of study. Please contact your academic advisor for assistance in the application of specific coursework to a program of study and course selection and planning for upcoming semesters.

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