BIOCHEMISTRY AND MOLECULAR BIOLOGY, B.S.

Learning Outcomes

- Students will explain basic and advanced concepts in biology, chemistry, and biochemistry and apply them in problem solving.
- Students will apply computer applications and information retrieval skills to experiments and data analysis. These skills are taught in CHEM 541L and CSCE 102.
- 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 UofSC 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 UofSC 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

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 [1] (0-3 hours)

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

INF – Information Literacy [1] (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 [1] (0-3 hours)

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

[1] **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
Total Credit Hours		**6**

History (3 hours)

The College of Arts and Sciences requires one U.S. History and one non-U.S. History course. Whichever is not fulfilled through the Carolina Core GHS requirement must be fulfilled through this college requirement. Accordingly, please select one of the following:

- One Carolina CoreGHS-approved courseprimarily focused on U.S. History: HIST 111, HIST 112, HIST 214, or another GHS-approved course determined by the College of Arts and Science to fit this geographic category.

or

- One Carolina Core GHS-approved course primarily focused on non-U.S. History: HIST 101, HIST 102, HIST 104, HIST 105, HIST 106, HIST 108, HIST 109, GERM 280, FAMS 300, or another GHS-approved course determined by the College of Arts and Sciences to fit this geographic category.

Social Science and Fine Arts or Humanities (6 hours)

- Courses Acceptable for Social Science and Fine Arts or Humanities Credit in Degree Programs in the College of Arts and Sciences (https://academicbulletins.sc.edu/undergraduate/arts-sciences/courses-acceptable-social-science-fine-arts-humanities/)
  - **Three** hours of Social Science
  - **Three** hours of Fine Arts or Humanities

3. Program Requirements (3-16 hours)

Supporting Courses (3 hours)

must be passed with a grade of C or higher

- MATH 241

Cognate (12 hours) *optional*

The Biochemistry and Molecular Biology Major does not require a Cognate or a Minor. If either is selected, it must meet the College of Arts and Sciences requirements as listed below.

The cognate is intended to support the course work in the major. The cognate must consist of twelve (12) hours of courses at the advanced level, outside of but related to the major. The cognate may be taken in one or more departments or programs, depending on the interests of the student and the judgment of the advisor.

Courses offered by departments and programs that are acceptable for cognate credit are outlined in the section titled Courses Acceptable for Cognate Credit in Degree Programs in the College of Arts and Sciences (https://academicbulletins.sc.edu/undergraduate/arts-sciences/courses-acceptable-cognate/).

For cognate course offerings in other colleges, consult the appropriate sections of this bulletin. Some major programs have specific cognate requirements.

It should be emphasized that the cognate is not a second set of elective courses to be chosen at random by the student. The cognate must be approved by the major advisor as being related to the major field of study. Students are urged to consult their major advisors for specific requirements in their major.

Courses applied toward general education requirements cannot be counted toward the cognate.

For Bachelor of Science degrees, grades of D are acceptable for completion of the cognate requirement, except where restricted by the major program.

Minor (18 hours) *optional*

The Biochemistry and Molecular Biology Major does not require a Minor. If one is selected, it must meet the College of Arts and Sciences requirements as listed below.

In place of the cognate a student in the College of Arts and Sciences may choose a minor consisting of at least 18 credit hours of prescribed courses. (Some minors in the sciences require a minimum of 16 hours.) The subject area of the minor may be related to the major.

Students pursuing interdisciplinary minors who wish to use courses in their major department for minor credit must petition the College Committee on Scholastic Standards and Petitions for permission to do so.

The minor is intended to develop a coherent basic preparation in a second area of study. It differs from the cognate inasmuch as the courses must be concentrated in one area and must follow a structured sequence. Interdisciplinary minors can be designed with the approval of the assistant dean for academic affairs and advising.

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.

Minors are available in participating departments of the College of Arts and Sciences and in other colleges. For descriptions of specific minors, students should see the appropriate sections of the bulletin.

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.

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 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	
Total Credit Hours		**54**

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.

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.

Biochemistry & Molecular Biology, B.S. (https://sc.edu/about/offices_and_divisions/advising/documents/major_maps/2021-2022/2021_biochem-mol-bio_map.pdf)