

BIOCHEMISTRY, B.S.

Overview

Students who major in chemistry or biochemistry begin their program with a laboratory-oriented introduction to the underlying principles of the discipline. This is followed by an in-depth study of the chemistry elements, compounds of carbon and other elements. Upper-level coursework includes physical chemistry, quantum and computational chemistry, biochemistry, quantitative and instrumental methods with emphasis on laboratory techniques, data analysis, and chemical information literacy. Oral and written technical communication skills development is an integral part of all courses with a capstone senior seminar presented by the students to the faculty members and students of the department. Students may also choose to participate in independent research projects with the professors.

To continue as a chemistry or biochemistry major, a student must maintain a cumulative GPA of 2.5 at the completion of 16 credits of freshman and sophomore chemistry courses.

All chemistry and biochemistry majors are required to attend departmental seminars.

All majors pursuing the chemistry or biochemistry degree are required to take the ETS Major Field Achievement Test in Chemistry, administered in CH420 Chemistry/Biochemistry Seminar, before graduation.

Learning Outcomes

Chemistry and Biochemistry

Upon successful completion of the program of studies for Chemistry or Biochemistry the student will receive a B.S. in Chemistry or a B.S. in Biochemistry and will have given evidence of the following outcomes and goals:

- Students will demonstrate knowledge and application of fundamental concepts and the theories of chemistry in five key areas of chemistry, including physical, organic, inorganic, analytical chemistry, and biochemistry through course exams, American Chemical Society standardized subject exams, and the Major Field Test in Chemistry.
- Students will be given the opportunity to develop skills related to effective communication, including both technical writing and oral presentations.
- Students will be given the opportunity to develop laboratory skills needed to confidently function in a laboratory environment, including proper use of basic scientific instrumentation and equipment such as balances, chemical glassware, pH meters, and UV-VIS spectrometers necessary to collect experimental data to evaluate substances and monitor chemical reactions. Students will demonstrate understanding of the safe handling and disposal of chemicals and hazardous materials.
- Students will be given the opportunity to enhance their problem solving skills via real and scenario-based scientific data analysis and interpretation. Upon successful completion of this program, students will be prepared to evaluate experimental data, identify, and clearly state predictions that logically flow from a hypothesis and able to propose how such predictions could be tested and/or validated.

Requirements

To earn this degree, students must successfully complete at least 120 credits, including General Education (<https://catalog.georgian.edu/undergraduate/academic-programs/bridge-general-education-program-requirements/>) requirements and the major requirements below.

Major Sequence

Code **Title** **Credits**

A minimum of 42 biochemistry credits, plus courses in related areas, including:

Biochemistry Courses		
CH113	General Chemistry I	4.0
CH114	General Chemistry II	4.0
CH223	Organic Chemistry I	4.0
CH224	Organic Chemistry II	4.0
CH241	Quant. Analysis	4.0
CH304	Chemical Literature	2.0
CH311	Biochemistry I	4.0
CH312	Biochemistry II	4.0
CH331	Quantum Chemistry	4.0
CH332	Reaction Dynamics	4.0
CH416	Topics in Chemistry/Biochemistry	3.0
CH420	Chemistry/Biochemistry Seminar	1.0

Related Courses		
BI121	Cellular Organiz., Energetics & Function	4.0
BI204	Genetics & Evolution	4.0
Select one of the following:		
BI219	Microbiology	4.0
BI320	Cell Biology	4.0
BI422	Advanced Molecular Genetics	4.0
PH121	University Physics I	4.0
PH122	University Physics II	4.0
MA115	Calculus I	4.0
MA116	Calculus II	4.0
Strongly recommended additional courses:		
CH334	Inorganic Chemistry	4.0
CH402	Instrumental Analysis	4.0

Total Credits **70.0**

Degree Map(s)

Course	Title	Credits
First Year		
Fall Semester		
GEN101	Pathway to the Bridge ¹	2.0
EN111 or EN221	Writing, Research, and Digital Literacy ¹ or HNRS: Rhetoric, Research & Digital Lit	3.0
Creative Thinking & Expression ¹		3.0
MA115	Calculus I ^{1,2}	4.0
CH113	General Chemistry I ²	4.0
Credits		16.0
Spring Semester		
GEN199	WI: Discovering Self in the Universe ¹	3.0

Critical Reading & Analysis ¹	3.0
Intercultural Understanding & Intercultural Communication ¹	3.0
CH114 General Chemistry II ²	4.0
MA116 Calculus II ²	4.0

Credits **17.0**

Second Year**Fall Semester**

CH223 Organic Chemistry I ²	4.0
CH241 Quant. Analysis ²	4.0
BI121 Cellular Organiz., Energetics & Function ²	4.0
Elective	3.0

Credits **15.0**

Spring Semester

Understanding Human Behavior & Social Systems ¹	3.0
CH224 Organic Chemistry II ²	4.0
BI204 Genetics & Evolution ²	4.0
Elective	3.0

Credits **14.0**

Third Year**Fall Semester**

Select one of the following ¹ 3.0

Religious Studies

Power & Society

Ethics

CH304 Chemical Literature ² 2.0

CH311 Biochemistry I ² 4.0

PH121 University Physics I ^{1,2} 4.0

Elective 3.0

Credits **16.0**

Spring Semester

Select two of the following: ¹ 6.0

Religious Studies

Power & Society

Ethics

GEN400 WI: Visioning a Future

CH312 Biochemistry II ² 4.0

PH122 University Physics II ² 4.0

Credits **14.0**

Fourth Year**Fall Semester**

Select one of the following: ¹ 3.0

Religious Studies

Power & Society

Ethics

GEN400 WI: Visioning a Future

CH331 Quantum Chemistry ² 4.0

Select one of the following: ² 4.0

BI219 Microbiology

BI320 Cell Biology

BI422 Advanced Molecular Genetics

Elective 3.0

Credits **14.0**

Spring Semester

CH332 Reaction Dynamics ² 4.0

CH416 Topics in Chemistry/Biochemistry ² 3.0

CH420 Chemistry/Biochemistry Seminar ² 1.0

Elective 3.0

Elective 3.0

Credits **14.0**

Total Credits **120.0**

¹ General Education

² Major