

CHEMISTRY, 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.

Students participating in the accelerated B.S. Chemistry + Seton Hall University M.S. Chemistry program can earn their GCU bachelor's degree in just seven semesters. See Department page above (<https://catalog.georgian.edu/undergraduate/school-arts-sciences/biology/>) and B.S. Chemistry degree map for more information.

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

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

Code	Title	Credits
Chemistry 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
CH331	Quantum Chemistry	4.0
CH332	Reaction Dynamics	4.0
CH334	Inorganic Chemistry	4.0
CH402	Instrumental Analysis	4.0
CH416	Topics in Chemistry/Biochemistry	3.0
CH420	Chemistry/Biochemistry Seminar	1.0
Related Courses		
PH121	University Physics I	4.0
PH122	University Physics II	4.0
MA115	Calculus I	4.0
MA116	Calculus II	4.0
Strongly Recommended		
MA215	Calculus III	
Total Credits		58.0

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
PH121	University Physics I ^{1,2}	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
PH122	University Physics II 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
CH331	Quantum Chemistry ²	4.0
Elective		3.0
Elective		3.0
Credits		15.0

Spring Semester

Select two of the following: ¹		6.0
Religious Studies		
Power & Society		
Ethics		
GEN400	WI: Visioning a Future	
CH332	Reaction Dynamics ²	4.0
Elective		3.0
Elective		3.0
Credits		16.0

Fourth Year**Fall Semester**

Select one of the following: ¹		3.0
Religious Studies		
Power & Society		
Ethics		
GEN400	WI: Visioning a Future ¹	
CH334	Inorganic Chemistry ²	4.0
Elective		3.0
Elective		3.0
Credits		13.0

Spring Semester

CH402	Instrumental Analysis ²	4.0
CH416	Topics in Chemistry/Biochemistry ²	3.0
CH420	Chemistry/Biochemistry Seminar ²	1.0
Elective		3.0

Elective		4.0
Credits		15.0
Total Credits		121.0

¹ General Education² Major**Accelerated B.S. Chemistry + Seton Hall University M.S. Chemistry (degree map is for GCU degree only)**

Course	Title	Credits
First Year		
Fall Semester		
GEN101	Pathway to the Bridge ¹	2.0
EN111	Writing, Research, and Digital Literacy ¹	3.0
or EN221	or HNRS: Rhetoric, Research & Digital Lit	
	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 Communications ¹	3.0
CH114	General Chemistry II ²	4.0
MA116	Calculus II ²	4.0
Credits		17.0

Second Year**Fall Semester**

Understanding Human Behavior & Social Systems ¹		3.0
CH223	Organic Chemistry I ²	4.0
CH241	Quant. Analysis ²	4.0
PH121	University Physics I ^{1,2}	4.0
Elective		3.0
Credits		18.0

Spring Semester

CH224	Organic Chemistry II ²	4.0
CH334	Inorganic Chemistry ²	4.0
PH122	University Physics II ²	4.0
Elective		3.0
Elective		3.0
Credits		18.0

Third Year**Fall Semester**

Select two of the following: ¹		6.0
Religious Studies		
Power & Society		
Ethics		
CH304	Chemical Literature ²	2.0
CH331	Quantum Chemistry ²	4.0
Elective		3.0
Elective		3.0
Credits		18.0

Spring Semester

Select two of the following: ¹		6.0
Religious Studies		
Power & Society		
Ethics		
GEN400	WI:Visioning a Future	
CH332	Reaction Dynamics ²	4.0
Elective		3.0
Elective		3.0
Credits		16.0

Fourth Year**Fall Semester**

CH402	Instrumental Analysis ²	4.0
CH416	Topics in Chemistry/Biochemistry ²	3.0
CH420	Chemistry/Biochemistry Seminar ²	1.0
Elective		3.0
Elective		3.0
Elective		3.0
Credits		17.0
Total Credits		120.0

¹ General Education² Major