

BACHELOR OF SCIENCE IN BIOCHEMISTRY

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Biochemistry majors apply the principles of chemistry and physics to living systems. Students gain foundational knowledge about the properties and reactions of inorganic, organic and biological compounds. Lab courses enable you to carry out syntheses and analyze complex materials. You will use a sophisticated array of analytical instruments, which include a variety of spectrophotometers and chromatographic systems, to help build confidence in your ability to solve complex problems in the field. You can individualize your experience by taking chemistry and biology electives in specialized areas or pursue a minor to meet your career goals.

Because of our small class sizes and highly accessible faculty, you'll get plenty of support and the personal attention you need. An independent research project strengthens the skills you develop in the classroom. Students are encouraged to pursue real-life work experience in the form of internships. You will evaluate and interpret data, hone your analytical thinking skills and present the results of your own scientific research to various audiences.

Your degree in biochemistry provides the foundation to pursue an advanced degree in a specific area of the physical or life sciences or in other fields including medicine, pharmacy, veterinary medicine or law. After graduation, you will be prepared to work as a laboratory or research assistant in an academic, governmental, pharmaceutical or industrial laboratory.

The curriculum in this degree program can fulfill the science prerequisites for most professional schools. Students should refer to Pre-Medical Studies (<http://catalog.qu.edu/academics/premedical-studies/>) for more information about the pre-medical studies program and contact the Health Professions Advisory Committee for further academic advising.

Initial placement in English and mathematics courses is determined by placement examinations and an evaluation of high school units presented. Students who do not place directly into MA 141 or MA 151 should take MA 140. MA 153 and MA 154 are strongly recommended.

Biochemistry majors must maintain a minimum grade of C- in all required chemistry, physics, biology and mathematics courses. Any required course not listed in the course descriptions may be considered for scheduling when the need arises. All 4-credit science courses have a laboratory component. Chemistry and biology electives must be selected with the advice and approval of the department adviser. Open electives should be selected based upon student interests and career goals from offerings in all schools.

Students majoring in biochemistry must complete the following requirements:

Code	Title	Credits
University Curriculum ¹		46
Modern Language Requirement		3-6
Biochemistry Core Requirements		
CHE 110 & 110L	General Chemistry I and General Chemistry I Lab	4

CHE 111 & 111L	General Chemistry II and General Chemistry II Lab	4
CHE 210 & 210L	Organic Chemistry I and Organic Chemistry I Lab	4
CHE 211 & 211L	Organic Chemistry II and Organic Chemistry II Lab	4
CHE 215 & 215L	Analytical Chemistry and Analytical Chemistry Lab	4
CHE 301 & 301L	Physical Chemistry I and Physical Chemistry I Lab	4
CHE 302 & 302L	Physical Chemistry II and Physical Chemistry II Lab	4
CHE 305 & 305L	Instrumental Analysis and Instrumental Analysis Lab	4
CHE 315 & 315L	Biochemistry I and Biochemistry I Lab	4
CHE 316	Biochemistry II	3
CHE 420	Chemistry Integrative Capstone	3
CHE 475	Chemistry Seminar I	1
CHE 476	Chemistry Seminar II	1
CHE 490	Chemistry Research I	3
CHE 491	Chemistry Research II	3
Upper-level CHE elective course ²		3
Two upper-level BIO or BMS electives ³		6
Cognate Courses ⁴		
MA 141	Calculus of a Single Variable ^{4,5}	3
PHY 110 & 110L	General Physics I and General Physics I Lab ^{4,6}	4
PHY 111 & 111L	General Physics II and General Physics II Lab ^{4,6}	4
BIO 150 & 150L	General Biology for Majors and General Biology for Majors Laboratory	4
BIO 151 & 151L	Molecular and Cell Biology and Genetics and Molecular and Cell Biology and Genetics Lab	4
Open Electives ⁷		
Total Credits		120

1

All students must complete the University Curriculum (<http://catalog.qu.edu/academics/university-curriculum/>) requirements.

2

Typically CHE 300 (offerings vary).

3

Advanced biology electives for the biochemistry major are chosen in consultation with the departmental adviser.

4

Required courses, which support the biochemistry major and may be used to satisfy requirements outside the major.

5

MA 151 may be substituted for MA 141. MA 153 and MA 154 are also highly recommended but not required.

6

PHY 121 and PHY 122 may be substituted.

7

Students take open electives to fulfill the minimum number of credits for graduation. Number of credits may vary depending on foreign language and math placement scores. Some cognate course credits may apply toward the University Curriculum.

Minimum number of credits required for graduation is 120.

Upon completion of the biochemistry degree program, students will demonstrate the following competencies:

- 1. Disciplinary Knowledge:** Develop a broad knowledge base of chemical principles in the areas of general, organic, analytical, physical and biochemistry along with cognate knowledge in the areas of biology, physics and mathematics.
- 2. Laboratory Skills:** Develop relevant knowledge and hands-on skills to be able to work safely and independently in a chemistry laboratory setting to collect, record and evaluate experimental data including the utilization of both classical and instrumental techniques.
- 3. Scientific Information Literacy:** Conduct relevant field-specific searches of scientific databases to locate research articles related to a topic or problem and gain experience in reading, interpreting and discussing research literature in the field.
- 4. Research Experience:** Apply acquired knowledge and skills to investigate problems by working on independent mentored project(s) through a senior research project, independent research, internship(s) and/or summer research study.
- 5. Critical Thinking and Problem Solving:** Apply knowledge and skills to solve increasingly complex conceptual and quantitative problems in the field.
- 6. Scientific Communication:** Demonstrate competency in oral and written expression of the results of their laboratory work through written lab reports, poster presentations and seminar presentations.
- 7. Career Advancement:** Be competitive for employment in an entry-level field-related position or acceptance into a graduate or professional degree program.

Admission Requirements: College of Arts and Sciences

The requirements for admission into the undergraduate College of Arts and Sciences programs are the same as those for admission to Quinnipiac University.

Admission to the university is competitive, and applicants are expected to present a strong college prep program in high school. Prospective first-year students are strongly encouraged to file an application as early in the senior year as possible, and arrange to have first quarter grades sent from their high school counselor as soon as they are available.

For detailed admission requirements, including required documents, please visit the Admissions (<http://catalog.qu.edu/general-information/admissions/>) page of this catalog.

Seamless Transfer Agreement with Gateway Community College (GCC), Housatonic Community College (HCC) and Norwalk Community College (NCC)

Under this Transfer Agreement, GCC, HCC and NCC graduates will be guaranteed admission into a bachelor's degree program with third year (junior) status at Quinnipiac University on the condition that they:

- Graduate with an associate in arts, an associate in science in business, College of Technology engineering science, nursing or an allied health degree with a minimum cumulative GPA of 3.00 (this may be higher in specific programs).
- Satisfy all other Quinnipiac University transfer admission requirements and requirements for intended major.

Quinnipiac University agrees to accept the general education embedded in these associate degree programs in accordance with Quinnipiac preferred choices for general education as meeting all the requirements of its undergraduate general education except for the Integrative Capstone Experience and where courses are encumbered by the major (e.g., General Chemistry for the Disciplinary Inquiry Natural Science requirement for a Biochemistry major).

Suggested Transfer Curriculum for BS in Biochemistry

A minimum of 60 credits is required for transfer into the BS in Biochemistry program, and the following courses must be completed: general chemistry 1 and 2, organic chemistry 1 and 2, general biology 1 and physics 1. Below is a recommended plan of study for the first two years prior to matriculation at Quinnipiac University.

Course	Title	Credits
First Year		
Fall Semester		
English I		3
Pre-Calculus		4
General Chemistry I		4
Elective		3
Credits		14
Spring Semester		
English II		3
Calculus I		4
General Chemistry II		4
General Biology I		4
Credits		15
Second Year		
Fall Semester		
Organic Chemistry I		4
Physics I		4
Microbiology		4
Elective		3
Credits		15
Spring Semester		
Organic Chemistry II		4
Elective		3
Elective		3
Elective		3
Elective		3
Credits		16
Total Credits		60

Shown below is one of many possible paths through the curriculum. Each student's individual academic plan is crafted in consultation with their academic adviser.

Code	Title	Credits
First Year		
Milestones: Earn 30 credits, meet with your adviser at least once a semester and have a GPA of 2.00 or higher.		
Fall Semester		
BIO 150 & 150L	General Biology for Majors and General Biology for Majors Laboratory	4
CHE 110	General Chemistry I	3
EN 101	Introduction to Academic Reading and Writing	3
FYS 101	First-Year Seminar	3
MA 140	Pre-Calculus	3
Spring Semester		
BIO 151 & 151L	Molecular and Cell Biology and Genetics and Molecular and Cell Biology and Genetics Lab	4
CHE 111 & 111L	General Chemistry II and General Chemistry II Lab	4
EN 102	Academic Writing and Research	3
MA 141	Calculus of a Single Variable	3
CHE 110L	General Chemistry I Lab	1
Second Year		
Milestones: Earn 60 credits and a GPA of 2.00 or higher. Meet with your adviser at least once per semester to discuss academic, experiential learning, career and co-curricular opportunities.		
Fall Semester		
CHE 210 & 210L	Organic Chemistry I and Organic Chemistry I Lab	4
PHY 110 & 110L	General Physics I and General Physics I Lab	4
Advanced Biology or Biomedical Science elective		4
Foreign Language at the 101 level		3
Spring Semester		
CHE 211 & 211L	Organic Chemistry II and Organic Chemistry II Lab	4
PHY 111 & 111L	General Physics II and General Physics II Lab	4
Foreign Language at the 102 level (Satisfies CAS Language Requirement)		3
University Curriculum course		3
Open Elective		1
Third Year		
Milestones: Earn 90 credits and a GPA of 2.00 or higher. Meet with your adviser at least once per semester. Participate in study abroad, complete internship or research opportunities.		
Fall Semester		

CHE 301 & 301L	Physical Chemistry I and Physical Chemistry I Lab	4
CHE 315 & 315L	Biochemistry I and Biochemistry I Lab	4
Advanced Biology or Biomedical Science elective		4
Open Electives		3
Spring Semester		
CHE 302 & 302L	Physical Chemistry II and Physical Chemistry II Lab	4
CHE 316	Biochemistry II	3
University Curriculum course		3
University Curriculum		3
Open Electives		3
Fourth Year		
Milestones: Earn 120 credits and a GPA of 2.00 or higher. Complete possible minor or double major and prepare for graduation.		
Fall Semester		
CHE 215 & 215L	Analytical Chemistry and Analytical Chemistry Lab	4
CHE 475	Chemistry Seminar I	1
CHE 490	Chemistry Research I	3
Advanced Chemistry elective		3
University Curriculum course		3
Spring Semester		
CHE 476	Chemistry Seminar II	1
CHE 491	Chemistry Research II	3
CHE 420	Chemistry Integrative Capstone	3
CHE 305 & 305L	Instrumental Analysis and Instrumental Analysis Lab	4
Open Elective		3
Total Credits		120