

CHEMISTRY AND BIOCHEMISTRY

Requirements for Chemistry & Biochemistry Majors

The department offers three options for degrees in Chemistry & Biochemistry: Bachelor of Science (B.S.) programs in Chemistry and in Biochemistry that provide a rigorous course of study in preparation for professional careers, graduate work in chemistry/biochemistry or related fields, or professional schools (medical, dental, pharmacology, veterinary); and a Bachelor of Arts (B.A.) program in Chemistry for students intending to pursue fields such as dentistry, medicine, secondary school teaching or other areas requiring a strong chemistry background. Earning a B.A. degree does not preclude a professional scientific career, although an additional year of undergraduate study may be required for admission to some graduate programs. The department also offers a minor in Chemistry.

Our program requires courses at the introductory (100), intermediate (200 and 300), and advanced (400) levels. We expect that majors will complete the required 300-level courses by the end of their junior year. The Department of Chemistry and Biochemistry recommends strongly that students earn a C or better in each of the core courses, CHEM 131 - Atoms and Molecules: Structure and Dynamics, CHEM 132 - Organic Structure and Reactivity, CHEM 251 - Intermediate Organic Chemistry and CHEM 258 - Intermediate Biochemistry, before proceeding to 300-level courses. 400-level courses, to be counted toward the major, need to be taken after the prerequisites. Any request to waive this requirement must come prior to taking the course. We strongly encourage all majors to have an advisor in the department.

Students pursuing any of the three majors are required to complete the following nine common courses plus the additional courses listed for each program:

Code	Title
Two introductory courses in the principles of chemistry:	
CHEM 131	Atoms and Molecules: Structure and Dynamics
CHEM 132	Organic Structure and Reactivity
Three required intermediate courses:	
CHEM 251	Intermediate Organic Chemistry
CHEM 258	Intermediate Biochemistry
CHEM 343	Intermediate Physical Chemistry
The following four additional science courses:	
BIOL 210	Molecular Biology and Unicellular Life
MATH 135	Single Variable Calculus
MATH 145	Multi-variable Calculus
PHYS 121	General Physics I

All Chemistry and Biochemistry majors must also satisfactorily complete two zero-credit courses used for program assessment CHEM 300 - Chemistry & Biochemistry Assessment I and CHEM 400 - Chemistry & Biochemistry Assessment II.

BA in Chemistry

A student may graduate with a B.A. degree in Chemistry on fulfillment of G.E. requirements and the successful completion of the following 12 courses:

- The nine common courses listed above
- One additional 300-level intermediate course
- One additional four-credit 400-level CHEM course¹
- One additional four-credit 300 or 400 level CHEM course¹

note: 1) CHEM 451 or 452 will not satisfy this requirement

BS in Chemistry

A student may graduate with a B.S. degree in Chemistry on fulfillment of G.E. requirements and the successful completion of the following 16 courses:

Code	Title
The nine common courses listed above	
CHEM 317	Intermediate Inorganic Chemistry
CHEM 331	Intermediate Analytical Chemistry
One additional four-credit 300 or 400-level CHEM course	
Three additional four-credit 400-level CHEM courses	
PHYS 122	General Physics II

Note: In order to complete the required courses for a B.S. in Chemistry, students must start CHEM 131 in the first semester of their first year.

BS in Biochemistry

A student may graduate with a B.S. degree in Biochemistry on fulfillment of G.E. requirements and the successful completion of the following 17 courses:

Code	Title
The nine common courses listed above	
CHEM 331	Intermediate Analytical Chemistry
Five additional 300 and 400-level CHEM or BIOL courses: one of these must be a 300 or 400-level biology class, and one of these must be a 400-level chemistry/biochemistry class taken in the senior year (CHEM 451 or 452 will not satisfy this requirement) ¹	
BIOL 220	Multicellular Life
PHYS 122	General Physics II

¹ (All advanced courses in Biology have prerequisite courses that a student majoring in Biochemistry may not have completed. Students must either obtain the appropriate prerequisite courses or obtain the permission of the instructor before registering for these advanced Biology courses.)

The Minor in Chemistry

A student may graduate with a minor in chemistry on successful completion of the following 6 courses, taken at Denison:

Code	Title
Two introductory courses in the principles of chemistry:	
CHEM 131	Atoms and Molecules: Structure and Dynamics

CHEM 132	Organic Structure and Reactivity
Two required intermediate courses	
CHEM 251	Intermediate Organic Chemistry
CHEM 258	Intermediate Biochemistry
Two additional 300 or 400-level CHEM courses	

Research and ACS Certification

For students pursuing the B.S. degree in either Chemistry or Biochemistry, two semesters of Senior Research (or a summer research experience at Denison followed by one semester of Senior Research in the same laboratory) may be counted as one of the 400-level electives.

The B.S. Chemistry major who takes two semesters of Senior Research as part of the degree requirements will earn a degree certified to the American Chemical Society. The B.S. Biochemistry major who takes CHEM 317 - Intermediate Inorganic Chemistry, two semesters of Senior Research and three additional 400-level CHEM courses as part of the degree requirements will earn a degree certified to the American Chemical Society.

Majors are encouraged to participate in the various on-going research projects in the department. Additional research opportunities are available in the department during the summer and as part of the Oak Ridge Science Semester (https://www.acm.edu/programs/15/oakridge/?utm_source=%2foakridge&utm_medium=web&utm_campaign=redirect).

Additional Points of Interest

Students interested in teaching should consult with faculty in the Department of Education. Faculty and staff in the Department of Education assist students in creating individually designed plans for obtaining licensure through a range of programs after graduation. Students interested in pursuing a B.A. degree in Chemistry before pursuing a teaching career are strongly encouraged to take all three 300-level Chemistry course options (as described below).

The Chemistry courses listed above must be taken at Denison with the following exception: the Department of Chemistry and Biochemistry recognizes the valuable contribution that off-campus study can provide to a broad liberal arts education, so one course in the major at the 300-level or higher may be taken at another institution, providing that prior approval is received from the department. Students considering study off-campus are encouraged to discuss these plans with their academic advisor early in their Denison careers. The department understands that transfer students, students who adopt a chemistry or biochemistry major after the first year, and students who study off-campus may have unique needs; we encourage them to contact us so that we can work together to help them achieve their academic objectives.

Approved eye protection is required in all laboratory courses.