Intermediate Chemistry Courses

For students who have completed General Chemistry (CHEM 104, 109, 116, or equivalent)

Many students will continue taking chemistry courses after completing general chemistry. Below is information about chemistry courses that can be taken next. If you need additional details about the content of a particular course, please consult the instructor. For questions about enrollment and course access issues, please go to: http://chem.wisc.edu/content/enrollment-inquiries.

Chemistry 311 Chemistry Across the Periodic Table (4 credits)
This inorganic chemistry course is designed to provide broader exposure to the chemistry of the elements with links to the life sciences and engineering. CHEM 311 can be used as an elective for many majors. It is a required course for Chemistry majors and should be taken no later than the third year. The course builds upon topics from general chemistry through an emphasis on structure-property-reactivity relationships across the periodic table, presented in the context of cutting-edge research developments. The weekly, three-hour laboratory component will introduce the synthesis and characterization of both molecular compounds and materials. Formal lab reports are due most weeks.

CHEM 311 is offered both fall and spring semesters.

Chemistry 327 Fundamentals of Analytical Science (4 credits)
Chemistry 329 Fundamentals of Analytical Science (Honors) (4 credits)
Chemistry 327 and 329 emphasize quantitative laboratory skills, fundamental analytical chemistry, and problem solving involving complex chemical equilibria. The courses use example applications in chemistry, biology, environmental science, medical science, and engineering. The courses typically cover acid/base, chelation, oxidation-reduction, precipitation equilibria, absorption spectroscopy, gas chromatography, liquid chromatography, and electrochemical methods. CHEM 327 is the intermediate level analytical chemistry course for non-chemistry majors. CHEM 329 is an honors level course which is mathematically more rigorous. It is required for both Chemistry and CBE (Chemical and Biological Engineering) majors and recommended for students seeking honors credit. Students do not need to be part of an honors program to enroll in CHEM 329. The key difference between CHEM 327 and 329 is the level of coverage. CHEM 329 provides a higher level of material and lab work including dealing with realistic solutions and example applications that depend on understanding complex chemical equilibria. Students participate in a group research project that culminates in the writing of a formal paper and an informal oral presentation at the end of the semester.

CHEM 327 is offered every fall, spring, and summer, while CHEM 329 is offered every fall and spring.

Chemistry 341 Elementary Organic Chemistry (3 credits)
Chemistry 341 is a single semester, terminal course covering selected topics in organic chemistry. Chemistry 341 is not equivalent to either Chemistry 343 or 345 and it does not satisfy the prerequisite for enrollment in Chemistry 345. This course is intended for students who need only one semester of organic chemistry. (Pre-med, pre-dental, and pre-vet students need two semesters and should take the CHEM 343/345 sequence instead. Other pre-health students should consult their advisor.) The laboratory course, CHEM 342, can be taken concurrently with CHEM 341.

CHEM 341 is offered fall semesters only.

Chemistry 342 Elementary Organic Chemistry Laboratory (1 credit)
Chemistry 342 introduces organic laboratory techniques in synthesis, purification and spectral interpretation. The course is designed to accompany Chemistry 341 and topics closely follow those presented in Chemistry 341. Completion of or concurrent registration in CHEM 341 is a required. This course is intended for students who need only one semester of organic chemistry and only a single laboratory credit.

CHEM 342 is offered fall semesters only.

Chemistry 343 Introductory Organic Chemistry (3 credits)
Intended for those students who expect to take two semesters of organic chemistry, this course is the first of two organic lecture courses. Lab is a separate 2-credit course (CHEM 344) that is taken either concurrently with or after the second lecture course, CHEM 345. CHEM 343 is typically taken by students majoring in chemistry, chemical engineering, biochemistry, various life sciences, and pre-med students. For well-prepared students especially interested in the chemical sciences, an honors-level section of CHEM 343 is offered in the fall semester only with a follow-up honors-level section of CHEM 345 in the spring semester only. Students need special permission to enroll in the honors section and should contact Erynn Zweifel (ezweifel@wisc.edu) with questions.

CHEM 343 is offered in fall, spring, and summer terms.

Chemistry 344 Introductory Organic Chemistry Laboratory (2 credits)
Chemistry 344 introduces the basic synthesis, purification, and characterization techniques of organic chemistry, along with critical interpretation of experimental data. The laboratory includes material from both Chemistry 343 and 345. Completion of or concurrent enrollment in CHEM 345 is required.

CHEM 344 is offered fall, spring, and summer terms.

Chemistry 345 Intermediate Organic Chemistry (3 credits)
Chemistry 345 is the second course of a two-semester sequence in organic chemistry. It covers diverse themes in organic reactivity, building on a foundation provided in Chemistry 343. Completion of CHEM 343 with grade of C or better is required to enroll in CHEM 345. CHEM 341 does not satisfy the prerequisite.

CHEM 345 is offered fall, spring, and summer terms.

Chemistry Course Plans for Various Majors

Below are suggestions of next chemistry courses depending on intended major for students who have completed General Chemistry (CHEM 104 or CHEM 109). Students needing guidance on course planning should consult their academic advisor. Those considering the chemistry major should consult the chemistry major advisor (http://www.chem.wisc.edu/content/undergraduate-advising). For questions about enrollment and course access issues, please go to: http://chem.wisc.edu/content/enrollment-inquiries.

MAJOR	FALL	SPRING	NEXT FALL
Chemistry			
Option 1	329	343	345 & 344
Option 2	311	343	345 & 344
Option 3	343	345 & 344	329 or 311
Option 4 (compressed schedule)	343 & 311	345 & 344	329
Biochemistry or Molecular Biology			
Option 1	327 (or 329)	343	345 & 344
Option 2	343	345 & 344	327 (or 329)
Biology or Microbiology	343	345 & 344	
Engineering			
Chemical & Biological (CBE)	329	343	345 & 344
Biomedical			
Option 1	343	345	344
Option 2	341*	327 (or 329)	
Other (Electrical, Mechanical, etc)	None	None	
Neurobiology			
Option 1	None	341*	
Option 2	343	345	
Pre-Health (Medicine, Dentistry, Pharmacy, Veterinary)			
Option 1	343	345 & 344	
Option 2	343	345 & 344	311 or 327 or 329
Option 3	311 or 327 or 329	343	345 & 344
Math	None	None	
Physics		None	None
Zoology	None	None	

Note: *If selecting Option 2, both semesters are required.*

Note: *Most medical schools require 2 years of chemistry. For students taking CHEM 103 & 104, Option 1 (without 327, 329 or 311) will provide two years. For students taking CHEM 109, Option 1 is usually sufficient, because many schools (including UW-Madison) accept CHEM 109 as a full-year-equivalent.*

**CHEM 341 is a terminal one-semester organic chemistry course and is only offered fall semesters. It does not serve as an adequate prerequisite for CHEM 345 and it is not sufficient for medical, dental, pharmacy or veterinary schools.*