

CHEMISTRY: ENVIRONMENTAL CHEMISTRY, BS

for the Degree of Bachelor of Science in Chemistry, Environmental Chemistry Concentration

The Environmental Chemistry Concentration is based on the Specialized Curriculum in Chemistry. This concentration is designed to provide a background in environmental chemistry that is sufficient in breadth and depth to prepare a person to work as an environmental chemist in the public or private sectors and/or to pursue an advanced degree in the field. Students who complete this concentration will be certified in environmental chemistry by the American Chemical Society (ACS).

Undergraduate Degree Programs in Chemistry

For the Degree of Bachelor of Science in Liberal Arts and Sciences

- Major in Computer Science & Chemistry (Sciences and Letters) (http://catalog.illinois.edu/undergraduate/eng_las/computer-science-chemistry-bslas/)
- Major in Chemistry (Sciences and Letters) (<http://catalog.illinois.edu/undergraduate/las/chemistry-bslas/>)

For the Degree of Bachelor of Science in Chemistry

- Major in Chemistry (Specialized Curriculum) (<http://catalog.illinois.edu/undergraduate/las/chemistry-bs/>)
- Major in Chemistry (Specialized Curriculum), Environmental Chemistry Concentration (p. 1)

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Specialized Curriculum

Graduation requires grade point averages of at least 2.0 overall and 2.0 in chemistry, mathematics, and physics courses.

Students in the Specialized Curriculum in Chemistry must include a course in Biochemistry in the Advanced Chemistry area or the Technical Electives area to be certified by the American Chemical Society as having met its specifications.

Departmental distinction: Students qualify for graduation with distinction by exhibiting superior performance in both course work and in senior thesis research. To be eligible, a student must have a UIUC coursework major grade point average of 3.25, must take CHEM 499 (normally for two semesters) and submit a senior thesis for evaluation, and must have their undergraduate research advisor submit to the department Head a letter of support attesting to the effort invested by the student. The minimum major GPAs for Distinction, High Distinction, and Highest Distinction are

3.25, 3.5, and 3.75, respectively. Final decisions on awarding Distinction honors will be made by the Head or designee.

Graduation Requirements

Minimum hours required for graduation: 120 hours.

University Requirements

Minimum of 40 hours of upper-division coursework, generally at the 300- or 400-level. These hours can be drawn from all elements of the degree. Students should consult their academic advisor for additional guidance in fulfilling this requirement.

The university and residency requirements can be found in the Student Code (<https://studentcode.illinois.edu/article3/part8/3-801/>) (§ 3-801) and in the Academic Catalog (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>).

General Education Requirements

Follows the campus General Education (Gen Ed) requirements (<https://courses.illinois.edu/gened/DEFAULT/DEFAULT/>). Some Gen Ed requirements may be met by courses required and/or electives in the program.

Code	Title	Hours
	Composition I	4-6
	Advanced Composition	3
	Humanities & the Arts (6 hours)	6
	Natural Sciences & Technology (6 hours)	6
	fulfilled by CHEM 202 & CHEM 204 or CHEM 102 & CHEM 104; PHYS 211, PHYS 212	
	Social & Behavioral Sciences (6 hours)	6
	Cultural Studies: Non-Western Cultures (1 course)	3
	Cultural Studies: US Minority Cultures (1 course)	3
	Cultural Studies: Western/Comparative Cultures (1 course)	3
	Quantitative Reasoning (2 courses, at least one course must be Quantitative Reasoning I)	6-10
	fulfilled by MATH 220 or MATH 221, MATH 231, MATH 241; PHYS 211, PHYS 212	
	Language Requirement (Completion of the third semester or equivalent of a language other than English is required)	0-15

Code	Title	Hours
Orientation and Professional Development		
LAS 101	Design Your First Year Experience	1
	OR	
LAS 100 & LAS 101	Success in LAS for International Students and Design Your First Year Experience	3
	OR	
LAS 102	Transfer Advantage	1
Total Hours		1 or 3

Code	Title	Hours
Major Core Requirements and Electives		
Core Chemistry		37

CHEM 150	First Semester Success in Chemistry (Transfer students may substitute 1 hour of 200 level or higher Chemistry, including CHEM 297, CHEM 397, CHEM 497, or CHEM 499, for the 1 hour of CHEM 150. This may not include CHEM 222 or CHEM 223 for students who took the CHEM 102, CHEM 103, CHEM 104, and CHEM 105 sequence instead of CHEM 202, CHEM 203, CHEM 204, and CHEM 205.)	
CHEM 202	Accelerated Chemistry I	
CHEM 203	Accelerated Chemistry Lab I	
CHEM 204	Accelerated Chemistry II	
CHEM 205	Accelerated Chemistry Lab II	
If necessary, CHEM 102, CHEM 103, CHEM 104, CHEM 105, CHEM 222, and CHEM 223 may be substituted for CHEM 202, CHEM 203, CHEM 204, and CHEM 205.		
CHEM 236	Fundamental Organic Chem I	
CHEM 237	Structure and Synthesis	
CHEM 312	Inorganic Chemistry	
CHEM 315	Instrumental Chem Systems Lab	
CHEM 420	Instrumental Characterization	
CHEM 436	Fundamental Organic Chem II	
CHEM 442	Physical Chemistry I	
CHEM 444	Physical Chemistry II	
CHEM 445	Physical Principles Lab I	
Advanced Chemistry		11
CHEM or BIOC courses numbered 300 or higher, which must include three laboratory courses from the following:		
CHEM 317	Inorganic Chemistry Lab	
CHEM 437	Organic Chemistry Lab	
CHEM 447	Physical Principles Lab II	
CHEM 483	Solid State Structural Anlys	
BIOC 455	Technqs Biochem & Biotech	
A student who has earned at least 6 credit hours in any combination of CHEM 397, CHEM 497, or CHEM 499 must complete only two laboratory courses from the list, one of which must be CHEM 317, CHEM 437, or CHEM 447.		
Mathematics		16-19
MATH 220	Calculus	
or MATH 221	Calculus I	
MATH 225	Introductory Matrix Theory	
or MATH 227	Linear Algebra for Data Science	
or MATH 257	Linear Algebra with Computational Applications	
or MATH 415	Applied Linear Algebra	
MATH 231	Calculus II	
MATH 241	Calculus III	
MATH 285	Intro Differential Equations	
Physics		10
PHYS 211	University Physics: Mechanics	
PHYS 212	University Physics: Elec & Mag	
PHYS 214	Univ Physics: Quantum Physics	
Technical Electives		7-9
CHEM (300 or higher), BIOC, CHBE (200 or higher)		

Courses in life sciences (all courses at 200 or higher)

Mathematics or computer science above the basic level

Other courses in the physical and biological sciences and engineering including CHEM 199 (Three hours maximum credit in CHEM 199. Additional courses in sciences and engineering can be taken, upon consultation with the SCS advisor and approval from the chemistry department. Approved courses must generally have a strong technical prerequisite, such as one year of college-level math or science.)

Code	Title	Hours
Required Technical Elective Courses for the Environmental Chemistry Concentration		12

These courses can contribute, in whole or in part, to the required 7-9 hours of technical electives for the Specialized Curriculum in Chemistry.

Basic Courses

CHEM 360	Chemistry of the Environment	3
or CEE 330	Environmental Engineering	

Advanced Courses

9

Select three courses from the following:

ATMS 420	Atmospheric Chemistry	
ATMS 449	Biogeochemical Cycles	
CEE 443	Env Eng Principles, Chemical	
CHEM 397	Individual Study Junior	
CHEM 460	Green Chemistry	
CHEM 497	Individual Study Senior	
CHEM 499	Senior Thesis	
GEOL 380	Environmental Geology	
GEOL 460	Geochemistry	
NRES 351	Introduction to Environmental Chemistry	
NRES 487	Soil Chemistry	
NRES 490	Surface Water System Chemistry	

Other 400 level courses dealing with economic, engineering, or biological aspects of environmental chemistry, upon consultation with the SCS advisor and approval of the chemistry department.

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Sample Sequence

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence.

Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. See the corresponding section on the Degree and General Education Requirements page (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>).

First Year	
First Semester	Hours
LAS 101	1
CHEM 150	1
CHEM 202	3
CHEM 203	2
MATH 220 or 221	4
Language Other Than English (3rd level) or Composition I course	4
	15
Total Hours 15	

First Year	
Second Semester	Hours
CHEM 204	3
CHEM 205	2
MATH 231	3
PHYS 211	4
Composition I course or Language Other Than English (3rd level)	4
	16
Total Hours 16	

Second Year	
First Semester	Hours
CHEM 236	4
CHEM 237	2
PHYS 212	4
MATH 241	4
General Education course	3
	17
Total Hours 17	

Second Year	
Second Semester	Hours
CHEM 436	3
Environmental Chemistry Technical Electives	3
PHYS 214	2
MATH 225, 415, 227, or 257	3
MATH 285	3
General Education course	3
	17
Total Hours 17	

Third Year	
First Semester	Hours
CHEM 442	4
CHEM 420	2
CHEM 315	2
General Education course	3

General Education course	3
	14

Third Year	
Second Semester	Hours
CHEM 444	4
CHEM 445	2
CHEM 312	3
General Education course	3
General Education course	3
	15
Total Hours 15	

Fourth Year	
First Semester	Hours
Advanced Chemistry course (lab)	3
Advanced Chemistry lab	2
Environmental Chemistry Technical electives	3
CHEM 360 or CEE 330	3
General Education course	3
	14
Total Hours 14	

Fourth Year	
Second Semester	Hours
Advanced Chemistry course (lab)	3
Additional Technical Elective course	3
Environmental Chemistry Technical Elective course	3
General Education course	3
	12
Total Hours 12	

Total Hours: 120

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Students graduating with the BS in Chemistry will have:

1. A thorough knowledge of the basic principles of chemistry, including atomic and molecular structure, chemical dynamics and the chemical and physical properties of substances.
2. An exposure to the subfields of chemistry, such as analytical, organic, physical, materials, inorganic, as well as chemical biology.
3. The ability to read, evaluate, interpret, and present (via oral and written communication) numerical, chemical and general scientific data, information and literature.
4. The ability to carry out experiments, use appropriate experimental apparatus effectively, and demonstrate proper laboratory safety skills.

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Chemistry

Chemistry website (<https://chemistry.illinois.edu>)

Chemistry faculty (<https://chemistry.illinois.edu/directory/faculty-by-type/>)

SCS Academic Advising (<http://advising.scs.illinois.edu/>)

College of Liberal Arts & Sciences

Liberal Arts & Sciences College & Admissions requirements (<http://catalog.illinois.edu/schools/las/>)

LAS website (<https://las.illinois.edu/>)