Chemistry

Chemistry is an excellent foundation for any scientific, professional or business career, including but not limited to agricultural chemistry, analytical chemistry, biochemistry, chemical engineering, dentistry, ecology and environmental chemistry, chemical education, forensic science, geochemistry, management and marketing, materials science, medicine, optometry and ophthalmology, patent law, pharmacology, physical chemistry, plastics and polymer chemistry, renewable energy, synthetic organic chemistry, toxicology or veterinary science. Undergraduate research experiences are readily available under the supervision of a faculty advisor. Students are encouraged to meet with an undergraduate advisor to design a curriculum focused on their career goals.

All Chemistry majors begin with the same foundation courses, which provides a rigorous program with advanced study in analytical, organic and physical chemistry for the professional chemist. After the freshman year, all students pursuing a Bachelor of Science degree in the College of Agricultural, Life, and Physical Sciences have the option to continue in Comprehensive Chemistry or move into a more specific specialization, which builds upon the foundation course work in analytical, biochemistry, inorganic, organic and physical chemistry.

Pre-professional students and those interested in biological chemistry may pursue the Biochemistry major with additional advanced courses in other life sciences. The Chemical Education specialization prepares students for participation in the Teacher Education Program, which will qualify students for an Initial Professional Educator license endorsed for secondary education-Chemistry. The Environmental Chemistry specialization complements advanced study in analytical and organic chemistry with in depth study of environmental chemistry and related fields of engineering, forestry, geology, plant biology and soil science. The Forensic Chemistry specialization gives students the opportunity to study the science required for investigative research in a crime lab. Although not required for graduate study or employment as a chemist, students are encouraged to pursue certification from the American Chemical Society, 1155 Sixteenth St. NW, Washington, D.C.

Future business leaders can earn a Bachelor of Arts degree in the College of Agricultural, Life, and Physical Sciences. The Business specialization allows students to pursue a minor degree in Business and Administration and is ideal preparation for a career in the production, management, marketing and technology transfer aspects of the chemistry industry. Additional course work is recommended to prepare for a Masters in Business Administration.

All science majors require proficiency in mathematics, which is prerequisite for upper level course work in chemistry. Students are encouraged to enroll in the highest level of mathematics appropriate to their background within the first semester. All students are expected to show proficiency in chemistry prerequisites that are chemistry courses with a grade of C- or better, or obtain consent of the instructor for enrollment in the subsequent chemistry course. For chemistry majors, a grade of C- or better is needed in every Chemistry Introductory course and in every Chemistry Foundation course to be eligible for graduation. A minimum grade point average of 2.0 in chemistry course work is needed in order for a student to receive a degree in chemistry. A student cannot repeat a course or its equivalent in which a grade of B or better was earned without the consent of the program.

Students wishing more detailed information should visit our website at or contact an undergraduate advisor at the School of Chemical and Biomolecular Sciences, Neckers Hall, Rm. 224 - Mail Code 4409, Southern Illinois University Carbondale, Carbondale, Illinois 62901.

Bachelor of Arts (B.A.) in Chemistry Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirements [1]	39
Chemistry Major Requirements	48

Degree Requirements	Credit Hours
Supportive Skills: CS 201 or CS 202; ENGL 290 or ENGL 291 or ENGL 391; MATH 282 or MATH 483	6
CHEM 200 or CHEM 205 or CHEM 205H, CHEM 201, CHEM 202, or CHEM 207 or CHEM 207H, CHEM 210 or CHEM 215 or CHEM 215H, CHEM 211, CHEM 212 or CHEM 217 or CHEM 217H (3 hours included in the UCC Physical Science hours)	7
CHEM 311, CHEM 330, CHEM 340, CHEM 341, CHEM 350, CHEM 351, CHEM 360, CHEM 361	22
MATH 150, MATH 250 (3 hours included in the UCC Mathematics hours)	5
PHYS 205A, PHYS 255A, PHYS 205B, PHYS 255B	8
Business Specialization	21-22
One of the following: CHEM 411, CHEM 431, CHEM 434, CHEM 442, CHEM 452, CHEM 460	3-4
ACCT 220, ACCT 230	6
ECON 240	3
FIN 330	3
MGMT 304 or MGMT 318	3
MKTG 304	3
Free Electives	7-10
Total	115-119

[1] *A total of nine hours of biological science, mathematics, and physical science course work are accounted for in the 39-hour University Core Curriculum requirement. An additional three hours of social science are accounted for if students take ECON 240 in the Business Specialization*

Bachelor of Science (B.S.) in Chemistry Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirements [1]	39
Chemistry Major Requirements [2]	68-70

Degree Requirements	Credit Hours
Supportive Skills - CS 201 or CS 202; ENGL 290 or ENGL 291 or ENGL 391; MATH 282 or MATH 483 [3]	6
CHEM 200 or CHEM 205 or CHEM 205H, CHEM 201, CHEM 202 or CHEM 207 or CHEM 207H, CHEM 210 or CHEM 215 or CHEM 215H, CHEM 211, CHEM 212 or CHEM 217 or CHEM 217H (3 hours included in the UCC Physical Science hours)	7
CHEM 311, CHEM 330, CHEM 340, CHEM 341, CHEM 350, CHEM 351, CHEM 360, CHEM 361	22
MATH 150, MATH 250 (3 hours included in the UCC Mathematics hours)	5
MATH 221 or MATH 251 or MATH 305 or MATH 483	3-4
PHYS 205A, PHYS 255A, PHYS 205B, PHYS 255B	8
One of the following specializations: [4]	
Comprehensive Chemistry Specialization	16
CHEM 434, CHEM 442, CHEM 443, CHEM 460, CHEM 463	13
One of the following: CHEM 411, CHEM 431, CHEM 439, CHEM 444, CHEM 451A & CHEM 451B in lieu of CHEM 350, CHEM 452, CHEM 456, CHEM 468, CHEM 479	3
Environmental Chemistry Specialization	15
CHEM 431, CHEM 434, CHEM 442, CHEM 443	12
MATH 483 (included in math hours above)	
At least 3 hours from the following: CE 310, CE 418; FOR 452/FOR 452L; GEOL 418, GEOL 421; ME 410, ME 416; MICR 423, MICR 425; CSEM 442, CSEM 446, CSEM 447/ CSEM 448; PLB 427; ZOOL 411, ZOOL 432	3
Forensic Chemistry Specialization	17
CHEM 434, CHEM 439, CHEM 442, CHEM 443	12
CHEM 396 (This research must involve problems of interest to forensic science or a formal internship at a forensic lab. The latter is subject to availability and approval from said lab.)	2
MATH 483 (included in math hours above)	

Degree Requirements	Credit Hours
PHIL 104 or PHIL 340 (3 hours included in UCC humanities)	
At least 3 hours from the following: BIOL 305; GEOL 310, GEOL 417; MICR 301, MICR 302, MICR 454, MICR 460; PHSL 310, PHSL 401A, PHSL 401B, PHSL 420A, PHSL 420B; PLB 330	3
American Chemical Society Certification	3
Certification by the ACS requires a minimum of 300 contact hours of undergraduate research over at least two semesters, including two credit hours of CHEM 396, CHEM 496, or CHEM 496H; attending undergraduate seminar, CHEM 490; and completion of a comprehensive research report under the direction of a faculty advisor. A student can receive ACS Certification with any of the above specializations.	
Chemistry Honors	6
Participation in Chemistry Honors requires completion of the ACS Certificate with 300 contact hours of undergraduate research, including two credit hours of CHEM 496H; attending undergraduate seminar, CHEM 490H; and completion of an honors thesis, CHEM 499H or UHON 499, under the direction of a faculty advisor. A faculty advisor approved proposal for an honors research project should be submitted one year prior to the expected completion of an honors thesis. A student can earn Chemistry Honors with any of the above specializations.	
General Electives	13-15
Total	120

[1] *A total of nine hours of biological science, mathematics, and physical science course work are accounted for in the 39-hour University Core Curriculum requirement.*

[2] *A total of nine hours of biological science, mathematics, and physical science course work are accounted for in the 39-hour University Core Curriculum requirement.*

[3] *A total of three hours of biological sciences are completed with biological chemistry or biochemistry. CHEM 451A may substitute for CHEM 350, if a student continues with CHEM 451B. Prerequisite is MATH 106, MATH 111 or MATH 108 and MATH 109. The elective hours are decreased by three to six hours for students who place into a course lower than calculus.*

[4] *While students may complete more than one specialization, only one will be reported on their transcript.*

B.S. Chemistry - Chemical Education Specialization Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirements [1]	41
Chemistry Major Requirements	36-37
Supportive Skills - CS 201 or CS 202; ENGL 290 or ENGL 291 or ENGL 391; MATH 282 or MATH 483 [2]	6
CHEM 200 or CHEM 205 or CHEM 205H, CHEM 201, CHEM 202 or CHEM 207 or CHEM 207H, CHEM 210 or CHEM 215 or CHEM 215H, CHEM 211, CHEM 212 or CHEM 217 or CHEM 217H (3 hours included in the UCC Physical Science hours)	7
CHEM 311, CHEM 330, CHEM 340, CHEM 341, CHEM 350, CHEM 351, CHEM 360, CHEM 361 [3]	18-19
MATH 150, MATH 250 (3 hours included in UCC Mathematics hours)	5
MATH 282 (hours included in supportive skills)	
PHYS 205A, PHYS 205B, PHYS 255A, PHYS 255B	
Specialization Requirements	44
CHEM 396, CHEM 442, CHEM 443	6
GEOL 121, GEOL 124	3
BIOL 202 (2 hours included in UCC Human Health), BIOL 211, BIOL 212 (3 hours included in UCC Life Sciences above)	5
PHIL 105, PHIL 307I (6 hours included in UCC Social Science)	
EDUC 211, EDUC 214, EDUC 301, EDUC 302, EDUC 303, EDUC 308, EDUC 313, EDUC 319, EDUC 401A (3 hours included in UCC Multicultural Diversity in the US and 3 hours in Social Science)	24
Fine Arts Elective (3 hours included in UCC/UNIV 101U)	
Total	121-122

[1] *A total of nine hours of biological science, mathematics, and physical science course work are accounted for in the 41-hour University Core Curriculum requirement. An additional 20 credit hours (BIOL 202, PHIL 307I, PHIL 105, PSYC 102, UNIV 101, EDUC 211, EDUC 214) are included as part of Chemical Education Specialization.*

[2] *Prerequisite is MATH 106, MATH 111 or MATH 108 and MATH 109.*

[3] *CHEM 360 and CHEM 350 required, choose either CHEM 361 or CHEM 351.*

Multiple Specializations in Chemistry

Students meeting the requirements for a Bachelor of Science degree in Chemistry may earn multiple specializations. All requirements for each specialization must be satisfied.

Chemistry Honors Specialization

All freshmen chemistry majors are strongly encouraged to enroll in CHEM 205H and to participate in the University Honors Program. The Chemistry Honors track includes completion of an ACS Certificate and an honors thesis under the supervision of a faculty research advisor. Applications for Chemistry Honors should be submitted at least one year prior to graduation and must include an honors research project proposal with a letter of support from a faculty research advisor. Acceptance and participation in an honors research project requires a 3.25 grade point average in all chemistry coursework. Students will complete 300 hours of undergraduate research including two credit hours of CHEM 496H; attend undergraduate seminar, CHEM 490H; complete an honors thesis, CHEM 499H; and present their thesis work as a seminar or poster presentation. The honors thesis and all chemistry honors courses may be included in the pursuit of an Honors Degree offered by the University Honors Program, which requires submission of an honors thesis project proposal to the Honors Program Director before the end of the junior year after approval from a faculty research advisor. The Honors Thesis course, UHON 499, may substitute for CHEM 499H and requires submission of an honors thesis to the Honors Program Office and Open SIU.

Chemistry Minor

The minor in chemistry requires a minimum of 20 credit hours of chemistry in formal course work including CHEM 200, CHEM 201, CHEM 210, CHEM 211 and three elective lecture courses at 300-level or above. At least one of the elective courses must include a lab component. All elective courses must be taken at SIU Carbondale. A grade of C- or better is needed in all elective courses to be eligible for a minor in chemistry. Microbiology majors may take MICR 425 in place of CHEM 350 to meet the requirements for a minor in chemistry.

Forensic Science Minor

Required courses for the Forensic Science Minor amount to 15 credit hours, including nine credit hours of required courses and six credit hours of electives (with no more than four of the minimum six credit hours of electives from a single discipline/program).

Required Courses: nine credit hours: ANTH 231, CCJ 101, CHEM 173.

Electives: (note, some have prerequisites) six credit hours: ANTH 240A, ANTH 455H, ANTH 465 (Internship in Forensics - must be arranged individually); BIOL 305; CCJ 290, CCJ 310, CCJ 408; CHEM 439; PHIL 104, PHIL 340; PHSL 301; PLB 300, PLB 330; POLS 334; PSYC 305, PSYC 431, PSYC 440; SOC 372.

American Chemical Society Certification

The American Chemical Society (ACS) Certificate prepares students for a career in the chemical industry or for further studies in graduate school. The certificate indicates that a student has completed the rigorous academic requirements for a degree in chemistry and has actively participated in undergraduate research under the direction of a faculty research advisor. Students should contact a faculty research advisor at least one year prior to graduation to apply for an undergraduate research position in their

laboratory. Students will complete 300 hours of undergraduate research including two credit hours of CHEM 396, CHEM 496, or CHEM 496H; attend undergraduate seminar, CHEM 490; and complete a comprehensive research report for submission to the program. An application to receive an ACS Certificate must be submitted at least one month prior to graduation with verification by a faculty research advisor of completion of all requirements.

Transfer Credit

Credit for a course in chemistry successfully completed at another accredited institution will be accepted to meet major or minor requirements in chemistry at SIU Carbondale, subject to the following conditions:

1. The course number must bear a program prefix clearly indicating the course is a chemistry (or biochemistry) course.
2. The course must have covered substantially the same material as a course currently offered at SIU Carbondale to meet major requirements.
3. Any course used to meet major or minor requirements in chemistry must be explicitly approved by the School of Chemical and Biomolecular Sciences.

Technology Fee

The College of Agricultural, Life, and Physical Sciences assesses undergraduate majors a technology fee of $4.58 per credit hour up to 12 credit hours. The fee is charged Fall and Spring semester.

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