

## 2012-2013 Undergraduate Catalog

### **Chemistry and Biochemistry** (Department, Major, Minor [Chemistry, Forensic Science], Courses, Faculty)

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, 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 in the Comprehensive Chemistry specialization, 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 Science have the option to continue in Comprehensive Chemistry or move into a more focused 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 specialization with additional advanced courses in other life sciences. 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 Science. 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 department.

Students wishing more detailed information should visit our website at <http://www.chem.siu.edu> or contact an undergraduate advisor at the Department of Chemistry and Biochemistry, Neckers Hall, Rm. 224 - Mail Code 4409, Southern Illinois University Carbondale, Carbondale, IL 62901.

**Requirements for all Chemistry Majors in the College of Science:**

*University Core Curriculum Requirements* (41 credit hours)

*College of Science Academic Requirements* (6 credit hours)

Biological Sciences—six hours (not UCC courses)

Mathematics – completed with the Chemistry major

Physical Sciences – completed with the Chemistry major

Supportive Skills – a minimum of six hours from two subject areas:

Computer Science 201 or 202; English 290, 291 or 391; and Mathematics 282 or 483.

**Bachelor of Science Degree in Chemistry, College of Science**

*Requirements for Bachelor of Science in Chemistry* (60-63 credit hours)

Chemistry Introductory 200, 201, 210, 211

Chemistry Foundation 330, 340 with 341, 350 with 351, 360 with 361, 411 with 410

Mathematics 150, 250 and either 221, 251, 305 or 483

Physics 205a,b; 255a,b

Select one specialization to complete degree requirements

**Specializations for the Chemistry B.S. degree:**

*Comprehensive Chemistry Specialization* (16 credit hours)

For students desiring a strong background in Chemistry with In-Depth courses in analytical, organic and physical chemistry. Required: Chemistry 434, 442 with 443, 460 with 463; and an additional three hours from among Chemistry 352, 431, 439, 444, 451, 456, 468 and 479.

*Biochemistry Specialization* (16 credit hours)

For students with an interest in the biological and medical aspects of chemistry and for pre-professional students. Required: Chemistry 352 with 353 or Physiology 310; Chemistry 442 with 443; and at least six hours at the 300- to 400-level in two courses from among Biology 305, 306; Chemistry 352 with 353, 434, 444, 451, 456, 460 with 463; Microbiology 301, 302, 425, 460; Physiology 310, 401, 410, 420, 430; Plant Biology 320, 419, 427; Zoology 409 and 418.

*Environmental Chemistry Specialization* (15 credit hours)

For students interested in green chemistry and the chemistry of atmospheric science, geology, hydrology, environmental engineering, industrial ecology and toxicology. Students are encouraged to also pursue an Environmental Studies minor. Required: Chemistry 431, 434, 442 with 443; Mathematics 483; and an additional three hours at 300- to 400-level from among: Civil Engineering 310, 418; Forestry 452 with 452L; Geology 418, 421; Mechanical Engineering 410, 416; Microbiology 423, 425; Plant and Soil Science 442, 446, 447 with 448; Plant Biology 427; and Zoology 411.

*Forensic Chemistry Specialization* (15 credit hours)

For students interested in chemistry applied to solving problems encountered in crime labs. Students are encouraged to also pursue a Forensic Science minor. Required: Chemistry 434, 439, 442 with 443; Mathematics 483; Philosophy 104 or 340; and an additional three hours at 300- to 400-level from among; Biology 305; Geology 310, 417; Microbiology 301, 302, 454, 460; Physiology 310, 401, 420; Zoology 409 and 421. Philosophy 104 or 340 also meets the University Core Curriculum requirements. Research Experience (optional): Chemistry 396 may involve research on problems of interest to the State Crime Lab or a formal internship at the State Crime Lab. The latter is subject to availability and approval of the State Crime Lab.

### *American Chemical Society Certification* (optional, 3 credit hours)

To receive certification by the ACS a student must complete a minimum of 300 contact hours of undergraduate research over at least two semesters under the direction of a faculty advisor including two credits for Chemistry 396 or 496. A student must enroll in senior seminar, Chemistry 490. A student can receive ACS certification with any of the specializations listed above.

### **Bachelor of Arts Degree in Chemistry, College of Science**

*Requirements for Bachelor of Arts in Chemistry* (62-72 credit hours)

Chemistry Introductory 200, 201, 210, 211

Chemistry Foundation 330, 340 with 341, 350 with 351, 360 with 361, 411 with 410

Mathematics 150, 250

Physics 205a,b and 255a,b

Select one specialization to complete degree requirements

### **Specializations for the Chemistry B.A. degree:**

*Business Specialization* (18 credit hours)

For students pursuing a career in chemistry with an interest in the business aspects such as management, marketing, and production. Students may pursue a minor in Business and Administration or prepare for the Masters in Business Administration degree program. Required: An additional three hours in chemistry at the 300- to 400-level, chosen from among Chemistry 352 with 353, 431, 434, 442 with 443, and 460 with 463; and all course work in the College of Business: Accounting 220, 230; Economics 240; Finance 330; Management 304 or 318; and Marketing 304. Either Psychology 102 or Sociology 108 is recommended for the University Core Curriculum requirements for social science. Recommended course work to prepare for M.B.A.: Business 123, 302; Economics 241; and Finance 270.

### **Chemistry Minor**

The minor in chemistry requires a minimum of 18 semester hours of chemistry in formal course work at the 200 level or above, including 200, 201, 210, 211. At least eight of the eighteen hours must be taken at SIUC. A grade point average of at least 2.0 is required in the minor, both in course work taken at SIUC and over-all.

### **Forensic Science Minor**

Required courses for the Forensic Science Minor amount to 15 hours, including 9 hours of required courses and 6 hours of electives (with no more than 4 of the minimum 6 hours of electives from a single discipline or department). Required Core Courses: (9 credit hours): AJ 201, ANTH 231, CHEM 173. Electives: (note, some have prerequisites) 6 hours: AH 313; AJ 290, 310, 330, 408; ANTH 240 A/E, 440B, 441D, 455A, 455H, 465 (Internship in Forensics - must be arranged individually); BIOL 305; CHEM 439; PHIL 104, 340; PHSL 301; PLB 300; POLS 334; PSYC 305, 431, 440; SOC 372; ZOOL 394.

### **Transfer Credit**

Credit for a course in chemistry successfully completed at another accredited institution will be transferred to meet major or minor requirements in chemistry at SIUC, subject to the following conditions: 1) The course number must bear a departmental 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 SIUC to meet major requirements, 3) Credit for a course completed at a community or junior college is not transferable if the corresponding course at SIUC is offered at the 400-level, 4) All transfers of credit to meet major or minor requirements in chemistry must be explicitly approved by the Department of Chemistry and Biochemistry.