

## Department of Chemistry

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The Department of Chemistry is approved by the American Chemical Society to offer a certified degree, which is recognized by graduate schools, industries and professional schools as the highest level of undergraduate professional training in chemistry. Chemistry is the study of the composition, structure and properties of matter and the changes that matter can undergo. It includes study of all the elements plus numerous compounds, including those found in polymers, petrochemicals, foods, cosmetics, paper, paints, fertilizers and many other products. Chemistry is divided into the broad branches of organic, inorganic, biological, analytical and physical chemistry, which includes 20-30 sub-areas, including materials, petroleum, medicinal, forensic, theoretical and environmental chemistry.

Among the physical sciences, chemistry provides the largest field of employment. A college graduate with a B.S. degree in Chemistry could qualify for the following positions: industrial positions in research and development, analysis and testing, quality control, technical services and sales; hospital or governmental positions in clinical analysis, food and drug testing and environmental control; admission to graduate study in chemistry; admission to professional schools including medical, dental, veterinary medicine, optometry and pharmacy; junior and/or senior high science teaching (additional education requirements must be met). A chemist with a B.S. degree may expect to earn a starting salary in the range of \$32,000-\$54,000.

Employers of recent graduates include Allied Signal Aerospace Fed. Mfg. & Technologies, Amgen, Clemson University, Crosslink, Daiichi Concepts, Dow Chemical, Dow Pharmaceutical Sciences, DuPont, Environmental Works, L & L Products, Merck, Missouri Highway Patrol Crime Lab, Midwest Research Institute, Monsanto, Pfizer, Inc., Quintiles, Sigma Chemical, Springfield City Utilities, Springfield Public Schools, 3M Healthcare.

Graduate schools attended by our graduates include George Mason University, Georgia Tech University, Miami University, Notre Dame University, Purdue University,

Princeton University, Rice University, Texas A & M University, Vanderbilt University, Washington University, University of Arizona, University of California-San Diego, University of Georgia, University of Florida, University of Missouri, Northwestern University, University of Oklahoma, University of Kansas, University of Kentucky.

Professional schools attended by our graduates include University of Arkansas Medical School, Creighton Medical School, University of Iowa-Physician Assistant Program, University of Missouri-Medical School, University of Missouri-St. Louis Optometry School and College of Pharmacy, University of Tennessee College of Optometry and School of Pharmacy, and Tufts School of Dental Medicine.

### Academic Program

Programs available through the Department of Chemistry include the following:

#### B.S. in Chemistry (comprehensive)

This degree is certified by the Committee for Professional Training of the American Chemical Society as indicating full preparation as a professional chemist. This program has three options: industrial, graduate school or biochemistry. This program does not require a minor.

#### B.S. in Chemistry (non-comprehensive)

In this program, chemistry electives are chosen to meet one of several areas of interest, including basic chemistry, environmental chemistry, biochemistry and pre-professional programs such as Pre-Medicine, Pre-Dentistry, Pre-Optometry, Pre-Pharmacy or Pre-Veterinary. This program requires a minor.

#### B.S. in Education (certifiable grades 9-12)

This is a unified science degree with an emphasis in chemistry. This program requires a 3.00 or higher cumulative GPA overall and in the major. The program includes courses in chemistry, physics, biology, earth science and professional education.

#### Accelerated Master's Degree Option

Chemistry majors with junior standing, a GPA in chemistry of 3.00 or better and an overall GPA of 3.00 or better are eligible to apply for acceptance into this program. If accepted, up to 12 hours of advanced chemistry courses may be counted toward both the undergraduate and graduate degrees. This option offers an opportunity for chemistry majors with undergraduate laboratory experience to complete the requirements for the Master of Science degree in Chemistry in two semesters and a summer after attaining the Bachelor's degree.

Graduate degrees at the master's level are available in Chemistry and Chemical Education.

### Courses

Please consult the Missouri State Catalog online at [www.missouristate.edu/catalog](http://www.missouristate.edu/catalog) for course descriptions and specific degree requirements, including courses in the Department of Chemistry and the Departments of Biology, Biomedical Sciences, Physics and Mathematics.

### Faculty

The Department of Chemistry is made up of 17 full-time faculty members, all of whom hold Ph.D.'s. In addition, the department has three full-time instructors and one chemical storeroom supervisor. All major areas of chemistry (analytical, biochemical, organic, inorganic, materials, physical and chemical education) are represented by the faculty.

### Facilities

The department is housed in Temple Hall. The instructional chemistry laboratories accommodate 16 to 24 students for close student-to-teacher contact. Facilities include a modern, safety-equipped storeroom for chemicals and equipment and major instruments for instruction and research. Students are provided extensive hands-on experience with scientific instruments. Most industrial employers are pleased when a prospective employee has had experience with instruments similar to those used in the industrial laboratory. Undergraduates work with all the basic instruments and with many of the more advanced instrumental techniques before they graduate.

Types of major equipment available include the following: 400 MHz Varian INOVA NMR spectrometer with multinuclear and solid state capabilities; Bruker X-ray instrumentation for both single crystals and powders; spectrophotometry instrumentation for UV-visible (Perkin Elmer Lambda 650, Varian Cary 100 Bio, Hitachi U-2001), fluorescence (Perkin Elmer LS55 and Shimadzu RF5301), and infrared (Bruker Vertex 70 FTIR with Raman accessory, Perkin Elmer 1750); atomic spectroscopy instrumentation (Varian Libery 150 AX Inductively Couple Plasma-Atomic Emission, Shimadzu AA-160 Atomic Absorption); Hewlett-Packard 5971 Gas Chromatography-Mass Spectrometer System; gas chromatography systems (two Varian 430 systems, Hewlett Packard 6890, two Hewlett Packard 5890s); high performance liquid chromatography systems (two Varian ProStar systems, one with photodiode array detector and gradient capabilities; Sorvall RC-5B Refrigerated Super Speed Centrifuge; Scanning Electron Microscope with Energy Dispersive X-Ray Analyzer).

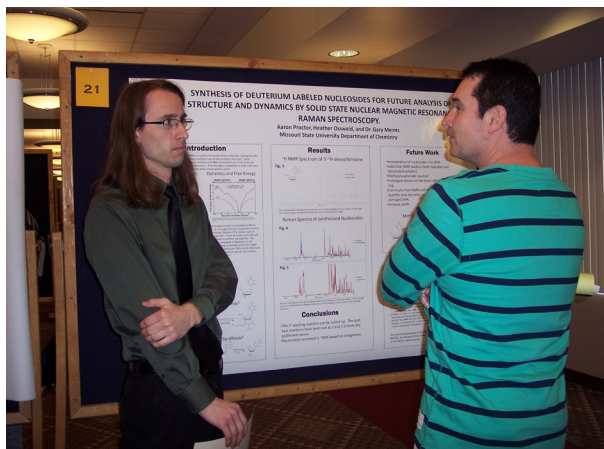
## Special Opportunities and Services

The department has an active Cooperative Education program in which students can receive valuable chemical experience.

The Department of Chemistry has an active student organization called the Student Affiliate Chapter of the American Chemical Society (ACS). The organization has received an outstanding rating from the national ACS office for its activities. The chapter hosts social events, invites guest speakers to campus and provides an opportunity for chemistry majors to get to know one another.



The department encourages undergraduate student research in which a student chooses a professor and a topic and carries out a guided research project. Past research projects have led to presentations at state and national meetings and to publication in scientific journals.



## Sample Schedule (non-comprehensive, minor required)

### Freshman Year 1st Semester

GEP 101	2 hrs
CHM 160	4 hrs
CHM 161	1 hr
MTH 261 or 287	3-5 hrs
ENG 110 or COM 115	3 hrs
	13-15 hrs

### Freshman Year 2nd Semester

CHM 170	3 hrs
CHM 171	1 hr
MTH 280 or 288	3-5 hrs
ENG 110 or COM 115	3 hrs
PLS 101	3 hrs
Life Sciences elective	3-4 hrs
	16-19 hrs

### Sophomore Year 1st Semester

CHM 342	5 hrs
CHM 375	3 hrs
PHY 123 or 203	3-5 hrs
Human Cultures: Soc./Beh. Sciences elective	3 hrs
	14-16 hrs

### Sophomore Year 2nd Semester

CHM 343	5 hrs
CHM 302	5 hrs
PHY 124 or 204	4-5 hrs
Course for minor	3 hrs
	17-18 hrs

### Junior Year 1st Semester

CHM 398	1 hr
CHM 506	3 hrs
CHM 508	2 hrs
ENG 210	3 hrs
HST 121 or 122	3 hrs
CHM 399	1 hr
Course for minor	3 hrs
	16 hrs

### Junior Year 2nd Semester

CHM 507 <sup>1</sup>	3 hrs
Chemistry electives*	3 hrs
Courses for minor	6 hrs
Human Cultures: Soc./Beh. Sciences elective	3 hrs
Public Affairs: Public Issues elective	3 hrs
	15-18 hrs

### Senior Year 1st Semester

CHM 502	4 hrs
Chemistry electives*	3 hrs
Courses for minor	6 hrs
Public Affairs: Cultural Competence elective	3 hrs
	16 hrs

### Senior Year 2nd Semester

CHM 498	1 hr
Chemistry Electives*	6 hrs
Course for minor	3 hrs
Human Cultures: Humanities elective	3 hrs
Human Cultures: The Arts elective	3 hrs
	16 hrs

\*Chemistry Electives: CHM 352, 376, 399 or 499 (2-3 hr), 460, 509, 461, 462, 452, 453, 552, 553.

Other Requirements include: 40 hours must be in upper level courses (300 level or above). <sup>1</sup> CHM 505 may be substituted for CHM 506, 507 and 508. Gen. Education Human Cultures and Public Affairs electives vary; consult the General Education Worksheet or your advisor for help.



**MAKE YOUR  
MISSOURI  
STATEMENT.**

## Department of Chemistry

College of Natural and Applied Sciences

[www.chemistry.missouristate.edu](http://www.chemistry.missouristate.edu)

**Missouri State**  
UNIVERSITY  
Springfield