

# CHEMISTRY

## B.S. and B.A. Programs

Chemistry has solved many of the world's biggest challenges from genetic code to space age materials to the heart of the semiconductor to materials for an artificial human heart. Modern chemistry is centric to many careers including chemical research, materials, medicine, patent law, environmental sciences, teaching, biochemistry, chemical sales and marketing and many other areas.

The chemistry department offers two major degree options to help the student customize their career goals. The B.S. degree is a rigorous chemical education with additional emphases available in biochemistry, polymer and coatings and pre-medicine. This degree program is certified by the American Chemical Society. The B.A. degree is for students who desire a broad liberal arts education, with additional emphasis available in secondary education. The B.A. degree requires a close working relationship between the student and their advisor to develop a curriculum that addresses their career goals. A full range of chemistry courses are available plus mathematics, physics, and, if desired, biology, business or other areas. Students may also elect a special interest such as analytical, bio, electro, environmental, inorganic, nuclear, organic, physical, or polymer chemistry.

Schrenk Hall is home to the department and where most chemistry classes and laboratories are held. The internationally known Missouri S&T Coatings Institute and the Materials Research Center are also closely tied to the department. All have excellent research and teaching facilities.

### Undergraduate Research

All students are encouraged to participate in research programs during their undergraduate career. The opportunities not only lead to valuable experience but also to the possibility of publications, awards, and recognition from potential employers or graduate schools. During their first year, students may interview with the research faculty in the department and choose a faculty member with whom to conduct their research. In addition, in their sophomore year, students can opt to participate in the campus wide "Opportunities for Undergraduate Research Experience" (OURE). Through OURE they can receive academic credit and a stipend for conducting a research project of mutual interest to the student and a faculty member (see Missouri S&T home page). Paid summer research internships are also available. In addition to the experience obtained, the student will also gain a valuable career ally to aid in job acquisition or entry into a professional school.

### Faculty

#### Professors:

Frank Blum (Curators'), Ph.D., Minnesota  
 Harvest L. Collier (Vice Provost, Undergraduate Studies),  
 Ph.D., Mississippi State  
 Nuran Ercal (Richard K. Vitek/FCR Endowed Chair in Biochemistry),  
 Ph.D., Hacettepe University; MD, Istanbul Medical Faculty  
 Shubbender Kapila (Missouri Soybean Merchandising Council  
 Endowed), Ph.D., Dalhousie University  
 Nicholas Leventis (Curators'), Ph.D., Michigan State University  
 Gary Long, Ph.D., Syracuse  
 Yinfa Ma (Curators' Teaching), Ph.D., Iowa State University  
 Chariklia Sotiriou-Leventis, Ph.D., Michigan State University  
 Jay A. Switzer (Donald L. Castleman/FCR Endowed Professor of  
 Discovery in Chemistry), Ph.D., Wayne State University  
 Philip Whitefield (Department Chair), Ph.D., University of London-  
 Queen Mary College

#### Associate Professors:

V. Prakash Reddy, Ph.D., Case Western Reserve University  
 Thomas Schuman, Ph.D., University of Alabama in Huntsville  
 Pericles Stavropoulos, Ph.D., Imperial College  
 Michael R. Van De Mark, Ph.D., Texas A&M  
 Klaus Woelk, Ph.D., University of Bonn

#### Assistant Professors:

Paul Nam, Ph.D., University of Missouri-Columbia  
 Manashi Nath, Ph.D., Indian Institute of Science  
 Jeffrey Winiarz, Ph.D., State University of New York at Buffalo

### Cooperative Education Program

Cooperative Education (Co-op) is a structured educational strategy integrating classroom studies with work learning experiences in a field related to academic or career goals. It provides progressive experiences in integrating theory and practice. In chemistry, students have worked with the following companies through our Co-op program: American Cyanamid Company, Ashland Petroleum, Baxter Healthcare, Protein Technologies, Monsanto Co., Sigma Chemical Co., MEMC Electronic Materials, Inc.

### Brief List of Career Options:

- Scientist
- Research Chemist
- Analytical Chemist
- Environmental Chemist
- Teacher of Chemistry
- Formulation Chemist
- Biomedical Scientist
- Medicine
- Dental
- Technical Sales and Marketing
- Information Specialist
- Science Writer or Editor
- Food and Drug Inspector
- Coatings and Polymer Scientist

### Departmental Scholarships

In addition to the extensive scholarships and financial aid offered by the university, the departmental scholarship committee offers scholarships to incoming freshmen based on ACT scores, GPA, class rank, and commitment to a career in chemistry.

Typical departmental scholarship amounts are \$500-\$1,000 per academic year but can go as high as \$3,000 per academic year.

All scholarships are renewable annually for a total of 8 semesters, dependent on the availability of funds and on the student maintaining a satisfactory cumulative GPA and making satisfactory progress towards their bachelor's degree in chemistry.

### Departmental Contact

Donna Riggs, Chemistry  
 Phone: 573-341-4420  
 or 877-632-2436 (Toll Free)  
 E-mail: chem@mst.edu  
 Web: chem.mst.edu

### Admissions Contact

Office of Admissions  
 Phone: 800-522-0938  
 E-mail: admissions@mst.edu

# Curriculum

## **B.S. Degree (American Chemical Society Certified)**

Chem 1-General Chemistry .....	4
Chem 2-General Chemistry Lab .....	1
Chem 4-Intro to Lab Safety & Hazardous Materials .....	1
Chem 3-General Chemistry .....	3
Chem 8-Qualitative Analysis .....	2
Chem 11-Intro to Chemistry .....	1
Chem 221-Organic Chemistry I .....	4
Chem 226-Organic Chemistry I Lab .....	1
Chem 223-Organic Chemistry II .....	4
Chem 228-Organic Chemistry II Lab .....	1
Chem 237-Inorganic Chemistry .....	3
Chem 238-Inorganic Chemistry Lab .....	1
Chem 151-Analytical Chemistry I .....	4
Chem 241-Physical Chemistry .....	3
Chem 242-Physical Chemistry Lab .....	1
Chem 243-Physical Chemistry .....	3
Chem 244-Physical Chemistry Lab .....	1
Chem 251-Analytical Chemistry II .....	4
Chem 328-Organic Synthesis & Spec. Analysis .....	3
Chem 343-Intro to Quantum Chemistry .....	3
Chem 361-Biochemistry .....	3
Chemistry Electives (300 level or above Chem) .....	3
Chem 310 or 390-Undergraduate Seminar or Research .....	2
Math 8-Calculus w/Analytic Geometry I .....	5
Math 21-Calculus w/Analytic Geometry II .....	5
Math 22-Calculus w/Analytic Geometry III .....	4
Computer Science 53 or 74 & 78-Intro to Programming .....	3
Statistics 213-Applied Engineering Statistics .....	3
Physics 21-General Physics I .....	4
Physics 22-General Physics Lab .....	1
Physics 25-General Physics II .....	4
Physics 26-General Physics Lab .....	1
English 20-Exposition and Argumentation .....	3
English 60-Writing & Research .....	3
History 112, 175, 176, or Political Science 90 .....	3
Social Science Electives .....	6
Technical Electives (200 level or above Chem or approved) .....	10
Humanities Electives .....	6
Humanities Elective Literature .....	3
Free Electives .....	11
<b>Total Credits .....</b>	<b>131</b>

**Grade Requirements:** A minimum grade of "C" is required for each Chemistry course counted towards the degree.

**ROTC:** Basic ROTC may be taken in the freshman and sophomore years, but is not countable towards a degree.

**In the BS degree program, additional emphases are available in biochemistry, polymer and coatings and pre-medicine. Students must complete paperwork in the department office to choose any of these emphasis areas.**

## **B.A. Degree**

Chem 1-General Chemistry .....	4
Chem 2-General Chemistry Lab .....	1
Chem 4-Intro to Lab Safety & Hazardous Materials .....	1
Chem 3-General Chemistry .....	3
Chem 8-Qualitative Analysis .....	2
Chem 221-Organic Chemistry I .....	4
Chem 226-Organic Chemistry I Lab .....	1
Chem 223-Organic Chemistry II .....	4
Chem 228-Organic Chemistry II Lab .....	1
Chem 151-Analytical Chemistry I .....	4
Chem 241 or 243-Physical Chemistry or Chem 343-Intro to Quantum Chemistry .....	3
Chem 242 or 244-Physical Chemistry Lab .....	1
Chem 310-Undergraduate Seminar .....	1
Chem 3XX-Chemistry Elective .....	4
Math 8-Calculus w/Analytic Geometry I .....	5
Math 21-Calculus w/Analytic Geometry II .....	5
Statistics 213-Applied Engineering Statistics .....	3
Physics 21-General Physics I .....	4
Physics 22-General Physics Lab .....	1
Physics 25-General Physics II .....	4
Physics 26-General Physics Lab .....	1
English 20-Exposition and Argumentation .....	3
English 60-Writing & Research .....	3
History 111-Early Western Civilization .....	3
History 112-Modern Western Civilization .....	3
Foreign Language .....	9
Humanities Elective Literature .....	3
Social Science Electives .....	12
Humanities Electives .....	9
Free Electives .....	18
<b>Total Credits .....</b>	<b>120</b>

For the B.A., a minor in one of the following areas is required: English, Economics, History, Philosophy, Psychology, Sociology, Communications, Speech, Media, Political Science, Music, Mathematics, Statistics, Foreign Language, Computer Science, Biology, or Art.

**In the BA degree program, additional emphasis is available in secondary education. Students must complete paperwork in the department office to choose this emphasis area.**