Additional information may be obtained from:
UM-St. Louis Admissions Office
One University Boulevard
St. Louis, Missouri 63121-4400
(314) 516-5451
http://www.umsl.edu/

University of Missouri-St. Louis

Chemistry and Biochemistry

CAREERguide

Why UMSL?

The Department of Chemistry and Biochemistry at UM-St. Louis offers a highly supportive environment for its majors. Chemistry majors are assigned individual faculty advisors to meet with every semester who help guide their academic program. Class sizes are small enough that each major can receive significant personal attention, including in the the introductory classes. Classes are offered both day and evening such that the schedules of working students can be accommodated, and the frequency of evening offerings is sufficient for a student to ultimately complete their entire degree in the evening. Our faculty aim to contribute to the professional development of our majors. The Department has a research-active faculty who publish in internationally recognized journals and who receive significant research funding from federal agencies and other sources. The involvement of undergraduates in research helps students to develop their scientific skills and makes them more attractive to employers or to graduate and professional schools. Chemistry majors involved in research can gain experience with a range of state-of-the-art analytical facilities and can play prominent roles in faculty members' research groups. Saint Louis is an active center of the chemical and life science industries, and the placement of our B.A. and B.S. graduates in local industry has been excellent.

Careers in Chemistry

Chemistry has often been called the "central science" because it impacts nearly every aspect of our lives, including foods, health care products, paints, plastics, and fuels. A degree in chemistry provides the background for careers in a large number of areas, such as research and development, marketing and sales, teaching, patent law, and the rapidly developing health professions.

A bachelor's degree in chemistry provides students with the professional training needed to enter the chemical industry. The St. Louis metropolitan area is a major center for industrial chemistry and the expanding biotech industry, and the demand for graduates consistently exceeds the supply. The B.S. degree in chemistry is the usual foundation for graduate study in chemistry.

A major in chemistry provides students with excellent preprofessional training in the health sciences. A double major in chemistry and biology is often chosen by premedical and predental students and those interested in graduate work in biochemistry and biology. A minor in chemistry provides the minimum qualifications and training for a position as laboratory technician in industry, hospital laboratories, etc.

Degrees and Areas of Concentration

The Chemistry Department offers courses leading to the B.A. in chemistry, and the B.S. in chemistry, in which students may follow either the chemistry or biochemistry track. In cooperation with the College of Education, we offer the B.S. in education with emphasis in chemistry, and the B.A. in chemistry with teacher certification. The B.S. degree is accredited by the American Chemical Society.

The Chemistry Department also offers work leading to the M.S. degree in chemistry, with or without a thesis. The Ph.D. degree in chemistry is offered in the areas of inorganic, organic, physical, and biochemistry. All graduate courses are offered in the early evening hours in order to accommodate the schedules of our part-time students. In addition to a balanced program of basic graduate courses, the Department offers special topics courses and seminars in current research areas. Research is carried out in the areas of inorganic, organic, physical, and biochemistry by faculty members, postdoctoral associates, and graduate and undergraduate students.

The Department currently has 18 full-time faculty members, as well as several part-time faculty. Many classes are small, permitting good interaction between students and instructors. Faculty members are available for help outside of class periods, and to advise students on their course of study.

Undergraduate Studies

General Education Requirements

Students must satisfy the University and College general education requirements. Courses in chem-

istry may be used to meet the University's science and mathematics area requirement. The College's foreign language requirement fulfills the Departmental requirements for B.A. candidates. B.S. degree candidates are not required to take a foreign language; however, the study of a foreign language is highly recommended, especially for students planning to pursue graduate studies in chemistry.

Degree Requirements

Bachelor of Arts in Chemistry

This degree is intended primarily for preprofessional students in the health science and related areas, as well as prelaw students interested in patent law. Candidates must complete the following chemistry courses:

1111, Introductory Chemistry I
1121, Introductory Chemistry II
2223, Quantitative Analysis
2612, Organic Chemistry I
2622, Organic Chemistry II
2633, Organic Chemistry Laboratory
3022, Introduction to Chemical Literature
3312, Physical Chemistry I
3322, Physical Chemistry II
3333, Physical Chemistry Laboratory I
3412, Basic Inorganic Chemistry
4897, Seminar

In addition, candidates must complete one advanced laboratory course chosen from Chemistry 3643, 4233, and 4343, 4433, and 4733.

No more than 45 hours in chemistry may be applied toward the degree. Each chemistry major must present a seminar and pass a comprehensive examination during the senior year.

After fulfilling the general education and specific major degree requirements, students are to take the remaining hours required to complete the B.A. degree from courses which the appropriate department has evaluated as being of university-level quality, from one or more of the following areas or their university-quality equivalents at other institutions: anthropology/archaeology, art (appreciation, history, studio), astronomy, biology, chemistry, communication, criminology and criminal justice, economics, English, foreign languages/literatures, geology, history, mathematics/computer science, music (appreciation, history, performance), philosophy, physics, political science, psychology, social work, sociology, business, education, engineering, and interdisciplinary. The Chemistry Department may require students to pass a tracking test in order to enroll in the next level course, provided this or an equivalent test is administered to all students seeking to enroll in that course.

Bachelor of Arts in Chemistry with a Biochemistry Certificate

The University offers a certificate program for science majors who are interested in careers in biochemistry. This is an interdisciplinary program that involves additional courses in biochemistry and biology. In addition to the usual requirements for the B.A. degree in chemistry, the student must take the following courses:

Chemistry

4712, Biochemistry
4722, Advanced Biochemistry
4733, Biochemistry Laboratory
4764, Interdisciplinary Topics in Biochemistry or
4772, Physical Biochemistry

Biology

1811, Introductory Biology I
2012, Genetics
3622, Cell Biology
4602, Molecular Biology or
4614, Biotechnology Laboratory I

Students may obtain a minor in biology by adding Biology 1821 to the curriculum described above. The Biology Department also offers a certificate in biochemistry.

Bachelor of Science in Chemistry

This is the first professional degree in chemistry. It may be taken as a terminal degree by students intending to become professional chemists or for preparation for graduate work in chemistry or biochemistry. Students may choose to specialize in chemistry or biochemistry.

Chemistry Option

Candidates must complete the requirements for the B.A. degree in chemistry. In addition, the following chemistry courses are required:

4343, Physical Chemistry Laboratory II
4212, Instrumental Analysis
4233, Laboratory in Instrumental Analysis
4412, Inorganic Chemistry I
4433, Inorganic Chemistry Laboratory
3643, Advanced Organic Chemistry Laboratory
4712, Biochemistry

Students must also take two elective hours of advanced work in chemistry at the 3000-level or above. Students are encouraged to take Chem 3905, Chemical Research, to fulfill the advanced elective requirement.

Biochemistry Option

Candidates must complete the requirements for the B.A. degree in chemistry. In addition, the following chemistry and biology courses are required:

Biology

1811, Introductory Biology I
2012, Genetics or
3622, Cell Biology

Chemistry

4212, Instrumental Analysis
4233, Laboratory in Instrumental Analysis
4412, Inorganic Chemistry I
4712, Biochemistry
4722, Advanced Biochemistry
4733, Biochemistry Laboratory
4764, Interdisciplinary Topics in Biochemistry, or
4772, Physical Biochemistry or 3 credits of Chemistry 3905 Chemical Research (which must be a project in biochemistry).

Fifty hours of chemistry courses may be applied toward the degree. Each candidate must present a seminar and pass a comprehensive examination during the senior year.

Bachelor of Science in Biochemistry and Biotechnology

This degree is intended for students seeking training encompassing the basic principles of biochemistry and the basic background and methods of biotechnology. The degree would be highly suitable for students seeking a career in the life sciences industry or those intending to pursue graduate studies in the life sciences. It is also suitable as a pre-professional degree. This degree program is a cooperative effort between the Department of Chemistry and Biochemistry and the Department of Biology.

B.S. Degree in Secondary Education with an Emphasis in Chemistry

In addition to the general requirements for the B.S. degree in secondary education, students must complete the 36 hours of chemistry courses required for the B.A. degree in chemistry with the following exceptions:

Chemistry 4802, Methods of Teaching Chemistry in Secondary Schools, is required instead of Chemistry 3022 and 4897. In addition, a computer science course is required.

Bachelor of Arts in Chemistry with Teacher Certification

Students must complete the B.A. in chemistry requirements, as well as the requirements for teacher certification. (See the College of Education section of the University of Missouri-St. Louis Bulletin on-line.)

Minor in Chemistry

Requirements for the Minor

Students may earn a minor in chemistry by completing the program below:

The following five courses are required:

1111, Introductory Chemistry I
1121, Introductory Chemistry II
2223, Quantitative Analysis
2612, Organic Chemistry I
2633, Organic Chemistry Laboratory

One course from the following list must be completed:

2622, Organic Chemistry II
3312, Physical Chemistry I
3412, Basic Inorganic Chemistry
4712, Biochemistry (same as Biology 371)

Courses which are prerequisites to subsequent courses in the minor may not be taken on a satisfactory/unsatisfactory basis. A GPA of at least 2.0 is required for the courses presented for the minor. At least three courses toward the minor must be completed at UM-St. Louis.

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St. Louis, Missouri 63121-4400
(314) 516-5451
Toll-free in MO and IL area code:
1-888-GO-2-UMSL
Career Services: (314) 516-5111
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