Chemistry BA

The St. Louis metropolitan area has long been a major center for industrial chemistry, and in the past decade it has also become vibrant in life sciences research and development. A bachelor's degree in chemistry provides a student with the professional training needed to contribute to this dynamic industry. The B.A. degree provides a well-rounded academic background and includes a language requirement. Students who earn this degree are well prepared for a career in the chemical industry, graduate work in the chemical sciences, health sciences, medicine, business or law.

General Education Requirements

Students must satisfy the university and college general education requirements. Courses in chemistry may be used to meet the university's mathematics and life/natural science 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 American Chemical Society (ACS) states that the study of a foreign language is recommended, especially for students planning to pursue graduate studies in chemistry.

Satisfactory/Unsatisfactory Restrictions

Chemistry majors may not take required chemistry, mathematics, or physics courses on a satisfactory/unsatisfactory basis.

Related Area Requirements

Bachelor of Arts and Bachelor of Science in Chemistry

Candidates for both degrees must also complete:

MATH 1800	Analytic Geometry and Calculus I	5
MATH 1900	Analytic Geometry and Calculus II	5
MATH 2000	Analytic Geometry and Calculus III	5
PHYSICS 2111	Physics: Mechanics and Heat	4
PHYSICS 2111L	Mechanics and Heat Laboratory	1
PHYSICS 2112	Physics: Electricity, Magnetism, and Optics	4
PHYSICS 2112L	Electricity, Magnetism, and Optics Laboratory	1
Total Hours		**25**

Candidates must complete the following chemistry courses:

CHEM 1000	Chemistry: The Central Science	1
CHEM 1111	Introductory Chemistry I (MOTR CHEM 150L)	5
CHEM 1121	Introductory Chemistry II	5
CHEM 2223	Quantitative Analysis in Chemistry	3
CHEM 2612	Organic Chemistry I	3
CHEM 2622	Organic Chemistry II	3
CHEM 2633	Organic Chemistry Laboratory	2
CHEM 3022	Introduction to Chemical Literature	1
CHEM 3312	Physical Chemistry I: Thermodynamics and Kinetics	3
CHEM 3322	Physical Chemistry II: Quantum Chemistry and Spectroscopy	3
CHEM 3333	Physical Chemistry Laboratory I	2
CHEM 3412	Basic Inorganic Chemistry	3
CHEM 4897	Seminar in Chemistry	2
Select one of the following:		2
CHEM 3643	Advanced Organic Chemistry Laboratory	
CHEM 4233	Laboratory in Instrumental Analysis	
CHEM 4343	Physical Chemistry Laboratory II	
CHEM 4433	Inorganic Chemistry Laboratory	
CHEM 4733	Biochemistry Laboratory	
Total Hours		**38**

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. At least 12 credits at the 3000 level or higher must be completed at UMSL. The Department of Chemistry and Biochemistry 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.

B.S. Ed. in Secondary Education with Emphasis in Chemistry

The B.S. Ed. is a professional education degree designed for students who wish to pursue a teaching career in secondary schools. Much of the discipline-specific coursework parallels the B.A. or B.S. degree in the discipline; however, the Missouri Department of Elementary and Secondary Education (DESE) requires specific coursework for teacher certification. Therefore, students interested in the B.S. Ed. should contact the advising office (OASIS) 314-516-5937 in the College of Education for discipline-specific requirements. *Note: To obtain teaching certification, DESE requires a 3.0 GPA in the discipline and professional education coursework, as well as a 2.75 GPA overall.*

B.A. or B.S. in Chemistry with Master's Level Coursework for Secondary Teacher Certification

In addition to the B.S. Ed., students may opt to complete a B.A. or B.S. degree in their discipline as an undergraduate, followed by admission to the Graduate School for Master's level teaching certification. The College of Education has a one-year accelerated program for post-graduate certification called Teach in 12, or students can choose a traditional path to certification. Graduate coursework for certification can apply towards a Master's Degree in Secondary Education, with additional coursework. Students interested in Master's Level teacher certification should contact the advising office (OASIS) 314-516-5937 in the College of Education. *Note: To obtain teaching certification, DESE requires a 3.0 GPA in the discipline and professional education coursework, as well as a 2.75 GPA overall.*

Learning Outcomes

Upon completion of the program, graduates will be able to:

- Demonstrate proficiency at an in-depth level in organic chemistry and physical chemistry.
- Apply appropriate concepts and investigative and quantitative methods as used in all sub-disciplines of chemistry research.
- Critically evaluate existing scientific studies to integrate and apply that body of knowledge to the design of studies to test

specific hypotheses addressing unsolved problems in the chemical and life sciences.
- Use computers and the required scientific software in data acquisition, processing, presentation or analysis, including statistical and regression analysis.
- Demonstrate basic skills associated with safely performing and properly documenting laboratory experiments in chemistry following a broad introduction of commonly used equipment and procedures.
- Demonstrate the ability to work either independently or as a part of a small team.
- Identify the need for information, procure the information from relevant scientific literature publications and databases, properly cite the information, and critically evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias.
- Effectively communicate orally, visually and in writing about the processes of the chemical sciences and the results of scientific inquiry.
- Follow ethical practices in research, experimental interpretation, presentation, citation and application of research.

Sample Four Year Plan

First Year

Fall	Hours	Spring	Hours
INTDSC 1003[1]	1	CHEM 1121	5
CHEM 1000	1	MATH 1800	5
CHEM 1111	5	EXPLORE - Humanities and Fine Arts	3
ENGL 1100	3	EXPLORE – Social Sciences	3
MATH 1035	2		
CORE- US History and American Government	3		
	15		**16**

Second Year

Fall	Hours	Spring	Hours
CHEM 2223	3	CHEM 2622	3
CHEM 2612	3	CHEM 2633	2
MATH 1900	5	PHYSICS 2111	4
CORE - Communication Proficiency	3	PHYSICS 2111L	1
		MATH 2000	5
	14		**15**

Third Year

Fall	Hours	Spring	Hours
CHEM 3312	3	CHEM 3322	3
CHEM 3412	3	CHEM 3333	2
Foreign Language 1001	5	PHYSICS 2112	4
EXPLORE - Humanities and Fine Arts	3	PHYSICS 2112L	1
EXPLORE - Social Sciences	3	Foreign Language 1002	5
	17		**15**

Fourth Year

Fall	Hours	Spring	Hours
CHEM 3022	1	CHEM 4897	2
CHEM 3643 or 4343	2	EXPLORE - Social Sciences	3
Foreign Language 2101	3	EXPLORE - Humanities and Fine Arts	3
ENGL 3160	3	Elective or minor	3
Cultural Diversity Requirement	3	Elective or minor	3
Elective or minor	3		
	15		**14**

Total Hours: 121

1

INTDSC 1003 is required only for first-time freshmen and transfer students with less than 24 college credits.

PLEASE NOTE: This plan is an example of what a four year plan could look like for a typical full-time student. Placement exam scores in math as well as the completion of coursework may change the plan. It should not be used in the place of regular academic advising appointments. All students are encouraged to meet with their advisor each semester. All requirements are subject to change.