Bachelor of Arts in Chemistry

Why study chemistry?

At KU Chemistry, we have faculty dedicated to mentoring both undergraduate and graduate students and to helping each student achieve scientific maturity. In addition to required classroom and laboratory courses, options exist for doing research in exciting areas of mainstream chemistry, including emerging fields of microfluidics, precision medicine and sustainable catalysis.

Undergraduate Program

The undergraduate program in the Department of Chemistry has two primary missions. One of these is to help its majors attain a mastery of the discipline in preparation for further study in chemistry or a chemical science, or for immediate employment in chemistry. The other is to provide an opportunity for students majoring in other disciplines to acquire a basic knowledge of the fundamental areas of chemistry.

The curriculum leading to the **Bachelor of Science (B.S.)** degree, a rigorous program certified by the American Chemical Society, consists of a full spectrum of chemistry courses as well as supporting courses in mathematics, physics, and biochemistry, and is designed to prepare students for a professional career in chemistry. The **Bachelor of Arts (B.A.)** degree program, with fewer required courses, allows students to obtain a broader knowledge of areas outside of chemistry, or to tailor their chemistry program for specific or unique objectives. We also offer a **minor** in chemistry for those seeking a secondary area of study.

Undergraduate Admission

Admission to KU

All students applying for admission must send high school and college transcripts to the Office of Admissions. Prospective first-year students should be aware that KU has qualified admission requirements that all new first-year students must meet to be admitted. Consult the Office of Admissions (http://admissions.ku.edu/) for application deadlines and specific admission requirements.

Visit the International Support Services (http://www.iss.ku.edu/) for information about international admissions.

Students considering transferring to KU may see how their college-level course work will transfer on the Office of the University Registrar (https://registrar.ku.edu/credittransfer/) website.

Chemistry Programs

The B.A. degree is for the student who wants to understand the fundamental principles of chemistry and to study a number of other fields. The B.S. degree prepares students for graduate school and professional careers. Both are based on a high school background that includes at least 1½ years of algebra and 1 year of geometry. High school courses in chemistry and physics are desirable but are not required. Many chemistry majors are preparing for medical school or for graduate study in chemistry and related fields. For graduate school, the common body of knowledge in the B.A. program is the minimum prerequisite. For premedical students, much of the knowledge will be important in their careers. Even more important, however, is the training in logical thinking, drawing conclusions from experimental observations, and digesting and understanding scientific information.

First- and Second-Year Preparation

Because study in chemistry requires preparation in mathematics and physics as well as a structured series of courses in chemistry, students should begin meeting major requirements in the first year. Students planning to major in chemistry should consult a chemistry department major advisor during their first semester to develop a 4-year plan for degree completion. It is particularly important to take CHEM 170 (or CHEM 130 or CHEM 190 and CHEM 191) and CHEM 175 (or CHEM 135 or CHEM 195 and CHEM 196) in the first year and CHEM 330 or(CHEM 380) and CHEM 331 in the second year. For those seeking a B.A. degree, it is also important to complete two semesters of calculus and two semesters of physics during the first two years. Minimum requirements in these subject areas for the B.A. degree are MATH 115, MATH 116, PHSX 114 and PHSX 115.

Requirements for the B.A. Major

In addition to the common College requirements for the B.A., a minimum of 29 hours in chemistry (including 5 hours each of analytical, organic, and physical chemistry lecture and laboratory) and one year each of calculus and physics (prerequisites for physical chemistry) are required. These courses fulfill the requirements:

Code	Title	Hours
Chemistry Prerequisite & Co-requisite Knowledge		
Chemistry Courses		
Chemistry I. Satisfied by one of the following (CHEM 170 recommended)		
CHEM 170	Chemistry for the Chemical Sciences I	
CHEM 130	General Chemistry I	
CHEM 190 & CHEM 191	Foundations of Chemistry I, Honors and Foundations of Chemistry I Laboratory, Honors	
Chemistry II. Satisfied by one of the following (CHEM 175 recommended)		
CHEM 175	Chemistry for the Chemical Sciences II	
CHEM 135	General Chemistry II	
CHEM 195 & CHEM 196	Foundations of Chemistry II, Honors and Foundations of Chemistry II Laboratory, Honors	
Mathematics and Physics		
Mathematics: (choose one of the following (MATH 115 & MATH 116 recommended))		
MATH 115 & MATH 116	Calculus I and Calculus II	
MATH 125 & MATH 126 & MATH 127	Calculus I and Calculus II and Calculus III	
Physics: (Choose one of the following (PHSX 114 & PHSX 115 recommended))		
PHSX 114 & PHSX 115	College Physics I and College Physics II	
PHSX 211 & PHSX 216 & PHSX 212 & PHSX 236	General Physics I and General Physics I Laboratory and General Physics II and General Physics II Laboratory	

Chemistry Core Knowledge & Skills		
Seminar I. Satisfied by		0.5
CHEM 180	Seminar I	
Laboratory Safety in the Chemical Sciences. Satisfied by:		1
CHEM 201	Laboratory Safety in the Chemical Sciences	
Organic Chemistry I (Lecture and Lab). Satisfied by:		5
CHEM 330	Organic Chemistry I	
or CHEM 380	Organic Chemistry I, Honors	
CHEM 331	Organic Chemistry I Laboratory	
Organic Chemistry II (Lecture and Lab). Satisfied by:		5
CHEM 335	Organic Chemistry II	
or CHEM 385	Organic Chemistry II, Honors	
CHEM 336	Organic Chemistry II Laboratory	
Analytical Chemistry (Lecture and Lab). Satisfied by:		5
CHEM 400	Analytical Chemistry	
CHEM 401	Analytical Chemistry Laboratory	
Physical Chemistry (Lecture and Lab). Satisfied by one of the following (CHEM 510 &511 recommended)		5-10
CHEM 510	Biological Physical Chemistry	
& CHEM 511	and Biological Physical Chemistry Laboratory	
CHEM 530	Physical Chemistry I	
& CHEM 535	and Physical Chemistry II	
& CHEM 537	and Physical Chemistry Laboratory	
Seminar II. Satisfied by:		0.5
CHEM 695	Seminar II	
Capstone experience. Satisfied by one of the following:		**3**
CHEM 636	Instrumental Methods of Analysis Laboratory	
or CHEM 690	Undergraduate Capstone Research	
or CHEM 691	Undergraduate Honors Research	
Total Hours		**25-30**

Students choosing CHEM 636 will be required to take CHEM 635 as the pre or co-requisite.

Biological and Biomedical Chemistry Concentration

This option is available to students who are on the pre-medical track or are otherwise interested in the biological applications of chemistry.

In addition to all of the requirements for the regular B.A. major, the following courses are required:

Code	Title	Hours
BIOL 150	Principles of Molecular and Cellular Biology	3
BIOL 636	Biochemistry I	4
BIOL 638	Biochemistry II	4
Plus 1 elective (In consultation with a major advisor, choose at lease one course from the Biological and Biomedical Chemistry Option Group)		3-4
Biological and Biomedical Chemistry Option Group		
CHEM 560	Introduction to Chemical Biology	
BIOL 350	Principles of Genetics	
BIOL 400	Fundamentals of Microbiology [1]	
BIOL 416	Cell Structure and Function	
BIOL 503	Immunology [1]	
BIOL 546	Mammalian Physiology [1, 2]	
Total Hours		**14-15**

[1] These courses are recommended, but not required, for pre-medical students. Pre-medical students also often opt to take BIOL 240 Fundamentals of Human Anatomy, BIOL 350 Principles of Genetics, and MATH 365 Elementary Statistics. Students considering other pre-Health tracks should consult with their Academic Advisor.

[2] Students selecting BIOL 546 will also need to take the prerequisite course BIOL 152 Principles of Organismal Biology

Major Hours & Major GPA

While completing all required courses, majors must also meet each of the following hour and grade-point average minimum standards:

Major Hours in Residence
Satisfied by a minimum of 15 hours of KU resident credit in the major.

Major Junior/Senior Hours
Satisfied by a minimum of 23.5 hours from junior/senior courses (300+) in the major.

Major Junior/Senior Graduation GPA
Satisfied by a minimum of a 2.0 KU GPA in junior/senior courses (300+) in the major. GPA calculations include all junior/senior courses in the field of study including F's and repeated courses. See the Semester/Cumulative GPA Calculator (https://sis.ku.edu/gpa-calculator/). (http://clas.ku.edu/undergrad/tools/gpa/)

Sample 4-year plans for the BA degree with the following concentrations, can be found here: Chemistry (https://catalog.ku.edu/liberal-arts-sciences/chemistry/ba/general-chemistry/), Biological and Biomedical Chemistry (https://catalog.ku.edu/liberal-arts-sciences/chemistry/ba/biological-chemistry/), or by using the left-side navigation.

At the completion of this program, students will be able to:

- Solve chemical problems by application of conceptual and practical knowledge.
- Competently acquire, document, and interpret experimental data.
- Effectively communicate chemical information in written and oral form.
- Demonstrate integrity and act responsibly in professional activities.

Departmental Honors

Undergraduates may apply for admission to the departmental honors program after completion of an analytical, organic, and physical chemistry course but no sooner than the beginning of the junior year. Highly motivated and superior B.A. and B.S. students are admitted to the honors program. Honors in chemistry are awarded to students who have been admitted to the program and who have completed the following requirements with superior performance, including a major GPA of 3.5.

1. At least 2 semesters of CHEM 699 (4 hours total) resulting in a written thesis.
2. Evaluation and approval of the thesis by a faculty advisory committee.

3. Oral presentation of the thesis results at a special departmental seminar or other approved forum.

For an application form and further information, consult the department office.