BACHELOR OF SCIENCE IN CHEMISTRY

Why study chemistry?
Because understanding the atomic and molecular nature of matter informs us about ourselves and our universe, and creating and finding applications for new and modified forms of matter helps to conserve and enhance our world.

Undergraduate Admission

Admission to KU
All students applying for admission must send high school and college transcripts to the Office of Admissions. Unless they are college transfer students with at least 24 hours of credit, prospective students must send ACT or SAT scores 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 Office of International Student and Scholar 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 Admissions (http://credittransfer.ku.edu) website.

Admission to the College of Liberal Arts and Sciences
Admission to the College is a different process from admission to a major field. Some CLAS departments have admission requirements. See individual department/program sections for departmental admission requirements.

Chemistry Programs
The B.S. degree prepares students for graduate school and professional careers. 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. Both are based on a high school background that includes at least 1 ½ 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 175 (or CHEM 135 or CHEM 195) in the first year and CHEM 201, CHEM 330 (or CHEM 380) and CHEM 331 in the second year. For those seeking a B.S. degree it is also important to complete CHEM 335 (or CHEM 385) and CHEM 336 in the second year as well as their mathematics preparation (MATH 125, 126, 127 and CHEM 250) and physics preparation (PHSX 211 & PHSX 216, and PHSX 212 & PHSX 236) in the first 2 years.

Requirements for the B.S. Degree

General Education Requirements
All students must complete the KU Core.

Chemistry Prerequisite or Co-requisite Knowledge (27-28)
Majors must complete courses as specified in each of the following areas. Majors are advised to take honors courses when eligible. These hours do not contribute to the minimum number of hours required for the major.

Calculus I. Satisfied by the following:
- MATH 125 Calculus I
- or MATH 145 Calculus I, Honors

Calculus II. Satisfied by the following:
- MATH 126 Calculus II
- or MATH 146 Calculus II, Honors

Calculus III. Satisfied by the following:
- MATH 127 Calculus III
- or MATH 147 Calculus III, Honors

Mathematical Methods for the Chemical Sciences. Satisfied by:
- CHEM 250 Mathematical Methods for the Chemical Sciences

General Physics I. Satisfied by one of the following:
- PHSX 211 General Physics I
- & PHSX 216 and General Physics I Laboratory

General Physics II. Satisfied by one of the following:
- PHSX 213 General Physics II Honors
- & PHSX 214 General Physics II Laboratory

Biochemistry. Satisfied by one of the following:
- B IOL 600 Introductory Biochemistry, Lectures
- B IOL 636 Biochemistry I

Chemistry Core Knowledge and Skills (47)
Majors must complete courses as indicated in the following areas:

Chemistry for the Chemical Sciences I. Satisfied by one of the following:
- CHEM 170 Chemistry for the Chemical Sciences I
- CHEM 130 General Chemistry I
- CHEM 190 Foundations of Chemistry I, Honors

Chemistry for the Chemical Sciences II. Satisfied by one of the following:
- CHEM 175 Chemistry for the Chemical Sciences II
- CHEM 135 General Chemistry II
- CHEM 195 Foundations of Chemistry II, Honors

Laboratory Safety in the Chemical Sciences. Satisfied by:
- CHEM 201 Laboratory Safety in the Chemical Sciences

Seminar I. Satisfied by:
- CHEM 180 Seminar I
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 381 Organic Chemistry II, Honors
CHEM 336 Organic Chemistry II Laboratory

Physical Chemistry I Satisfied by: 4
CHEM 530 Physical Chemistry I

Physical Chemistry II (Lecture and Lab). Satisfied by: 6
CHEM 535 Physical Chemistry II
& CHEM 537 and Physical Chemistry Laboratory

Analytical Chemistry (Lecture and Lab). Satisfied by: 5
CHEM 620 Analytical Chemistry
& CHEM 621 and Analytical Chemistry Laboratory

Instrumental Methods of Analysis. Satisfied by: 2
CHEM 635 Instrumental Methods of Analysis

Systematic Inorganic Chemistry. Satisfied by: 3
CHEM 660 Systematic Inorganic Chemistry

Advanced Inorganic Laboratory. Satisfied by: 2
CHEM 661 Advanced Inorganic Laboratory

Seminar II. Satisfied by: 0.5
CHEM 695 Seminar II

Select one of the following: (Fulfills KU Core Goal 6) 3
CHEM 636 Instrumental Methods of Analysis Laboratory
or CHEM 698 Undergraduate Research Problems
or CHEM 699 Undergraduate Honors Research

Major Hours & Major GPA
KU Core Goal 6 is satisfied by either CHEM 636 Instrumental Methods of Analysis Laboratory, or 3 credit hours of CHEM 698 or CHEM 699.

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

Major Hours
Satisfied by 47 hours of major courses.

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 35.5 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. (http://clas.ku.edu/undergrad/tools/gpa)

Biological Chemistry Option
This option is available to students interested in the biological applications of chemistry. The curriculum is compatible with many pre-health-professions programs and prepares the student for graduate study or career opportunities.

General Education Requirements
All students must complete the KU Core.

Chemistry Prerequisite or Co-requisite Knowledge (24)
Majors must complete courses as specified in each of the following areas. Majors are advised to take honors courses when eligible. These hours do not contribute to the minimum number of hours required for the major.

Calculus I. Satisfied by one of the following: 4
MATH 125 Calculus I
or MATH 144 Calculus I, Honors

Calculus II. Satisfied by one of the following: 4
MATH 126 Calculus II
or MATH 144 Calculus II, Honors

Calculus III. Satisfied by one of the following: 4
MATH 127 Calculus III
or MATH 144 Calculus III, Honors

Mathematical Methods for the Chemical Sciences. Satisfied by: 3
CHEM 250 Mathematical Methods for the Chemical Sciences

General Physics I. Satisfied by one of the following: 5
PHSX 211 General Physics I
& PHSX 216 and General Physics I Laboratory

PHSX 213 General Physics I Honors

General Physics II. Satisfied by one of the following: 4
PHSX 212 General Physics II
& PHSX 236 and General Physics II Laboratory

PHSX 214 General Physics II Honors

Chemistry Core Knowledge and Skills (47)
Majors must complete courses as indicated in the following areas:

Chemistry for the Chemical Sciences I. Satisfied by one of the following:
CHEM 170 Chemistry for the Chemical Sciences I
CHEM 130 General Chemistry I

CHEM 190 Foundations of Chemistry I, Honors

Chemistry for the Chemical Sciences II. Satisfied by one of the following:
CHEM 175 Chemistry for the Chemical Sciences II
CHEM 135 General Chemistry II

CHEM 195 Foundations of Chemistry II, Honors

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 380 Organic Chemistry II, Honors

CHEM 336 Organic Chemistry II Laboratory

Physical Chemistry I Satisfied by: 4
CHEM 530 Physical Chemistry I

Physical Chemistry II (Lecture and Lab). Satisfied by: 6
CHEM 535 Physical Chemistry II
& CHEM 537 and Physical Chemistry Laboratory

Analytical Chemistry (Lecture and Lab). Satisfied by: 5
CHEM 620 Analytical Chemistry
& CHEM 621 and Analytical Chemistry Laboratory

Instrumental Methods of Analysis Satisfied by: 2
CHEM 635 Instrumental Methods of Analysis

Systematic Inorganic Chemistry. Satisfied by:
CHEM 660 Systematic Inorganic Chemistry

Advanced Inorganic Laboratory. Satisfied by:
CHEM 661 Advanced Inorganic Laboratory

Seminar II. Satisfied by: 0.5
CHEM 695 Seminar II

Select one of the following: (Fulfills KU Core Goal 6)
CHEM 636 Instrumental Methods of Analysis Laboratory
or CHEM 698 Undergraduate Research Problems
or CHEM 699 Undergraduate Honors Research

Biological Chemistry Core Knowledge and Skills (16)
Principles of Molecular and Cellular Biology. Satisfied by: 4
BIOL 150 Principles of Molecular and Cellular Biology

Biochemistry. Satisfied by:
BIOL 636 Biochemistry I
BIOL 638 Biochemistry II

Biochemistry Laboratory. Satisfied by:
BIOL 637 Introductory Biochemistry Laboratory

Biological Chemistry Required Electives
Majors choosing this option should select 1 elective (3 hours) from the following:
BIOL 350 Principles of Genetics
BIOL 400 Fundamentals of Microbiology
BIOL 416 Cell Structure and Function

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
Satisfied by 47 hours of major courses.

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 35.5 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 (http://clas.ku.edu/undergrad/tools/gpa).

Chemical Physics Option
This option allows students to focus on the theoretical basis of chemistry. Students are prepared for graduate programs or employment.

General Education Requirements
All students must complete the KU Core.

Chemistry Prerequisite or Co-requisite Knowledge (29-30)
Majors must complete courses as specified in each of the following areas. Majors are advised to take honors courses when eligible. These hours do not contribute to the minimum number of hours required for the major.

Calculus I. Satisfied by one of the following: 4
MATH 125 Calculus I
or MATH 145 Calculus I, Honors

Calculus II. Satisfied by one of the following: 4
MATH 126 Calculus II
or MATH 146 Calculus II, Honors

Calculus III. Satisfied by one of the following: 4
MATH 127 Calculus III
or MATH 147 Calculus III, Honors

Differential Equations. Satisfied by one of the following: 3
MATH 220 Applied Differential Equations

MATH 320 Elementary Differential Equations

Elementary Linear Algebra. Satisfied by: 2
MATH 290 Elementary Linear Algebra

General Physics I. Satisfied by one of the following: 5
PHSX 211 General Physics I
& PHSX 216 and General Physics I Laboratory

PHSX 213 General Physics I Honors

General Physics II. Satisfied by one of the following: 4
PHSX 212 General Physics II
& PHSX 236 and General Physics II Laboratory

PHSX 214 General Physics II Honors

Biochemistry. Satisfied by one of the following: 3-4
BIOL 600 Introductory Biochemistry, Lectures
BIOL 636 Biochemistry I

Chemistry Core Knowledge and Skills (47)
Majors must complete courses as indicated in the following areas:

Chemistry for the Chemical Sciences I. Satisfied by one of the following: 5
CHEM 170 Chemistry for the Chemical Sciences I
CHEM 130 General Chemistry I
CHEM 190 Foundations of Chemistry I, Honors

Chemistry for the Chemical Sciences II. Satisfied by one of the following: 5
CHEM 175 Chemistry for the Chemical Sciences II
CHEM 135 General Chemistry II
CHEM 195 Foundations of Chemistry II, Honors

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 38 Organic Chemistry I, Honors
CHEM 331 Organic Chemistry I Laboratory

Organic Chemistry II (Lecture and Lab). Satisfied by: 5
Bachelor of Science in Chemistry

CHEM 335 Organic Chemistry II
or CHEM 385 Organic Chemistry II, Honors
CHEM 336 Organic Chemistry II Laboratory

Physical Chemistry I Satisfied by: 4
CHEM 530 Physical Chemistry I

Physical Chemistry II (Lecture and Lab), Satisfied by: 6
CHEM 535 Physical Chemistry II
& CHEM 537 and Physical Chemistry Laboratory

Analytical Chemistry (Lecture and Lab), Satisfied by: 5
CHEM 620 Analytical Chemistry
& CHEM 621 and Analytical Chemistry Laboratory

Instrumental Methods of Analysis Satisfied by: 2
CHEM 635 Instrumental Methods of Analysis

Systematic Inorganic Chemistry, Satisfied by: 3
CHEM 660 Systematic Inorganic Chemistry

Advanced Inorganic Laboratory, Satisfied by: 2
CHEM 661 Advanced Inorganic Laboratory

Seminar II, Satisfied by: 0.5
CHEM 695 Seminar II

Select one of the following: (Fulfills KU Core Goal 6) 3
CHEM 636 Instrumental Methods of Analysis Laboratory
or CHEM 698 Undergraduate Research Problems
or CHEM 699 Undergraduate Honors Research

Chemical Physics Core Knowledge and Skills (12) 12

Majors must complete 2 courses from each of the following groups:

Group I
PHSX 313 General Physics III
& PHSX 316 and Intermediate Physics Laboratory I (PHSX 313
and PHSX 316 should be taken concurrently)

PHSX 518 Mathematical Physics
PHSX 521 Mechanics I
PHSX 615 Numerical and Computational Methods in Physics
PHSX 623 Physics of Fluids
PHSX 655 Optics
PHSX 681 Concepts in Solids

Group II
PHSX 531 Electricity and Magnetism
PHSX 621 Mechanics II
MATH 646 Complex Variable and Applications
MATH 647 Applied Partial Differential Equations
CHEM 698 Undergraduate Research Problems
CHEM 750 Introduction to Quantum Mechanics

Satisfied by a minimum of 35.5 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/

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 an overall KU GPA
3.25 and a major GPA of 3.5.

1. At least 2 semesters of CHEM 699 (4-8 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.

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
Satisfied by 47 hours of major courses.

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

Major Junior/Senior Hours