

# Doctor of Philosophy in Chemistry

Graduate studies in Chemistry at KU are intended to prepare graduate students for any of the multitude of career pathways available to individuals who hold a doctorate in the Chemical Sciences. Graduate studies differ from the undergraduate experience in that each activity and requirement of the graduate program is designed to prepare students to become independent, creative practitioners of Chemistry.

Chemists at KU still make new materials and find new and exciting applications for these compounds, and study how chemical reactions occur. We apply this knowledge to developing compounds that fight disease, to creating cleaner and more efficient chemical processes for industry and to applying chemistry in other manners that benefit society. Striving for a Ph.D. or M.S. degree is about creating and completing an independent, original research project in the chemical sciences. For KU students, this experience becomes the foundation for their future careers in the increasingly diverse scientific enterprise.

Research in Chemistry graduate programs used to take place exclusively in the laboratory. At KU, students apply a broader definition of the term laboratory to include many other types of research environments:

- Medical facilities where researchers study the efficacy of therapeutic agents and analyze the results of clinical trials,
- Computer laboratories where the modeling of molecular structure, chemical reactions and phase changes are contributing enormously to our understanding of the complex systems around us,
- Fields and streams where environmental chemists strive to understand how chemicals derived from natural processes and human activity impact the quality and diversity of life, and
- Classrooms where individuals study strategies for improving student learning of scientific concepts.

## Graduate Program

For a student wishing to earn a **Doctor of Philosophy (Ph.D.)** degree or a **Master's of Science (M.S.)** degree in chemistry, the selection of a graduate school is one of the most important career decisions you will make. Your choice will not only determine where you will be during the next several years, but will lay the foundation for your future.

At the University of Kansas, we feel that our program provides exceptional and diverse opportunities for the student interested in a career in cutting-edge research, higher education or any one of a number of chemically related positions requiring an advanced degree. We have a department of outstanding faculty, each of whom is dedicated to providing mentoring to graduate students and guiding them during their journey from undergraduate to colleague.

## Admission to Graduate Studies

### Admission Requirements

- All applicants must meet the requirements outlined in the Admission to Graduate Study (<https://policy.ku.edu/graduate-studies/admission-to-graduate-study/>) policy.
- Bachelor's degree: A copy of official transcripts showing proof of a bachelor's degree (and any post-bachelor's coursework or degrees)

from a regionally accredited institution, or a foreign university with equivalent bachelor's degree requirements is required.

- English proficiency: Proof of English proficiency (<https://gradapply.ku.edu/english-requirements/>) for non-native or non-native-like English speakers is required. There are two bands of English proficiency, including Admission and Full proficiency. For applicants to online programs, Full proficiency is required.

## Graduate Admission

### Prerequisites

Before beginning graduate work, students should have completed a bachelor's degree in chemistry or a related field.

### Application

Applications for admission are accepted online through the Office of Graduate Studies. Applications must include academic transcripts from all post-secondary schools attended, as well as recommendation letters from three individuals familiar with the applicant's academic background and abilities. Additional materials include a resume/CV and personal statement describing the applicant's qualifications and reasons for pursuing a graduate degree in chemistry. Please refer to the Department of Chemistry graduate admissions webpage (<https://chem.ku.edu/graduate-admissions/>) for more information on our department's graduate admissions.

Although the preferred submission deadline is December 1, applications must be received by **April 15** to be considered for admission in the fall semester.

To apply, complete the online graduate application form (<https://gradapply.ku.edu/apply/>) and upload all requested documents.

### Procedure

Completed applications are reviewed by a committee of faculty members from the Department of Chemistry. Offers of admission depend on favorable evaluation of the application materials and an expectation that the student will attain an undergraduate grade-point average of B or higher in chemistry and all other natural science and mathematics courses. Admission to the graduate program is contingent upon completion of a bachelor's degree in chemistry (or a related field) and all other general admissions requirements.

## Ph.D. Degree Requirements

### Course Requirements

The following courses are required for all students in the Chemistry Ph.D. These courses must be completed by the end of the semester of the oral comprehensive exam and must be completed with a grade of B or higher. Note that these are minimum course requirements to be approved to move forward to the oral comprehensive exam.

Code	Title	Hours
<b>Research &amp; Responsible Scholarship Requirement</b>		
CHEM 700	Responsible Scholarship in the Chemical Sciences	1
CHEM 701	Laboratory Safety in the Chemical Sciences	1
<b>Distribution Courses</b>		
Each student must complete a distribution requirement consisting of two courses selected from the following list of introductory courses in the 5 major areas of study:		6

CHEM 720	Fundamentals and Methods of Analytical Chemistry
CHEM 730	Coordination and Organometallic Chemistry
CHEM 740	Principles of Organic Reactions
CHEM 750	Introduction to Quantum Mechanics
CHEM 760	Introduction to Chemistry in Biology

### Advanced Courses

Each student must complete 4 courses at the 700 level or above in chemistry or a related area. The list of courses to be completed must be agreed upon by the student and the student's research advisor and approved by the Graduate Affairs Committee before the beginning of the student's second semester in the program. (Changes to the list can only be made with the approval of the student, the research advisor, and the Graduate Affairs Committee.) Note: These 4 courses represent a minimal set and do not preclude the student, with consultation of the research advisor, from taking additional courses in support of the research effort.

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**Total Hours** 20

These courses must be satisfactorily completed before a student takes the comprehensive oral examination.

## Research Skills & Responsible Scholarship

For students in the Chemistry PhD program, this requirement is satisfied by completion of the courses in the Research Skills & Responsible Scholarship section in the course grid above.

## Oral Comprehensive Examination

A comprehensive oral examination must be completed. The student must prepare a written, original research proposal before the examination is scheduled. The proposal must be presented and defended orally at the examination before a committee of faculty composed in accordance with the Doctoral Student Oral Exam Committee Composition policy (<https://policy.ku.edu/graduate-studies/doctoral-student-oral-exam-committee-composition/>); however, the examination is comprehensive in nature.

The student must be prepared for questions on a range of topics in the discipline. Prior to starting their oral comprehensive examination, the student must complete all the Course Requirements above. Failure to pass the oral examination before the beginning of the fourth year of graduate study leads to ineligibility for support by departmental or research funds.

Upon passing the comprehensive examination, the student becomes a candidate for the Ph.D. degree and is approved to proceed with their dissertation research and project.

## Post-Comprehensive Exam Enrollment

Starting the semester following successful completion of the oral comprehensive exam, students must enroll in accordance with the Office of Graduate Studies' Doctoral Candidacy Policy (<https://policy.ku.edu/graduate-studies/doctoral-candidacy/>). This enrollment includes, but is not limited to, at least 1 dissertation hour or approved dissertation hour equivalent every semester until graduation. For doctoral students in Chemistry, CHEM 900 is an approved dissertation equivalent. Students must enroll in CHEM 900 instead of dissertation hours until they accrue their 18 post-comp enrollment hours. Following that, they may enroll in dissertation hours in accordance with the Doctoral Candidacy policy. See the Doctoral Candidacy policy for more information about this University level requirement.

## Dissertation Defense

The dissertation must be an original work of research that advances the field of Chemistry and complies with the Office of Graduate Studies' Doctoral Dissertation policy (<https://policy.ku.edu/graduate-studies/doctoral-dissertation/>).

Upon approval by the student's committee that the student's dissertation research and written document is complete, the student must defend the dissertation before all committee members in the "final oral examination," or dissertation defense. The final dissertation defense includes a public presentation of the dissertation research by the candidate and concludes with a period of questioning by the committee, faculty, and public in attendance. After posing questions to the student about the dissertation work, committee members deliberate and vote on a grade of Satisfactory or Unsatisfactory. A grade of Satisfactory requires a majority vote, and may be contingent on the completion of specific revisions by a designated due date. The committee may also recommend that a student earning a satisfactory grade be considered for Honors by the Department. Honors are conferred at graduation by the Department, reflecting outstanding work in all aspects of the doctoral program.

For further details, see Doctoral Degree Requirements, Doctor of Philosophy (<https://catalog.ku.edu/graduate-studies/#programstext>) in the Graduate Studies section of the online catalog.

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

- Independently devise, implement and complete research projects.
- Demonstrate knowledge of literature in their field and beyond.
- Understand ethical and safety responsibilities.