

Ph.D. in Chemistry

The Chemistry and Biochemistry Department offers the Doctor of Philosophy degree in Chemistry, which consists of 72 credit hours beyond the bachelor's level (or at least 42 hours beyond the master's level). The program provides opportunities for education and research in areas consistent with the strengths of department faculty and established research initiatives. The program is designed to prepare professional chemists for careers in teaching and research in academic, industrial, and public-sector settings. It contributes to meeting an anticipated need for PhD trained chemists, particularly Hispanics, in industry and in academia.

Admission Requirements

Admissions recommendations will be based upon review of an applicant's academic record and other relevant performance indicators, set out in the following list.

1. Bachelor's degree in Chemistry or in a related science discipline from an accredited institution in the United States or proof of equivalent education in a foreign institution.
2. Official transcripts of all previous academic work.
3. Applicants from countries where English is not the first language are required to demonstrate English proficiency. Please consult the graduate school (<http://catalog.utep.edu/admissions/graduate/graduate-student/>) website for required scores.
4. Three letters of recommendation from individuals who are qualified to assess the applicant's potential for doctoral work.
5. A personal statement setting out the applicant's reasons for wishing to pursue a PhD in Chemistry at UTEP and future career plans.
6. Curriculum vitae.

Degree Requirements

A total of 72 semester credit hours beyond the bachelor's degree will be required for this degree. Students who previously earned a master's degree in Chemistry can, at the discretion of the admissions committee, be awarded up to 30 hours of credit toward the doctoral degree. Each student's case will be individually evaluated to determine whether additional courses may be required.

Students have to pass cumulative exams by the end of their fifth semester in graduate school in order to remain in the chemistry PhD program. In their third year of graduate studies, PhD students will take the comprehensive exam, which consists of two parts: Part A, presentation of the student's research project (written and oral); and Part B, presentation of an original research idea, which should be distinct from the student's research project.

Elective Graduate Courses in Chemistry or Allied Fields-as Approved by the Student's Dissertation Committee

Each student, in accordance with the overall program requirements, will develop a degree plan in consultation with her or his supervisor and the program director appropriate to her or his specific interests and academic needs. A minimum of five PhD doctoral level chemistry lecture courses (15 credit hours) must be taken.

| Code | Title | Hours |
|---|--------------------------------|-------|
| Three of these lecture courses (9 credit hours) must be from the following group of lecture courses: | | 9 |
| CHEM 6318 | Advanced Analytical Chemistry | |
| CHEM 6321 | Advanced Organic Chemistry I | |
| CHEM 6331 | Advanced Biochemistry | |
| CHEM 6351 | Adv Physical Chemistry I | |
| CHEM 6361 | Advanced Inorganic Chemistry | |
| The remaining two lecture courses (6 credit hours) must be from the following group of lecture courses: | | 6 |
| CHEM 6319 | Contemp Topics in Analyt Chem | |
| CHEM 6322 | Advanced Organic Chemistry II | |
| CHEM 6329 | Contemp Topics in Organic Chem | |
| CHEM 6339 | Contemp Topics in Biochemistry | |
| CHEM 6352 | Advanced Physical Chemistry II | |
| CHEM 6359 | Contemp Topics in Phys Chem | |
| CHEM 6369 | Contemp Topics Inorganic Chem | |

Total Hours

15

The doctoral level courses taken must satisfy at least three different areas of chemistry. In addition to the minimum requirement students may take up to three additional doctoral level lecture courses (9 credits) from the chemistry course offerings of from any other science or engineering discipline which will count toward their PhD degree. With the approval of the student's advisor and the program director, a student can take undergraduate

courses in science fields (that have been approved for graduate credit) to fulfill this requirement. Graduate students in such courses will be expected to do additional work appropriate to graduate-level training. If a student does not take additional doctoral level lecture courses beyond the minimum requirement of five, nine credits or graduate research must be taken in addition to the minimum requirement of 34 graduate research credits (see below).

Graduate Seminar

Doctoral student must enroll in Graduate Seminar at least six (6) times. One of these Graduate Seminar courses is designed to promote professional development. It includes a wide variety of topics in the areas of scientific information retrieval, research ethics, oral and written presentation of research results, and writing grant proposals. Attention is also given to providing the students with current information and advice on career opportunities, writing job applications, and how to conduct themselves at interviews. The other five Graduate Seminar credits are from the weekly seminars that feature accounts of current research by outstanding investigators in chemistry and related scientific areas. Graduate Seminar must be taken every semester of residence, but only six Graduate Seminar credits count toward a student's PhD degree. Doctoral students must present their research at least once in the Graduate Seminar to the department as a whole, outlining their personal research objectives and results.

Teaching Practicum

All doctoral students are required to earn two (2) hours of credit teaching undergraduate laboratory courses or team-teaching undergraduate (or graduate) courses with an experienced faculty member. Students are also encouraged to participate in the professional development programs focusing on preparing future faculty and professionals offered through the Graduate School and the Center for Effective Teaching and Learning.

Doctoral Research

Doctoral students must earn credit for at least 34 semester credit hours of original research in some recognized branch of chemistry. The student must work under the guidance of a faculty supervisor. The purpose of the program is to enable the students to develop the skills and knowledge to enable them to carry out an independent program of research. If a student takes only five doctoral level lecture courses, nine additional credits of doctoral research must be taken. If a student takes six or seven doctoral level lecture courses, six or three additional credits of doctoral research must be taken.

Career Practicum

Credit can, with concurrence of their research director, be given for students to spend a semester in another academic or an industrial or governmental environment to permit them to explore possible career options.

Publication Requirement

Each doctoral student must have co-authored at least one peer-reviewed scientific publication. Manuscripts accepted for publication are acceptable. The student's dissertation does not fulfill the publication requirement.

Doctoral Dissertation

All graduates must complete a dissertation that is a substantial work of original scholarship. The dissertation shall contain an introduction that describes the general area of chemical scholarship and clearly identifies the purpose of the investigation. The research shall have led to new knowledge of a standard worthy of publication in a major refereed journal. If previously published articles are to be included in the dissertation, it must be made clear how much the candidate has contributed. Detail of the nature of the work performed should be provided such that it should be possible for a qualified reader to repeat each step. In cases involving potential patents, all or part of the dissertation can be embargoed for specified periods of time, following accepted university policies. Candidates must defend their dissertations successfully. Part of the defense proceeding will be open to the public.

| Code | Title | Hours |
|-----------|--------------|-------|
| CHEM 6398 | Dissertation | 3 |
| CHEM 6399 | Dissertation | 3 |

A copy of the dissertation in PDF or Word electronic format must be submitted to the Graduate School for format check prior to the scheduled defense date. The dissertation, including an abstract not to exceed 350 words, must be prepared according to the Graduate School's thesis and dissertation guidelines available at the Graduate School Web site. The student will receive email confirmation from the Graduate School after the format has been approved. The final Graduate School-approved dissertation must be submitted to the Graduate School in PDF electronic format by the deadline as published in the *Class Schedule*, along with a hard copy of the signature page with original signatures of the dissertation committee members. Information on submission procedures can be found on the Graduate School website. The signature page must be included in the PDF file but it should not be signed.

Degree Plan

Required Credits: 72

| Code | Title | Hours |
|--|-------|-------|
| PhD in Chemistry (All courses require a grade of C or better) | | |
| Nine hours of Core Courses: | | |
| Select three courses from the following: | | |

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|--|--|-----------|
| CHEM 6318 | Advanced Analytical Chemistry | |
| CHEM 6321 | Advanced Organic Chemistry I | |
| CHEM 6331 | Advanced Biochemistry | |
| CHEM 6351 | Adv Physical Chemistry I | |
| CHEM 6361 | Advanced Inorganic Chemistry | |
| Six hours of Core Courses: | | |
| CHEM 6319 | Contemp Topics in Analyt Chem | |
| CHEM 6322 | Advanced Organic Chemistry II | |
| CHEM 6329 | Contemp Topics in Organic Chem | |
| CHEM 6339 | Contemp Topics in Biochemistry | |
| CHEM 6341 | Anal./Model of Bio Structures | |
| CHEM 6352 | Advanced Physical Chemistry II | |
| CHEM 6359 | Contemp Topics in Phys Chem | |
| CHEM 6369 | Contemp Topics Inorganic Chem | |
| Select two courses of the following: | | 6 |
| Graduate Seminar: | | |
| CHEM 6195 | Graduate Seminar (Enroll in six semesters) | 6 |
| Doctoral Research: | | |
| Select thirty-four hours from the following: | | 34 |
| CHEM 6196 | Graduate Research in Chemistry | |
| CHEM 6396 | Graduate Research in Chemistry | |
| Elective Courses: | | |
| Select nine hours from the following: | | 9 |
| CHEM 6195 | Graduate Seminar | |
| CHEM 6196 | Graduate Research in Chemistry | |
| CHEM 6281 | Teaching Practicum - Chemistry | |
| CHEM 6318 | Advanced Analytical Chemistry | |
| CHEM 6319 | Contemp Topics in Analyt Chem | |
| CHEM 6321 | Advanced Organic Chemistry I | |
| CHEM 6322 | Advanced Organic Chemistry II | |
| CHEM 6329 | Contemp Topics in Organic Chem | |
| CHEM 6331 | Advanced Biochemistry | |
| CHEM 6339 | Contemp Topics in Biochemistry | |
| CHEM 6351 | Adv Physical Chemistry I | |
| CHEM 6352 | Advanced Physical Chemistry II | |
| CHEM 6359 | Contemp Topics in Phys Chem | |
| CHEM 6361 | Advanced Inorganic Chemistry | |
| CHEM 6369 | Contemp Topics Inorganic Chem | |
| CHEM 6396 | Graduate Research in Chemistry | |
| Teaching Practicum: | | |
| CHEM 6281 | Teaching Practicum - Chemistry | 2 |
| Dissertation: | | |
| CHEM 6398 & CHEM 6399 | Dissertation and Dissertation | 6 |
| Total Hours | | 72 |