DOCTOR OF PHILOSOPHY IN NATURAL SCIENCES: CHEMISTRY

As part of the Natural Sciences Ph.D. program, students in a primary discipline of Chemistry must meet the minimum Ph.D. program requirements. These can be found within the main program page (https://catalog.umkc.edu/colleges-schools/graduate-studies/phd-programs/) and subsequent requirement pages.

Chemistry

Please see the School of Graduate Studies web page (https://sgs.umkc.edu/academics/nat-sci-coordinators.html) for the contact information for the discipline Coordinator. To view all doctoral and graduate faculty in Chemistry, see this web page (https://sgs.umkc.edu/faculty-and-staff/doctoral-graduate-faculty-lists.html).

Admission Requirements

Applicants must meet both the general and the discipline-specific criteria for admission and be recommended for admission by the faculty review group. Upon approval by the graduate dean, students are admitted to the School of Graduate Studies.

Please see the website (https://sgs.umkc.edu/admissions/natural-sciences-apply.html) for updated application deadlines.

Normally, only applications to full-time academic status will be considered. To qualify for full admission (Note: full admission is unrelated to full-time academic status), applicants are expected to have the equivalent of an American Chemical Society-approved bachelor's degree in chemistry, which includes coursework in general chemistry, analytical chemistry, one year of organic chemistry, inorganic chemistry and one year of physical chemistry requiring calculus and physics as prerequisites. Except for general chemistry, courses in the aforementioned topics should consist of work at the junior and senior level. For example, see UMKC's B.S. Chemistry program in this catalog. Applicants may be admitted as provisional students with a limited number of undergraduate deficiencies. Undergraduate courses included in these requirements must be completed with grades of "C" or higher.

Applicants should take particular note of the physical chemistry requirement.

Applications are only accepted through the online system, and include:

1. Official, confidentially transmitted transcripts.
2. Statement of purpose
3. Three confidentially transmitted letters of recommendation (academic and/or professional).
4. English language proficiency requirement.

Chemistry as a Secondary Discipline

Applicants for the Chemistry secondary discipline are expected to have undergraduate coursework in general chemistry and organic chemistry.

Special Requirements

Placement Examinations

Incoming primary discipline students take placement examinations in analytical inorganic, organic and physical chemistry. Placement examinations are typically administered the week preceding the first week of classes of the fall and spring semesters. Students scoring below the 50th percentile in the organic and/or physical chemistry exams are required to enroll in CHEM 5520R (https://catalog.umkc.edu/search/?P=CHEM%205520R) and/or CHEM 5530 (https://catalog.umkc.edu/search/?P=CHEM%205530), respectively. Enrollment in other graduate organic or physical chemistry courses is not permitted until CHEM 5520R (https://catalog.umkc.edu/search/?P=CHEM%205520R) and/or CHEM 5530 (https://catalog.umkc.edu/search/?P=CHEM%205530), respectively, is(are) successfully completed. These courses may not be counted toward the core coursework requirements. Students must complete all additional coursework required as a result of the placement exam scores by the end of their first three regular semesters.

Research Advisor

Full-time students are to select a research advisor from the doctoral faculty of the Department of Chemistry and a supervisory committee by the end of their first regular (e.g. fall or spring) semester on campus. For chemistry as the primary discipline, the student's supervisory committee shall consist of the research advisor in chemistry and two additional chemistry doctoral faculty, as well as at least one doctoral faculty member from the secondary discipline (if designated).

Core Coursework Requirements

Students with a Chemistry primary discipline will complete a minimum of 43 credit hours for the degree. This includes at least 15 credit hours in the primary discipline, 9 hours outside the primary discipline (decided in consultation between the student and primary advisor, with a minimum of 3 hours taken at the 5500+ level), electives as needed to constitute a minimum of 30 coursework hours, 1 hour of Chemistry seminar, and at least 12 hours of dissertation credit in the primary discipline. Students may be required to take additional courses as outlined by their plan of study.

The Chemistry coursework must include one course from Group A, one course from Group B, a minimum of two electives (6 credit hours) from any graduate chemistry course numbered 5500 to 5589 (excluding CHEM 5520R, CHEM 5530, and CHEM 5540R), and at least 1 credit hour of CHEM 5611. The remaining required Chemistry credit hours may be satisfied with directed studies (CHEM 5590).

Up to 9 credit hours of graduate coursework may be waived, with suitable U.S. graduate transfer credit, upon approval by the chemistry program.

A grade of C+ (2.3) or less in more than two Chemistry courses applicable to the Ph.D. program will result in the recommendation for termination from Ph.D. candidacy.

Primary Discipline Program Requirements

Code	Title	Credits
Minimum of 15 credit hours of coursework within primary area.		15
Group A at least one from:		
CHEM 5531	Classical Thermodynamics	
CHEM 5532	Chemical Kinetics	
CHEM 5533	Quantum Chemistry	
CHEM 5534	Molecular Spectroscopy	
CHEM 5535	Statistical Thermodynamics	
Group B at least one from:		
CHEM 5521R	Mechanisms Of Organic Reactions	
CHEM 5522	Synthetic Organic Chemistry	
Chemistry Electives [1]		
Other:		
Coursework Outside of Primary Discipline (either in designated secondary discipline or multiple other disciplines) [2]		9
Electives (coursework can be from any discipline)		6
CHEM 5611	Chemistry Seminar	1
Dissertation		12
Total Credits		**43**

Total Credit Hours: 43

1 Coursework can include any CHEM course numbered 5500 to 5589 except CHEM 5520R, CHEM 5530, and CHEM 5540R.

2 Minimum of 9 hours with possibility of more required. Decided in consultation with primary advisor.

Secondary Discipline Program Requirements

Students with a Chemistry secondary discipline will complete a minimum of 9 credit hours in the discipline at the 400-level or above, with at least 3 credit hours being at the 5500+ level. CHEM 5520R and CHEM 5530 may be used to satisfy the "400-level or above" requirement, but not the "5500+ level" requirement. CHEM 5590, CHEM 5599, and CHEM 5699 may not be used to satisfy the requirements.

Code	Title	Credits
Minimum of 9 credit hours from the Department of Chemistry, at the 400-level or above. At least 3 hours must be at the 5500-level or above. [3, 4]		9
Total Credits		**9**

3 CHEM 5590, CHEM 5599, and CHEM 5699 do not count toward satisfying these requirements.

4 CHEM 5520R and CHEM 5530 can satisfy the 400-level requirement but not the 5500-level requirement.

Seminar

Students are required to attend and participate in all regularly scheduled and special Chemistry Department seminars and colloquia. Students are required to present a one-hour chemistry seminar (CHEM 5611 (https://catalog.umkc.edu/search/?P=CHEM%205611)) during their second year following full admission to the Ph.D. program, based on their dissertation research project. This seminar will include a thorough review of the literature pertinent to their project and a description of the objectives, the proposed methodology and the significance of this research. An abstract is to be posted and distributed one week prior to the presentation date.

Time Constraints and Financial Support

Students must complete all requirements for their degree within seven years from the date of full admission to the Ph.D. program. Under compelling circumstances and on the written recommendation of a majority of the supervisory committee, a single extension for up to one year may be requested for approval by the dean of the School of Graduate Studies. Full-time (as defined in the current UMKC catalog) Ph.D. students may receive financial support (in the form of fellowships or teaching assistantships) for a maximum of five years. Students from countries not having English as their

first language, and who are to be supported as GTAs, must meet the UMKC standards for international students to become certified as GTAs. Full information on that process can be found here: Policy on Award of Teaching Assistantships (https://catalog.umkc.edu/general-graduate-academic-regulations-information/international-graduate-student-academic-regulations/).

Dissertation

All supervisory committee members are to receive a final draft of the dissertation for approval of form and content at least two weeks before submission to the dean of the School of Graduate Studies for certification. Candidates should submit preliminary drafts well in advance of this deadline. After the dissertation is certified for acceptance, the student must present an oral defense of his/her research in the form of a dissertation seminar. The supervisory committee will make a final determination of the acceptability of the dissertation immediately following this presentation. Only minor changes may be made to the dissertation at this point.

Expectations for Interdisciplinary Work

Chemistry as a Primary Discipline

Students develop and pursue a plan of study that includes coursework from the primary discipline and co-discipline(s). The interdisciplinary nature of the student's program is emphasized in the comprehensive examination, which includes material from all disciplines in the plan of study.

Chemistry as a Secondary discipline

The Department of Chemistry will cooperate with the student's primary discipline in assessing student progress.

Comprehensive Examination Guidelines

Chemistry as Primary Discipline

All students are required to prepare a research proposal describing a research project. An abstract is to be posted and distributed, and a written copy of this proposal (in standard NSF or NIH format) given to all members of the examination committee (consisting of the student's supervisory committee and others selected by the Dean of the School of Graduate Studies) at least one week prior to presentation in a proposal seminar. This seminar must be presented to all members of the examination committee by the end of the second year following full admission to the Ph.D. program.

A written comprehensive examination will be prepared and administered by the examination committee before completion of the student's third year following full admission to the Ph.D. program. This examination will be based on the student's coursework and on general knowledge in all areas of his/her specialization. All efforts will be made to emphasize the multidisciplinary nature of the student's program in this examination. If the student fails the written portion of the comprehensive examination, he/she may petition the examination committee to allow for a single opportunity to retake it. This second examination must be completed no earlier than 12 weeks and no later than six months from the date of completion of the first examination.

The research proposal and the written comprehensive exam constitute parts of the comprehensive exam. A PhD student may elect to enroll in 3 credit hours of CHEM 5590 (https://catalog.umkc.edu/search/?P=CHEM%205590), the grade for which will be CR/NC-only and will be based on the outcome of the comprehensive exam; retroactive enrollment is allowed. A PhD student with chemistry as the primary discipline, who has passed the comprehensive exam can have up to 9 credit hours of CHEM 5590 (https://catalog.umkc.edu/search/?P=CHEM%205590)/CHEM 5599 (https://catalog.umkc.edu/search/?P=CHEM%205599)/ CHEM 5699 (https://catalog.umkc.edu/search/?P=CHEM%205699) counted towards a non-thesis MS degree in Chemistry.

Chemistry as a Secondary discipline

The comprehensive examination will be determined by the student's primary discipline in cooperation with the secondary discipline(s).