

DOCTOR OF PHILOSOPHY WITH A MAJOR IN CHEMISTRY

The goal of the doctoral program is to provide proficient knowledge in a specialized area of chemistry, with particular emphasis being placed on original, independent, and scholarly research. Students working toward a PhD must complete fifteen credit hours of courses and a series of seminar courses. Students should complete all course requirements in the first year of graduate study and present a seminar in the second year. The PhD candidacy examination consists of a series of examinations in the major area based on a reading assignment from the recent literature and an original research proposal to be completed by the end of the second year. Independent research for the PhD is demonstrated by completion of published work.

Chemistry Website

Code	Title	Credit Hours
Coursework from areas of Specialization ^{1,2,3}		6
Seminars		
CHEM 8000	Seminar in Chemistry	1
CHEM 7001	Introduction to Research	3
CHEM 8001	Faculty Seminar	1
CHEM 8002	Information Resources for Chemists and Biochemists	2
CHEM 8003	Student Seminar ²	2
Doctoral Thesis ⁴		6
Doctoral Minor ^{2,3}		9
Qualifying Examinations ⁵		
Candidacy Requirements ⁶		
Total Credit Hours		30

¹ In addition, to the 9 hours of courses required for the minor, a further 6 hours of course work must be completed. These 15 hours of course work must encompass at least two areas of specialization and at least two courses must be core courses from traditional specializations (inorganic chemistry, analytical chemistry, organic chemistry, physical chemistry, biochemistry, and polymer chemistry).

² Must be completed with a grade of B or higher

³ All courses must be letter-grade and students must have a 3.0 GPA overall and 3.0 GPA for the courses used towards the minor

⁴ Students will typically have far more credit for doctoral thesis than this.

⁵ Students must successfully complete a set of literature examinations. This is usually done in their 1st year.

⁶ To gain candidacy, students must prepare and defend in front of their doctoral advisory committee an original research proposal and a summary of research progress. This is usually done before the end of their 2nd year.

GPA Requirement

- Students must have a GPA greater than 2.5 based on two or more classes that count towards the degree after their first semester in

order to continue and take literature exams. Students with a GPA less than this must petition the School's graduate program committee to continue in the program

- Students must have GPA greater than 2.7 based on four or more classes that count towards the degree after their second semester to continue in the program. Students with GPA less than will need to acquire approval to continue in the program

Other Requirements

- Annual written progress reports describing the original research
- Annual meetings with their doctoral advisory committee to review progress
- A review, six months prior to thesis defense, of the proposed contents for the thesis
- Defense of a thesis describing original research

Core and elective courses for commonly pursued traditional areas of specialization are listed below. However, alternative course combinations, corresponding to other areas of specialization, are strongly encouraged. Course combination for other areas of specialization should be developed and approved in consultation with the faculty research advisor and the director of graduate studies. Examples of other areas of specialization include Biophysical Chemistry, Chemical Biology, Computational and Theoretical Chemistry, Energy and Catalysis, Metallobiochemistry, Materials Chemistry and Nanoscience.

Code	Title	Credit Hours
Inorganic Chemistry Specialization		
Core		
CHEM 6170	Inorganic Chemistry I	3
CHEM 6172	Physical Methods in Inorganic Chemistry	3
Elective		
CHEM 6171	Inorganic Chemistry II	3
CHEM 6181	Chemical Crystallography	3
CHEM 6182	Chemistry of the Solid State	3
CHEM 6183	Organometallic Chemistry	3
CHEM 8813	Special Topics in Inorganic Chemistry	3
Analytical Chemistry Specialization		
Core		
CHEM 6271	Analytical Chemistry I	3
CHEM 6281	Mass Spectrometry	3
Elective		
CHEM 6272	Analytical Chemistry II	3
CHEM 6273	Analytical techniques for chemistry and biology	3
CHEM 6282	Chemical Sensors	3
CHEM 6283	Electroanalytical Chemistry	3
CHEM 6284	Environmental Analytical Chemistry	3
CHEM 6285	Analytical Spectroscopy	3
CHEM 6287	Scanned Probe Techniques	3
CHEM 6288	Analytical Separations	3
CHEM 8823	Special Topics in Analytical Chemistry	3
Organic Chemistry Specialization		
Core		
CHEM 6370	Organic Reaction Mechanisms	3

CHEM 6371	Identification of Organic Compounds	3
CHEM 6372	Physical Organic Chemistry	3
Elective		
CHEM 6373	Organic Synthesis	3
CHEM 6381	Advanced Organic Synthesis	3
CHEM 6382	Computational Methods in Organic Chemistry and Biochemistry	3
CHEM 8833	Special Topics in Organic Chemistry	3
Physical Chemistry Specialization		
Core		
CHEM 6481	Statistical Mechanics	3
	or CHEM 6755 Theoretical Chemistry of Polymers	
CHEM 6491	Quantum Mechanics	3
	or CHEM 64Quantum Chemistry and Molecular Spectroscopy	
Elective		
CHEM 6471	Chemical Thermodynamics and Kinetics	3
CHEM 6482	Chemical Kinetics and Reaction Dynamics	3
CHEM 6483	Chemistry of Electronic Organic Materials	3
CHEM 6484	Chemistry of Optical Organic Materials	3
CHEM 6485	Computational Chemistry	3
CHEM 6492	Molecular Spectroscopy	3
CHEM 8843	Special Topics in Physical Chemistry	3
Biochemistry Specialization		
Core		
CHEM 6571	Enzymology and Metabolism	3
CHEM 6572	Macromolecular Structure	3
CHEM 6573	Molecular Biochemistry	3
Elective		
CHEM 6501	Biochemistry I	3
CHEM 6502	Biochemistry II	3
CHEM 6581	Protein Crystallography	3
CHEM 6582	Biophysical Chemistry	3
CHEM 6583	Drug Design and Discovery	3
CHEM 6584	Contemporary Biochemistry	3
CHEM 6756	Discovery of Signaling Molecules	3
CHEM 6760	Biocatalysis and Metabolic Engineering	3
CHEM 8853	Special Topics in Biochemistry	3
Polymer Chemistry Specialization		
Core		
CHEM 6750	Preparation and Reaction of Polymers	3
CHEM 6752	Polymer Characterization	4
Elective		
CHEM 6751	Physical Chemistry of Polymer Solutions	3
CHEM 6757	Advanced Polymer Chemistry	3
CHEM 8873	Special Topics in Polymer Chemistry	3