

CHEMISTRY: CHEMISTRY EDUCATION (PH.D.)

<https://ceps.unh.edu/chemistry/chemistry-phd>

Description

The **Ph.D. Option in Chemistry Education** is designed for students who plan a career at the interface of Science and Education (e.g. discipline-based education research, educational program assessment, STEM curricular design, chemistry teaching, etc.). The rigorous program involves coursework in Chemistry, Psychology and Education and original research in Chemistry Education, leading to the submission of a dissertation. Students with a research-based MS (or equivalent) will be admitted directly to the program. Students with a BS (or equivalent) will first obtain an MS degree, carrying out original laboratory-based research with a faculty mentor, and submitting a thesis. The program has a focus on developing strong writing and oral communication skills. Financial support is typically available through a teaching assistantship.

Requirements

Ph.D. Option in Chemistry Education

- Demonstration of a broad understanding of undergraduate chemistry by passing a series of basic examinations or satisfactory performance in approved courses.
- Demonstration of chemistry laboratory research proficiency by completing a thesis-based M.S. (or equivalent) either at UNH or another university.
- Satisfactory performance in a series of courses in science education, cognition, and qualitative/quantitative research methods.
- Attendance at Department seminars and research Lunch Talks.
- Satisfactory presentation of a Research Progress Report in the second year of residence
- Present a department seminar on a topic unrelated to dissertation research in the third year of residence.
- Preparation and oral defense of an original research prospectus in the third year of residence. Successful completion of the research proposal defense enables the student to advance to candidacy.
- Preparation, public presentation, and oral defense of a written dissertation.
- GPA of 3.0 or higher required to graduate.
- Please contact the department for additional information on this option.

Faculty Research Advisor and Dissertation Committee

Students select a research advisor during the first semester in the program after interviewing at least three faculty members. During each semester thereafter, students conduct independent research under the supervision of the Faculty Research Advisor. In the second year of residence and before the Research Progress Report, a dissertation committee is selected. This committee evaluates the student's Research Progress Report and the Research Proposal Defense. Once the Research Proposal Defense has been passed and the student advances to candidacy, a fifth committee member is selected and added to the Dissertation Committee to evaluate the Dissertation Defense.

Code	Title	Credits
Required department courses		
CHEM 802	Critical and Creative Thinking for Chemists	1
CHEM 992	Graduate Writing Portfolio	1
CHEM 997	Seminar	1
3 Chemistry CORE courses in a sub-discipline recommended by research advisor or MS degree		
Quantitative Stats		
Choose 1 course from:		
PSYC 705	Tests and Measurement	4
PSYC 805	Research Methodology and Statistics I	4
PSYC 806	Research Methodology and Statistics II	4
PSYC 907	Research Methods and Statistics III	4
EDUC 981	Quantitative Inquiry, Methods and Techniques of Educational Research	4
MATH 835	Statistical Methods for Research	3
MATH 839	Applied Regression Analysis	3
Quantitative Stats		
Choose 2 courses from:		
SOC #894	Evaluation Research	4
EDUC 982	Qualitative Fieldwork & Data Analysis	4
Cognition		
Choose 1 course from:		
PSYC 783	Cognitive Development	4
PSYC 710	Visual Perception	4
PSYC 712	Psychology of Language	4
PSYC 731	Brain and Behavior	4
PSYC 914	Advanced Seminar in Cognition	4
PSYC #917	Advanced Seminar in Sensory and Perceptual Processes	4

Student Learning Outcomes

All graduates will be able to:

- Comprehend, plan and conduct advanced research under the guidance of a research advisor while developing their intellectual independence that demonstrates scholarship.
- Develop the ability to design and conduct experiments safely, as well as to analyze and interpret data.
- Develop and demonstrate oral and written communication skills to enable effective communication in all aspects of their professional career. This would include presentations, developing papers for published works and grant writing.
- Develop and apply theories, methodologies, and knowledge to address questions and resolve problems in the field of chemistry and in associated interdisciplinary projects.
- Develop the capacity of function and work effectively alone and in a team environment.
- Develop professional and ethic responsibility and follow this throughout their careers in the field or in academia.
- Investigate research ideas related to the content, context, and human experience of chemistry learning.
- Understand and implement research methodologies from education, psychology, and sociology.