

Graduate Program in Chemical Education Research

The graduate program in chemical education research (CER) at the University of Iowa is designed to prepare students to be scholars of teaching and learning in chemistry contexts. Chemical education Ph.D. students complete coursework in the traditional sub-disciplines of chemistry in order to develop disciplinary expertise. They also take courses in educational research methods, learning theory, and curriculum development to support their research on the teaching and learning of chemistry. For students who wish to gain additional experience in curriculum development or research project in a traditional sub-discipline of chemistry, we offer a cognate option that can be tailored to meet individual students interests.

Degree requirements – Ph.D. in chemistry education research

Proficiency exams

All graduate students in the chemistry Ph.D. program must demonstrate basic proficiency in 3 sub-disciplines of chemistry (analytical, biochemistry, inorganic, organic, physical) (see Guidelines for Graduate Study in Chemistry at <http://www.chem.uiowa.edu/graduate> for details)

Coursework

All students in the chemistry Ph.D. program must complete a minimum of 11 semester hours of graduate-level coursework. Coursework is determined in consultation with the faculty advisor and graduate advisory committee and is targeted to support the students' specific research goals.

Chemistry coursework

- Students may select from any graduate-level chemistry courses in analytical, biochemistry, inorganic, organic or physical chemistry (see <http://www.chem.uiowa.edu/graduate> for details about chemistry coursework)
- CER students are encouraged to select a “cognate” area (area of emphasis in a traditional chemistry discipline) in order to develop greater expertise in one of the traditional areas of chemistry

Education coursework

- CER students typically take at least one course each in qualitative research methods, quantitative research methods and learning theory
- Examples of courses that may be taken by CER students include:
 - EALL: 5150 Introduction to Educational Research
 - PSQF: 6200 Educational Psychology
 - PSQF: 243 Intermediate Statistical Methods
 - PSQF:6243 Qualitative Educational Research Methods
 - EDTL: Assessment in Teaching and Research

Comprehensive Exam

During their fourth semester of graduate study, all chemistry Ph.D. students complete a two-component comprehensive exam. This includes:

- Writing and defending a summary of research completed to date
- Writing and defending an original research proposal that is unrelated to the student's dissertation research

CER students typically prepare an original research proposal related to research on the teaching and learning of chemistry.

Cognate Project (optional)

For students who wish to develop greater expertise within a specific sub-discipline of chemistry, students may elect to participate in a cognate project, that is a short research or curriculum development project in analytical, biochemistry, inorganic, organic or physical chemistry. As they design and carry out their cognate project, students are mentored by both their CER advisor and a faculty member working in a traditional area of chemistry (cognate mentor). Students may select from two options:

- **Curriculum development project in cognate area:** In collaboration with the CER advisor and the cognate area mentor, the CER student develops a laboratory or other curricular activity for an undergraduate chemistry course at the University of Iowa
- **Cognate research project:** Working in the research lab of the cognate mentor, the student completes a short (one semester or one summer) research project in a traditional sub-discipline of chemistry

If you are interested in learning more about the graduate program in chemical education research at the University of Iowa, please contact Dr. Nicole Becker (nicole-becker@uiowa.edu) or Dr. Renee Cole (renee-cole@uiowa.edu).