

## ***The Ph.D. Candidate in Chemistry will:***

### **2. Effectively engage undergraduate students as Teaching Assistants and consistently practice laboratory safety.**

**In particular:**

**(Same as M.S. Candidate)**

- a. All students will demonstrate comprehensive knowledge of the NIU Chemical Hygiene Plan, participate in lab safety training, and consistently practice and promote all safety policies in their assigned teaching and research laboratories.
- b. 90% of students will apply sound pedagogical practices as laboratory or recitation instructors and will be considered effective instructors by at least 70% of their assigned undergraduate students.

### **3. Communicate published research using clear and effective language. In particular:**

**(Same as M.S. Candidate, except expectation is 100%, rather than 90%)**

- a. All students will be able to give a seminar in the primary field of study that organizes, accurately presents, and explains the significance of the published works of others.

### **5. Demonstrate advanced proficiency within the field of study and conduct research that culminates in a dissertation. In particular:**

- a. All Ph.D. students will demonstrate knowledge proficiency at the 60<sup>th</sup> percentile composite norm level in general chemistry and two undergraduate chemical subject areas, with at least one subject area in the field of study.
- b. All Ph.D. students will demonstrate an advanced understanding of the primary field of study.
- c. All Ph.D. students will articulate a research problem, discuss its potential and limits with respect to theory, knowledge, or practice within a field of study, and formulate hypotheses, concepts, experimental designs, and/or techniques beyond the current boundaries of knowledge within the field of study.
- d. All Ph.D. students will communicate complex ideas in a clear and understandable manner.
- e. All Ph.D. students will conduct research that makes a substantive contribution to society and advances the field of study (e.g. grant writing, poster/oral presentations at local/regional/national meetings, manuscript writing/publication).

### **6. Demonstrate breadth of learning experiences. In particular:**

- a. All Ph.D. students will engage in collaborative/interdisciplinary research experiences and/or provide evidence of broad professional development through diverse activities (workshops, professional networking (e.g. LinkedIn), professional committees, symposia, seminars, internships, RCR training).
- b. All Ph.D. students will effectively mentor undergraduate research students.

### **7. Demonstrate professional conduct and ethics. In particular:**

- a. All Ph.D. students will practice, encourage and promote ethical, professional, and responsible research conduct.

**Direct Assessments:**

- SLO 2a: CHEM 690, undergraduate response, Inspections by Laboratory Safety Team.
- SLO 5a: ACS Standardized Exams.
- SLO 5b: Qualifying Exam, Written Dissertation.
- SLO 5c: Candidacy Exam, Oral Defense of Research, Written Dissertation.
- SLO 5d: Candidacy Exam, Oral Defense of Research, Written Dissertation.
- SLO 5e: Evidence includes grant writing, poster/oral presentations at local/regional/national meetings, manuscript writing/publication.
- SLO 6a: Evidence includes collaborative experiences, workshops, professional networking (e.g. LinkedIn), professional committees, symposia, seminars, internships.
- SLO 6b: Mentoring and Professional Conduct Survey (Questions 1 through 6).
- SLO 7a: Mentoring and Professional Conduct Survey (Question 7). Also, CITI training with evidence of course(s) completion (required of students supported by NIH/NSF grants) and/or RCR Completion Certificate.

**Indirect Assessments:**

- External evaluation of dissertations (Graduate School).
- Dean's designee reports.
- Employment within 3 months of graduation.