Chemical & Environmental Engineering

Assessment Plan for the PhD Program

Program Learning Outcomes

The Ph.D. program in Chemical and Environmental Engineering will produce graduates who:

1. Have comprehensive knowledge of the factual information, theoretical principles, and methodological approaches in the core areas including thermodynamics; transport phenomena (mass, energy, and heat transfer); chemical reaction kinetics and reactor design; and are able to apply knowledge of these core areas to address complex problems in biotechnology, advanced materials and nanotechnology, air quality, water quality, and renewable energy.

   **Assessment Methods:**
   Assignments and examinations in core course sequences CEE 200 Advanced Computational Methods, CEE 206 Advanced Chemical Engineering Thermodynamics, CEE 202 Transport Phenomena, and CEE 204 Advanced Kinetics and Reaction Engineering; written comprehensive examination(s) in at least one core area.

2. Are able to (1) critically read, understand, and evaluate scholarly literature; (2) integrate and synthesize ideas; (3) identify and evaluate novel and relevant research questions; (4) develop appropriate and effective research strategies; (5) communicate clearly and effectively.

   **Assessment Methods:** Oral presentation and written proposal of PhD work submitted as part of the Advancement to Candidacy (ATC) exam. Preparation of PhD dissertation and public defense.

3. Are able to (1) apply appropriate, responsible, and ethical research methods; (2) evaluate, analyze, and interpret evidence; (3) develop and sustain evidence-based arguments; (4) convey findings clearly and effectively; (5) identify broader implications of findings; (6) produce publishable results.

   **Assessment Methods:** Annual progress reports; presentations at professional meetings, group meetings, and the annual graduate student symposium; dissertation defense.

4. Are able to produce acceptable results within reasonable timeframes.

   **Assessment Methods:** Successful completion/passing of preliminary exam (end of year 1); Advancement to candidacy by end of year 3 (although highly encouraged by end of year 2 due to financial implications and academic advantage of prompt advancement); publication of research results;
presentation at professional meetings, and degree conferral within 3 years after advancement (assuming a full-time student).

5. Are effective teachers.

   **Assessment Methods:** Assignments and examinations in teaching practicum course (CEE 302); student teaching evaluations.

6. Are capable professionals.

   **Assessment Methods:** Attendance and participation in departmental colloquium series, conference presentations, submission (and receipt) of fellowship and grant awards, publications, job placement.

7. Are satisfied graduates.

   **Assessment Method:** Exit interview.
Assessment Plan for the MS Program (Thesis Option)

Program Learning Outcomes

The goal of the Master's program in Chemical and Environmental Engineering is the production of graduates who:

1. Have comprehensive knowledge of the factual information, theoretical principles, and methodological approaches in the core areas including thermodynamics; mass, energy, and heat transport; chemical reaction kinetics; and are able to apply knowledge of these core areas to address complex problems in biotechnology, advanced materials and nanotechnology, air quality, water quality, energy, or molecular theory modeling.

   **Assessment Methods:** Assignments and examinations in core course sequences CEE 200 Advanced Computational Methods, CEE 206 Advanced Chemical Engineering Thermodynamics, CEE 202 Transport Phenomena, and CEE 204 Advanced Kinetics and Reaction Engineering.

2. Are able to (1) read and understand scholarly literature; (2) integrate and synthesize ideas; (3) evaluate research questions and research strategies; (4) communicate clearly and effectively.

   **Assessment Method:** Presentations at the annual graduate student symposium; oral presentation and written thesis submitted at conclusion of graduate work.

3. Are able to (1) apply appropriate, responsible, and ethical research methods; (2) evaluate, analyze, and interpret evidence; (3) develop and sustain evidence-based arguments; (4) convey findings clearly and effectively; (5) identify broader implications of findings; (6) produce publishable results.

   **Assessment Methods:** Annual progress reports; presentations at group meetings and the annual graduate student symposium; thesis defense.

4. Are able to produce acceptable results within reasonable timeframes.

   **Assessment Methods:** Completion of coursework and thesis within two years (assuming a full-time student).

5. Are capable professionals.

   **Assessment Methods:** Attendance and participation in departmental colloquium series, conference presentations, submission (and receipt) of fellowship and grant awards, publications, job placement.

6. Are satisfied graduates.

   **Assessment Method:** Exit interview.
Assessment Plan for the MS Program
(Comprehensive Exam Option)

Program Learning Outcomes (PLO)

The Master’s program in Chemical and Environmental Engineering will produce graduates who:

1. Have comprehensive knowledge of the fundamentals of chemical and environmental engineering. Specifically, attainment and understanding of factual information, theoretical principles, and methodological approaches in such core areas as thermodynamics; mass, energy, and heat transport; chemical reaction kinetics.

   **Assessment Methods:** Assignments and examinations in required core course sequences CEE 200 Advanced Computational Methods, CEE 206 Advanced Chemical Engineering Thermodynamics, CEE 202 Transport Phenomena, and CEE 204 Advanced Kinetics and Reaction Engineering, and 4 additional graduate-level regular lecture courses.

2. Are able to produce acceptable results within reasonable timeframes.

   **Assessment Method:** Completion of coursework and successful passing of a comprehensive exam within two years.

3. Are capable professionals.

   **Assessment Methods:** Attendance and participation in departmental colloquium series, job placement.

4. Are satisfied graduates.

   **Assessment Method:** Exit interview.