

# **Graduate Program in Chemical and Biochemical Engineering**

## **Master of Science Degree Learning Goals and Assessment**

### **Adopted January 2012**

The Graduate Program in Chemical and Biochemical Engineering trains Master of Science students at an advanced level in science and engineering related to Chemical Engineering. The graduate program also meets the expectations and standards as outlined by the professional organization providing specialized accreditation for the discipline.

#### **Learning Goal 1 for Students: Attain mastery of the essential aspects of practice and research in the field of Chemical Engineering**

Assessment of graduate student achievement of Goal 1:

- Grades in graduate courses (core courses and electives)
- Review by faculty of student progress with close advising and mentoring
- Capstone paper or project or a research thesis
  - Assessment of student's performance by committee of graduate faculty members
- Continuation of graduate studies or placement in a professional position that requires an understanding of the norms and practices of Chemical Engineering, as well as competency in the technical aspects of performing the work associated with Chemical Engineering.

Roles of the program in helping students to achieve Goal 1:

- Defined curriculum of core courses required for all graduate students in the program:
  - Advanced Transport Phenomena I (155:501)
  - Advanced Transport Phenomena II (155:502)
  - Analytical Methods in Chemical and Biochemical Engineering (155:507)
  - Advanced Chemical Engineering Thermodynamics (155:511)
  - Kinetics, Catalysis & Reactor Design (155:514)
- Evolving set of graduate elective courses taught by program faculty covering a wide range of advanced Chemical Engineering topics
- Life science course requirement ensuring that all graduate students in the program gain a broader perspective by being exposed to biologically related course material
- Departmental seminar series offered in the Fall and Spring required for all graduate students (graduate seminar course 155:601 and 602) so that they are knowledgeable regarding current research in the field.
- Close advising to assure that students are being prepared in a coherent and academically rigorous way
- Effective monitoring of student progress
- Evaluations of teaching effectiveness of instructors in graduate courses
  - If effectiveness is below expectations, work with instructors to improve effectiveness
- Periodic review of curricular offerings, degree requirements and assessment tools
  - By program faculty
  - In consultation with the office of the dean of the graduate school and/or the unit dean

## **Learning Goal 2 for Students: Engage in and conduct original research**

Assessment of graduate student achievement of Goal 2:

- Assessment of quality of Master's thesis (for Master's degrees with thesis)
  - Public defense of thesis
  - Critical reading of thesis by committee of graduate faculty members
  - Submission and acceptance of peer-reviewed articles and conference papers
- Grade in a project-based research course (for non-thesis Master's degrees)
  - Critical reading of final project report by research advisor (course instructor)
- Achievement of students as evidenced by continuation of graduate studies or professional placement.

Role of the program in helping graduate students to achieve Goal 2:

- Provide early introduction to research methods and opportunities for research
- Provide opportunities to present research and receive feedback
- Provide comprehensive advising and assist in the identification of mentors

## **Learning Goal 3 for Students: Prepare to be professionals in Chemical Engineering**

Assessment of graduate student achievement of Goal 3:

- Participation in internships and other work tailored to career goals, assessed accordingly
- Collection of data on professional placement data or continuation of graduate studies
- Review by external advisory committees, both inside of and external to the academy.

Role of the program in helping students achieve Goal 3:

- Host professional development and career exploration activities
- Develop internship opportunities
- Host external advisory committees

**The leadership of the Chemical and Biochemical Engineering graduate program** will regularly review the structure and content of the program and the feedback received from assessments and surveys. These reviews will be used to provide the best possible education to students that meet current needs for professionals in Chemical Engineering.