

**Graduate Program in Industrial and Systems Engineering**  
**Ph.D. Degree Learning Goals and Assessment**  
**Adopted January 2012**

The doctoral program in Industrial & Systems Engineering trains students at the highest level to assume leadership roles in technical fields including product design and manufacturing, automation, manufacturing processes, statistical models and quality engineering that address issues related to Industrial & Systems Engineering. The Department is firmly committed to offer the best possible education and faculty members' dedication to excellence in teaching and research and professional service in industrial engineering sets a standard for the students to follow in meeting the increasingly complex demands of their professional careers.

**Learning Goal 1 for Students: To prepare students to apply their creativity in solving complex engineering problems, to approach unstructured problems, to synthesize and design potential solutions and to evaluate the impact of their solutions in the broader context of the organization or society.**

Assessment of student achievement of Goal 1:

- Grades in graduate courses
- Placement in positions and careers that require ability and scholarship in those aspects of the product design and manufacturing, automation, manufacturing processes, statistical models and quality engineering that address issues related to Industrial & Systems Engineering.
- Qualifying examinations assessing depth and breadth of knowledge

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

- Close advising to assure that students are being prepared in a coherent and academically rigorous fashion
- 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: To provide students with analytical and computational skills to operate effectively within the industrial engineering domain through advanced education in problem representation, abstraction and validation.**

Assessment of student achievement of Goal 2:

- Grades in graduate courses
- Qualifying examinations assessing depth and breadth of knowledge
- Review by faculty of student progress with close advising and mentoring

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

- 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 3 for Students: Attain marked ability, scholarship, research and leadership skills concerning factors that contribute to Industrial & Systems Engineering**

Assessment of student achievement of Goal 3:

- Grades in graduate courses
- Qualifying examinations assessing depth and breadth of knowledge
- Review by faculty of student progress with close advising and mentoring
- Placement in positions and careers that require ability and scholarship in those aspects of the product design and manufacturing, automation, manufacturing processes, statistical models and quality engineering that address issues related to Industrial & Systems Engineering.

Role of the program in helping students to achieve Goal 3:

- Close advising to assure that students are being prepared in a coherent and academically rigorous fashion
- Effective monitoring of student progress
  - Includes annual reports on research progress from both the student and the student's committee chair
- 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 4 for Students: Engage in and conduct original research**

Assessment of graduate student achievement of Goal 4:

- Preparation of and defense of Ph.D. dissertation proposal
- Assessment of quality of Ph.D. dissertation:
  - Public defense of dissertation
  - Critical reading of dissertation by committee of graduate faculty members and a committee member from outside of the Industrial & Systems Engineering graduate program.
  - Submission and acceptance of peer-reviewed articles and conference papers based on the dissertation
- Achievement of students as evidenced by professional placements, selection for conference presentations, peer-reviewed publications and individual grant attainment

Role of the graduate program in helping students achieve Goal 4:

- Provide early introduction to research methods and opportunities for research
- Provide opportunities to present research and receive feedback
- Maintain adequate funding levels through the research phase
- Provide comprehensive advising and assist in the identification of mentors

**Learning Goal 5 for Students: To prepare students to function as professionals by fostering their ability to form, facilitate, lead and coordinate, and to understand organizational processes and behavior.**

Assessment of graduate student achievement of Goal 5:

- Review evidence of papers presented, publications and professional networking
- Evaluations of teaching effectiveness of graduate student instructors
- Collection of placement data
- Review by external advisory committees, both inside of and external to the academy.
- Survey alumni

Role of the program in helping students achieve Goal 5:

- Encourage participation in professional development programs in such areas as library use, course management software, interview skills, presentation skills, use of research tools, training in the responsible conduct of research, and proposal writing
- Host discipline-specific training when appropriate
- Teach students how to do assessments in their future professional capacities
- Provide flexible options for students with interdisciplinary interests related to Industrial & Systems Engineering
- Develop or enhance programs related to job and networking skills, including activity in professional societies and preparation for necessary certifications
- Acquaint students with non-academic career opportunities

**The leadership of the Industrial & Systems 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 in order to meet the needs for highly trained individuals in the product design and manufacturing, automation, manufacturing processes, statistical models and quality engineering that address issues related to Industrial & Systems Engineering.