MISSION:

The mission of the Department of Mechanical and Industrial Engineering is to provide an education that builds within students a solid foundation in mechanical and industrial engineering principles, expands the reasoning, communication and problem solving abilities of students, and prepares graduates who have the motivation and ability for lifelong growth in their professional careers; and to develop and maintain a world-class research program in selected focus areas within mechanical and industrial engineering that complements the educational mission and addresses the evolving needs of industry and society.

The goal of the Industrial Engineering Graduate Program at both the M.S. and PhD levels is to educate students in the disciplines of Industrial Engineering, in more depth and breadth than is possible at the B.S. level. This preparation will allow the graduate to utilize contemporary methods at an advanced level during a professional career in practicing engineering, teaching, or research. Each student's plan of study is based on her/his background and career objectives as well as on sound academic practice. The Industrial Engineering Program faculty members have teaching and research expertise in areas related to human factors, operational research, reliability systems and wind power management.

ADMISSION PROCESSES AND CRITERIA:

Students from U.S. universities may be admitted from an ABET accredited baccalaureate curricula in any engineering discipline or the mathematical, physical, or computer science disciplines with a minimum undergraduate grade point average of 3.00 (based on 4.00) and/or an acceptable score on the Graduate Record Examination (minimum score of 650 Q and 4.5 W). Mathematical background should be essentially equivalent to that of a B.S. in engineering.

Applicants from non-U.S. institutions must meet equivalent conditions for consideration for regular admission. Students with lesser qualifications may be considered for conditional admission. Students from business or social science programs with mathematical preparation similar to the engineering student are considered for either regular or conditional admission. The student on conditional status must achieve regular status within two sessions of initial registration by attaining an acceptable grade point average and/or other specified conditions or be dismissed. Available resources may limit admission.

Entering students need strong verbal and written skills in the English language and a background in computer programming, (e.g., C++, C, VB), probability, statistics, and mathematics equivalent to that required in an accredited undergraduate engineering program. Other background requirements are helpful depending upon the emphasis of the individual's program of study. Students with insufficient background are expected to take additional courses beyond those normally required in a plan of study.
The applications were reviewed by faculty. The selection metrics are (a) GPA, (b) GRE test scores, (c) research and scholarship experience, (d) letters of recommendation. The entering IE graduate students have an average GPA comparable to all students entering the UI Programs, e.g. 3.17 vs. 3.30 for 96-99 Sessions and 3.42 vs. 3.45 for 04-07 Sessions. The GRE test scores of IE graduate students were consistently higher than that of all students in the range of 9.1 % (99-02 Sessions) to 13.8% (01-04 Sessions) for combined V, Q and A scores; and in the range of 7.2% (04-07) to 12.7% (02-05) for combined V and Q scores. It is also noted that the test scores of our students were consistently higher than that of the national average of all IE graduate students. On diversity counts for the period of 2001 to 2009, 5.9% were minority and 37.4% were woman students.

Student demand remains high even during a time of strong global economy, 2005-2008. The number of applications for IE graduate program annually was 27, 27, 27, 42, 44 for 2004 through 2008. The selectivity of respective year was 61%, 18%, 38%, 26%, 28%. The high selectivity rates were partially due to high quality applicants who applied for admissions as indicated by the high GRE test scores noted above. The high selectivity rates were also due to the fact that many students were discouraged informally through email discussions with individual faculty. Nor did we encourage students to apply if their interests did not match our program or their test scores and GPA did not meet our admission standards.

Majority of graduate students received graduate assistantship support. Our record of assistantship appointment of the fall semester data over 2001-2009 shows an average number of 75.2% of students were appointed with GTA or GRA. The standard deviation was 7.7%; the highest rate of appointments was in Fall 2006 (84.8%), and the lowest in Fall 2001 (57.1%). About 28% of the appointments were the teaching assistant appointments. More than two-thirds of the students were on the appointments of external grants and contracts; which suggest that research endeavors strongly support the graduate education and graduate education is the core of our research enterprise. The department faculty has been active in pursuing external grants and contracts. For example, the research expenditures per faculty data placed our faculty near the top of the Big-10+ ME (and second program, e.g., Industrial Engineering, if applicable) departments as revealed at the group’s annual department chairs/heads meeting in Spring 2009. Success of the external funding enables us to offer competitive stipends, which varied across the IE Program. The funding rates were determined by either the advising faculty member (based on their grant funds) or by the research institute that administered the grant. Research assistantships offered for the fall 2009 ranged from the COGs minimum ($20,258) to $25,576 for a 1/2-time GRA appointment for the calendar year.

**PROGRAM OUTCOMES:**

The PhD enrollment data showed that 47% PhD students completed the PhD study for the period (96-97) through (00-01) and the median time to degree (TTD) was 4.9 years. It should be noted that 47% of the students left UI after they earned the MS degrees.

Since 2004, only 2 IE graduate students received the Graduate College Summer Fellowship. In addition, several students received the University’s GAANN Fellowship (for minority doctorates in areas of national needs), and GEM (The National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc.) fellowships.
Our database of initial placements of 32 PhD’s graduated over the period of August 1997 to May 2008 shows all but 1 (3%) reported placements. The breakdown of the placements was about 80% accepted academic positions (e.g., tenure-track faculty, research and post-doc positions), and the balance accepted positions in government and industry.

PROGRAM CHARACTERISTICS:

The IE graduate enrollments averaged 35.8 students (standard deviation of 4.37) for the period of 2001 through 2009, namely it averages about 5 graduate students per FTE. This number is comparable to that of the comparison group.

Reviewing characteristics of the graduate program, one observes strengths in (a) quality of graduate program (i.e., quality of graduate students and quality of faculty mentorship) as indicated by reasonable TTD and, (b) research excellence as indicated by the high percentage of graduate students supported by external contracts or grants. One also observes weakness in low minority enrollments. On opportunity, the IE graduate program is well positioned to expand its endeavors in interdisciplinary research. Majority of graduate students conducted research through interdisciplinary environments offered by the Center for Computer-Aided Design, and Public Policy Center. The faculty research agenda is well position to pursue research in “big science areas” and prepare our students to contribute to the Grand Challenges identified by the National Academy of Engineering. Specific examples are (a) innovation in data mining and management to “advance health informatics”, (b) human factors to “reverse-engineering the brain”, and (c) user-machine interface and robust mathematics to “enhance virtual reality”. The threats to the graduate program are (a) retention of PhD students, (b) competition of high quality PhD students, and (c) decrease in funding opportunities.

CONCLUSIONS:

The Department of Mechanical and Industrial Engineering maintains a high quality industrial engineering graduate program. Quality of the program is also affirmed by the fact that many IE alumni took leadership roles in academic institutions, corporations, and government agencies. The faculty research is aligned well to support the Grand Challenges noted by the National Academy of Engineering. To maintain its competitiveness to recruit, retain and graduate high quality graduate students and to fund student research and scholarship endeavors through external contracts and grants, the IE graduate program should further expand its scope to engage in interdisciplinary research, and to form clusters with colleagues on campus to pursue research in selected Grand Challenges areas.