

SCHOOL OF ENGINEERING

Report of Assessment Findings & Curricular Improvements Academic Year 2011-12

Graduate (Master's and PhD) Programs

OVERVIEW

Each of engineering's graduate programs (i.e., biomedical, civil, engineering management, electrical and computer science, materials science & engineering, and mechanical) conducts reviews of its programs annually.

The School of Engineering has adopted a unified assessment process using common assessment processes, tools, and analysis methods all engineering programs for evaluating student learning outcomes.

ASSESSMENT MEASURES

The School of Engineering uses the following measures to assess student learning outcomes:

- Review of coursework by major professors, including: exams, homework assignments, course projects (as appropriate), and reports (as appropriate)
- Review of course content by department chairs, including topics covered and tools/techniques taught
- Student course evaluations
- Comprehensive Exam (for doctoral students)
- Evaluation of theses (if applicable) by major professors and readers using criteria: originality of work, quality of experimental design, accuracy of data analysis, quality of written report, and oral presentation (see rubric for graduate theses)

ASSESSMENT FINDINGS

Historical Analysis and Methodology Discussion:

For AY 2011-12, as part of our normal assessment process, the School of Engineering analyzed course grades, student evaluation, and enrollment data in core curriculum courses (i.e., ENGR 516, ENGR 520, and CMGT 505) and compared this data to the five-year average period between AY 2006-07 through AY 2011-12. These are gateway courses for all engineering graduate students at the master's level and are required of all Ph.D. students who have not completed a similar course during their master's work. The data is summarized in Table 1 below.

For AY 2011-12, engineering offered ENGR 516 and ENGR 520 in both the Fall and Spring semesters to accommodate increasing graduate enrollment in these courses. ENGR 520 was also offered during Summer 2011. The resulting effect was to control maximum enrollment in each of these required courses to approximately 25 per course per semester. While total ENGR 516 enrollment for AY 2011-12 was 41 (compared to 25-32 between 2006-2011), ENGR 516's maximum enrollment for Fall/Spring offerings was 24 students. Similarly, while ENGR 520's total enrollment of 36 students for AY 2011-12 was 50% higher than 2 years ago, peak enrollment in AY 2011-12 was 25 students. We believe enrollment controls through secondary (and tertiary) offerings have enhanced students learning as evidenced by student evaluation scores under "achievement of course objectives" and "learned a lot".

Similarly, in Fall 2011, the 3rd engineering core courses CMGT 505 received similarly high student evaluation scores (i.e. instructor, course, objectives achieved, and learned a lot).

For both ENGR 520 and CMGT 505, student evaluation scores meet or exceed historical 5-year averages showing a continued high level of satisfaction with instruction and attainment of course objectives. A review of student course evaluation data shows that no evaluations were returned for ENGR 516. A new instructor for ENGR 516 was in place in AY 2011-12 which may partially explain the lack of data for this course.

	Historical Data-2006-2011			AY 2011-12		
	ENGR 516	ENGR 520	CMGT 505	ENGR 516	ENGR 520	CMGT 505
Instructor (10=high; 1=low)	7.96±0.47	7.58±0.48	9.15±0.35	-	8.6±0.50	9.3
Course (10=high; 1=low)	7.48±0.41	7.26±0.40	8.8±0.06	-	7.57±0.83	8.9
Objectives Achieved (5=high; 1=low)	4.08±0.07	4.14±0.14	4.75±0.03	-	4.33±0.25	4.5
Learned A Lot (5=high; 1=low)	4.08±0.14	3.92±0.16	4.65±0.03	-	4.20±0.32	4.4
Enrollment (high/low)	18.7±4.9 (32/6)	18.17±3.68 (30/5)	33 (33/18)	20.5 (24/17)	12±8.03 (25/4)	35

Table 1: Summary of historical course evaluation data vs. AY 2011-12 for core engineering courses.

PhD Comprehensive Exams and Progression:

For AY 2011-12, 4 students took and passed the PhD comprehensive examination (100% pass rate). All students are still continuing in their respective programs. The passing rates for the PhD Comprehensive Exams support the quality and rigor of the preparation of our students and confirm that students are achieving the expected program learning outcomes. Additionally, 100% (n=10) of students successfully defended and were awarded doctoral degrees in AY 2011-12, up from 5 PhD degrees awarded in the previous year.

CURRICULAR IMPROVEMENTS FOR MASTER'S PROGRAM AND PH.D. PROGRAMS

In Engineering, the key core courses for all graduate students are ENGR 516, ENGR 520, and CMGT 505, which function as the gateway courses in the School. Both student and faculty performance are continuously reviewed and no changes have been made to these core courses in the recent past because of our belief that they are functioning properly to prepare students for the remainder of their work. The School will work with the new instructor for ENGR 516 to ensure data is properly collected in AY 2012-13.

As previously mentioned, multi-semester offerings of ENGR 516 and ENGR 520 and corresponding enrollment limits has been beneficial to increasing the effectiveness of instruction in these courses as well as reduce instructor burden. As these courses are required for the School of Engineering's on-campus graduate programs, multi-semester offerings have had the added benefit for students to ensure timely satisfaction of graduation requirements. For ENGR 520, the course was also offered in Summer 2011 (and again in Summer 2012). However, summer enrollment has been low (5-6 students) and may not be necessary going forward. The School of Engineering's graduate committee will discuss the merits of a 3rd (summer) offering.

From the prior year, the School has been monitoring enrollment in ENGR 516. In the prior year (AY 10-11), total enrollment (23 students) decreased unexpectedly from historical data for this course (~30 students per year). This situation seems to have self-corrected in AY 2011-12 as total enrollment rebounded to 41 students. Preliminary enrollment data for Fall 2012 is consistent with 2011-12 data.

Lastly, the recently launched (Spring 2010) master's degree in materials science & engineering (MSE) completed its first full year in AY 2011-12 and graduated its first 2 students (Fall-2011: 1; Spring 2012: 1). In addition to the core ENGR courses mentioned above and several electives offered within various graduate engineering programs, the MSE program offered 4 program specific courses in AY 2011-12, several for the first time, and has gradually increased its core offerings over the past few semesters. The program is developing a base of part-time faculty to provide consistent, high-quality instruction in this area.