ANNUAL ASSESSMENT REPORT
ELECTRICAL AND COMPUTER ENGINEERING DEPARTMENT
2012-2013

INTRODUCTION

This annual assessment report details the activities, events, decisions and actions in relation to the process of continuous improvement in the Department of Electrical and Computer Engineering. The following sections discuss curricular changes and updates as well as proposed modifications to the data collection process for assessment within the department. Included are descriptions relating to how we closed the loop on issues raised in previous years. We note that these changes are in response to feedback from various constituencies including faculty, students, graduating seniors and the industrial advisory committee. These changes are evidence of an active assessment process within the Department of Electrical and Computer Engineering.

UPDATES ON CURRICULAR CHANGES

Various constituencies provide inputs to the cycle of continuous improvement in the department. One of the areas where input is sought is in the area of the curriculum. Over the past several years, inputs from students, graduates, alumni, industrial advisors, and teachers have been collected. As data have been collected, the department executive committee, curriculum committee, and assessment committee have discussed with faculty ways to respond to data from the constituents. This year, several changes have been made to the curriculum--some changes are major, others are minor. This section documents these curricular adjustments. Since some of the changes apply to undergraduate courses that are taken by both electrical engineering and computer engineering majors, it should be recognized that these issues apply to both programs.

NEW ISSUES

1. Over the last few years, there has been extensive discussion and updates made to ECE 5530 to reduce the overlap (up to 70%) that this course has with ECE 2700. A committee consisting of computer engineering faculty and members of the curriculum committee was formed to discuss this course and make a recommendation. The committee has proposed dropping ECE 5530. Originally, the course was listed as a 5000 level course so that new international students could take the course and receive graduate level credit for it. However, it has been found that no international students currently take the course. The few new topics that are introduced into ECE 5530 can be absorbed into more advanced courses in the computer engineering graduate program (ECE 5/6740). This new material was reviewed by the curriculum committee and found to be material that is not typically required for BS programs anywhere in the country.

2. This year the curriculum committee has responded to observations by students and teachers that it is difficult to complete the senior design project in a single semester. The committee investigated moving to a two-semester sequence for senior design. This affects the design course and the accompanying communication
course taught by an instructor from the English department. Currently seniors take ECE 4840 (3cr) senior design and ECE 4850 (2cr) engineering communication in the spring semester of their senior year. In the new program seniors take ECE 4820 (1cr) design 1 and ECE 4830 (1cr) communication 1 in the fall semester and ECE 4840 (2cr) design 2 and ECE 4350 (1cr) communication 2 in the spring semester. The change is credit hour neutral. By stretching the senior project over a year it is hoped that students will have more time to conceive, propose and carry out their design projects.

3. In the Fall of 2012, Dr. Karl Locke, an experienced ABET reviewer, visited the College of Engineering. During his visit, he reviewed the program educational objectives (PEOs) for the electrical and computer engineering programs. Dr. Locke felt that our PEOs were stated more like outcomes than objectives. Based on this feedback, the ECE department undertook a review process, taking inputs from faculty and the industrial advisory committee (IAC). Based on feedback as well as surveying the PEOs for more than 20 ECE departments around the country, a new set of two PEOs were created, revised and finally accepted in a vote by the faculty. The new PEOs are as follows.

Program educational objectives (PEOs) are broad statements that describe what graduates are expected to attain within a few years of graduation. The PEOs support the mission of the department. The PEOs of the Electrical Engineering and the Computer Engineering programs are as follows.

**PEO1:** Graduates will succeed in pursuing their chosen career path. The primary indicator of success is that graduates will establish a reputation among their co-workers for technical expertise and sound ethical judgment. Other indicators of success include:
- a) achieving professional advancement with increasing responsibility;
- b) engaging in technology-based entrepreneurial activities;
- c) engaging in advanced study in engineering graduate programs or related areas.

**PEO2:** Graduates will engage in a continuous process of life-long learning. Evidence of such engagement includes activities such as:
- a) staying abreast of emerging technologies;
- b) obtaining new skills, developing proficiencies with tools and programming/hardware description languages;
- c) actively participating in professional communities.

### CLOSING THE LOOP ON OLD ISSUES

1. [updated] Last year, a new year-long two-course circuits course sequence was introduced to solve a long standing problem with a single one-semester circuits course which spilled over into the next signals and systems class. Also, the signals and systems sequence was revamped. The new circuits sequence was taught for the first time this academic year. Next year, the new signals and systems courses will be taught. The following year, the new courses at the 5000 and 7000 levels will be taught. The effects of this change will take several years to ripple through the curriculum. We will maintain this as an item to report on in the future as data become available.

2. [updated] ECE 3710, Microcomputer Hardware and Software – Based on input from the industrial advisory committee (IAC) last year, the computer engineering faculty began discussing moving the lab assignments from the 8051 microcontroller to an ARM-based processor. This year, the switch was made and students now use the ARM Cortex M3 based microcontroller in ECE 3710 labs. We feel that this change brings this class into alignment with current trends in the industry. Dr. Gerdes’s hopes to introduce touch screens, USB and networking in the future as well.
3. [updated] CS I and CS II (C/C++ programming) – Students feel that they are learning syntax but not good software architecture or software engineering principles. Students emerge from these classes confused about the difference between C and C++. Often they don’t feel like they really learn the language until they have to use it in ECE classes. One student observed that the programming projects are like 1980s business applications. Students would like to learn to interface to libraries such as OpenGL. After doing some digging, we have found that feedback from students is strongly dependent upon who teaches the CS I and II classes. For example, when Dr. Mathias or Dr. Cannon teach the course, students come away with a good understanding of theses languages.