

## **ASSESSMENT PLAN FOR THE BSEE PROGRAM (Spring 2005)**

### **1. Program Educational Objectives.**

The objectives of the Electrical Engineering Program, as adopted by its constituencies, are:

- a. To provide students with an understanding of the fundamental knowledge necessary for the practice of electrical engineering or graduate study, including scientific principles, rigorous analysis, and creative design.
- b. To provide students with the broad education, including knowledge of important current issues in electrical engineering and a commitment to lifelong learning, as is necessary for productive careers in the public or private sectors.
- c. To develop skills for clear communication and responsible teamwork, and to inculcate professional attitudes and ethics in an innovative program that is rigorous, challenging, open, and supportive.

### **2. Program Constituencies.**

The constituencies of the electrical engineering program are

- a. Students
- b. Employers of Graduates
- c. Graduate Programs (at WSU and elsewhere)

### **3. Process to Determine and Evaluate Objectives.**

Suggestions for program objectives were presented to the Industrial Advisory Board (IAB). Their comments were helpful in establishing the department's initial set of objectives. These objectives will be reviewed on a yearly basis to determine if the objectives still satisfy the needs of the constituents. It is the faculty's desire to make the curriculum and the contents of individual courses reflect the changes in technology and course delivery. When and if changes in technology necessitate a change in the department's outcomes, changes will be made with the help of the constituencies. The ECE department meets at least once a year with their (IAB) to discuss issues and review goals and objectives. Material and procedures as outlined in this document are reviewed by members of the IAB.

Students are involved in the process of evaluation of program objectives and outcomes through a survey given seniors at the end of the second semester of the senior project (ECE595). Employers are involved in the review of program objectives through the Industrial Advisory Board and discussions with industrial recruiters who visit the campus. Graduate programs play a part in the process by accepting the applicants from those receiving their undergraduate degrees from the ECE graduates.

The ECE department has implemented what it calls a knowledge probe. During the first week of each class an exam, over the basics that should be known for success in the class, is given to the students. This exam gives the instructor a feel for how much review of the

prerequisite material is required. If there are serious deficiencies, the results of the exam are shared with the faculty member who is the monitor for that prerequisite course. The monitor determines what action will be taken and informs the person teaching the follow-on course. Subsequent knowledge probes should reflect an improvement in knowledge in the area that showed deficiencies. The faculty reviews the probe data each semester during a faculty meeting shortly after the start of each semester.

The syllabi of eight courses will be reviewed on a yearly basis by the Industrial Advisory Board (IAB) which will allow examination of all courses by the IAB every five years. New state-of-the-art material can be added as determined by the IAB and faculty. Inappropriate subjects may be removed or moved to other courses. As new delivery techniques are developed and adopted, courses may be taken from other universities on the Internet or via television. New assessment strategies must be developed for courses taken on line that are offered by other universities or organizations. Assessing courses offered by other universities will be more difficult. The course policy also allows any course to be reviewed at any time.

#### **4. Program Outcomes.**

After much discussion and revision, the ECE department has adopted the following five outcomes.

- a. Graduates will have a broad-based understanding of the fundamentals of Computer Engineering, mathematics and science and their application in the solution of electrical engineering problems..
- b. Graduates will have achieved a technical understanding of subjects in computer engineering, including the latest technologies available, providing for successful employment in industry or pursuit of a higher degree.
- c. Graduates will have acquired skill in hands-on hardware and software laboratory experimentation and data analysis, and in the use of a broad range of hardware and software tools for analysis and design of digital systems.
- d. Graduates will have developed proficiency in critical workplace skills including teamwork, oral and written communication, and lifelong independent learning.
- e. Graduates will have an awareness of the complex, rapidly-changing, global environment (including professional and ethical issues) in which they will practice computer engineering.

#### **5. Process for Input/Evaluation/Revision of Program Outcomes.**

The items listed below are tools the ECE department is considering or using as assessment tools.

- a. Course Portfolios: Course portfolios will be maintained for each course. The data contained in the portfolios are as follows:  
Course objectives & Outcomes

Course syllabus  
Knowledge probe results and feedback  
Examples of homework, exams and design projects  
Student course questionnaires  
Student performance statistics  
A record of who taught the course the last five semesters.  
Comments from the instructor(s)

This collection of data will be examined on a short term basis each semester by the course moderator (and reported to the faculty). The Syllabi of six courses will be reviewed on a yearly basis by the Industrial Advisory Board (IAB) which will allow examination of all courses by the IAB every five years. The policy also allows any course to be reviewed at any time.

- b. Knowledge Probes: The knowledge probes (see section 3 for details) are fed back to prerequisite courses.
- c. Hour Exams, Homework, Finals, and Reports: The grading statistics for each course will be kept for the previous five semesters where appropriate. The intent is to ascertain that grade inflation is not occurring and that grading quality is maintained. In connection with this data, a running list of those teaching the course will be maintained for five semesters also. This traditional form of assessment will still continue and provide useful information. Efforts will be made to make each of these traditional items more useful in assessing the success in meeting the department's educational objectives.
- d. Peer Reviews for Team Projects: Opportunities for team interaction occur during courses with labs and for a more sustained period and larger team during the two semester senior project (ECE 585 & 595). Each student of a team will have an opportunity to evaluate his team members and to be evaluated.
- e. Faculty Evaluations of Senior Project Oral and Written Presentations: Each senior project team is required to make an oral presentation during both semesters of the project. These formal presentations and presentations of their projects are video taped and available for review by the students and faculty members.
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- g. Senior Exit survey: Each student, at the end of the second semester of the senior project (ECE595) , is required to make an evaluation of the degree program's objectives and effectiveness in meeting the ABET criterion 3 (a through k). A - k areas which the students perceive as not being adequately covered are reviewed by the faculty and plans for increasing emphasis in that area discussed.
- h. Placement Office Analysis of Graduate Employment: Each senior student is enrolled with the campus career/placement office. The placement office tracks

the employment of the students and provides statistics of how many are hired, average salary, etc. Employment of our students by industry is indicative of meeting the requirements of two of our constituents. It is hoped that the WSU placement office data will be able to track a sufficient number of students to give valid employment statistics.

- i. Co- op Employer Evaluations of Employees: Though we don't count credits earned for co-op participation (except if a student is one hour short of graduation), we have 30 - 40 students enrolled in co-op each semester. At the end of each semester, the student receives an evaluation by the employer. This evaluation covers items other than technical competency but still gives an overview of the quality of the students involved. Even though only about 15% of our students are involved in co-op, the feedback from the employers gives us some data on technical competency and ability to work in an industrial setting.
- j. Fundamentals of Engineering Exam (FE): We currently have no official policy relative to the student=s taking the FE exam. The number of students taking the exam is not sufficient to make a judgment about their academic experience. Students are, however, encouraged to take the exam. It is our intent to see more students electing to take the FE exam. An even smaller percentage take the FE exam than are involved in co-op. However, if the students all do poorly in some area compared to national and state averages then it should be considered as a possible weakness in the curriculum in that area. The testing agency provides score comparison, in basic subjects and degree specific subjects, with state schools and nationally.