The University of Texas - Pan American
Bachelor of Science in Electrical Engineering
Assessment Plan

Revision History

May 31, 2004	Typographical Corrections; Update Status Sections
April 2, 2004	Modified to meet University-wide Requirements
November 27, 2002	Original Assessment Plan

I. Introduction

A. Overview

This Assessment Plan for the Bachelor of Science in Electrical Engineering program was first developed at a series of faculty meetings, with the first held November 27, 2002, in response to the Interim Report of the October 2002 site visit by the Accreditation Board for Engineering and Technology (ABET). The plan was originally specific to ABET requirements. It has been expanded and revised in format (April 2004) to meet the requirements of the University-wide assessment program. The primary purposes are to: (a) determine whether, and to what extent, the BSEE program meets its stated objectives and outcomes, (b) aid the program faculty in continuously improving the curriculum to better meet the objectives and outcomes, (c) demonstrate to the program's constituencies (students, employers, and the community) our committment to maintaining a quality program.

The primary assessment measures are: (a) objective assessment tests given after fundamental courses to provide short-term monitoring of student progress, (b) a nationally normed, standardized test for graduating seniors to assess program outcomes, and (c) surveys of alumni and employers to assess program objectives. Secondary assessment measures include student portfolios, project reports, and presentations. Twice annual meetings will be held to modify the curriculum.

I. B. <u>Plan Development & Revision</u>

The current Program Objectives and Outcomes were developed and approved at a sequence of faculty meetings in Spring and Fall of 2001. These meetings were led by Dr. Anand Ojha, and were attended by A.Aounallah, M.Ben Ghalia, H.Foltz, J.S.Son, and H.Zarnani. S.Kumar joined the meetings in Fall 2001. The Objectives and Outcomes document is to be reviewed by the Engineering Advisory Council (EAC), made up of industry and government representatives, and by the EE faculty, every two years. The last presentation of the Objectives and Outcomes document to the EAC was on March 1, 2004.

Systematic tracking of nationally normed test results began in Fall 1997; however, a formal Assessment Plan including the other assessment tools was not developed until November 2002. Participants in the original November 2002 meeting included all full-time Electrical Engineering Department faculty: A.Aounallah, E.Banatoski, M.Ben Ghalia, H.Foltz, S.Kumar, J.Li, J.S.Son, H.Zarnani. Substantial changes to the plan,if any, are proposed at regular department meetings, and must be approved by a vote of the full-time faculty. The plan will be reviewed by the Engineering Advisory Council (EAC), and by the EE faculty, every two years. The last presentation of the Objectives and Outcomes document to the EAC was on March 1, 2004. Nonsubstantive formatting changes and revisions of dates in this document are made by the Department Chair, and the archival copy will be kept by the Department Secretary.

II. Departmental Mission, Program Objectives, and Program Outcomes

The Departmental Mission Statement, the Bachelor of Science in Electrical Engineering Program Objectives, and the Bachelor of Science in Electrical Engineering Program Outcomes are maintained in a separate document, and are available on the Department website: **www.engr.panam.edu/ee**.

The Program Outcomes have three components:

- Items 1 through 8, which are common to all engineering programs
- Items A through F, which are specific to electrical engineering
- Subsidiary outcomes A1, A2, etc. under each of the items A through F.

The department will monitor all of the above items as part of its internal assessment plan. The University plan requests a smaller number of outcomes; therefore, for the purposes of the University plan, only Items 1 through 8 and A through F will be considered.

III. Assessment Measures

III. A. Internal Assessment Tests

Description: These tests are intended to measure the extent to which electrical engineering students are learning basic skills in lower division coursework. The tests are given in later courses for which the lower division courses are a prerequisite. For example, in ELEE 3302 (Electronics II), students are given an assessment test covering material from ELEE 3301. The tests are developed and administered according to the following criteria:

1. Each test is developed by a committee of two to four faculty teaching the course in question and the courses for which it is a prerequisite. A single

faculty member (see table below) will be responsible for maintaining the test and providing a grading key to faculty administering the test.
2. The tests are objective (multiple choice), are at a level suitable for a 30-50 minute time period.
3. Each test will be given once per semester.
4. The tests do not count toward the grade for either the course being assessed or the course in which the test is given.
5. The examinees are anonymous. Students may be permitted to enter an optional code name by which their grade will be posted, for their own use only.
6. Students are not provided advance notice of the test content, and it is not expected that students will engage in any preparation specifically for the tests.
7. Test content will be reviewed each semester by the test committee responsible and also by the entire faculty at a department meeting. However, to facilitate comparisons between semesters, the questions will remain unchanged unless there is an error or other compelling reason to change them.
8. To promote objectivity in the assessment test program, it is department policy that the results will not be used in the tenure or merit evaluation of any faculty.

Procedure:

1. Prior to the beginning of each semester, the department chair will send a reminder notification to the faculty member responsible for each test, as given in the table below. The responsible faculty will check the test for errors and approved revisions, make copies, and prepare an answer key.
2. Prior to or during the first week of each semester, the tests will be distributed. They will be administered during regular class times according to the table below, and graded by the faculty administering the test. The faculty will provide a summary of the results question-by-question, with the students separated according to the semester and year in which they took the relevant course.
3. The department chair will schedule a faculty meeting, normally during the third week of the semester. At the meeting:
    a. The results of each test will be distributed and presented for discussion.
    b. The tests themselves will be distributed for review and discussion.
    c. Curriculum changes will be proposed as appropriate. Minor changes within course syllabi or in emphasis will be implemented informally at the department level. Changes in course descriptions or degree plan changes will be proposed to the University Curriculum Committee.
    d. Deletions, additions, or revisions of test questions will be proposed as appropriate.

4. The scored tests and summary of results will be kept on file in the department office. The scored tests will be retained for at least three years, and the summaries indefinitely.

Status: The tests were first given in January 2003, and have been given in two additional cycles since then. The following tests have been developed and are currently being administered:

Subject:	Digital Systems
Given In:	Digital Systems II (ELEE 4303) each Spring, Microprocessors (ELEE 3435) each Fall.
Test Maintained by:	Sanjeev Kumar

Subject:	Electric Circuits
Given In:	Electric Circuits II (ELEE 2321) each long semester.
Test Maintained by:	Edward Banatoski

Subject:	Electric Circuits II
Given In:	Automatic Control (ELEE 4321) each Fall, EE Lab II (ELEE 3330) each Spring.
Test Maintained by:	Heinrich Foltz

Subject:	Electronics I
Given In:	EE Lab I (ELEE 3225) each Fall, students who have had ELEE 3301 only. Electronics II (ELEE 3302) each Spring, all students.
Test Maintained by:	Hamid Zarnani

III. B. National Normed Test

Description: The Fundamentals of Engineering (FE) examination is a standardized national exam given as part of the licensing process for engineers. Although it is a state licensure exam, almost all states now use the test developed by the National Council of Examiners for Engineering and Surveying (NCEES) and administered by ACT. UTPA has been a designated test site for the FE exam since 1996, and the test has been given every Fall and Spring since 1997.

Eligibility to take the test as a student is restricted to engineering seniors within one year of graduation. To the best of our knowledge, the test is **optional** at all electrical engineering programs in Texas, and to avoid biasing the results the test is also optional at UTPA. However, UTPA has a much higher percentage of EE students taking the test than other schools, with our students making up about a quarter of the statewide pool. It is department policy that all **eligible** students are encouraged to take the test, regardless of GPA.

The morning part of the test covers general science, mathematics, and engineering knowledge. The afternoon part of the test covers discipline specific content in electrical engineering. NCEES provides summary results by topic area (approximately twenty-five topic areas are separately assessed), including comparisons to the average for Texas and US schools, and averages for Carnegie Master's, Doctoral Intensive, and Doctoral Extensive institutions.

Procedure:

1. The department chair, in conjunction with the Director of the School of Engineering and Computer Science and the other department chairs within the school, will maintain contact with the Texas Board of Professional Engineers and NCEES to ensure that UTPA retains its test site status.
2. The department chair will be responsible for disseminating test information, application forms, schedules, and regulations to eligible students, and for determining and announcing relevant deadlines.
3. NCEES typically gives the test in April and October of each year, with an application deadline in January or August. The department secretary will be responsible for collecting applications from interested students and ensuring they reach the Texas Board prior to the deadline.
4. NCEES and the Texas Board mail out summary results in June (for the April exam) and December (for the October exam). The department chair will distribute the results, and the department office will keep archival copies of the summary results. These files will be retained indefinitely.
5. The department chair will call meeting to discuss the results in September and February of each year. If time permits, the meeting may be combined with that discussing the internal assessment tests. At this meeting:
    a. Results in any topic area that significantly deviate from expectations will be discussed.
    b. Curriculum changes will be proposed as appropriate. Minor changes within course syllabi or in emphasis will be implemented informally at the department level. Changes in course descriptions or degree plan changes will be proposed to the University Curriculum Committee.

Status: The FE exam has been given twice yearly since Fall 1997.

III. C. Surveys

Description: The department will periodically survey alumni and employers of electrical engineering graduates. These surveys are intended to assess the broader objectives of the program and outcomes common to all engineering programs, rather than specific learning outcomes, and therefore ask more general questions related to career satisfaction, preparedness, continuing education, and general impressions of the BSEE program.

The alumni survey is an online survey available through the department web site. It is available at all times; however, we will periodically send out e-mail notifications encouraging groups of selected alumni to respond. These groups will be rotated so that no individual is asked to respond to a survey more than once in three years.

The employer survey asks similar questions, but is directed toward the immediate managers of BSEE program alumni working in industry. (Note: See Status section below).

Procedure:

1. The alumni survey will be developed in conjunction with the other engineering disciplines and will share a core of questions with the other disciplines.
2. In April of each year, the School Learning Specialist and/or department chair, with the aid of the Office of Admissions and Records and the Career Placement Center, will identify a list of alumni who have not recently been requested to answer the Alumni Survey. These alumni will be contacted by e-mail.
3. Survey responses are automatically e-mailed. The School Learning Specialist or a designated faculty member from the School of Engineerng and Computer Science will receive the results.
4. A designated faculty member will collect responses received by June 15 each cycle, and prepare a summary of the results separated on a question-by-question basis.
5. The department chair will call a faculty meeting in September or October of each year to discuss the results. This discussion can be part of a regular department meeting. At this meeting:
    a. The designated faculty will present the summary of results.
    b. Curriculum changes will be proposed as appropriate. Minor changes within course syllabi or in emphasis will be implemented informally at the department level. Changes in course descriptions or degree plan changes will be proposed to the University Curriculum Committee.
    c. Changes to the survey itself will be proposed as appropriate.
6. Summary results for each year's survey will be kept on file in the department office indefinitely.

Status:

An initial e-mail version of the alumni survey was distributed in Spring 2001, and the results were incorporated in our July 2002 ABET Report. The web based version of this test was completed in December 2003, and is now available online at **www.engr.panam.edu/ee**. A preliminary mailing list has been created.

The Engineering Advisory Council has stated that there may be privacy concerns with the employer survey (legal and/or related to company policy) in having managers give evaluations of employees to persons outside of their company. We are currently looking into alternate methods for obtaining employer feedback. For the 2004 cycle, the survey is being given to EAC members only.

IV. Reporting

Internal Records Results of (a) the internal assessment tests, (b) the FE exam, and (c) surveys will be kept on file within the department, as stated in the procedures outlined above. Decisions relating to curriculum changes will be recorded in the form of department meeting minutes.

Annual Report Annually, or as requested by the University administration, a written report will be prepared describing assessment results, the actions that have been taken based on those results, and an evaluation of whether prior actions have had the desired results. The report will be prepared by a faculty commitee, reviewed by the department chair, and submitted to the College of Science and Engineering Dean and the Director of the School of Science and Engineering. Further dissemination will be as requested.

ABET Reporting ABET requires periodic reporting of assessment plans, methods, results, and corrective actions. The timing of these reports depends on ongoing ABET accreditation actions. Our next report is due in July 2004.

V. Usage of Results

As stated in section III under each of the individual assessment measures, a key step in the assessment process is feedback of the results to improve the curriculum, both at the course syllabus level and at the degree plan level. This includes assessing whether prior improvements have had the desired effect. Feedback will be accomplished through:

1. Scheduled faculty meetings (minimum of one per semester), reserved for discussing assessment results.
2. Distribution of test and survey results to faculty.
3. Adjustment of course content, and the relative weight given to different topics, based on these results. These changes could take the form of:
    a. Directives issued at assessment meetings to emphasize or deemphasize particular topics in specified courses.
    b. Directives issued at assessment meetings to move coverage of specified topics from one course to another.

    c. Spontaneous adjustments of course content by individual faculty based on their own interpretation of the disseminated test and survey results.
4. In cases where assessment results show that more substantial action is needed, changes to the degree plan.