

## **Processes Used to Produce and Assess Student Learning Outcomes**

In this section we briefly describe the processes used to produce and assess Student Learning Outcomes (SLOs) in the E&EE Department. These are summarized in Table II (Monitoring Student Learning Outcomes) and Table III (Strategies to Achieve Student Learning Outcomes). The E&EE program performs outcomes assessment at two levels: Course and Program.

### Course Level Assessment

As discussed previously, we have established a Course Embedded Assessment (CEA) process that focuses on a set of core classes required of all students in our major. Each course has detailed objectives, specific course outcomes, and indicators that are monitored to ensure successful achievement of those outcomes. On an annual basis, the Course Coordinators for courses covered by CEA present a report to the Department faculty reflecting on student achievement on the specific course outcomes and course topics, whether prerequisites are appropriate, student reaction to the course, and suggested changes if any.

This process is useful because it enables faculty who are not directly involved in specific courses from the CEA group to get a full understanding of the courses in the CEA group and make any adjustments to their own courses. It allows new faculty and part-time faculty to acquire a thorough understanding of the curriculum and become familiar with the challenges by perusing the annual CEA reports. Also, the process ensures that faculty in related courses interact with each other on a regular basis when preparing the CEA report for a particular course. Equally important, the CEA reports provide the documentation to illustrate how the faculty use assessment results for ongoing program improvement.

For courses that are not part of the CEA group, individual faculty members who teach the course are responsible for course-level assessment. Each course has clearly defined objectives, a set of measurable outcomes, and contributes to one or more of the program's Student Learning Outcomes. The faculty member teaching the course is responsible for reporting any major issues that are revealed from outcomes assessment and initiating appropriate changes to ensure that the course objectives are met successfully.

### Program Level Assessment

Outcomes assessment at the program level is carried out by using a variety of assessment tools:

1. Student and alumni surveys reflecting on program outcomes.
2. Site visits to industry.
3. Independent assessment by Department-level Industry Liaison Council.

#### 4. Feedback from College's Industry Advisory Board.

Since faculty are primarily responsible for assessment, we use faculty surveys to set indicators as appropriate for our program outcomes. In some instances it is more appropriate to use qualitative indicators to assess success of a particular outcome (typically feedback and action items resulting from independent assessment by the Department's Industry Liaison Council).

#### Assessment Instruments

In order to meet ABET Engineering Criteria 2000 with respect to assessment; we use the following assessment instruments in our program:

*Focused Assignments and Examinations:* Assignments and examinations including mid-terms and final are required in all courses. In addition, projects, Computer Aided Design and term papers are required in several classes as appropriate.

*Surveys of Graduating Seniors:* Graduating seniors are surveyed at the time of graduation for their perceptions about the program's educational objectives and student learning outcomes, our relative success in achieving those outcomes, and suggestions for improvement.

*Alumni Surveys:* Alumni from our program are surveyed five years out (1997-2001 alumni for the 2002 academic year) to rank the importance of each of our Program Educational Objectives and Student Learning Outcomes in the context of their current professional position and their level of preparation with respect to that objective or outcome.

*Site Visits:* Faculty teams visit a company or industry that employs several graduates from our program to meet with a group of our alumni. Typically the alumni include recent graduates (1-5 years out), as well as experienced engineers and managers (6-10 years out, 11 years and over). A set of open-ended questions is distributed to the site prior to the visit to provide a foundation for the participants. The interviews are audio taped and placed on the Web for faculty review following the visit. A written transcript is also produced and shared with all faculty members. The reports are analyzed and action items with appropriate timelines are developed for implementation.

*Industry Liaison Council:* The Council is made up of engineers from industry representing all major areas of emphasis in the E&EE program. The ILC meets biannually and provides the Department and the faculty with independent feedback on its efforts to achieve the Program Educational Objectives.

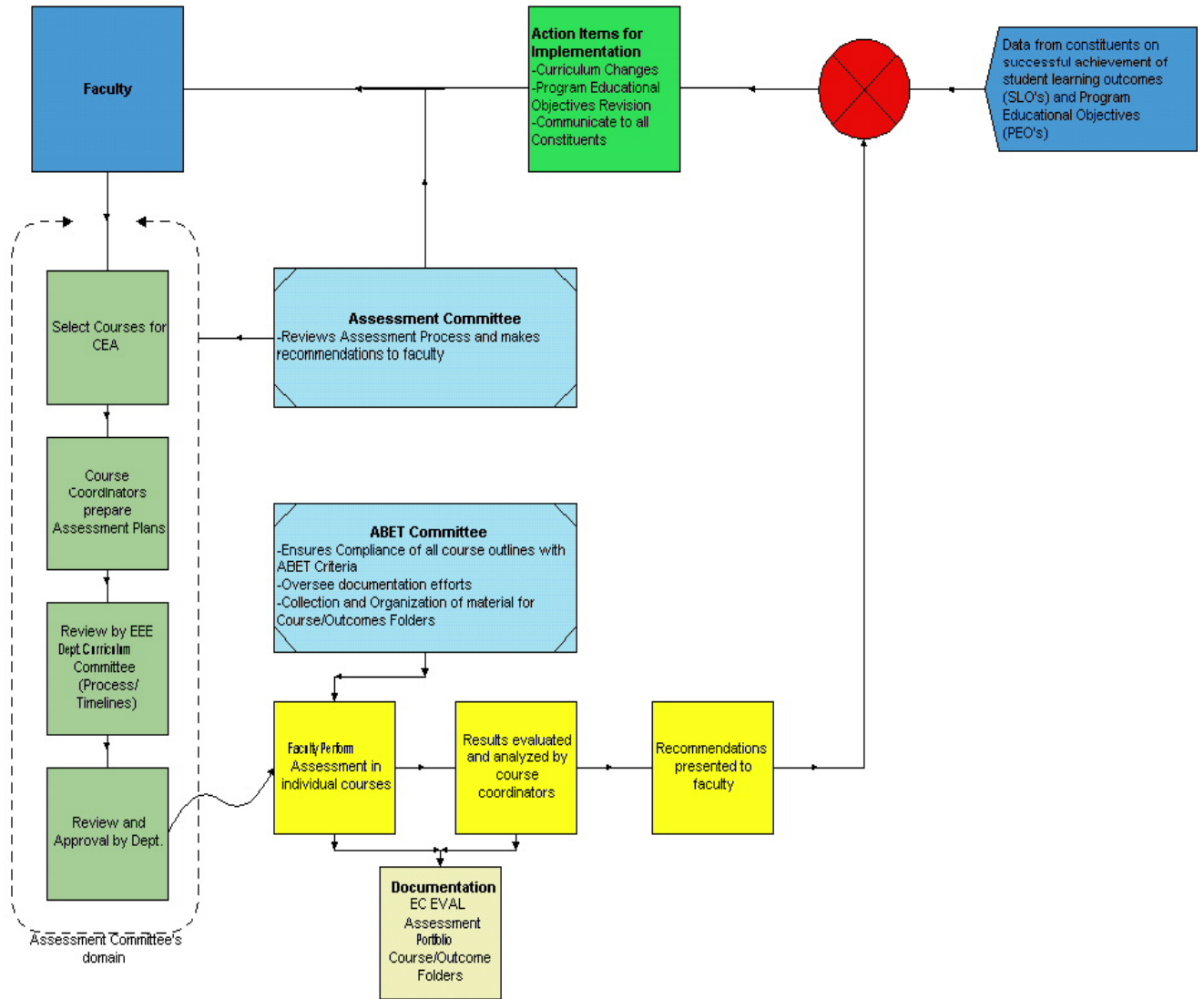
*Industry Advisory Board:* At the College level, the IAB receives reports from each program on a biannual basis and evaluates each program's success in implementing the strategic plan of the college. The IAB meets in executive session following the presentations and reports back to the Program Coordinators, Department Chairs and Deans with specific recommendations for follow up and action.

*Employer Surveys:* The College's Career and Placement Office periodically surveys employers and provides salary information and relevant information on upcoming trends and opportunities to the programs.

Again, it should be emphasized that our ultimate goal is to utilize these assessment instruments to make ongoing improvements to our program. Course Embedded Assessment represents the "bricks and mortar" of our assessment program. Our experience shows that assignments and exams in individual courses provide immediate and valuable feedback to both the student and the faculty. They allow the faculty to identify any potential problems in related courses, i.e. if the performance of several students in a given exam or assignment indicates that they do not understand a concept they should have acquired in a prerequisite course, that probably indicates a problem with the related course. For instance, in our junior-level course on electric networks, EEE 117, we assess all the students, including our native freshmen and community college transfers, for proficiency in Circuit Analysis, ENGR 17.

The assessment exam is evaluated by topic and can be quickly analyzed to obtain a snapshot of each student's level of preparation to succeed in EEE 117. In some instances students are referred to the Circuits or Networks Workshop to remedy inadequate preparation in the prerequisite course. Problems requiring broader interaction are summarized by the Course Coordinator and presented to the faculty for action.

Figure 3.1: Course Embedded Assessment in E&EE:



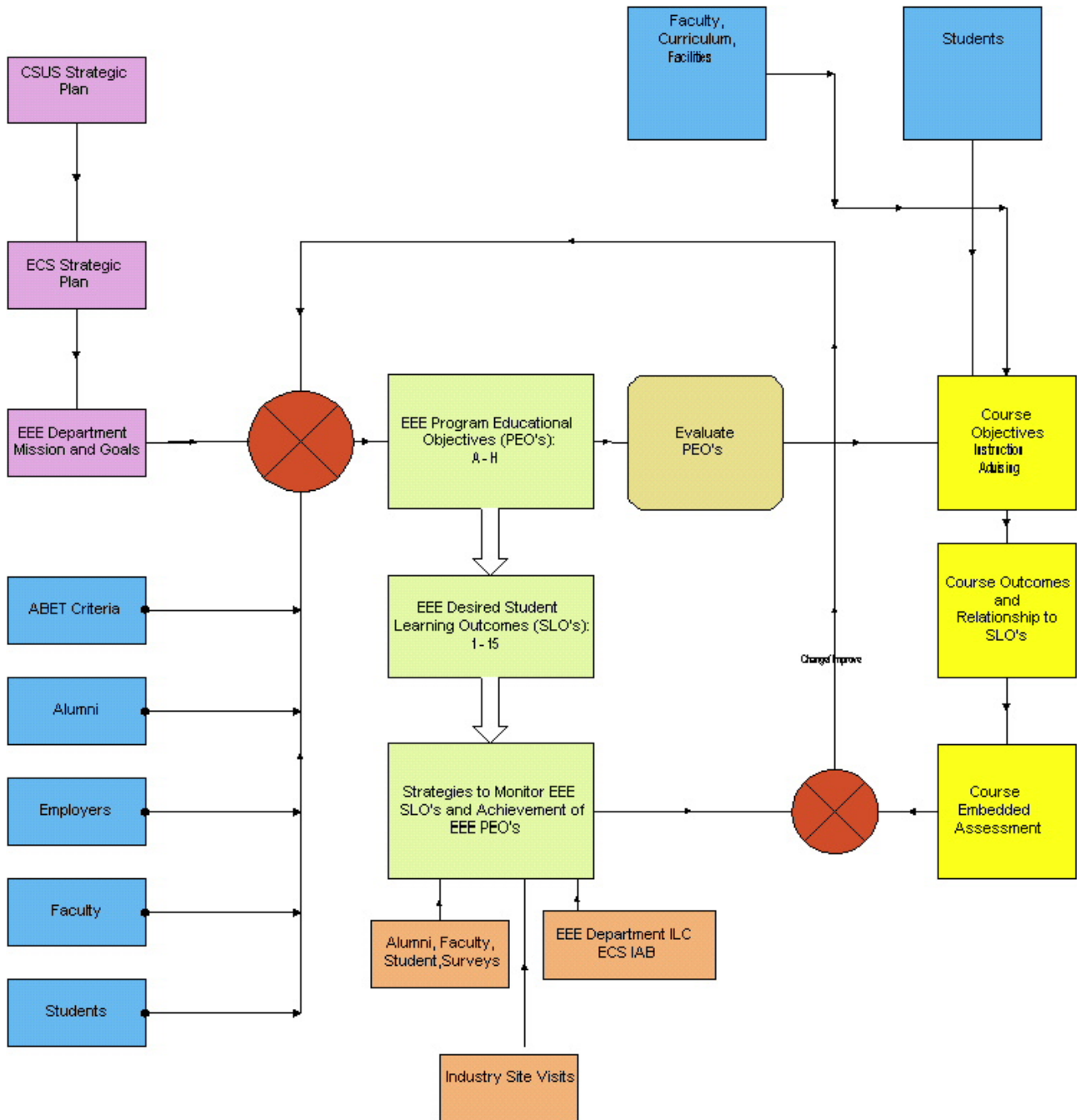


Figure 2.1 Flowchart illustrating E&EE Department's process for implementing ABET Engineering Criteria 2000