

## *Chapter 4 D: Assessment and Accreditation*

### **Starting Points**

Undergraduate academic programs in the College of Engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). The accreditation process starts with a self-study process, followed by a visit from an accreditation team, which results in an accreditation determination. A six-year cycle exists for programs on the normal sequence. Shorter accreditation periods may occur when significant issues are identified during the self-study and visit process. The College of Engineering is scheduled for its next ABET visit in the Fall of 2007.

In 2000, ABET instituted new accreditation criteria that shifted the emphasis from identifying the inputs and characteristics of the curriculum to an emphasis on defining and assessing the program's effectiveness in meeting appropriate program objectives and outcomes, then utilizing these assessments as a basis for program improvements. Eleven learning objectives were identified in the ABET criteria; engineering programs must demonstrate that their students attain these learning objectives by the time of graduation:<sup>1</sup>

- (a) an ability to apply knowledge of mathematics, science, and engineering,
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data,
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability,
- (d) an ability to function on multi-disciplinary teams,
- (e) an ability to identify, formulate, and solve engineering problems,
- (f) an understanding of professional and ethical responsibility,
- (g) an ability to communicate effectively,
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,
- (i) a recognition of the need for, and an ability to engage in life-long learning,
- (j) a knowledge of contemporary issues, and
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Engineering programs must demonstrate a functioning continuous improvement process that documents the program's performance in the above outcomes on an annual basis, along with the performance in meeting more broadly stated program objectives (what graduates are prepared to do in the first few years after graduation) at least every several years. ABET expects that programs will assess these learning outcomes, evaluate the results, and use these assessment results in planning improvements to the programs.

During the College of Engineering's last general visit in Fall 2001, several programs were required to have intermediate visits two years later, rather than being granted the maximum 6-year accreditation. The issues that led to these intermediate visits focused on

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<sup>1</sup> Additional discipline-specific outcomes are specified for some engineering majors.

shortcomings in assessment procedures. To improve the preparation for future accreditation visits and to strengthen the general assessment procedures in the college, the following strategic plan has been developed.

### **Objectives and Goals**

**Objective:** **Implement a process for annual assessment of student learning outcomes for all engineering programs in the College of Engineering.**  
Our objective directly supports University Strategic Plan Goal 7 and also supports Goals 3 and 8.

Preparation for ABET visits requires maintenance of program objectives and outcomes judged appropriate by various program stakeholders, development of annual procedures that result in the generation of assessment data, evaluation of the data, and implementation of improvements based on the evaluation. Assessment tools must include some direct measures of student performance and often include surveys of recent graduates, employers, and other stakeholders. University accreditation through the Higher Learning Commission of the North Central Accreditation agency also requires annual assessment procedures for student learning outcomes.

**Goal:** **Develop an annual process for collecting and evaluating assessment data on student learning outcomes for all programs in the College of Engineering.**

### **Strategies**

- ✘ Create an Assistant Dean for Assessment and Accreditation to coordinate assessment activities in the college,
- ✘ Appoint a program representative from each degree program to work with the Assistant Dean and with the departmental faculty serving the degree program,
- ✘ Align college assessment procedures with the university-based PRISM system for program assessment,
- ✘ Develop and implement annual assessment procedures that address the ABET-mandated, and program-developed student-learning outcomes, and
- ✘ Develop and conduct surveys to be used for all undergraduate engineering programs to the extent possible to assess suitability of program objectives and outcomes and to measure the attainment of program objectives.

**Goal:** **Prepare the College of Engineering programs for a successful accreditation visit scheduled for Fall 2007.**

The goal of the college is to have all programs receive a full 6-year accreditation determination during the next visit. During the last visit, several programs required intermediate visits. Improvements have been implemented since those visits and college programs should now be positioned to return to the desired full 6-year cycle. In addition to the 11 student learning outcomes, other aspects of programs are evaluated, including course

outlines, typical student work, faculty, staff, administrative, and physical-plant resources. The self-study materials must address all of these issues within a specified format.

#### Strategies:

- ✘ Produce an example self-study for one of the college programs to use as a model for all college programs,
- ✘ Using the example self-study, require all programs to draft self-study materials, including available assessment information, one year prior to the scheduled visit,
- ✘ Run an internal mock ABET visit based on the program materials developed in the year prior to the actual ABET visit,
- ✘ Use the results of the internal visit to implement desired improvements in program features and assessments, and in the self study report, during the year leading up to the scheduled ABET visit, and
- ✘ Put in place schedules and practices to assure the procedures developed and refined for the accreditation visit are continued as ongoing features of the programs' maintenance following the accreditation visit.

#### Metrics:

- ✘ Development of an effective assessment system for the College of Engineering, and
- ✘ Successful ABET accreditation of all COE undergraduate programs.