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Engineering Criteria 2000

The new accreditation guidelines were accepted in November 1996 by the Board of Directors of the ABET—the Accreditation Board for Engineering and Technology. The guidelines reflect changes and needs in the formation of engineering graduates, and are cited here as a possible basis for a more international accreditation system which could be considered beyond US boundaries.

I. OBJECTIVES OF ACCREDITATION

THE accreditation process is a voluntary accreditation system that:

- assures that graduates of an accredited program are adequately prepared to enter and continue the practice of engineering;
- stimulates the improvement of engineering education;
- encourages new and innovative approaches to engineering education;
- identifies these programs to the public.

II. BASIC LEVEL ACCREDITATION CRITERIA

It is the responsibility of the institution seeking accreditation of an engineering program to demonstrate clearly that the program meets the following criteria.

1. Students

An important consideration in the evaluation of an engineering program is the quality and performance of the students and graduates. The institution must evaluate, advise, and monitor students to determine its success in meeting program objectives.

2. Program educational objectives

Each engineering program for which an institution seeks accreditation or re-accreditation must have in place:

- detailed, published educational objectives that are consistent with the mission of the institution and these criteria;
- a process based on the needs of the program's various constituencies in which the objectives are determined and periodically evaluated;
- a curriculum and process that ensures the achievement of these objectives;
- a system of ongoing evaluation that demonstrates achievement of these objectives and uses the results to improve the effectiveness of the program.

3. Program outcome and assessment

Each program must have an assessment process with documented results. Evidence must be given that the results are applied to further development and improvement of the program. The assessment process must demonstrate that the outcomes important to the mission of the institution and the objectives of the programs are being measured. Evidence that may be used includes, but is not limited to, the following student portfolios:

- design projects;
- nationally formed subject content examinations;
- alumni surveys that document professional accomplishments and career development activities;
- employer surveys;
- placement data of graduates.

Engineering programs must demonstrate that their graduates have:

- an ability to apply knowledge of science, mathematics and engineering;
- an ability to design and conduct experiments as well as to analyse and interpret data;
- an ability to design system, component or process and meet desired needs;
- an ability to function in multidisciplinary teams;
- an ability to identify, formulate, and solve engineering problems;
- an understanding of professional and ethical responsibility;
- an ability to communicate effectively;
- the broad education necessary to understand the impact of engineering solutions in a global/societal context;
- a knowledge of contemporary issues;
- an ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

The institution must have and enforce policies for the acceptance of transfer students and for the validation of credit for courses taken elsewhere. The institution must also have and enforce procedures to assure that all students meet all program requirements.

4. Professional component

The professional component requirements specify subject areas appropriate to engineering,

but do not prescribe specific courses. The engineering faculty must assure that the curriculum devotes adequate attention and time to each component, consistent with the objectives of the program and institution. The curriculum must prepare students for engineering practice culminating in a major design experience based on the knowledge and skills acquired in earlier coursework and incorporating engineering standards and realistic constraints that include most of the following considerations: economic, environmental, sustainability, manufacturability, ethical, health and safety, social and political. The professional component must include:

- one year of college-level mathematics and basic sciences appropriate to the discipline;
- one and one-half years of engineering topics, to include engineering sciences and engineering design appropriate to the student's field of study;
- a general education component that complements the technical content of the curriculum and is consistent with the program and institution objectives.

5. Faculty

The heart of any educational program is the faculty. The faculty must be of sufficient number, and must have the competencies to cover all of the curricular areas of the program. There must be sufficient faculty to accommodate adequate levels of student/faculty interaction, student advising and counselling, university service activities, professional development, and interactions with industrial and professional practitioners as well as employers of students.

The faculty must have sufficient qualifications and must ensure the proper guidance of the program, its evaluation and development. The overall competence may be judged by such factors as education, diversity of backgrounds, engineering experience, teaching experience, ability to communicate, enthusiasm, development of effective programs, level of scholarship, participation in professional societies, and registration as professional engineers.

6. Facilities

Classrooms, laboratories and associated equipment must be adequate to accomplish program goals and objectives and provide an atmosphere conducive to learning. Appropriate facilities must be available to foster faculty/student interaction and to create a climate that encourages professional activities. Programs must provide opportunities for students to learn the use of modern engineering tools. Computing and information infrastructures must be in place to support the scholarly activities of the students and faculty and the educational objectives of the institution.

7. Institutional support and financial resources

Institutional support, financial resources with constructive leadership must be adequate to assure the quality and continuity of the engineering program. Resources must be sufficient to attract, retain, and provide for continued professional development of a well-qualified faculty. Resources must be sufficient to acquire, maintain, and operate facilities and equipment appropriate for the engineering program. In addition, support personnel and institutional services must be adequate to meet program needs.

8. Program criteria

Each program must satisfy applicable program criteria. Program criteria provide the specificity needed for interpretation of the basic level criteria as applicable to a given discipline. Requirements stipulated in the program criteria are limited to the areas of curricular topics and faculty qualifications. If a program, by virtue of its title, becomes subject to two or more program criteria, then that program must satisfy each set of program criteria, understanding that overlapping requirements need to be satisfied only once.

III. GENERAL ADVANCED-LEVEL PROGRAMS

Criteria for advanced-level programs are the same as for basic-level programs with the following additions: one year of study beyond the basic level and an engineering project or research activity resulting in a report that demonstrates both mastery of the subject matter and a high level of communication skills.