ABET

ABET Accreditation Criteria

Engineering Accreditation Commission (EAC)

Briefing on Proposed Revisions to General Criteria 3, 5, Preamble & Definitions

MRS
March 28, 2016

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Member, EAC Commission

Topics

- ABET
- Criteria
- Proposed Changes to Criteria Feedback

Handout

- October 15, 2015 Recommended Motion from Sarah Rajala, Chair, EAC

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About ABET

What is ABET?

- ABET is a federation of 35 professional and technical societies.
- ABET relies on 2,200 volunteers supported by 33 full-time and 10 part-time staff.

What Does ABET Accredit?

ABET accredits an academic program leading to a specific degree in a specific discipline

(not institutions, schools, colleges, or departments, facilities, courses, faculty, graduates, degrees)

ABET's 35 Member Societies

Organizational Structure
2,200+ Volunteer Experts

Board of Directors (12)
- Elected by Board of Delegates
- Provide strategic direction and plans
- Appeals process

Board of Delegates (47)
- Nominated by & represent the member societies
- Decide policy and procedures
- Approve criteria

4 Commissions
- ASAC, CAC, **EAC,** ETAC
- Make decisions on accreditation status
- Implement accreditation policies
- Propose changes to criteria

Program Evaluators
- Visit campuses
- Evaluate individual programs
- Make initial accreditation recommendations
- "Face of ABET"

Engineering Area Delegation, materials representation:
ACerS – William Mullins (Program Officer, Structural Materials, ONR)
MRS – Todd Hufnagel (Professor MSE, Johns Hopkins) (was Bruce Clemens)
TMS – Ashok Saxena (Provost, University of Arkansas
WEPAN – Kristen Constant (Chair, Materials, Iowa State)

Criteria: The Guiding Principles of Accreditation Decisions

- Ensure the quality of educational programs
- Foster the systematic pursuit of quality improvement in educational programs
- Develop educational programs that satisfy the needs of constituents in a dynamic and competitive environment

ABET Accreditation Criteria

1) Students
2) Program Educational Objectives
3) Student Outcomes
4) Continuous Improvement
5) Curriculum
6) Faculty
7) Facilities
8) Support

\+ Program Criteria

Harmonization of Criteria

Criteria Common to All Commissions

Criterion 1 (Students)

Criterion 2 (PEO)

Criterion 4 (CQI)

Criterion 7 (Facilities)

Criterion 8 (Support)

Commission-Specific Criteria

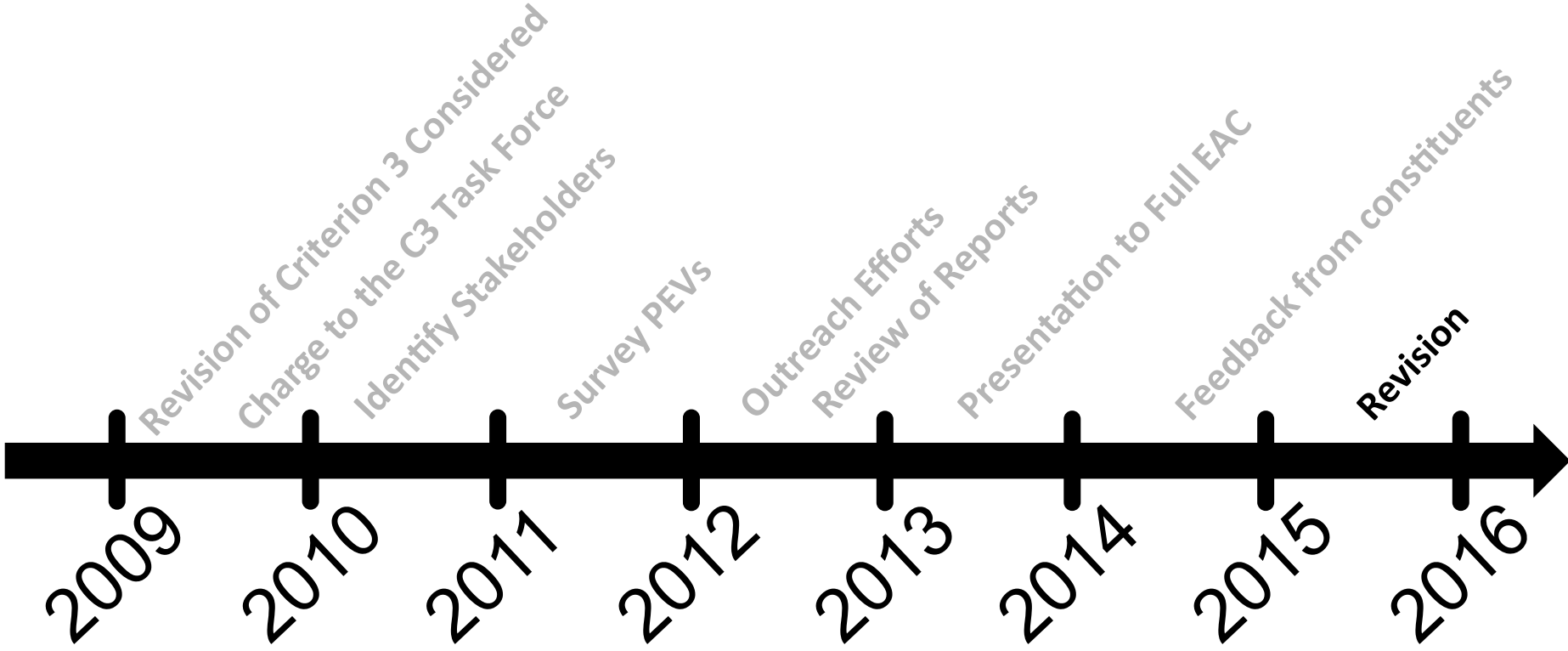
Criterion 3 (Outcomes)

Criterion 5 (Curriculum)

Criterion 6 (Faculty)

Program Criteria

Proposed Criteria Revisions in Process



Slide attribution: Prepared by Alan Cheville (Bucknell) and Rebecca Bates (Minnesota State University), who prepared a Webinar for ASEE (full slide deck can be found here: https://www.dropbox.com/sh/omvmpjg6n9eicgs/AACKfk6OTEY0airaCY26oDXEa?dl=0)

The Proposed C3/C5 Revision

- The EAC's Criteria Committee believes that all of the elements of the Criterion 3 that are applicable in 2015-16 are included in the proposed revisions to Criterion 3, Criterion 5, and Introduction section, along with some additional elements.
- Proposed changes are extensive in Criterion 3, and less so in Criterion 5.
- The proposed introductory section contains definitions that currently are embedded in Criterion 5; hence, the proposed Criterion 5 is shortened.
- The proposed changes are significant in configuration and grouping, but modest in content.
- ***TMS and NICE are supportive of this year's version.***

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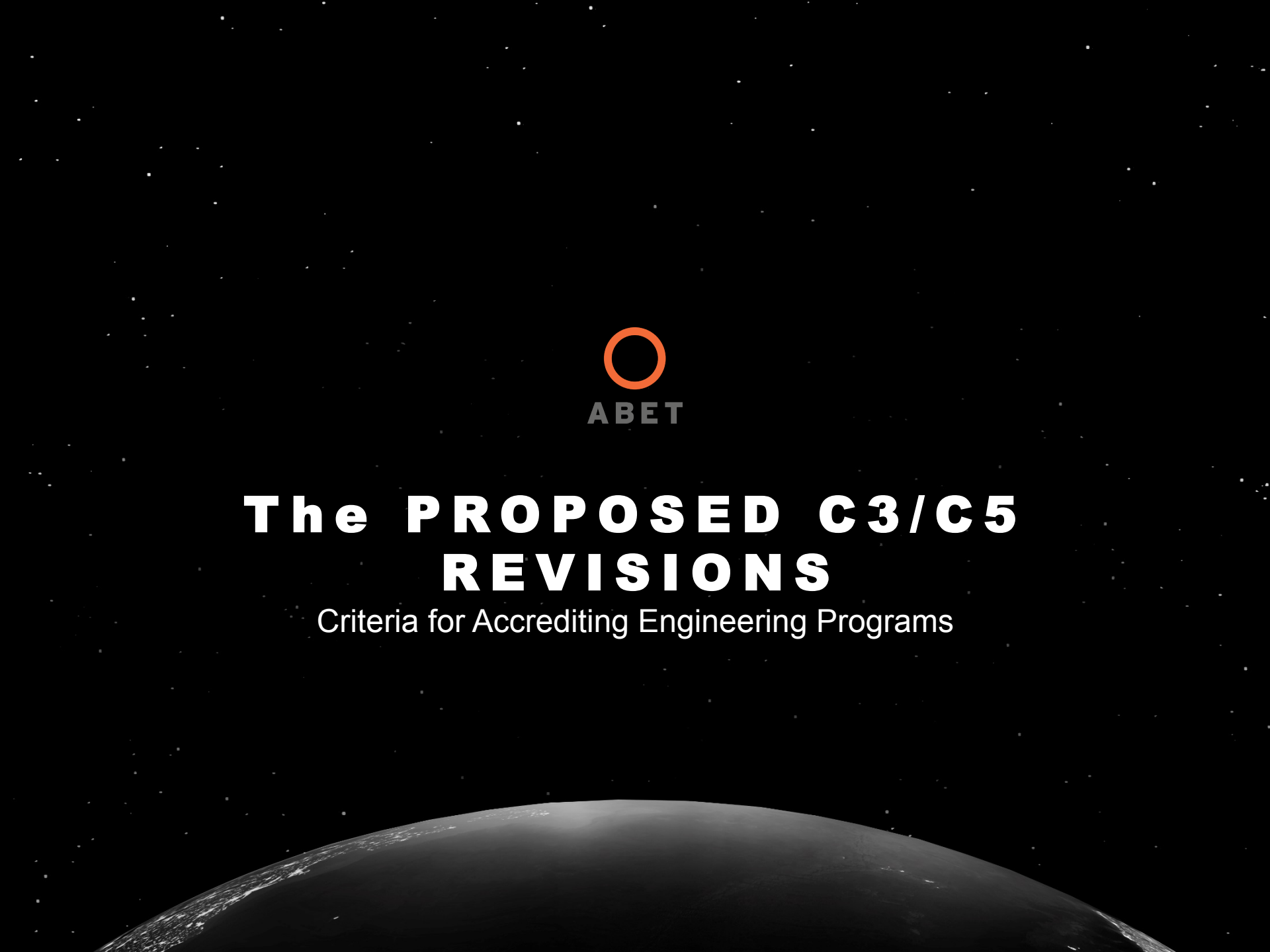
The PROPOSED C3/C5 REVISIONS

Criteria for Accrediting Engineering Programs



"Preamble" NOW

These criteria are intended to assure quality and to foster the systematic pursuit of improvement in the quality of engineering education that satisfies the needs of constituencies in a dynamic and competitive environment. It is the responsibility of the institution seeking accreditation of an engineering program to demonstrate clearly that the program meets the following criteria.

Proposed Preamble

These criteria are intended to provide a framework of education that prepares graduates to enter the professional practice of engineering who are (i) able to participate in diverse multicultural workplaces; (ii) knowledgeable in topics relevant to their discipline, such as usability, constructability, manufacturability and sustainability; and (iii) cognizant of the global dimensions, risks, uncertainties, and other implications of their engineering solutions. Further, these criteria are intended to assure quality to foster the systematic pursuit of improvement in the quality of engineering education that satisfies the needs of constituencies in a dynamic and competitive environment. It is the responsibility of the institution seeking accreditation of an engineering program to demonstrate clearly that the program meets the following criteria

Proposed Preamble, continued (has definitions)

The Engineering Accreditation Commission of ABET recognizes that its constituents may consider certain terms to have certain meanings; however, it is necessary for the Engineering Accreditation Commission to have consistent terminology. Thus, the Engineering Accreditation Commission will use the following definitions:

Basic Science – Basic sciences consist of chemistry and physics, and other biological, chemical, and physical sciences, including astronomy, biology, climatology, ecology, geology, meteorology, and oceanography.

College-level Mathematics – College-level mathematics consists of mathematics above pre-calculus level.

Engineering Science – Engineering sciences are based on mathematics and basic sciences but carry knowledge further toward creative application needed to solve engineering problems.

Engineering Design – Engineering design is the process of devising a system, component, or process to meet desired needs, specifications, codes, and standards within constraints such as health and safety, cost, ethics, policy, sustainability, constructability, and manufacturability. It is an iterative, creative, decision-making process in which the basic sciences, mathematics, and the engineering sciences are applied to convert resources optimally into solutions.

Teams – A team consists of more than one person working toward a common goal and may include individuals of diverse backgrounds, skills, and perspectives.

One Academic Year – One academic year is the lesser of 32 semester credits (or equivalent) or one-fourth of the total credits required for graduation with a baccalaureate degree.

11 outcomes → 7 outcomes

Student Outcomes NOW (criterion 3)

(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 multidisciplinary 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
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Proposed Student Outcomes (criterion 3)

(1) an ability to identify, formulate, and solve engineering problems by applying principles of engineering, science and mathematics.
(2) an ability to apply both analysis and synthesis in the engineering design process, resulting in designs that meet desired needs.
(3) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
(4) an ability to communicate effectively with a range of audiences.
(5) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
(6) an ability to recognize the ongoing need for additional knowledge and locate, evaluate, integrate, and apply this knowledge appropriately.
(7) an ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.

Curriculum NOW (criterion 5)

The curriculum requirements specify subject areas appropriate to engineering but do not prescribe specific courses. The faculty must ensure that the program curriculum devotes adequate attention and time to each component, consistent with the outcomes and objectives of the program and institution.

The professional component must include:

(a) one year of a combination of college level mathematics and basic sciences (some with experimental experience) appropriate to the discipline. Basic sciences are defined as biological, chemical, and physical sciences.
(b) one and one-half years of engineering topics, consisting of engineering sciences and engineering design appropriate to the student's field of study. The engineering sciences have their roots in mathematics and basic sciences but carry knowledge further toward creative application. These studies provide a bridge between mathematics and basic sciences on the one hand and engineering practice on the other. Engineering design is the process of devising a system, component, or process to meet desired needs. It is a decision-making process (often iterative), in which the basic sciences, mathematics, and the engineering sciences are applied to convert resources optimally to meet these stated needs.
(c) a general education component that complements the technical content of the curriculum and is consistent with the program and institution objectives. Students must be prepared for engineering practice through a curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints.

One year is the lesser of 32 semester hours (or equivalent) or one-fourth of the total credits required for graduation.

Proposed Curriculum (criterion 5)

The curriculum requirements specify subject areas appropriate to engineering but do not prescribe specific courses. The curriculum must support attainment of the student outcomes and must include:

(a) one academic year of a combination of college-level mathematics and basic sciences (some with experimental experience) appropriate to the program.
(b) one and one-half academic years of engineering topics, consisting of engineering sciences and engineering design appropriate to the program and utilizing modern engineering tools.
(c) a broad education component that includes humanities and social sciences, complements the technical content of the curriculum, and is consistent with the program educational objectives. Students must be prepared to enter the professional practice of engineering through a curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple constraints.

Next Steps

- The EAC recognizes that programs must reconfigure assessment tools and practices to map course content to the proposed organizational structure of Criterion 3 and to a lesser extent of Criterion 5.
- Because of the magnitude of change that has been proposed, a phase-in period for compliance following adoption of the proposed changes would be reasonable and appropriate
- Based on feedback received and the recommendation of the EAC, the Engineering Area Delegation may decide to extend the review and comment period for one additional year.
- Likewise, due to the breadth and complexity of the proposed changes and the impact to programs demonstrating compliance with Criteria, a phase-in implementation period may be recommended by the EAC to the Engineering Area Delegation.

ABET Website Portal for Comment

http://www.abet.org/news/abet-releases-criteria-proposal-for-public-comment/

Questions?

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THANK YOU