NEW ACCREDITATION CRITERIA FOR U.S. ENGINEERING TECHNOLOGY PROGRAMS

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Abstract *¾ This past year the Engineering Technology Commission of the Accreditation Board for Engineering and Technology [TAC of ABET] adopted new accreditation criteria that will be a significant change for accredited engineering technology programs in the United States. These criteria, for the most part, are outcomes-based and modeled after the new ABET criteria for engineering programs which was adopted four years ago. Discussed in this paper will be the development of these new criteria, a detailed explanation of the criteria and the likely impact upon the over 700 accredited engineering technology programs in the United States.*

Index Terms ¾ – Accreditation, engineering technology, assessment

INTRODUCTION

The Accreditation Board for Engineering and Technology [ABET] is recognized in the United States as the sole accrediting agency for educational programs leading to degrees in engineering, engineering technology, and related engineering areas[1]. This past year, ABET has expanded its mission to include computer science and other computer-orientated programs. The Technology Accreditation Commission [TAC], one of four ABET commissions, has responsibility for engineering technology accreditation criteria and the accreditation process, and reports to the ABET Board of Directors.

About six years ago, TAC formed a committee to review, and perhaps reform, its accreditation criteria. Over several years this committee developed 'outcomes-based' criteria similar to that of the Engineering Accreditation Commission [EAC] of ABET and consistent with the trends of the regional accreditation agencies that accredit U.S. universities and colleges. These new TAC criteria were renamed *"TC2K"* [Technology Criteria 2000] and were approved by the ABET Board of Directors for accreditation reviews starting in Fall 2001.

Throughout the development of TC2K, there were many revisions, both minor and major, resulting from input from engineering technology administrators and faculty. TC2K are a significant departure from previous TAC criteria, which tended to be more prescriptive and sometimes criticized for restricting program innovation. As one would expect, there are many that are critical of TC2K, the old criteria, and probably any future criteria that may be developed. In this paper, the author will not attempt to be critical of TC2K but rather explain TC2K and forecast the likely impact on engineering technology in the next decade.

TC2K, CRITERION 1- STUDENTS AND GRADUATES

TC2K [Technology Criteria 2000] is composed of Criterion 1 through 7: Students and Graduates, Program Characteristics, Faculty, Facilities, Institutional and External Support, Assessment, and Program Criteria [2]. Of all these seven criteria, Criterion 1, Students and Graduates, might have the greatest impact on engineering technology programs. Criterion 1 of TC2K requires that an engineering technology program prepare graduates who:

a. demonstrate an appropriate mastery of the knowledge, techniques, skills and modern tools of their disciplines,
b. apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology,
c. conduct, analyze, and interpret experiments and apply experimental results to improve processes,
d. apply creativity in the design of systems, components, or processes appropriate to program objectives,
e. function effectively on teams,
f. identify, analyze, and solve technical problems,
g. communicate effectively,
h. recognize the need for and possess the ability to pursue lifelong learning,
i. understand professional, ethical, and social responsibilities,
j. recognize contemporary professional, societal, and global issues and are aware of and respect diversity, and
k. have a commitment to quality, timeliness and continuous improvement.

During the accreditation process, the engineering technology program being evaluated will be expected to provide documented evidence that the above areas are addressed in the curriculum.

As programs prepare for the accreditation review by TAC of ABET, they must first try to define and understand numerous key words and phrases in Criterion 1. For

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example, "appropriate mastery," "apply," "adapt," "communicate effectively," "understand social responsibility," "recognize," "diversity," etc. are terms that can generate hours of discussion at a faculty meeting. Assuming that over time faculty can reach a consensus on terminology, the next issue will be to identify which technique can be utilized to best document that 'it's in the curriculum.' Fortunately, TC2K Criterion 1.a-k is very similar to EC2000 [Engineering Criteria 2000], Criterion 3.a-k, the ABET criteria for engineering programs which has been in force for the past three years [3]. There have been numerous EC2000 conference workshops over the past five years dealing with defining terminology, objectives, strategies, outcomes and assessment methods for engineering programs. It is expected that the engineering technology community will adopt the outcomes from these workshops, and workshops now being offered specifically for engineering technology accreditation, over the next five to ten years. Eventually, a 'comfort level' will be achieved where most engineering technology educators feel they understand the intent of Criterion 1.

Criterion 1 will challenge engineering technology programs to embed the non-technical topics such as 'developing teamwork skills, understand professional, ethical and social responsibilities, and the respect diversity' into traditionally technical coursework. The author doubts that TAC of ABET will accept the notion that such topics only belong in humanities and social studies courses. Engineering technology faculty will 'somehow' have to make room for these additional topics.

TC2K, CRITERION 2- PROGRAM CHARACTERISTICS

For the past several decades, TAC of ABET criteria were very specific in course requirements for accredited engineering technology programs. Minimum course credit hours were specified for basic science, mathematics, communications, social studies and humanities, and technical coursework. For example, the old criteria for B.S. programs required a minimum of 24 semester credit hours of basic sciences and mathematics, with at least eight being basic sciences, and eight semester credit hours in social sciences and/or humanities [4]. In TC2K Criterion 2, the only quantitative measure is the specification of minimum total semester credit hours of 124, the same specification as the old criteria. Rather than semester credit hours, TC2K discusses the expectations of TAC of ABET with phrases like, "students must be proficient in," "course work in this area is required," "students must become thoroughly familiar with," and "student competence … is required." Other than total semester credit hours, TC2K Criterion 2 does have the one other statement that quantifies semester credit hour allocation, "The technical component must represent at least 1/3 of the total credit hour content of the program to have sufficient technical depth but should not exceed 2/3 of the total content to ensure breadth in essential mathematics, science, communications and humanities."

Engineering technology programs will have to design a curriculum based upon local needs and the judgment of program faculty and administration. Over time, there will be a wide variety of curricula developed. Supporters of TC2K stress that this encourages program creativity, variability and innovation – it does. However, others argue that employers "will not know what they are getting" when they hire an engineering technology graduate. Another area of concern is that of transferability. In the United States, there are 391 accredited engineering technology programs at community colleges, which offer only two-year associate degree programs [5]. A majority of these students will transfer to a baccalaureate program at a university for an additional two years of study. Because of this predicted wide variability in curricula at the two-year community colleges, articulation to a four-year program will be challenging for both the student and the four-year institution. In all likelihood, the two-year graduate will be required to take additional deficiency courses to 'blend into' the four-year institution or the four-year institution will have to design curricula specific to each transfer student based upon the student's background.

Most critics of TC2K feel that Criterion 2 will have a long-term negative impact on engineering technology education because it allows too much latitude in curricula and engineering technology will lose its identity to employers and the public. Proponents of TC2K feel Criterion 2 will have a long-term positive effect by encouraging innovation and better meeting local industry needs.

TC2K, CRITERION 3 THROUGH 7

The remaining criteria are: Criterion 3-Faculty; Criterion 4-Facilities; Criterion 5-Institutional and External Support; Criterion 6-Assessment, and Criterion 7-Program Criteria [not yet published]. All of these are very similar to sections in the old criteria and should not present any confusion except possibly for Criterion 7-Program Criteria, which is not yet published. Preliminary drafts of various Program Criteria indicate that the language will be non-quantitative and written in very general terms. The intent of Criterion 6, Assessment, present in the old criteria, is strengthened and expanded in TC2K. It is expected that the documentation needed to satisfactorily address this criterion will require much more effort from the institutions seeking TAC of ABET accreditation.

SUMMARY

TAC of ABET adopted TC2K to stress continuous improvement and encourage new and innovative approaches

to engineering technology education. Programs will be challenged to critically evaluate their curriculum, faculty, facilities and processes. Some feel very strongly that TC2K is a major improvement while others feel that the lack of specificity and credit hour quantification will cause serious, long-term damage to the identity and quality of engineering technology education. Only time will tell.

REFERENCES

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[5] "68th Annual Report, September 2000," ABET, Baltimore, Maryland, 2000, p.64.