

## **Maintaining Accreditation of an Accredited Program After Addition of A Distance Learning Degree Option**

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### **I: Abstract**

Each accreditation commission and/or board has established definitions of what activities constitute a substantive change that will require a review of accreditation of an existing accredited degree program. The offering of a complete and/or partial distance learning option of an existing degree program can affect the educational goals, intended student population, curriculum and modes of instruction, and thus constitutes a substantive change to the program.

To maintain accreditation of a program with any type of a distance learning option, strategies must be employed to ensure that the distance learning courses are the equivalent of those taught in the traditional classroom. There is, however, the recognition that there are many areas in which the usual techniques of doing things for a traditional classroom are not necessarily appropriate within the context of a distance learning course. Therefore, the strategies must assure alignment with academic standards in such areas as course development, faculty training, student services, learning resources, infrastructure, and outcome assessment.

Maintaining equivalency between traditional and distance learning courses become particularly challenging when the courses contain laboratory components. It may be practical to provide online laboratory experiments involving purely software activities. Examples of software oriented activities may include remote access to servers for network analysis, and remote configuration of switches and routers for configuring a wide area network scenario, simulating electronic circuits, simulating thermal systems, simulating fluid systems or developing computer programs using a compiler such as Visual Basic. However, laboratory experiments involving hardware, such as adding network interface cards to a computer, wiring of a local area network or modifying and repairing of computers, building and testing of electronic circuits and setting up and testing of thermal and fluid systems cannot be done online.

In this article, summaries of accreditation criteria for engineering technology and computer science programs, and accreditation criteria for institutions are presented. The summaries are then followed by discussions of how the accreditation criteria are affected by introduction of distance learning classes. Discussions of techniques for meeting the accreditation criteria influenced by offering of distance learning classes are presented.

## II: Introduction

This article focuses on unique accreditation issues that arise when an engineering technology and/or a computer science degree awarding program is partially or completely offered online.

The Accreditation Board for Engineering and Technology (ABET) is widely recognized for accrediting engineering technology and computer science programs. The Technology Accreditation Commission (TAC) of ABET criteria are used for engineering technology programs [1], [2]. The Computing Accreditation Commission (CAC) of ABET criteria are used for computer science programs [3], [4], [5].

This article contains a summary of the accreditation criteria from TAC and CAC of ABET. The summary is focused only on the portions of ABET criteria that would be affected if distance learning courses are offered. The article then contains discussions on techniques for satisfying the ABET requirements when distance learning courses are offered.

An institution can also be accredited by one of the following eight regional accrediting agencies.

- Commission on Higher Education, Middle States Association of Colleges and Schools
- Commission on Institutions of Higher Education, New England Association of Schools and Colleges
- Commission on Technical Career Institutions, New England Association of Schools and Colleges
- Commission on Institutions of higher Education, North Central Association of Colleges and Schools
- Commission on Colleges, the Northwest Association of Schools and Colleges
- Commission on Colleges, Southern Association of Colleges and Schools
- Accrediting Commission for Community and Junior Colleges, Western Association of Schools and Colleges
- Accrediting Commission for Senior Colleges and Universities, Western Association of Schools and Colleges

This article also contains a summary and discussion of a document titled “Good Practices For Electronically Offered Degree and Certificate Programs” developed by the eight regional accrediting commissions in response to the emergence of online instruction offered at a distance [6].

The University of Toledo operates a successful distance learning program. According to statistics provided by The University of Toledo distance learning office, for academic year 2002-2003, there were 530 distance learning courses offered at The University of Toledo. The total number of enrollment in The University of Toledo’s distance learning courses for the academic year 2002-2003 was 10570.

A summary of approaches taken by The University of Toledo distance learning division for satisfying the “Good Practices” requirements is presented [7].

This article contributes to the field of engineering education by focusing on unique issues that arise when engineering technology and/or computer science degreed programs are offered through internet based distance learning courses.

### **III: Summary of ABET Criteria**

#### **III.A: Engineering Technology Criteria**

Currently ABET has two sets of criteria for accrediting engineering technology programs, one identified as “Conventional Criteria” and the other one identified as “Technology Criteria 2000 (TC2K)”.

For general comprehensive reviews occurring during academic years 2002-03 and 2003-04, institutions may elect to have their programs evaluated under either the “Conventional Criteria” or “Technology Criteria 2000”.<sup>1,2</sup>

For reviews occurring during 2004-05 academic year and thereafter, all reviews must be conducted under “Technology Criteria 2000”.<sup>1,2</sup>

The portions of ABET criteria related to engineering technology programs that would be affected by offering of online courses are summarized in sections III.A.1 and III.A.2.

##### **III.A.1: Summary of Conventional Criteria of TAC of ABET for 2002-2003 & 2003-2004 accreditation cycle:**

1. The program content should provide an educational experience directed toward development of the ability to apply pertinent knowledge to the solution of practical problems in the graduate’s engineering technology specialty.<sup>1,2</sup>
2. ABET requires a high degree of specialization for engineering technology. The technical orientation of specialization should be manifested by faculty qualifications and course content.<sup>1,2</sup>

##### **III.A.2: Summary of Technology Criteria 2000 of TAC of ABET for 2002-2003 & 2003-2004 accreditation cycle:**

1. The program must provide an integrated educational experience that develops the ability of graduates to apply pertinent knowledge to solving problems in the engineering technology specialty.<sup>1,2</sup>
2. The program’s technical content must develop the skills, knowledge, methods, procedures, and techniques associated with the technical discipline and appropriate to the goals of the program.<sup>1,2</sup>
3. Laboratory activities must develop student competence in the use of analytical and measurement equipment common to the discipline and appropriate to the goals of the program.<sup>1,2</sup>

### **III.B: Summary of Criteria for Accrediting Computer Science Programs**

ABET documents cited in references [3], [4] and [5] contain two sets of criteria, one applicable to computer science programs, and one applicable to information systems programs. The portion of ABET criteria addressing the requirements of a computer science program that would be affected by offering of online courses are summarized in this section.

#### **1. Student Support:**

Students have ample opportunity to interact with their instructors. Students are offered timely guidance and advice about the program's requirements and their career alternatives.<sup>3, 4, 5</sup>

#### **2. Curriculum:**

The curriculum must include at least 12 semester hours (18 quarter hours) of science. Course work in science must include the equivalent of a two-semester (three-quarter) sequence in a laboratory science for science or engineering majors.<sup>3, 4, 5</sup>

The core materials must provide basic coverage of algorithms, data structures, software design, concepts of programming languages, and computer organization and architecture. Analysis and design should include substantial laboratory work, including software development.<sup>3, 4, 5</sup>

#### **3. Laboratories and Computing Facilities:**

Appropriate programming languages and support software should be available to support the needs of a modern curriculum.<sup>3, 4, 5</sup>

Systems that are representative of modern, state-of-the-practice computing facilities should be available.<sup>3, 4, 5</sup>

Adequate computer network connectivity should be available to faculty and students.<sup>3, 4, 5</sup>

### **IV: Discussion of Influence of Offering of Distance Learning Courses on ABET criteria**

According to the ABET criteria summarized in section III.A.1, an engineering technology graduate must have a high degree of specialization and be able to solve practical problems. To be able to achieve these requirements, laboratory usage must be an integral part of any engineering technology curriculum.

The ABET criteria summarized in section III.A.2 require an educational institution to ensure that the program's content enable an engineering technology graduate to apply relevant knowledge related to the area of study to solve problems. Achieving this goal also requires use of laboratories as an integral part of a typical engineering technology curriculum.

The ABET criteria summarized in section III.B call for regular interaction between faculty and students, and use of laboratories and state-of-the-practice computing facilities.

A course consisting only of online sessions cannot satisfy the laboratory usage requirements and/or the regular interaction between faculty and students criterion. An online course may also not allow the students the use of state-of-the-practice computing facilities.

It is possible to satisfy the ABET criteria for a program offering online courses by supplementing the courses with short duration, but intense campus classes.

An example of a short duration and intense course supplement can be campus classes consisting of eight hours per day sessions for as many days as are required to meet the course objectives. Such a supplemental course segment can be used to satisfy the required laboratory and/or the state-of-the-practice computing facilities usage.

Holding regular and frequent online chat sessions can be used to satisfy the requirement of regular contact between the students and faculty.

## **V: Summary of “Good Practices For Electronically Offered Degree and Certificate Programs”, and techniques used by The University of Toledo Distance Learning Program for addressing “Good Practices”**

The eight accrediting commissions listed in section II have developed a series of “Good Practices” for electronically offered degree and certificate programs [6].

The “Good Practices” are divided into five components. They are:

- Institutional Context and Commitment
- Curriculum and Instruction
- Faculty Support
- Student Support
- Evaluation and Assessment

The University of Toledo has a documented approach for meeting the “Good Practices” requirements [7]. Following this documented guideline is a part of The University of Toledo’s approach to obtain and/or maintain accreditation for its distance learning degree and certificate programs.

Sections V.A, V.B, V.C, V.D and V.E contain summaries of the “Good Practices” requirements, and The University of Toledo’s approach for responding to these requirements.

### **V.A: Institutional Context and Commitment**

The following items V.A.1 through V.A.5 are summaries of the required criteria related to institutional context and commitment.

V.A.1: In its content, purpose, organization, end enrollment history if applicable, the program is consistent with the institution's role and mission.<sup>6</sup>

V.A.2: The institution assures adequacy of technical and physical plant facilities including appropriate staffing and technical assistance, for supporting its electronically offered programs.<sup>6</sup>

V.A.3: In its articulation and transfer policies the courses and programs are judged based on their learning outcomes and the resources brought to bear for their achievement, not on modes of delivery.<sup>6</sup>

V.A.4: The selection of technologies is based on appropriateness for the students and the curriculum. It is recognized that availability, cost, and other issues are often involved, but program documentation should include specific consideration of the match between technology and program.<sup>6</sup>

V.A.5: The institution provides students with reasonable technical support for all hardware, software, and delivery system required in a program.<sup>6</sup>

The following items V.A.6 through V.A.10 are steps taken at The University of Toledo to address the criteria listed in items V.A.1 through V.A.5.

V.A.6: In response to item V.A.1, the university has developed strategies to ensure that online courses are equivalent to campus courses. The university recognizes that the usual ways of doing things for campus provisions are not necessarily appropriate in the context of online course delivery. The intent of these strategies is the alignment with academic standards in such areas as course development, faculty training, student services, learning resources, infrastructure, and outcome assessment.<sup>7</sup>

V.A.7: In response to item V.A.2, the university assures adequacy of technical and physical plant facilities including appropriate staffing and technical assistance for supporting its electronically offered programs. The university continually researches and implements the latest in available hardware, balanced by financial practicality and essentiality relative to delivery of course material and/or for the support of students, faculty and staff. Staffing consists of administrative, software application and programming, and technical support for systems and hardware. In addition, technical staff members have overlapping duties as to provide for a level of support in all appropriate areas in the absence of a key member of the team.<sup>7</sup>

V.A.8: In response to item V.A.3, the courses are judged for articulation and transfer policies based on their learning outcome, and the resources brought to bear for their achievement, not on modes of delivery. The articulation and policies and procedures for distance learning programs are the same as for campus programs. Decisions are made at the college level based on the criteria established and approved by the individual colleges.<sup>7</sup>

V.A.9: In response to item V.A.4, selection and use of media is directly related to the context of the content, the learner characteristics, and the learner/instructor technology environment. The

distance learning program design team informs faculty of the possibilities and limitations of each media considered, based on learning objectives, learner analysis, and environmental analysis. If the media preferred by the faculty is not technically possible for students, an instructionally sound alternative media is selected which meets the learning objective.<sup>7</sup>

V.A.10: In response to item V.A.5, the university's distance learning website provides information on a variety of areas including minimum computer requirements, how to get started in an online class which includes information on logging into the course site, when classes start, instructions for setting up the browser, links to important policies and procedures such as schedule adjustment deadlines, withdrawal policies, and academic dishonesty policy.<sup>7</sup>

A letter is mailed to each student enrolled in a distance learning class just before a new semester begins that contains internet and logon information. The distance learning office provides technical support to students during the day, evening and weekends. In addition to the person-to-person technical support, the distance learning office has email and voice mail that is checked periodically each day to respond to students' questions and provide technical assistance.<sup>7</sup>

## **V.B: Curriculum and Instruction**

The following items V.B.1 through V.B.3 are summaries of the required criteria related to curriculum and instruction.

V.B.1: The institution should assure that each program of study results in collegiate level learning outcome appropriate to the rigor and breath of the degree or certificate awarded by the institution. Therefore, the institution assures that the electronically offered degree or certificate program is coherent and complete, and that such programs leading to undergraduate degrees include general education requirements.<sup>6</sup>

V.B.2: In designing an electronically offered degree or certificate program, the institution provides a coherent plan for the student to access all courses necessary to complete the program, or clearly notifies students of requirements not included in the electronic offering. Hybrid programs or courses, and mixing online and campus elements are designed to assure that all students have access to appropriate services.<sup>6</sup>

V.B.3: The importance of appropriate interaction (synchronous or asynchronous) between instructor and students and among students is reflected in the design of the program and its course, and in the technical facilities and services provided.<sup>6</sup>

The following items V.B.4 through V.B.6, are steps taken at The University of Toledo to address the criteria listed in items V.B.1 through V.B.3.

V.B.4: In response to item V.B.1, each distance learning course must be approved in writing by the department offering the course.<sup>7</sup>

V.B.5: In response to item V.B.2, the departments offering online programs have outlined and

scheduled the required courses to enable the students to progress in their studies without interruption. Additional sections are added in response to student demand. Enrollment figures are continually reviewed to anticipate future needs.<sup>7</sup>

V.B.6: In response to item V.B.3, The University of Toledo's distance learning program requires a minimum of three asynchronous interactions per week between the faculty and students. The faculty are also encouraged to communicate with students on a regular basis beyond the minimum requirement.<sup>7</sup>

### **V.C: Faculty Support**

The following items V.C.1 through V.C.3 are summaries of the required criteria related to faculty support.

V.C.1: The institution provides an ongoing program of appropriate technical, design, and production support for participating faculty members.<sup>6</sup>

V.C.2: The institution provides to those responsible for program development the orientation and training to help them become proficient in the uses of the program's technologies, including potential changes in course design and management.<sup>6</sup>

V.C.3: The institution provides to those responsible for working directly with students the orientation and training to help them become proficient in the uses of the technologies for these purposes, including strategies for effective interaction.<sup>6</sup>

The following items V.C.4 through V.C.6, are steps taken at The University of Toledo to address the criteria listed in items V.C.1 through V.C.3.

V.C.4: In response to item V.C.1, the university provides complete technical, design, and production support for participating faculty.<sup>7</sup>

Technical: The courseware application for the university is administered by the distance learning division.<sup>7</sup>

Design: The university provides extensive support in design. Faculty that are teaching distance learning courses are provided with an instructional designer and a digital artist (assistant instructional designer) who work as a team to design learning constructs.<sup>7</sup>

V.C.5: In response to item V.C.2, in The University of Toledo, each instructional designer has earned a master's degree in educational technology. Digital artists have earned a bachelor's degree in arts or fine arts. Furthermore, the professional staff continuously enhance their knowledge by learning new technologies for evaluation and possible implementation into courses.<sup>7</sup>

V.C.6: In response to item V.C.3, the faculty work with their design team to develop various methods for student orientation and strategies for effective interaction.<sup>7</sup>

Many faculty have implemented a course-specific orientation which can include:

- A sample test.<sup>7</sup>
- A sample email/posting and reply activity.<sup>7</sup>

Faculty are also provided information to assist students with technical support and are encouraged to have the students contact the distance learning office toll-free or by email for support.<sup>7</sup>

#### **V.D: Student Support**

The institution must ensure that appropriate services are available to students of electronically offered programs, using the working assumption that these students will not be physically present on campus.<sup>6</sup>

The University of Toledo has taken the following steps to ensure an appropriate level of service for its distance learning students.

- Accurate and timely information about the institution, its program, courses, costs, and related policies and requirements are available 24/7 from the website.<sup>7</sup>
- The distance learning office staff explain distance learning courses and available programs to students, and also refer the students to the appropriate advisor or faculty member.<sup>7</sup>
- The application process is explained to students and instructions for applying online are provided. There is a link from the distance learning website to the undergraduate admission site, the graduate school site and distance learning offices associated with the admission process.<sup>7</sup>
- The academic advisor in the student's college of choice makes the necessary arrangements for placement testing. The university provides online testing in some areas.<sup>7</sup>
- After a student has been accepted and advised, the students can register online, via the phone system, in person at the registrar's office or through the distance learning office. The distance learning office works closely with academic advisors, faculty and department chairs in adding students to courses.<sup>7</sup>
- The distance learning and financial aid offices assist students with questions and issues related to financial aid. There is a link from the distance learning website to the financial aid website. The students are also referred to specific staff members in the financial aid office to resolve problems. Scholarship information is available on the financial aid website.<sup>7</sup>
- Students are instructed to contact the distance learning office immediately if they experience technical problems with their course. Faculty members communicate with students regarding their grade. The distance learning director contacts faculty and chairs as needed regarding students' issues and concerns.<sup>7</sup>

- There is a link to the career services website from the distance learning web site.<sup>7</sup>
- The student services offices in the colleges provide students with their degree audit reports.<sup>7</sup>
- There are numerous references and resources available online from the library's website. The library also provides delivery of items online. The University of Toledo library is a member of Ohio Link. Ohio Link is a consortium of the libraries of 82 Ohio colleges and universities as well as the State Library of Ohio.<sup>7</sup>
- The library website has instructional information related to use of the various resources and how to conduct research.<sup>7</sup>

### **V.E: Evaluation and Assessment**

The following items V.E.1 through V.E.3 are summaries of the required criteria regarding evaluation and assessment.

V.E.1: As a component of the institution's overall assessment activities, documented assessment of student achievement is conducted in each course and at the completion of the program, by comparing student performance to the intended learning outcomes.<sup>6</sup>

V.E.2: The institution conducts a program of continual self evaluation directed toward program improvement.<sup>6</sup>

V.E.3: Institutional evaluation of electronically offered programs take place in the context of the regular evaluation of all academic programs.<sup>6</sup>

The following items V.E.4 through V.E.6, are steps taken at The University of Toledo to address the criteria listed in items V.E.1 through V.E.3.

V.E.4: In response to item V.E.1, evaluations that compare student performance to their intended learning outcomes are within each course or delivered via alternative media as per the instructor, department chair, or college dean's request.<sup>7</sup>

V.E.5: In response to item V.E.2, The university continuously reviews new technology through communication with leading developers. The university provides the most current distance learning research to faculty on its web site. The university also provides faculty with conference opportunities to learn what other institutions are doing in regard to these issues.<sup>7</sup>

V.E.6: In response to item V.E.3, The university offers two student assessment tools to faculty and departments. Assessments are returned to the department chair at the end of the semester.<sup>7</sup>

### **VI: Summary and Conclusion**

This article's theme is focusing on the unique accreditation requirements of a complete or partial

distance learning degreed program. The article's focus is on accreditation requirements for engineering technology and computer science programs.

The majority of colleges and universities choose to follow the Accreditation Board for Engineering and Technology (ABET) criteria for accrediting their engineering technology and computer science programs. The Technology Accreditation Commission (TAC) of ABET criteria is followed for engineering technology programs. The Computing Accreditation Commission (CAC) of ABET criteria is followed for computer science programs.

This article summarized the TAC and CAC of ABET criteria that are relevant when distance learning courses are offered. The article then discusses unique issues to be considered for satisfying the ABET requirements when all or some of the courses are offered online.

The most serious potential shortcoming in a distance learning program as related to meeting the ABET criteria for most engineering technology and for a typical computer science program is the difficulty in having meaningful laboratory exercises. A suggestion in the form of supplemental short duration laboratory camps as supplements to distance learning courses is made. The laboratory camps can be used as a mean of offering effective laboratory sessions.

Furthermore, an institution can also be accredited by one of eight regional accrediting agencies. The regional accrediting agencies have collectively developed a document titled "Good Practices For Electronically Offered Degree and Certificate Programs". The "Good Practices" document explicate how the well established essentials of institutional quality found in regional accreditation standards are applicable to a distance learning environment.

A summary of the approach taken by The University of Toledo in meeting the "Good Practices" criteria is presented.

There are overlapping requirements between ABET criteria and regional accrediting agencies' criteria. Following the "Good Practices" guidelines leads to satisfaction of all ABET criteria not related to laboratory usage for engineering technology and computer science programs.

In summary, offering short duration laboratory camps as supplements to those courses requiring laboratory components, and following the "Good Practices" criteria will enable an institution to offer accredited engineering technology and/or computer science distance learning programs.

## **VII: Acknowledgment**

Dr. Karen Rhoda is the originator of reference [7]. Dr. Rhoda is currently the director of distance learning program at The University of Toledo. Dr. Rhoda has been nominated by the administrators and faculty of The University of Toledo to The United States Distance Learning Association for outstanding achievement by an individual in distance learning. The author is grateful to Dr. Rhoda for providing access to reference [7] to The Engineering Technology Department of The University of Toledo.

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