



University of the District of Columbia
School of Engineering and Applied Sciences

Continuous Improvement Process

And

ABET Outcomes Assessment Protocol

BASED ON

ABET 2008-2009 Criteria

April 2008

School of Engineering and Applied Sciences

Program Assessment and Evaluation Protocol

ABET Program Review In general, the ABET program review focuses on the following elements:

- (a) Program Educational Objectives
- (b) ABET Program Outcomes
- (c) Objectives-Outcomes Mapping and Assessment through individual courses
- (d) A balanced curriculum
- (e) Program Stakeholders
- (f) Continuous assessment and program review (closing the loop)
- (g) Documentation
- (h) Established Criteria

The essence of the ABET review is to ensure that programs are continuously assessed with inputs from all stakeholders, and the result of the assessment is reflected in program improvement. Since this is an ever evolving process, we refer to it as a Continuous Improvement Process. The goal is to always be improving the program. There are two clearly defined cycles in this process. The Slow Cycle that focuses on the achievement of the Program Educational Objectives, and the Fast Cycle that focuses on the demonstration of the attainment of the ABET Program Outcomes (*a*) – (*k*) (for Information Systems (*a*) – (*j*); for Information Technology, (*a*) – (*n*)).

Continuous Improvement Process

- (a) Each program must establish its Program Educational Objectives. These objectives must align with the university mission and goals.
- (b) Each program must define its stakeholders, such as, students, employers, etc.
- (c) The period for the Fast Cycle and Slow Cycle must be established.
- (d) To ensure success, it is essential that program faculty embrace the culture of program assessment and evaluation.
- (e) Once the Program Educational Objectives have been established, performance measures and metrics must be defined.

General Procedures for Addressing the ABET Accreditation Criteria

STUDENTS

(Engineering Accreditation Commission (EAC): Criterion 1. Students; Computing Accreditation Commission (CAC): Criterion 1. Students)

The critical issues in this criterion are advising and transfer credit policy.

Each student must be assigned an advisor. An Advisory Folder containing the program curriculum must be included in the Folder. A clearly defined graduation requirement (or graduation check) sheet and course pre-requisite relationships must be included in the folder. The advisor contacts, course curriculum, pre-requisite relationships, and the graduation check sheet should be easily accessible on the department's web site. It is recommended that faculty develop easy-to-use advising software to be used for advising students. It is also recommended that such advising package be adopted uniformly by all programs. The delay in 2007-2008 by the University in migrating from the SIS+ system to Banner[®] which has a built-in advising module has delayed our adoption of uniform advising software.

One key in advising is adherence to course prerequisites. The course pre-requisite information must be provided online and also made available to students and faculty. Cogent reason must be provided for deviation from established course prerequisites. Such reason must be approved by the chair following consultation with program faculty and advisor. This should be considered a program policy. Grades and assigned transfer credit must be posted in the Student Folder. Good advising practice requires that course offerings are planned at least 2-3 semesters in advance.

Another critical element under this criterion is the transfer credit policy. Each program must establish a transfer credit policy and also ensure that faculty apply this policy uniformly for all transfer students. Variations from the established policy must be approved by the chair and Dean. The engineering, engineering technology, computer science, and information technology programs must fully comply with the University's transfer credit policies published in the general catalog. It is imperative that transfer students are informed of transferable credits within the first semester of matriculation into the program.

PROGRAM EDUCATIONAL OBJECTIVES

(EAC: Criterion 2. Program Educational Objectives; CAC: Criterion 2. Program Educational Objectives)

- (a) Define the Program Stakeholders (e.g., students, alumni and their employers, etc)
- (b) Establish Program Educational Objectives
- (c) For the objective, define performance measures and metrics

Changes to the Program Educational Objectives must be undertaken in consultation with the Program Stakeholders whose inputs are sought routinely as part of our Continuous Improvement Process.

ABET PROGRAM OUTCOMES

(EAC: Program Outcomes; CAC Criterion 3. Program Outcomes)

Each course must address a subset of the corresponding ABET Program Outcomes *(a) – (k)* (for Information Systems *(a) – (j)*; for Information Technology, *(a) – (n)*).

Each program must maintain a Course-Outcome Matrix in order to demonstrate its compliance with the corresponding ABET Program Outcomes criteria. In addition, in each program, a “Program Objectives” – “ABET Program Outcomes” mapping must be maintained to justify, measure, and enrich the program’s objectives.

Various assessment tools have been implemented to establish attainment of the ABET Program Outcomes in each program.

A detailed Course Syllabus shows which elements of the ABET Program Outcomes are met in each course. Where there is a standard course description form, this is used. On the basis of this correlation, Course Objectives are established for each course to ensure that all the program outcomes are met.

A Course Outcome Table is prepared for each course detailing a matrix of the correlation of the Course Outcome cross-referenced with the assessment tools, such as, Assessment Methods, Instructional Strategies, and the Program Educational Objectives.

Programs must establish assessment instruments ranging from course-based methods to national Board Exams as appropriate to the discipline. The results of the assessment must continually be used to modify program content and pedagogy. The assessments should be reflected in a Course Folder for each course administered by the instructor. The primary purpose of the Course Folder is a rational assessment of the accomplishments of the Course Outcomes that are keyed to the ABET Program Outcomes. Students are administered questionnaires on the Course Outcomes and the ABET Program Outcomes.

The Course Folder is reviewed by the instructor as well as a committee of the whole of the program faculty to determine what changes should be made to the Course Outcomes and the overall pedagogy. The Course Outcomes are updated as necessary. Minutes of the faculty meeting, especially those that address curriculum materials are kept. The minutes of the curriculum committee meeting are crucial in this regard.

Questionnaires administered to the program Advisory Board are used in the reviews of the syllabi, curriculum, and supporting course materials. Survey instruments are also administered to program alumni, employers, and graduating seniors to solicit feedback on the acquired skills and areas of improvement. The surveys can be keyed to the ABET Program Outcomes, Program

Educational Objectives, and Instructional Strategies. Portfolios of student work are provided to alumni and Advisory Board members.

All the above encompass the activities related to the Fast Loop. The period of review is typically one year except where a course is taught every semester. During this period, the union of the Course outcomes of all actual courses offered must fully cover all the ABET Program Outcomes.

The results of these assessments, surveys, and questionnaires are used to modify the program content and instructional strategies.

Individual programs may require that each Course Folder or Course Book is compiled and updated by the instructor of the course and include additional components such as:

- (a) Syllabus
- (b) Customized Self-Study Course Description Form
- (c) Course Materials such as Lecture Notes
- (d) All Assignments and Exams
- (e) Samples of Student Work for each assignment or exam
- (f) Grade Spread and statistical data for each assignment if appropriate
- (g) The mapping between each assignment and exam question and course outcomes

CONTINUOUS IMPROVEMENT THROUGH ASSESSMENTS

(EAC: Criterion 4. Continuous Improvement; CAC Criterion 4. Continuous Improvement)

Measured program outcomes and objectives must be documented and periodically assessed by faculty and external advisory board. Such periodic assessments and necessary corrections must be documented through the defined Fast Cycle and Slow Cycle.

QUALITY CURRICULUM

(EAC: Criterion 5. Curriculum; CAC Criterion 5. Curriculum)

ABET requires that adequate attention and time is devoted to each curricular component. Typically curricular component are: a minimum of one year combination of college level mathematics and basic sciences (some with experimental experience); a minimum of one and one-half year of engineering topics (engineering science and design); and a general education component, comprising English, humanities, and social sciences.

The Course Folder is the core of the process for ensuring continuous assessment and modification of the curriculum. The review of the Course Folder is used to update the Course Outcomes and instructional strategies, and a new plan for each course. This process enables the faculty to maintain a contemporary curriculum that assures a balanced progression from fundamental mathematics, science, and engineering science to the analytical skills necessary to execute an engineering design.

The detailed accounting of each task within a course and its relationship to the objectives of the program, the mission of the institution, and ABET Program Outcomes that each of the curricular component receive adequate consideration.

FACULTY

(EAC: Criterion 6. Faculty; CAC: Criterion 6. Faculty)

This criterion is required to establish the qualifications, adequacy, and currency of the program faculty. This can be measured by academic credentials, professional development activities, and publications. This is reflected in the curriculum vita of the program faculty.

FACILITIES

(EAC: Criterion 7. Facilities; CAC: Criterion 7. Facilities)

A recitation of the instructional facilities, including classrooms, computing infrastructure, and laboratory space as well as their adequacy and currency is required.

INSTITUTIONAL SUPPORT AND FINANCIAL RESOURCES

(EAC: Criterion 8. Support; CAC Criterion 8. Support)

This criterion addresses the budget formulation and allocation process, and adequacy of the resources to support faculty professional development and equipment renewal plan.

PROGRAM CRITERIA

(EAC: Criterion 9. Program Criteria; CAC Criterion 9. Program Criteria)

This criterion addresses the technical aspect of the program curriculum. The stipulation varies from program to program. However, the requirements are curricular in nature. These elements are captured in the curricular component and attainment supported by the Course Folders.