

## COMPUTING ACCREDITATION COMMISSION

### Definitions and General Criteria

CAC Criteria Currently in Use	To Be Proposed for First Reading <sup>1</sup> in October 2016
<b>DEFINITIONS</b>	<b>DEFINITIONS</b>
<p>While ABET recognizes and supports the prerogative of institutions to adopt and use the terminology of their choice, it is necessary for ABET volunteers and staff to have a consistent understanding of terminology. With that purpose in mind, the Commissions will use the following basic definitions:</p> <p><b>Program Educational Objectives</b> – Program educational objectives are broad statements that describe what graduates are expected to attain within a few years of graduation. Program educational objectives are based on the needs of the program’s constituencies.</p> <p><b>Student Outcomes</b> – Student outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviors that students acquire as they progress through the program.</p> <p><b>Assessment</b> – Assessment is one or more processes that identify, collect, and prepare data to evaluate the attainment of student outcomes. Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the outcome being measured. Appropriate sampling methods may be used as part of an assessment process.</p> <p><b>Evaluation</b> – Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment processes. Evaluation determines the extent to which student outcomes are being attained. Evaluation results in decisions and actions regarding program improvement.</p>	<p>While ABET recognizes and supports the prerogative of institutions to adopt and use the terminology of their choice, it is necessary for ABET volunteers and staff to have a consistent understanding of terminology. With that purpose in mind, the Commissions will use the following basic definitions:</p> <p><b>Program Educational Objectives</b> – Program educational objectives are broad statements that describe what graduates are expected to attain within a few years of graduation. Program educational objectives are based on the needs of the program’s constituencies.</p> <p><b>Student Outcomes</b> – Student outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviors that students acquire as they progress through the program.</p> <p><b>Assessment</b> – Assessment is one or more processes that identify, collect, and prepare data to evaluate the attainment of student outcomes. Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the outcome being measured. Appropriate sampling methods may be used as part of an assessment process.</p> <p><b>Evaluation</b> – Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment processes. Evaluation determines the extent to which student outcomes are being attained. Evaluation results in decisions and actions regarding program improvement.</p>
<i>[No CAC-specific definitions section]</i>	The Computing Accreditation Commission also uses the following definitions:

<sup>1</sup> An approved “first reading” status indicates that the Computing Area Delegation (CAD) has approved the release of a proposed change to the Criteria for a nine-month period of public review and comment prior to a final CAD approval vote in the following year. The draft in the right column of this table is being submitted for first reading approval by the Computing Accreditation Commission to the CAD in October 2016.

CAC Criteria Currently in Use	To Be Proposed for First Reading <sup>1</sup> in October 2016
<i>[The definition of “one academic year” was previously only provided in the self-study document, and was not explicitly provided in the criteria]</i>	<b>One Academic Year</b> - For programs using standard semester units, one academic year is defined as 30 semester units. For programs using standard quarter units, one academic year is defined as 45 quarter units. For other programs, one academic year requires an equivalent amount of coursework.
<i>[Not explicitly defined in the criteria]</i>	<b>College-Level Mathematics</b> – College-level mathematics consists of mathematics above the pre-calculus level.
GENERAL CRITERION 3 (STUDENT OUTCOMES)	GENERAL CRITERION 3 (STUDENT OUTCOMES)
The program must have documented student outcomes that prepare graduates to attain the program educational objectives. There must be a documented and effective process for the periodic review and revision of these student outcomes.	The program must have documented and publicly stated student outcomes that include (1) through (5) below <sup>2</sup> and any additional outcomes required by applicable Program Criteria. The program may define additional student outcomes at its discretion.
The program must enable students to attain, by the time of graduation.	<i>["Must enable" language has been removed. Items below in Criterion 3 are now student outcomes that must be assessed.]</i>
(a) An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline.	<i>[Now incorporated into Criterion 5, Paragraph 2, Items 1 and 2]</i>
(b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.	(1) An ability to analyze a problem, and to identify and define the computing requirements appropriate to its solution.
(c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.	(2) An ability to design, implement, and evaluate a computer-based solution to meet a given set of computing requirements in the context of the discipline.
(d) An ability to function effectively on teams to accomplish a common goal.	(5) An ability to function effectively on teams to establish goals, plan tasks, meet deadlines, manage risk, and produce deliverables.
(e) An understanding of professional, ethical, legal, security and social issues and responsibilities.	(4) An ability to make informed judgments in computing practice based on legal and ethical principles.
(f) An ability to communicate effectively with a range of audiences.	(3) An ability to communicate effectively with a range of audiences about technical information.
(g) An ability to analyze the local and global impact of computing on individuals, organizations and society.	<i>[Now incorporated into Criterion 5, Paragraph 2, Item 5]</i>
(h) Recognition of the need for and an ability to engage in continuing professional development.	<i>[Now incorporated into Criterion 5, Paragraph 1]</i>

<sup>2</sup> These are rendered out of order (1, 2, 5, 4, 3) so as to match the (a) – (i) in order from the current criteria.

CAC Criteria Currently in Use	To Be Proposed for First Reading <sup>1</sup> in October 2016
(i) An ability to use current techniques, skills, and tools necessary for computing practice.	<i>[Now incorporated into Criterion 5, Paragraph 2, Item 3]</i>
<b>GENERAL CRITERION 5 (CURRICULUM)</b>	<b>GENERAL CRITERION 5 (CURRICULUM)</b>
The program's requirements must be consistent with its program educational objectives and designed in such a way that each of the student outcomes can be attained. The curriculum must combine technical and professional requirements with general education requirements and electives to prepare students for a professional career and further study in the computing discipline associated with the program, and for functioning in modern society.	The program's requirements must be consistent with its program educational objectives and designed in such a way that each of the student outcomes can be attained. The curriculum must combine technical, professional, and general education components to prepare students for a career, further study, and lifelong professional development in the computing discipline associated with the program.
The technical and professional requirements must include at least one year of up-to-date coverage of fundamental and advanced topics in the computing discipline associated with the program. In addition, the program must include mathematics appropriate to the discipline beyond the pre-calculus level. For each course in the major required of all students, its content, expected performance criteria, and place in the overall program of study must be published.	The curriculum requirements specify subject areas, but do not prescribe specific courses. The program must include each of the following in a manner appropriate to its discipline: <ol style="list-style-type: none"> <li>1. At least one academic year of up-to-date coverage of fundamental and advanced computing topics that provides both breadth and depth.</li> <li>2. College-level mathematics.</li> <li>3. Current techniques, skills, and tools necessary for computing practice.</li> <li>4. Information assurance and security principles and practices.</li> <li>5. Concepts involving the local and global impact of computing solutions on individuals, organizations, and society.</li> </ol>

## Computer Science Program Criteria

CAC Criteria Currently in Use	To Be Proposed for First Reading in October 2016
<b>CS PROGRAM CRITERION 3 (STUDENT OUTCOMES)</b>	<b>CS PROGRAM CRITERION 3 (STUDENT OUTCOMES)</b>
The program must enable students to attain, by the time of graduation.	In addition to outcomes 1 through 5, the following outcomes are required.
(j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.	(6) An ability to apply theory in the design and implementation of computer-based solutions.
(k) An ability to apply design and development principles in the construction of software systems of varying complexity.	<i>[Now incorporated into CS Program Criterion 5, Paragraph (a), Item 3]</i>
<i>[No analog]</i>	(7) An ability to reason about and explain computer-based solutions at multiple levels of abstraction.
<b>CS PROGRAM CRITERION 5 (CURRICULUM)</b>	<b>CS PROGRAM CRITERION 5 (CURRICULUM)</b>
Students must have the following amounts of course work or equivalent educational experience:	The curriculum requirements specify subject areas, but do not prescribe specific courses. These requirements are:
(a) Computer science: One and one-third years that must include: (1) Coverage of the fundamentals of algorithms, data structures, software design, concepts of programming languages and computer organization and architecture.	(a) Computer science: One and one-third years that must include <sup>3</sup> : (1) Computer science fundamentals including: (a) Algorithms and complexity, computer science theory, concepts of programming languages, and software development. (b) At least three of the following: computer architecture and organization, information management, networking and communication, operating systems, and parallel and distributed computing.
(2) An exposure to a variety of programming languages and systems	<i>[Now incorporated into "concepts of programming languages" from CS Program Criterion 5, Paragraph (a), Item 1, part (a)]</i>
(3) Proficiency in at least one higher-level language.	(4) In-depth coverage of at least one high-level language
(4) Advanced course work that builds on the fundamental course work to provide depth.	(2) Advanced course work that builds on fundamental topics to provide both breadth and depth
<i>[Analog is in CS Program Criterion 3, item (k)]</i>	(3) Design, implementation, and evaluation of computer-based solutions of varying complexity.

<sup>3</sup> (1) – (5) rendered out of order as (1), (4), (2), (3), (5) to match analogs from current criteria.

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<i>[No analog in the criteria]</i>	(5) A project requiring integration of knowledge and skills acquired in earlier course work.
(b) One year of science and mathematics:	<i>[This line removed; science and mathematics requirement reduced to provide increased overall curricular flexibility – see (b) and (c) below]</i>
(1) Mathematics: At least one-half year that must include discrete mathematics. The additional mathematics might consist of courses in areas such as calculus, linear algebra, numerical methods, probability, statistics, number theory, geometry, or symbolic logic.	(b) Mathematics: At least one-half academic year of college-level mathematics that must include discrete mathematics. The additional mathematics might consist of course work in areas such as calculus, linear algebra, numerical methods, probability, statistics, number theory, or geometry.
(2) Science: A science component that develops an understanding of the scientific method and provides students with an opportunity to experience this mode of inquiry in courses for science and engineering majors that provide some exposure to laboratory work.	(c) Science: Natural science course work that develops an understanding of the scientific method, provides exposure to laboratory work, and provides students with an opportunity to experience this mode of inquiry in courses appropriate for science or engineering majors.
<b>CS PROGRAM CRITERION 6 (FACULTY)</b>	<b>CS PROGRAM CRITERION 6 (FACULTY)</b>
Some full time faculty members must have a Ph.D. in computer science.	At least one full time faculty member must have a Ph.D. in computer science.

## Information Technology Program Criteria

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<b>IT PROGRAM CRITERION 3 (STUDENT OUTCOMES)</b>	<b>IT PROGRAM CRITERION 3 (STUDENT OUTCOMES)</b>
The program must enable students to attain, by the time of graduation:	In addition to outcomes 1 through 5, the following outcome is required:
(j) An ability to use and apply current technical concepts and practices in the core information technologies of human-computer interaction, information management, programming, networking, and web systems and technologies.	<i>[Now incorporated into IT Program Criterion 5]</i>
(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer-based systems. (l) An ability to effectively integrate IT-based solutions into the user environment.	(6) An ability to identify and analyze user needs and to take them into account in the selection, integration, evaluation, and administration of computer-based systems.
(m) An understanding of best practices and standards and their application.	<i>[Now incorporated into General Criterion 5, Item 3]</i>
(n) An ability to assist in the creation of an effective project plan.	<i>[Now incorporated into General Criterion 3, Outcome 5]</i>
<b>IT PROGRAM CRITERION 5 (CURRICULUM)</b>	<b>IT PROGRAM CRITERION 5 (CURRICULUM)</b>
Students must have course work or an equivalent educational experience that includes:	The curriculum must include coverage of fundamentals and applied practice in the following areas:
(a) Coverage of the fundamentals of: <ol style="list-style-type: none"> <li>1. The core information technologies of human computer interaction, information management, programming, networking, web systems and technologies.</li> </ol>	(a) The core information technologies of human-computer interaction, information management, programming, web systems and technologies, and networking.
2. Information assurance and security	<i>[Now incorporated into General Criterion 5]</i>
3. System administration and system maintenance	(b) System administration and maintenance
4. System integration and system architecture.	(c) System integration and system architecture.
(b) Advanced course work that builds on the fundamental course work to provide depth.	<i>[Now incorporated into General Criterion 5]</i>

## Information Systems Program Criteria

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<i>["Information Systems Environment" is not explicitly defined in the criteria]</i>	<p><b>Definition</b>  <b>Information Systems Environment</b> - An information systems environment is an organized domain of activity within which information systems are used to support and enable the goals of the activity. Examples of information systems environments include (but are not limited to) business, health care, government, not-for-profit organizations, and scientific disciplines.</p>
<b>IS PROGRAM CRITERION 3 (STUDENT OUTCOMES)</b>	<b>IS PROGRAM CRITERION 3 (STUDENT OUTCOMES)</b>
The program must enable students to attain, by the time of graduation:	In addition to outcomes 1 through 5, the following outcome is required:
(j) An understanding of and an ability to support the use, delivery, and management of information systems within an Information Systems environment.	6. An ability to support the delivery, use, and management of information systems within an information systems environment.
<b>IS PROGRAM CRITERION 5 (CURRICULUM)</b>	<b>IS PROGRAM CRITERION 5 (CURRICULUM)</b>
Students must have course work or an equivalent educational experience that includes:	The curriculum requirements specify subject areas, but do not prescribe specific courses. These requirements are:
(a) Information Systems: One year that must include: (1) Coverage of the fundamentals of application development, data management, networking and data communications, security of information systems, systems analysis and design and the role of Information Systems in organizations.	(a) Information systems: At least one academic year that includes coverage of fundamentals and applied practice in application development; data and information management; IT infrastructure; systems analysis, design and acquisition; project management; and the role of information systems in organizations. <i>[Note: "Security of information systems" from the current criteria is now incorporated into General Criterion 5]</i>
(2) Advanced course work that builds on the fundamental course work to provide depth	<i>[Now incorporated into General Criterion 5]</i>
(b) Information Systems Environment: One-half year of course work that must include a cohesive set of topics that provide an understanding of an environment in which the information systems will be applied professionally.	(b) Information systems environment: At least one-half additional academic year of course work that includes a cohesive set of topics that provide an understanding of an environment in which information systems are applied professionally.
(c) Quantitative analysis or methods, including statistics.	(c) Quantitative analysis or methods that must include statistics.

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<b>IS PROGRAM CRITERION 6 (FACULTY)</b>	<b>IS PROGRAM CRITERION 6 (FACULTY)</b>
Some full-time faculty members, including those responsible for the IS curriculum development, must hold a terminal degree with a program of study in information systems.	At least one full-time faculty member must hold a terminal degree with a program of study in information systems.