Engineering Technology Accreditation Commission

CRITERIA FOR ACCREDITING

ENGINEERING TECHNOLOGY PROGRAMS

Effective for Reviews During the 2018-2019 Accreditation Cycle
Incorporates all changes approved by the ABET Board of Delegates
Engineering Technology Area Delegation as of October 20, 2017

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Criteria for Accrediting Engineering Technology Programs

Effective for Reviews during the 2018-2019 Accreditation Cycle

Definitions

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:

Program Educational Objectives – Program educational objectives are broad statements that describe what graduates are expected to attain within a few years after graduation. Program educational objectives are based on the needs of the program's constituencies.

Student Outcomes – 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.

Assessment – 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.

Evaluation – 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.

The criteria for accreditation are in two sections.

General Criteria – General Criteria apply to all programs accredited by an ABET commission. Each program accredited by an ABET commission must satisfy every Criterion that is in the General Criteria for that commission.

Program Criteria – The Program Criteria provide discipline-specific accreditation criteria. Programs must show that they satisfy all of the specific Program Criteria implied by the program title. Any overlapping requirements need be satisfied only once.

It is the responsibility of the program seeking accreditation to demonstrate clearly that the program meets the following criteria.

I. GENERAL CRITERIA

Criterion 1. Students

Student performance must be evaluated. Student progress must be monitored to foster success in attaining student outcomes, thereby enabling graduates to attain program educational objectives. Students must be advised regarding curriculum and career matters.

The program must have and enforce policies for accepting both new and transfer students, awarding appropriate academic credit for courses taken at other institutions, and awarding appropriate academic credit for work in lieu of courses taken at the institution. The program must have and enforce procedures to ensure and document that students who graduate meet all graduation requirements.

Criterion 2. Program Educational Objectives

The program must have published program educational objectives that are consistent with the mission of the institution, the needs of the program's various constituencies, and these criteria. There must be a documented, systematically utilized, and effective process, involving program constituencies, for the periodic review of these program educational objectives that ensures they remain consistent with the institutional mission, the program's constituents' needs, and these criteria.

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.

For purposes of this section, broadly defined activities are those that involve a variety of resources; that involve the use of new processes, materials, or techniques in innovative ways; and that require a knowledge of standard operating procedures. Narrowly defined activities are those that involve limited resources, that involve the use of conventional processes and materials in new ways, and that require a knowledge of basic operating processes.

A. For associate degree programs, these student outcomes must include, but are not limited to, the following learned capabilities:

   (a) an ability to apply the knowledge, techniques, skills, and modern tools of the discipline to narrowly defined engineering technology activities;

   (b) an ability to apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require limited application of principles but extensive practical knowledge;

   (c) an ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments;

   (d) an ability to function effectively as a member of a technical team;

(e) an ability to identify, analyze, and solve narrowly defined engineering technology problems;

(f) an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;

(g) an understanding of the need for and an ability to engage in self-directed continuing professional development;

(h) an understanding of and a commitment to address professional and ethical responsibilities, including a respect for diversity; and

(i) a commitment to quality, timeliness, and continuous improvement.

B. For baccalaureate degree programs, these student outcomes must include, but are not limited to, the following learned capabilities:

(a) an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities;

(b) an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;

(c) an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;

(d) an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;

(e) an ability to function effectively as a member or leader on a technical team;

(f) an ability to identify, analyze, and solve broadly-defined engineering technology problems;

(g) an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;

(h) an understanding of the need for and an ability to engage in self-directed continuing professional development;

(i) an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;

(j) a knowledge of the impact of engineering technology solutions in a societal and global context; and

(k) a commitment to quality, timeliness, and continuous improvement.

Criterion 4. Continuous Improvement

The program must regularly use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained. The results of these evaluations must be systematically utilized as input for the continuous improvement of the program. Other available information may also be used to assist in the continuous improvement of the program.

Criterion 5. Curriculum

The curriculum must effectively develop the following subject areas in support of student outcomes and program educational objectives.

Mathematics The program must develop the ability of students to apply mathematics to the solution of technical problems.

(a) Associate degree programs will, at a minimum, include algebra and trigonometry at a level appropriate to the student outcomes and program educational objectives.

(b) Baccalaureate degree programs will include the application of integral and differential calculus or other mathematics above the level of algebra and trigonometry appropriate to the student outcomes and program educational objectives.

Technical Content The technical content of the program must focus on the applied aspects of science and engineering and must:

(a) Represent at least 1/3 of the total credit hours for the program but no more than 2/3 of the total credit hours for the program.

(b) Include a technical core that prepares students for the increasingly complex technical specialties they will experience later in the curriculum.

(c) Develop student competency in the use of equipment and tools common to the discipline.

Physical and Natural Science The basic science content of the program must include physical or natural science with laboratory experiences as appropriate to the discipline.

The Integration of Content Baccalaureate degree programs must provide a capstone or integrating experience that develops student competencies in applying both technical and non-technical skills in solving problems.

Cooperative Education When used to satisfy prescribed elements of these criteria, credits based upon cooperative/internships or similar experiences must include an appropriate academic component evaluated by the program faculty.

Advisory Committee An advisory committee with representation from organizations being served by the program graduates must be utilized to periodically review the program's curriculum and advise the program on the establishment, review, and revision of its program educational objectives. The advisory committee must provide advisement on current and future aspects of the technical fields for which the graduates are being prepared.

Criterion 6. Faculty

Each faculty member teaching in the program must have expertise and educational background consistent with the contributions to the program expected from the faculty member. The competence of faculty members must be demonstrated by such factors as education, professional credentials and certifications, professional experience, ongoing professional development, contributions to the discipline, teaching effectiveness, and communication skills. Collectively, the faculty must have the breadth and depth to cover all curricular areas of the program.

The faculty serving in the program must be of sufficient number to maintain continuity, stability, oversight, student interaction, and advising. The faculty must have sufficient responsibility and authority to improve the program through definition and revision of program educational objectives and student outcomes as well as through the implementation of a program of study that fosters the attainment of student outcomes.

Criterion 7. Facilities

Classrooms, offices, laboratories, and associated equipment must be adequate to support attainment of the student outcomes and to provide an atmosphere conducive to learning. Modern tools, equipment, computing resources, and laboratories appropriate to the program must be available, accessible, and systematically maintained and upgraded to enable students to attain the student outcomes and to support program needs. Students must be provided appropriate guidance regarding the use of the tools, equipment, computing resources, and laboratories available to the program.

The library services and the computing and information infrastructure must be adequate to support the scholarly and professional activities of the students and faculty.

Criterion 8. Institutional Support

Institutional support and leadership must be adequate to ensure the quality and continuity of the program.

Resources including institutional services, financial support, and staff (both administrative and technical) provided to the program must be adequate to meet program needs. The resources available to the program must be sufficient to attract, retain, and provide for the continued professional development of a qualified faculty. The resources available to the program must be sufficient to acquire, maintain, and operate infrastructures, facilities and equipment appropriate for the program, and to provide an environment in which student outcomes can be attained.

II. PROGRAM CRITERIA

Each program seeking accreditation from the Engineering Technology Accreditation Commission of ABET must demonstrate that it satisfies all Program Criteria implied by the program title.

PROGRAM CRITERIA FOR AERONAUTICAL ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: American Institute of Aeronautics and Astronautics

Applicability

These program criteria apply to engineering technology programs that include aeronautical or similar modifiers in their titles.

Objectives

An accreditable program in Aeronautical Engineering Technology will prepare graduates with knowledge, problem solving ability, and hands-on skills to enter careers in the design, installation, manufacturing, testing, evaluation, technical sales, or maintenance of aeronautical/aerospace systems. Level and scope of career preparation will depend on the degree level and specific program orientation. Graduates of associate degree programs typically have strengths in specifying, installing, fabricating, testing, documenting, operating, selling, or maintaining basic support and manufacturing practices for aeronautical/aerospace vehicle and component support. Baccalaureate degree graduates typically have strengths in the analysis, applied design, development, implementation, or oversight of more advanced aeronautical/aerospace systems and process.

Outcomes

Each program must demonstrate that the technical, scientific, and managerial areas of expertise developed by graduates are appropriate to the technical orientation and goals of that program. Much of aeronautical/aerospace engineering technology involves the translation of engineering ideas and concepts into functioning vehicles, engines, and components. It is anticipated that the fundamental experiential skills may incorporate portions of the approved FAA Airframe and Powerplant curriculum.

Associate degree programs must demonstrate that graduates can apply the following principles to the specification, installation, fabrication, test, operation, sales, or documentation of basic aeronautical/aerospace systems:

(a) Technical expertise in a minimum of three subject areas chosen from: engineering materials, applied structures, applied mechanics, applied aerodynamics, applied propulsion, and fundamentals of electricity.

(b) Technical expertise in assembly and support processes, industry standards, regulations and documentation, and computer-aided engineering graphics with added technical depth in at least one of these areas.

(c) Expertise in applied physics having an emphasis in applied mechanics and other technical topics in physics appropriate to the program objectives.

Baccalaureate degree programs must demonstrate that graduates can apply the following concepts to the analysis, development, implementation, or oversight of aeronautical/aerospace systems and processes:

(a) Technical expertise in engineering materials, statics, strength of materials, applied aerodynamics, applied propulsion, and either electrical power or electronics.

(b) Technical expertise having added depth in a minimum of three subject areas chosen from: manufacturing processes, vehicle design and modification, engineering materials, electro-mechanical devices and controls, industrial operations, and systems engineering including the appreciation of the engineering design cycle and the system life cycle relating to the manufacture and maintenance of aeronautical/aerospace vehicles and their components.

(c) Expertise in applied physics having an emphasis in applied mechanics, plus added technical topics in physics and other science principles appropriate to the program objectives.

Program Criteria for
Air Conditioning, Refrigerating, heating and ventilating Engineering Technology AND SIMILARLY Named Programs

Lead Society: American Society of Heating, Refrigeration and Air-Conditioning Engineers

Applicability

These program criteria apply to engineering technology programs that include air conditioning, HVAC, refrigerating, heating, or ventilating, or similar modifiers in their titles.

Objectives

An accreditable program in Air Conditioning, Refrigerating, Heating and Ventilating Engineering Technology will prepare graduates with the technical and managerial skills necessary to enter careers in the design, application installation, manufacturing, operation, marketing and maintenance of heating, ventilating, air-conditioning, and refrigeration (HVAC&R) systems. Graduates of associate degree programs typically have competence in air-conditioning processes, heating/cooling load calculations, ventilation principles, pipe and duct design, system controls, system components, heating, refrigeration, economic analysis and computerized energy evaluation methods. Baccalaureate degree graduates are well prepared for design and development of complex systems complementing and expanding on lower division work.

Outcomes

Graduates of associate degree programs must demonstrate knowledge and hands-on competence appropriate to the goals of the program in:

(a) utilizing air-conditioning processes, heating and cooling load calculations, ventilation principles, pipe and duct design, system controls, system components, heating, refrigeration, economic analysis, and computerized energy evaluation methods in system design.

(b) applying mathematics, physics or chemistry, thermodynamics, psychrometrics, and fluid mechanics to HVAC&R systems.

Graduates of baccalaureate degree programs must demonstrate, in addition to outcomes expected of associate degree graduates, the ability to:

(c) analyze and design complex HVAC&R systems.

(d) apply project management to HVAC&R systems.

(e) apply economic analysis and computerized energy evaluation methods to HVAC&R systems.

PROGRAM CRITERIA FOR ARCHITECTURAL ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: American Society of Civil Engineers

Applicability

These program criteria apply to engineering technology programs that include architectural or similar modifiers in their titles.

Objectives

Graduates of Architectural Engineering Technology programs will have the technical and managerial skills necessary to enter careers in the planning, design, construction, operation or maintenance of the built environment. Graduates of associate degree programs are prepared for careers in the construction, testing, operation, and maintenance of building systems; they have the abilities to produce and utilize basic construction documents and to perform basic analysis and design of system components. Baccalaureate degree graduates are prepared for careers in which they will analyze and design systems, specify project methods and materials, perform cost estimates and analyses, and manage technical activities in support of architectural projects.

Outcomes

Graduates of associate degree programs will, to the extent required to meet Program Educational Objectives:

(a) employ concepts of architectural theory and design in a design environment;

(b) utilize instruments, methods, software, and techniques that are appropriate to produce A/E documents and presentations;

(c) utilize measuring methods that are appropriate for field, office, or laboratory;

(d) apply fundamental computational methods and elementary analytical techniques in sub-disciplines related to architectural engineering;

In addition graduates of baccalaureate degree programs will, to the extent required to meet Program Educational Objectives:

(e) create, utilize, and present design, construction, and operations documents;

(f) perform economic analyses and cost estimates related to design, construction, and maintenance of building systems;

(g) select appropriate materials and practices for building construction;

(h) apply principles of construction law and ethics in architectural practice, and;

(i) perform standard analysis and design in at least one recognized technical specialty within architectural engineering technology that is appropriate to the goals of the program.

PROGRAM CRITERIA FOR AUTOMOTIVE ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: SAE, International

Applicability

These program criteria apply to engineering technology programs that include automotive or similar modifiers in their titles. The term "automotive" refers to land, sea, air, or space mobility.

Objectives

An accreditable program will prepare graduates with technical and managerial skills necessary to enter careers in design, manufacturing, marketing, operation, and maintenance in the field of automotive engineering technology. Graduates of associate degree programs are expected to have strengths in their knowledge of operations, maintenance, and manufacturing, while baccalaureate degree graduates are expected to be prepared for design and management in the automotive field.

Outcomes

The nature and level of proficiency demonstrated by graduates in the outcomes prescribed below must be appropriate to the program objectives.

The field of automotive engineering technology is dependent on the application of computers in analysis, design, manufacturing, and operation of facilities. The program must demonstrate that graduates are competent in the application of computer technologies commonly used in industry, governmental service, and private practice associated with land, sea, air, and space mobility.

Graduates must demonstrate proficiency in the application of probability and statistics to the solution of problems related to land, sea, air, and space mobility.

In the field of automotive engineering technology, management and technology are often inextricably intertwined. The program must demonstrate that graduates have acquired the ability to apply modern and effective management skills in identification and investigation of problems, analysis of data, synthesis and implementation of solutions, and operations of facilities related to land, sea, air, and space mobility.

The program must demonstrate that graduates have a working knowledge of the design, manufacture, and maintenance of major subsystems and technologies associated with land, sea, air, and space mobility.

PROGRAM CRITERIA FOR BIOENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: Association for the Advancement of Medical Instrumentation
Cooperating Societies: American Ceramic Society, American Institute of Chemical Engineers,
American Society of Agricultural and Biological Engineers, American Society of Mechanical Engineers, and IEEE

Applicability

These program criteria apply to engineering technology programs that include bioengineering, biomedical, medical electronics, biomedical equipment, or similar modifiers in their titles.

Objectives

An accreditable program in Bioengineering Technology will prepare graduates with the technical skills necessary to enter careers in the design, application, installation, operation and/or maintenance of biomedical equipment. Graduates of associate degree programs typically have strengths in the building, testing, operation, and maintenance of existing biomedical equipment or systems, whereas baccalaureate degree graduates are well prepared for development and implementation of biomedical equipment or systems.

Outcomes

Graduates of associate degree programs must demonstrate knowledge and hands-on competence appropriate to the goals of the program in:

(a) the application of circuit analysis and design, analog and digital electronics, microcomputers, bioengineering systems, and safety in the building, testing, operation, and maintenance of biomedical equipment.

(b) the applications of physics, chemistry, and biological sciences to building, testing, operation, and maintenance of biomedical equipment in a rigorous mathematical environment at or above the level of algebra and trigonometry.

In addition to the above, graduates of baccalaureate degree programs must demonstrate:

(c) the ability to analyze, design, and implement bioengineering systems.

(d) the ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of bioengineering systems.

(e) an understanding of the clinical application of biomedical equipment.

PROGRAM CRITERIA FOR CHEMICAL, PROCESS, PLANT ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: American Institute of Chemical Engineers

Applicability

These program criteria apply to engineering technology programs that include chemical, process, plant, or similar modifiers in their titles.

Objectives

An accreditable program will prepare graduates with the technical and managerial skills necessary to enter careers in design, manufacturing, marketing, operation, and maintenance in the field of chemical engineering technology. Graduates of baccalaureate degree programs typically have strengths in their knowledge of laboratory applications, design, technical service and supervision. Graduates of associate degree programs typically have strengths in their knowledge of operations, maintenance, and manufacturing.

Outcomes

The field of chemical engineering technology is dependent upon the application of chemistry in an industrial setting. The program must demonstrate that graduates have a working knowledge and ability to solve technical problems by the industrial application of inorganic chemistry, organic chemistry, analytical chemistry; physics, and process stoichiometry. The program must also demonstrate that graduates of the baccalaureate program possess a deeper and broader knowledge which enables them to solve technical and managerial problems of a more complex nature than those expected of graduates of associate degree programs.

In the field of chemical engineering technology, the operation of chemical processes is extremely important. The program must demonstrate that graduates have the ability to apply:

(a) The concepts of chemical engineering unit operations such as mass transfer, heat transfer, distillation, and evaporation to the design, operation, and maintenance of chemical processes,

(b) The principles of thermodynamics; process control and instrumentation, computer applications, and materials science to the design, operation, and maintenance of chemical processes.

The nature and level of proficiency must be appropriate to the program objectives.

In the field of chemical engineering technology, the various fields of the chemical sciences and the operation of industrial chemical process equipment are often inextricably intertwined. The program must demonstrate that graduates have the ability

to operate, test, and check out chemical process equipment in accordance with appropriate safety, health and environmental considerations and regulations.

PROGRAM CRITERIA FOR CIVIL ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: American Society of Civil Engineers

Applicability

These program criteria apply to engineering technology programs that include civil or similar modifiers in their titles.

Objectives

Graduates of Civil Engineering Technology programs will have the technical and managerial skills necessary to enter careers in the planning, design, construction, operation or maintenance of the built environment and global infrastructure. Graduates of associate degree programs have skills in construction testing, operation, and maintenance of buildings and infrastructure and the ability to produce and utilize basic construction documents and perform basic analysis and design of system components. Graduates of baccalaureate degree programs are prepared to analyze and design systems, specify project methods and materials, perform cost estimates and analyses, and manage technical activities in support of civil engineering projects.

Outcomes

Graduates of associate degree programs will, to the extent required to support Program Educational Objectives:

(a) utilize principles, hardware, and software that are appropriate to produce drawings, reports, quantity estimates, and other documents related to civil engineering;

(b) conduct standardized field and laboratory tests related to civil engineering;

(c) utilize surveying methods appropriate for land measurement and/or construction layout;

(d) apply fundamental computational methods and elementary analytical techniques in sub-disciplines related to civil engineering.

In addition, graduates of baccalaureate degree programs will, to the extent required to support Program Educational Objectives:

(e) plan and prepare documents appropriate for design and construction;

(f) perform economic analyses and cost estimates related to design, construction, operations and maintenance of systems associated with civil engineering;

(g) select appropriate engineering materials and practices, and;

(h) perform standard analysis and design in at least three sub-disciplines related to civil engineering.

PROGRAM CRITERIA FOR COMPUTER ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: IEEE

Cooperating Society: Institute of Industrial Systems Engineers

Applicability

These program criteria apply to engineering technology programs that include computer or similar modifiers in their titles.

Objectives

An accreditable program in Computer Engineering Technology will prepare graduates with the skills necessary to enter careers in the design, application, installation, operation, and/or maintenance of computer systems. Graduates of associate degree programs typically have strengths in the building, testing, operation, and maintenance of existing computer systems and their associated software systems, whereas baccalaureate degree graduates are well prepared for development and implementation of computer systems.

Outcomes

Graduates of associate degree programs must demonstrate knowledge and hands-on competence appropriate to the objectives of the program in:

(a) the application of electric circuits, computer programming, associated software applications, analog and digital electronics, microcomputers, operating systems, local area networks, and engineering standards to the building, testing, operation, and maintenance of computer systems and associated software systems; and

(b) the application of natural sciences and mathematics at or above the level of algebra and trigonometry to the building, testing, operation, and maintenance of computer systems and associated software systems.

Given the breadth of technical expertise involved with computer systems, and the unique objectives of individual programs, some baccalaureate programs may focus on preparing graduates with in-depth but narrow expertise, while other programs may choose to prepare graduates with expertise in a broad spectrum of the field. Therefore, the depth and breadth of expertise demonstrated by baccalaureate graduates must be appropriate to support the objectives of the program. In addition to the outcomes expected of associate degree graduates, graduates of baccalaureate degree programs must demonstrate:

(c) the ability to analyze, design, and implement hardware and software computer systems;

(d) the ability to apply project management techniques to computer systems; and

(e) the ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of computer systems and networks.

PROGRAM CRITERIA FOR CONSTRUCTION ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: American Society of Civil Engineers

Applicability

These program criteria apply to engineering technology programs that include construction or similar modifiers in their titles.

Objectives

Graduates of Construction Engineering Technology programs will have the technical skills necessary to enter careers in construction, operation and/or maintenance of the built environment and global infrastructure. Graduates of associate degree programs have skills in the construction, testing, operation, and maintenance of buildings and infrastructure; they also have the ability to utilize basic construction documents to participate in construction activities. Graduates of baccalaureate degree programs are prepared to specify project methods and materials, perform cost estimates and analyses, and manage construction activities.

Outcomes

Graduates of associate degree programs will, to the extent required to meet Program Educational Objectives:

(a) utilize techniques that are appropriate to administer and evaluate construction contracts, documents, and codes;

(b) estimate costs, estimate quantities, and evaluate materials for construction projects;

(c) utilize measuring methods, hardware, and software that are appropriate for field, laboratory, and office processes related to construction;

(d) apply fundamental computational methods and elementary analytical techniques in sub-disciplines related to construction engineering.

In addition, graduates of baccalaureate degree programs will, to the extent required to meet the Program Educational Objectives:

(e) produce and utilize design, construction, and operations documents;

(f) perform economic analyses and cost estimates related to design, construction, and maintenance of systems associated with construction engineering;

(g) select appropriate construction materials and practices;

(h) apply appropriate principles of construction management, law, and ethics, and;

(i) perform standard analysis and design in at least one sub-discipline related to construction engineering.

PROGRAM CRITERIA FOR DRAFTING/DESIGN ENGINEERING TECHNOLOGY (MECHANICAL) AND SIMILARLY NAMED PROGRAMS

Lead Society: American Society of Mechanical Engineers
Cooperating Society: SME

Applicability

These program criteria apply to engineering technology programs with an emphasis on mechanical components and systems, that include drafting/design or similar modifiers in their titles.

Objectives

An accreditable program in Drafting/Design Engineering Technology will prepare graduates with knowledge, problem solving ability, and hands on skills to enter careers in drafting and basic design of mechanical components and systems. Graduates of associate degree programs shall have competency in drafting, including at least one commercial CAD software package appropriate to the program objectives. Baccalaureate degree graduates are prepared with the knowledge, skills, and abilities to enter careers in applied mechanical design.

Outcomes

Graduates of associate degree programs must demonstrate knowledge and technical competency appropriate to the objectives of the program in:

(a) engineering materials, applied mechanics, and manufacturing methods.

(b) applied drafting practice emphasizing mechanical components and systems, as well as fundamentals of descriptive geometry, orthographic projection, sectioning, tolerancing and dimensioning, and basic computer aided drafting and design with technical depth in at least one of these areas.

(c) the application of physics and engineering materials having an emphasis in applied mechanics, or in-depth application of physics having emphasis in mechanical components and design.

Graduates of baccalaureate degree programs, in addition to outcomes required of associate degree graduates, must demonstrate competency in the application of manuals, handbooks, material and/or equipment specifications, and related software in advanced drafting/design. Competency in the application of current codes and standards must be demonstrated with open-ended design experiences that integrate materials, manufacturing, design analysis, or graphics. Understanding of concepts relating to the environmental and economic impacts of design must also be demonstrated. Graduates must also demonstrate competency in:

(d) design of machine elements, advanced drafting including current three dimensional computer representations as related to mechanical design, and manufacturing methods. Advanced proficiency must be demonstrated in at least three drafting / design related areas, consistent with the technical orientation of the program.

(e) the in-depth application of physics and engineering materials having emphasis in drafting, manufacturing, and design of mechanical components.

PROGRAM CRITERIA FOR ELECTRICAL/ELECTRONIC(S) ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: IEEE

These program criteria apply to engineering technology programs that include electrical or electronic(s) or similar modifiers in their titles.

I. PROGRAM CRITERIA FOR ASSOCIATE LEVEL PROGRAMS

Curriculum

The curriculum must enable the program to prepare graduates with skills necessary to enter careers in the design, application, installation, manufacturing, operation and/or maintenance of electrical/electronic(s) systems. Graduates of associate degree programs typically have strengths in the building, testing, operation, and maintenance of existing electrical systems. The curriculum must enable the program to prepare graduates to have competence in the following curricular areas:

(a) the application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers, and engineering standards to the building, testing, operation, and maintenance of electrical/electronic(s) systems; and

(b) the application of natural sciences and mathematics at or above the level of algebra and trigonometry to the building, testing, operation, and maintenance of electrical/electronic systems.

II. PROGRAM CRITERIA FOR BACCALAUREATE LEVEL PROGRAMS

Curriculum

The curriculum must enable the program to prepare graduates with skills necessary to enter careers in the design, application, installation, manufacturing, operation and/or maintenance of electrical/electronic(s) systems. Graduates of baccalaureate degree programs are well prepared for development and implementation of electrical/electronic(s) systems. Given the breadth of technical expertise involved with electrical systems, and the unique objectives of individual programs, some baccalaureate programs may focus on preparing graduates with in-depth but narrow expertise, while other programs may choose to prepare graduates with expertise in a broad spectrum of the field. Therefore, the depth and breadth of expertise demonstrated by baccalaureate graduates must be appropriate to support the program educational objectives. The curriculum must enable the program to prepare graduates to have competence in the following curricular areas:

(a) the application of circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers, and engineering standards to the building, testing, operation, and maintenance of electrical/electronic(s) systems;

(b) the application of natural sciences and mathematics at or above the level of algebra and trigonometry to the building, testing, operation, and maintenance of electrical/electronic systems;

(c) the ability to analyze, design, and implement one or more of the following: control systems, instrumentation systems, communications systems, computer systems, or power systems;

(d) the ability to apply project management techniques to electrical/electronic(s) systems; and

(e) the ability to utilize differential and integral calculus, as a minimum, to characterize the performance of electrical/electronic systems.

PROGRAM CRITERIA FOR ELECTROMECHANICAL ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: IEEE
Cooperating Society: American Society of Mechanical Engineers and International Society of Automation

Applicability

These program criteria apply to engineering technology programs that include electromechanical or similar modifiers in their titles.

Objectives

An accreditable associate degree program in electromechanical engineering technology will typically prepare graduates with the technical skills necessary to enter careers in the building, installation, application, and operation and/or maintenance of electromechanical hardware and software systems. An accreditable baccalaureate degree program in electromechanical engineering technology will typically prepare graduates for applied design, development, and management of electromechanical systems.

Outcomes

The field of electromechanical engineering technology depends heavily on the integration of electrical, mechanical, computer, and network components to the design, application, operation, and maintenance of electromechanical systems.

Accordingly, graduates of associate degree programs must demonstrate knowledge and technical competency, appropriate to the objectives of the program, to:

(a) Use computer-aided drafting or design tools to prepare graphical representations of electromechanical systems;

(b) Use circuit analysis, analog and digital electronics, basic instrumentation, and computers to aid in the characterization, analysis, and troubleshooting of electromechanical systems; and

(c) Use statics, dynamics (or applied mechanics), strength of materials, engineering materials, engineering standards, and manufacturing processes to aid in the characterization, analysis, and troubleshooting of electromechanical systems.

Given the breadth of technical expertise involved with electromechanical systems, and the unique objectives of individual programs, some baccalaureate programs may focus on preparing graduates with in-depth but narrow expertise, while other programs may choose to prepare graduates with expertise in a broad spectrum of the field. Therefore, the depth and breadth of expertise demonstrated by baccalaureate graduates must be appropriate to support the objectives of the program. In addition to the outcomes

required of associate degree graduates, graduates of baccalaureate degree programs must demonstrate:

(d) Use appropriate computer programming languages for operating electromechanical systems;

(e) Use electrical/electronic devices such as amplifiers, motors, relays, power systems, and computer and instrumentation systems for applied design, operation, or troubleshooting electromechanical systems;

(f) Use advanced topics in engineering mechanics, engineering materials, and fluid mechanics for applied design, operation, or troubleshooting of electromechanical systems;

(g) Use basic knowledge of control systems for the applied design, operation, or troubleshooting of electromechanical systems;

(h) Use differential and integral calculus, as a minimum, to characterize the static and dynamic performance of electromechanical systems; and

(i) Use appropriate management techniques in the investigation, analysis, and design of electromechanical systems.

PROGRAM CRITERIA FOR ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: American Society for Engineering Education

These program criteria apply to engineering technology programs without modifiers in their titles.

There are no program-specific criteria beyond the General Criteria.

PROGRAM CRITERIA FOR ENVIRONMENTAL ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: American Academy of Environmental Engineers and Scientists
Cooperating Societies: American Institute of Chemical Engineers;
American Society of Civil Engineers;
American Society of Heating, Refrigerating, and Air Conditioning Engineers;
American Society of Mechanical Engineers;
SAE International; and
Society of Mining, Metallurgy, and Exploration

Applicability

These program criteria apply to engineering technology programs that include environmental or similar modifiers in their titles.

Objectives

The field of environmental engineering technology is broad, ranging from laboratory measurements to field measurements to system design and operation. An accreditable environmental engineering technology program will prepare graduates to work in one or more specialties as described by the program objectives. Graduates shall understand the roles and responsibilities of public and private organizations pertaining to environmental regulations. Graduates are prepared to apply the concepts of professional practice and assist in project management. Graduates of associate degree programs typically have competence in applied skills, while baccalaureate degree graduates have a deeper understanding and competence in the application of engineering principles to problem solving and to the design of engineered systems; and the application of mathematics, physics, chemistry, and biology to the field.

Outcomes

The field of environmental engineering technology includes environmental measurements and the design, management, and operation of environmental facilities and systems. Associate degree programs must demonstrate that graduates are capable of:

(a) Conducting sampling of environmental media;

(b) Performing field and laboratory measurements of environmental parameters, including use of common instruments and equipment appropriate to environmental technology;

(c) Applying quality control methods in sampling and measurement and utilizing basic statistical techniques in analysis of the results;

(d) Preparing reports to adequately describe results of environmental sampling and measurement;

(e) Explaining operating principles of a range of unit processes for environmental control; and

(f) Performing CAD and GIS operations and applying them to solving engineering problems.

Baccalaureate degree programs must demonstrate that graduates, in addition to the outcomes expected of associate degree graduates, are capable of:

(g) Applying probability and statistics to measured data and performing risk analyses;

(h) Formulating flow and material balances;

(i) Applying principles of biology, chemistry, and physics to situations relevant to the program objectives; and

(j) Designing basic unit processes for pollution prevention and waste treatment.

PROGRAM CRITERIA FOR FIRE PROTECTION ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: Society of Fire Protection Engineers

Applicability

These program criteria apply to engineering technology programs that include fire protection and similar modifiers in their title.

Objectives

An accreditable Fire Protection Engineering Technology program will prepare graduates to work in one or more of the areas of fire protection engineering technology including fire protection analysis, knowledge of codes and standards, fire science and human behavior, fire protection systems, and passive building systems and construction as they relate to fire protection. Graduates of associate degree programs typically will have knowledge in the areas of fire science, fire suppression and detection systems, fire protection hydraulics, and fire prevention. Baccalaureate degree graduates, in addition to the knowledge required in associate degree programs, will be able to apply the basics of fire protection engineering technology to practical environments involving the fire safety of buildings and occupants.

Outcomes

Graduates shall have competence in the application of mathematics and physical sciences to human behavior and response to fire for the field. Also, they shall understand the concepts of ethical professional practice and the roles and responsibilities of public institutions and private organizations pertaining to fire protection engineering technology.

Graduates of associate degree programs must demonstrate knowledge and technical competency appropriate to the objectives of the program to:

(a) basic fire science;

(b) fire suppression and detection systems;

(c) inspection, testing and maintenance of fire suppression and detection systems;

(d) fire prevention and mitigation; and

(e) fire protection hydraulics and water supply analysis.

Graduates of baccalaureate degree programs, in addition to the outcomes required of associate degree graduates and appropriate to the objectives of the program must also demonstrate competency in:

(f) anticipating, recognizing and evaluating fire hazards;

(g) fire science and human behavior;

(h) conducting fire risk analysis;

(i) design and analysis of fire suppression and detection systems;

(j) formulating fire control and fire hazard mitigation strategies;

(k) maintaining program and system effectiveness;

(l) applying applicable codes and standards;

(m) hazardous materials chemistry; and

(n) demonstrating an understanding of forensic investigation including associated legal responsibilities and recordkeeping.

PROGRAM CRITERIA FOR INDUSTRIAL ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: Institute of Industrial Systems Engineers

Applicability

These program criteria apply to engineering technology programs that include industrial or similar modifiers in their titles.

Objectives

An accreditable program in Industrial Engineering Technology will prepare graduates with the technical and managerial skills necessary to develop, implement, and improve integrated systems that include people, materials, information, equipment, and energy. Graduates at the associate level will be prepared for immediate employment, but will also be prepared to continue in baccalaureate studies in industrial engineering technology and related upper level studies. Graduates at the baccalaureate level will be prepared for careers in higher levels of system design, integration, and management.

Outcomes

Graduates must demonstrate the ability to accomplish the integration of systems using appropriate analytical, computational, and application practices and procedures.

Graduates at the baccalaureate level must demonstrate the ability to apply knowledge of probability, statistics, engineering economic analysis and cost control, and other technical sciences and specialties necessary in the field of industrial engineering technology.

PROGRAM CRITERIA FOR INFORMATION ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: IEEE
Cooperating Society: CSAB

Applicability

These program criteria apply to engineering technology programs that include information or similar modifiers in their titles. The program title must include the words "engineering technology."

Objectives

An accreditable program in Information Engineering Technology will prepare graduates with the skills necessary to enter careers in the design, application, installation, operation and/or maintenance of computer systems, networks, and telecommunications systems dedicated to the processing and transfer of information. Graduates of associate degree programs typically have strengths in the building, testing, operation, and maintenance of existing hardware and software systems, whereas baccalaureate degree graduates normally are well prepared for design, development, and management.

Outcomes

The field of Information Engineering Technology depends heavily on the application of computer and network components for use in the processing, analysis, and transfer of information. Accordingly:

Graduates of associate degree programs must demonstrate knowledge and hands-on competence appropriate to the objectives of the program in:

(a) the application of computer and network hardware, operating systems, system and network administration, programming languages, applications software, and databases in the building, testing, operation, and maintenance of hardware and software systems; and

(b) the application of electrical, electronic, telecommunications, and digital signal propagation fundamentals in the building, testing, operation, and maintenance of hardware and software systems.

Given the breadth of technical expertise involved with information systems, and the unique objectives of individual programs, some baccalaureate programs may focus on preparing graduates with in-depth but narrow expertise, while other programs may choose to prepare graduates with expertise in a broad spectrum of the field. Therefore, the depth and breadth of expertise demonstrated by baccalaureate graduates must be appropriate to support the objectives of the program. In addition to outcomes expected of associate degree graduates, graduates of baccalaureate degree programs must demonstrate:

(c) the ability to design, implement, maintain and provide for the security of facilities involved with the processing and transfer of information;

(d) the ability to apply project management techniques to facilities that process and transfer information; and

(e) the ability to apply discrete mathematics, and probability and statistics in the support of facilities that process and transfer information.

PROGRAM CRITERIA FOR INSTRUMENTATION AND CONTROL SYSTEMS ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: International Society of Automation

Applicability

These program criteria apply to engineering technology programs that include instrumentation, measurement, metrology, control, robotics, automation, or similar modifiers in their titles.

Objectives

An accreditable program in instrumentation and control systems engineering technology will prepare graduates with the technical and managerial skills necessary to enter careers in design, manufacturing, marketing, operations, and maintenance in the fields of measurement, control, robotics, and automation engineering technology. Graduates of associate degree programs, as a result of extensive laboratory experience in component/device operation, calibration and interconnection, have strengths in their knowledge of operations, maintenance, and manufacturing. Baccalaureate degree graduates are qualified to undertake the design and specification of control systems and for the subsequent management of their installation and operation.

Outcomes

The field of instrumentation and control systems engineering technology is heavily dependent on the application of computers in the analysis, design, and operation of manufacturing and processing facilities. The program must demonstrate that graduates have the ability to:

(a) apply concepts of automatic control, including measurement, feedback and feedforward regulation for the operation of continuous and discrete systems,

(b) design and implement systems utilizing analog and/or digital control devices,

(c) apply the concepts of chemistry, physics, and electricity/electronics to measurement and control systems,

(d) apply the concepts of digital and microprocessor systems and functionality of system components/devices for the automation of processes,

(e) apply the concepts of measurements and sensor selection, and

(f) communicate the technical details of control systems using current techniques and graphical standards.

In addition, baccalaureate graduates must demonstrate the ability to

(g) apply the concepts of mechanics, fluid mechanics, and heat transfer to the design of process control systems, and

(h) understand and utilize programmable logic controllers (PLC), distributed control systems (DCS) and supervisory control systems for control of manufacturing and processing systems.

Mathematics forms the basis for design, synthesis and analysis in the field of instrumentation and control engineering technology. Associate degree graduates must demonstrate the ability to apply algebra, trigonometry, and elementary calculus in the installation, calibration and trouble-shooting of control systems. Baccalaureate graduates must demonstrate proficiency in the utilization of differential and integral calculus and ordinary differential equations in the design, analysis, and performance assessment of control systems.

In the field of instrumentation and control engineering technology, management and technology are often inextricably intertwined. Therefore

(a) associate degree graduates must demonstrate the ability to recognize and apply the fundamental concepts of economics and management to problems in automatic control systems, and

(b) baccalaureate degree graduates must demonstrate the ability to utilize modern and effective management skills for performing investigation, analysis, and synthesis in the implementation of automatic control systems.

PROGRAM CRITERIA FOR MANUFACTURING ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: SME

Applicability

These program criteria apply to engineering technology programs that include manufacturing or similar modifiers in their titles.

Objectives

An accreditable baccalaureate degree program in manufacturing engineering technology will prepare graduates with technical and leadership skills necessary for manufacturing competitiveness and to enter careers in manufacturing process and systems design, operations, quality, continuous improvement, lean manufacturing, and sustainability. Graduates of associate degree programs typically have careers in manufacturing operations and service functions.

Outcomes

Graduates must demonstrate the ability to apply the following to the solution of manufacturing problems to achieve manufacturing competitiveness: (a) materials and manufacturing processes; (b) product design process, tooling, and assembly; (c) manufacturing systems, automation, and operations; (d) statistics, quality and continuous improvement, and industrial organization and management.

Graduates of baccalaureate degree programs must have a capstone or integrating experience that develops and illustrates student competencies in applying both technical and non-technical skills in successfully solving manufacturing problems.

PROGRAM CRITERIA FOR MARINE ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: Society of Naval Architects and Marine Engineering

Applicability

These program criteria apply to engineering technology programs that include marine or similar modifiers in their titles.

Objectives

An accreditable program will prepare graduates with the technical and managerial skills necessary to enter a variety of different careers in the field of marine engineering technology. Graduates of associate degree programs must have strengths in their knowledge of operations, maintenance, and manufacturing, while baccalaureate degree graduates must also be well prepared for design and management in marine engineering technology.

Outcomes

The field of marine engineering technology is dependent on the application of the technical sciences to marine equipment, systems, and vehicles.

The program must demonstrate that the baccalaureate degree graduates are proficient in applying the principles of college-level physics and chemistry to problems associated with marine equipment, systems and vehicles. The program must demonstrate that associate degree graduates are proficient in applying the principles of college-level physics to problems associated with marine equipment, systems and vehicles. The nature and level of proficiency must be appropriate to the program objectives.

The program must demonstrate that graduates are proficient in applying the principles of fluid mechanics, hydrostatic stability, solid mechanics, materials, dynamics, and energy systems to marine equipment, systems and vehicles. The nature and level of proficiency must be appropriate to the program objectives.

Knowledge of modern instrumentation and proper laboratory practices is important in the field of marine engineering technology. The program must demonstrate that graduates are proficient in (a) the use and application of instrumentation for measuring physical phenomena related to naval architecture and/or marine engineering technology, and (b) the design of experiments, data collection, analysis, and formal report writing.

The program must demonstrate that graduates are proficient in the operation, maintenance, analysis, and management of modern marine power plants and associated marine auxiliary equipment and systems. The program must also demonstrate that graduates are proficient in the use of design manuals, material/equipment specifications, and industry regulations applicable to marine engineering technology. The nature and level of proficiency must be appropriate to the program objectives.

PROGRAM CRITERIA FOR MECHANICAL ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: American Society of Mechanical Engineers

These program criteria apply to engineering technology programs that include mechanical or similar modifiers in their titles. An accreditable program in mechanical engineering technology prepares graduates with knowledge, problem-solving ability and hands-on skills to enter careers in the design, installation, manufacturing, testing, technical sales, maintenance, and other endeavors typically associated with mechanical components and systems. Programs emphasize how things actually work, how they are made, and the realization that most mechanical components and assemblies become parts of complex systems, an important consideration realized at the beginning of the design process. Level and scope of career preparation will depend on the degree level and specific program orientation.

I. PROGRAM CRITERIA FOR ASSOCIATE LEVEL PROGRAMS

Curriculum

The curriculum must prepare associate degree graduates with the knowledge, techniques, skills, and use of modern equipment in mechanical engineering technology. Graduates must have strengths in specifying, installing, building, testing, documenting, operating, selling or maintaining basic mechanical systems. Programs prepare graduates for entry into industry as engineering technicians or for transfer to a baccalaureate degree program as appropriate to support the program educational objectives. The following curricular topics are required (unless the program's faculty and primary constituents approve the substitution of other specific, mechanically-related technical subjects supporting attainment of program educational objectives):

(a) Application of principles of geometric dimensioning and tolerancing;

(b) Use of computer aided drafting and design software;

(c) Selection, set-up, and calibration of measurement tools/instrumentation;

(d) Preparation of laboratory reports and systems documentation associated with development, installation, or maintenance of mechanical components and systems;

(e) Basic familiarity and use of industry codes, specifications, and standards;

(f) Use of basic engineering mechanics; and

(g) An integrating or capstone experience utilizing skills acquired in the program.

Faculty

The program must demonstrate that faculty members are maintaining currency in their specialty areas.

II. PROGRAM CRITERIA FOR BACCALAUREATE LEVEL PROGRAMS

Curriculum

The curriculum must prepare baccalaureate degree graduates with the knowledge, techniques, skills, and use of modern equipment in mechanical engineering technology. Baccalaureate degree graduates build on the strengths of associate degree programs by gaining proficiency in the analysis, applied design, development, implementation or oversight of more advanced mechanical components, systems or processes. Programs may focus on preparing graduates with in-depth but narrow expertise, while other programs may choose to prepare graduates with a broad spectrum of expertise. The depth and breadth of expertise demonstrated by baccalaureate graduates must support the program educational objectives. The following curricular topics are required (unless the program's faculty and primary constituents approve the substitution of other specific, mechanically-related technical subjects supporting attainment of program educational objectives):

(a) Application of principles of geometric dimensioning and tolerancing;

(b) Use of computer aided drafting and design software;

(c) Perform selection, set-up, and calibration of measurement tools/instrumentation;

(d) Elements of differential and integral calculus;

(e) Manufacturing processes;

(f) Material science and selection;

(g) Solid mechanics (such as statics, dynamics, strength of materials, etc.);

(h) Mechanical system design;

(i) Thermal sciences (such as thermodynamics, fluid mechanics, heat transfer, etc.);

(j) Electrical circuits (ac and dc) and electronic controls;

(k) Application of industry codes, specifications and standards; and

(l) Technical communications typically used in preparation of engineering proposals, reports, and specifications.

The capstone experience, ideally multidisciplinary in nature, must be project-based and include formal design, implementation and test processes.

Faculty

The program must demonstrate that faculty members are maintaining currency in their specialty areas.

PROGRAM CRITERIA FOR NUCLEAR ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: American Nuclear Society

Applicability

These program criteria apply to engineering technology programs that include nuclear or similar modifiers in their titles.

Objectives

An accredited program in Nuclear Engineering Technology will prepare graduates with knowledge, skills, and problem-solving abilities required to enter careers in those parts of the nuclear industry served by the program. Graduates of programs in nuclear engineering technology will have strengths in the areas of nuclear processes and operations, nuclear systems, and radiological safety, developed from an understanding of the fundamental principles, conservation laws, and rate processes of the physical sciences, and the importance of the safe operation of nuclear systems.

Outcomes

An associate degree program must demonstrate that graduates have acquired the following capabilities:

(a) An understanding of nuclear systems and operations, and radiological safety, including

1. radiation protection procedures,
2. currently applicable rules and regulations, maintenance, control, performance, the human interface in operations, and quality assurance pertaining to the operation of nuclear systems, and
3. the importance of the safe operation of nuclear systems.

(b) An ability to solve problems using foundation mathematics and the fundamental principles, conservation laws, and rate processes of the physical sciences that are commonly encountered in the segment of the nuclear industry served by the program.

(c) An ability to conduct, analyze, and interpret laboratory experiments, and to interpret laboratory analyses that measure nuclear and radiation processes.

A baccalaureate degree program must demonstrate that graduates have acquired the capabilities specified above and the following capabilities:

(a) An ability to apply advanced mathematics, including differential/integral calculus, to the solution of problems commonly encountered in the segment of the nuclear industry served by the program.

(b) An understanding of the design processes for nuclear systems used in the segment of the nuclear industry served by the program.

PROGRAM CRITERIA FOR SURVEYING/GEOMATICS ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: National Society of Professional Surveyors
Cooperating Society: American Society of Civil Engineers

Applicability

These program criteria apply to engineering technology programs that include surveying, geomatics, or similar modifiers in their titles.

Objectives

An accreditable program in Surveying/Geomatics Engineering Technology will prepare graduates with the technical skills necessary to enter careers in boundary and/or land surveying, geographic and/or land information systems, engineering project surveying, photogrammetry, mapping and geodesy, remote sensing, or other related areas. The level and scope of career preparation will depend on the degree level and specific program orientation. Graduates of associate degree programs typically have strengths in utilizing measurement technologies and field mapping, and possess the ability to interpret basic land records and prepare maps and plats; whereas baccalaureate degree graduates possess a stronger background in geodetic science, photogrammetry and remote sensing, and data analysis, and are prepared to design and select appropriate measurement systems, analyze positional accuracy in conformance with appropriate standards, prepare land records and plats to meet legal requirements, and manage surveying/geomatics activities.

Outcomes

Associate degree programs must demonstrate that graduates are capable of:

(a) Utilizing modern measurement technologies to acquire spatial data;

(b) Employing industry-standard software to solve technical problems;

Baccalaureate degree programs must demonstrate that graduates, in addition to the competencies above, are capable of:

(c) Applying technical concepts to the design of measurement systems to meet project requirements;

(d) Analyzing data for conformance with precision and accuracy requirements;

(e) Performing standard analysis and design in at least one of the recognized technical specialties within surveying/geomatics technology that are appropriate to the goals of the program. The specialties include boundary and/or land surveying geographic and/or land information systems, engineering project surveying, photogrammetry, mapping and geodesy, and other related areas.

PROGRAM CRITERIA FOR TELECOMMUNICATIONS ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: IEEE

Applicability

These program criteria apply to engineering technology programs that include telecommunications or similar modifiers in their titles.

Objectives

An accreditable program in Telecommunications Engineering Technology will prepare graduates with the skills necessary to enter careers in the design, application, installation, management, operation, and/or maintenance of telecommunication systems. Graduates of associate degree programs typically have strengths in the building, testing, operation, and maintenance of existing telecommunications systems, whereas baccalaureate degree graduates are well prepared for development and implementation of telecommunications systems.

Outcomes

Graduates of associate degree programs must demonstrate knowledge and hands-on competence appropriate to the objectives of the program in:

(a) the application of electric circuits, computer programming, associated software, analog and digital electronics, voice and data communications, engineering standards, and the principles of telecommunications systems in the solution of telecommunications problems; and

(b) the application of natural sciences and mathematics at or above the level of algebra and trigonometry to building, testing, operation, and maintenance of telecommunications systems.

Given the breadth of technical expertise involved with telecommunication systems, and the unique objectives of individual programs, some baccalaureate programs may focus on preparing graduates with in-depth but narrow expertise, while other programs may choose to prepare graduates with expertise in a broad spectrum of the field. Therefore, the depth and breadth of expertise demonstrated by baccalaureate graduates must be appropriate to support the objectives of the program. In addition to the outcomes expected of associate degree graduates, graduates of baccalaureate degree programs must demonstrate:

(c) the ability to analyze, design, and implement telecommunications systems;

(d) the ability to apply project management techniques in the design, maintenance, and implementation of telecommunication systems;

(e) the ability to analyze and implement switching technologies, wide area networking technologies, and policy;

(f) the ability to manage, design, and plan wide area networks; and

(g) the ability to utilize statistics/probability, transform methods, or applied differential equations in support of telecommunication systems and wide area networks.

IV. PROPOSED CHANGES TO THE CRITERIA

The following section presents proposed changes to these criteria as approved by the ABET Engineering Technology Area Delegation on October 20, 2017, on first reading. These are now published for a review and comment period. Comments will be considered until June 15, 2018. The ABET Engineering Technology Area Delegation will determine, based on the comments received and on the advice of the ETAC, the content of any adopted criteria. These criteria will then become effective if approved at the ABET Engineering Technology Area Delegation Meeting in the fall of 2018 and will first be implemented for accreditation reviews during the 2019-20 academic year.

PROPOSED REVISIONS TO CRITERIA FOR ACCREDITING ENGINEERING TECHNOLOGY PROGRAMS GENERAL CRITERION 3 STUDENT OUTCOMES, GENERAL CRITERION 5 CURRICULUM, GENERAL CRITERION 6 FACULTY, AND PROGRAM CRITERIA PREAMBLE

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.

For purposes of this section, ~~broadly defined~~ ~~activities are those that involve a variety of resources; that involve the use of new processes, materials, or techniques in innovative ways; and that require a knowledge of standard operating procedures.~~ ~~Narrowly defined~~ ~~activities are those that involve limited resources, that involve the use of conventional processes and materials in new ways, and that require a knowledge of basic operating processes~~ well-defined activities or problems involve limited resources; use conventional processes and materials in new ways; and require knowledge of standard operating processes. Broadly-defined activities involve a variety of resources; use new processes, materials, or techniques in innovative ways; and may require extension of standard operating procedures.

A. For associate degree programs, these student outcomes must include, but are not limited to, the following: ~~learned capabilities:~~

   a. ~~an ability to apply the knowledge, techniques, skills, and modern tools of the discipline to narrowly defined engineering technology activities;~~

b. ~~an ability to apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require limited application of principles but extensive practical knowledge;~~
c. ~~an ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments;~~
d. ~~an ability to function effectively as a member of a technical team;~~
e. ~~an ability to identify, analyze, and solve narrowly defined engineering technology problems;~~
f. ~~an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;~~
g. ~~an understanding of the need for and an ability to engage in self-directed continuing professional development;~~
h. ~~an understanding of and a commitment to address professional and ethical responsibilities, including a respect for diversity; and~~
i. ~~a commitment to quality, timeliness, and continuous improvement.~~

(1) an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve well-defined engineering problems appropriate to the discipline;
(2) an ability to design solutions for well-defined technical problems and assist with engineering design of systems, components, or processes appropriate to the discipline;
(3) an ability to apply written, oral, and graphical communication in well-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
(4) an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results; and
(5) an ability to function effectively as a member of a technical team.

B. For baccalaureate degree programs, these student outcomes must include, but are not limited to, the following: ~~learned capabilities:~~
a. ~~an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities;~~

b. ~~an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;~~

~~c. an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;~~

~~d. an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;~~

~~e. an ability to function effectively as a member or leader on a technical team;~~

~~f. an ability to identify, analyze, and solve broadly-defined engineering technology problems;~~

~~g. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;~~

~~h. an understanding of the need for and an ability to engage in self-directed continuing professional development;~~

~~i. an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;~~

~~j. a knowledge of the impact of engineering technology solutions in a societal and global context; and~~

~~k. a commitment to quality, timeliness, and continuous improvement.~~

(1) an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
(2) an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
(3) an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
(4) an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and
(5) an ability to function effectively as a member or leader on a technical team.

Criterion 5. Curriculum

~~The curriculum must effectively develop the following subject areas in support of student outcomes and program educational objectives.~~ Curricular requirements specify topics appropriate to engineering technology but do not prescribe courses. The curriculum must combine technical, professional and general education components in support of student outcomes to prepare students for a career, further study, and lifelong professional development. To differentiate the discipline, program criteria may add specificity for program curricula. The curriculum must include the following:

Mathematics The program must develop the ability of students to apply mathematics to the solution of technical problems.

a. Associate degree programs will, at a minimum, include algebra and trigonometry at a level appropriate to the student outcomes and ~~program educational objectives~~ the discipline.
b. Baccalaureate degree programs will include the application of integral and differential calculus or other mathematics above the level of algebra and trigonometry appropriate to the student outcomes and ~~program educational objectives.~~ the discipline.

Technical Content The technical content of the program must focus on the applied aspects of science and engineering and must:

a. Represent at least ~~1/3~~ one-third of the total credit hours for the program but no more than ~~2/3~~ two-thirds of the total credit hours for the program;
b. Include a technical core ~~that prepares~~ preparing students for the increasingly complex technical specialties ~~they will experience~~ experienced later in the curriculum;
c. Develop student competency in the ~~use of equipment and tools common to the~~ discipline (program criteria may add specificity to student competencies);
d. Include design considerations appropriate to the discipline and degree level such as: industry and engineering standards and codes; public safety and health; and local and global impact of engineering solutions on individuals, organizations and society; and
e. Include topics related to professional and ethical responsibilities, respect for diversity, and quality and continuous improvement.

Physical and Natural Science The ~~basic~~ physical or natural science content of the ~~program~~ curriculum must be appropriate to the discipline and must include ~~physical or natural science with~~ laboratory experiences. ~~as appropriate to the discipline.~~

The Integration of Content Baccalaureate degree programs must provide a capstone or integrating experience that develops student competencies in applying both technical and non-technical skills in solving problems.

Cooperative Education When used to satisfy prescribed elements of these criteria, credits based upon cooperative/internships or similar experiences must include an appropriate academic component evaluated by the program faculty.

Advisory Committee An advisory committee with representation from organizations being served by the program graduates must ~~be utilized to~~ periodically review ~~program's curriculum and advise the program on the establishment, review, and revision of its program~~ the program educational objectives and curriculum. The advisory committee must provide advisement on current and future aspects of the technical fields for which the graduates are being prepared.

Criterion 6. Faculty

Each faculty member teaching in the program must have expertise and educational background consistent with the contributions to the program expected from the faculty member. The competence of faculty members must be demonstrated by such factors as education, professional credentials and certifications, professional experience, ongoing professional development, contributions to the discipline, teaching effectiveness, and communication skills. Collectively, the faculty must have the breadth and depth to cover all curricular areas of the program. Program criteria may add specificity to faculty requirements.

The faculty serving in the program must be of sufficient number to maintain continuity, stability, oversight, student interaction, and advising. The faculty must have sufficient responsibility and authority to improve the program through definition and revision of program educational objectives and student outcomes ~~as well as~~ and through ~~the~~ implementation of a program of study ~~that fosters~~ fostering ~~the~~ attainment of student outcomes.

Program Criteria (Preamble)

Each program seeking accreditation from the Engineering Technology Accreditation Commission of ABET must satisfy all applicable program criteria. ~~implied by the program title.~~ Applicability is determined by the official degree title. Program criteria provide specific requirements needed for interpretation of

the general criteria for a given discipline. Requirements stipulated in the program criteria are to be limited to curriculum and faculty. If a program, by virtue of its degree title, becomes subject to two or more sets of program criteria, that program must satisfy each set of program criteria. However, overlapping requirements need be satisfied only once.

PROGRAM CRITERIA FOR ENGINEERING GRAPHICS /DESIGN/DRAFTING~~/DESIGN~~ ENGINEERING TECHNOLOGY (MECHANICAL) AND SIMILARLY NAMED PROGRAMS

Lead Society: American Society of Mechanical Engineers
Cooperating Society: SME

These program criteria apply to engineering technology programs ~~with an emphasis on mechanical components and systems, that include drafting/design or similar modifiers in their titles.~~ that include engineering graphics, design or drafting or similar modifiers in their titles and have an emphasis on mechanical components and systems. An accreditable program in engineering graphics or design or drafting engineering technology will prepare graduates with knowledge, hands-on skills and problem-solving ability to enter careers related to preparation of engineering drawings and basic design of mechanical components and systems. Level and scope of career preparation will depend on the degree level and specific program orientation as portrayed by its program educational objectives.

~~Objectives~~
~~An accreditable program in Drafting/Design Engineering Technology will prepare graduates with knowledge, problem solving ability, and hands on skills to enter careers in drafting and basic design of mechanical components and systems. Graduates of associate degree programs shall have competency in drafting, including at least one commercial CAD software package appropriate to the program objectives. Baccalaureate degree graduates are prepared with the knowledge, skills, and abilities to enter careers in applied mechanical design.~~

~~Outcomes~~
~~Graduates of associate degree programs must demonstrate knowledge and technical competency appropriate to the objectives of the program in:~~

- ~~a. engineering materials, applied mechanics, and manufacturing methods.~~
- ~~b. applied drafting practice emphasizing mechanical components and systems, as well as fundamentals of descriptive geometry, orthographic projection, sectioning, tolerancing and dimensioning, and basic computer aided drafting and design with technical depth in at least one of these areas.~~
- ~~c. the application of physics and engineering materials having an emphasis in applied mechanics, or in-depth application of physics having emphasis in mechanical components and design.~~

~~Graduates of baccalaureate degree programs, in addition to outcomes required of associate degree graduates, must demonstrate competency in the application of manuals, handbooks, material and/or equipment specifications, and related software in advanced drafting/design. Competency in the application of current codes and standards must be demonstrated with open-ended design experiences that integrate materials, manufacturing, design analysis, or graphics.~~

~~Understanding of concepts relating to the environmental and economic impacts of design must also be demonstrated. Graduates must also demonstrate competency in:~~

~~d. design of machine elements, advanced drafting including current three dimensional computer representations as related to mechanical design, and manufacturing methods. Advanced proficiency must be demonstrated in at least three drafting / design related areas, consistent with the technical orientation of the program.~~

~~e. the in-depth application of physics and engineering materials having emphasis in drafting, manufacturing, and design of mechanical components.~~

I. PROGRAM CRITERIA FOR ASSOCIATE LEVEL PROGRAMS

Curriculum

The curriculum must prepare associate degree graduates with the knowledge, techniques, skills, and use of modern equipment in engineering graphics/design/drafting engineering technology. Graduates typically enter the profession as engineering technicians or are prepared for transfer to a baccalaureate degree program, as appropriate to the program educational objectives. Graduates must have competency in engineering graphics/drafting, basic mechanical design and development, specifications related to mechanical components and systems and manufacturability of components. The following curriculum topics are required (unless the program's faculty and primary constituents approve the substitution of other specific, mechanically-related technical subjects supporting attainment of program educational objectives):

a. use of 3D parametric computer-aided drafting and design software used for a variety of mechanical drawing techniques (such as orthographic, section, auxiliary, assembly models, detailed working drawings and rendered images);
b. apply principles of
    1. geometric dimensioning and tolerancing;
    2. fundamentals of engineering materials, applied mechanics;
    3. manufacturing methods;
c. use of basic knowledge and familiarity with industry codes, specifications, and standards (ASME, ANSI or others); and
d. an integrating or capstone experience utilizing skills acquired in the program.

Faculty

The program must demonstrate that faculty members are maintaining currency in their specialty areas.

II. PROGRAM CRITERIA FOR BACCALAUREATE LEVEL PROGRAMS

Curriculum

The curriculum must prepare baccalaureate degree graduates with the knowledge, techniques, skills, and use of modern equipment in engineering graphics/design/drafting engineering technology. Baccalaureate degree graduates build on the strengths of associate degree programs by gaining the knowledge, skills and abilities for entry into careers in applied mechanical design using advanced software tools and techniques. The depth and breadth of expertise demonstrated by baccalaureate graduates must support the program educational objectives. The following curriculum topics are required (unless the program's faculty and primary constituents approve the substitution of other specific, mechanically-related technical subjects supporting attainment of program educational objectives):

a. use of 3D parametric computer-aided drafting and design software for a variety of mechanical drawing techniques (such as orthographic, section, auxiliary, assembly models, detailed working drawings and rendered images);
b. apply principals of
    1. geometric dimensioning and tolerancing;
    2. fundamentals of engineering materials, applied mechanics;
    3. manufacturing methods;
c. applications of calculus and statistics;
d. use of advanced 3D parametric modeling tools for design and analysis;
e. application of physics, materials, manufacturability, environmental and economic concepts to design of machine or mechanical elements;
f. use of industry codes, specifications and standards (ASME, ANSI or others); and
g. technical communications typically used in preparation of engineering proposals, reports, and specifications.

The capstone experience, ideally demonstrated via an open-ended project-based experience, must include a formal design or drafted product with analysis, and presentation materials.

Faculty

The program must demonstrate that faculty members are maintaining currency in their specialty areas.

PROGRAM CRITERIA FOR ENVIRONMENTAL ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: American Academy of Environmental Engineers and Scientists
Cooperating Societies: American Institute of Chemical Engineers; American Society of Civil Engineers; American Society of Heating, Refrigerating, and Air Conditioning Engineers; American Society of Mechanical Engineers; SAE International; and Society of Mining, Metallurgy, and Exploration

~~Applicability~~
~~These program criteria apply to engineering technology programs that include environmental or similar modifiers in their titles.~~

~~Objectives~~
~~The field of environmental engineering technology is broad, ranging from laboratory measurements to field measurements to system design and operation. An accreditable environmental engineering technology program will prepare graduates to work in one or more specialties as described by the program objectives. Graduates shall understand the roles and responsibilities of public and private organizations pertaining to environmental regulations. Graduates are prepared to apply the concepts of professional practice and assist in project management. Graduates of associate degree programs typically have competence in applied skills, while baccalaureate degree graduates have a deeper understanding and competence in the application of engineering principles to problem solving and to the design of engineered systems; and the application of mathematics, physics, chemistry, and biology to the field.~~

~~Outcomes~~
~~The field of environmental engineering technology includes environmental measurements and the design, management, and operation of environmental facilities and systems. Associate degree programs must demonstrate that graduates are capable of:~~

- ~~a. Conducting sampling of environmental media;~~
- ~~b. Performing field and laboratory measurements of environmental parameters, including use of common instruments and equipment appropriate to environmental technology;~~
- ~~c. Applying quality control methods in sampling and measurement and utilizing basic statistical techniques in analysis of the results;~~
- ~~d. Preparing reports to adequately describe results of environmental sampling and measurement;~~
- ~~e. Explaining operating principles of a range of unit processes for environmental control; and~~
- ~~f. Performing CAD and GIS operations and applying them to solving engineering problems.~~

~~Baccalaureate degree programs must demonstrate that graduates, in addition to the outcomes expected of associate degree graduates, are capable of:~~

- ~~g. Applying probability and statistics to measured data and performing risk analyses;~~
- ~~h. Formulating flow and material balances;~~
- ~~i. Applying principles of biology, chemistry, and physics to situations relevant to the program objectives; and~~
- j. ~~Designing basic unit processes for pollution prevention and waste treatment.~~

These program criteria apply to engineering technology programs that include environmental or similar modifiers in their titles. An accreditable program in environmental engineering technology will prepare graduates with the technical and managerial skills necessary to enter careers in design, operation, and maintenance in the field of environmental engineering technology.

I. PROGRAM CRITERIA FOR ASSOCIATE LEVEL PROGRAMS

Curriculum

Graduates of associate degree programs typically have strengths in operation and maintenance of facilities for monitoring or treatment of wastes and environmental contamination or conducting assessment of environmental contamination, including environmental sampling and laboratory analysis. Associate degree programs must prepare students to:

a. Perform field and laboratory measurements of environmental parameters, including use of common instruments and equipment appropriate to environmental engineering technology;
b. Prepare documents such as permit applications or reports to describe results of environmental sampling and measurement;
c. Apply quality control methods in sampling and measurement and utilizing basic statistical techniques in analysis of the results;
d. Apply the concepts of professional practice and assist in project management;
e. Understand the roles and responsibilities of public and private organizations pertaining to environmental regulations, including applicable standards, reporting requirements and other permitting requirements; and
f. Explain the operating principles of a range of unit processes for environmental protection.

II. PROGRAM CRITERIA FOR BACCALAUREATE LEVEL PROGRAMS

Curriculum

Graduates of baccalaureate degree programs typically have strengths in their knowledge of design of sampling plans, and design, operation and management of treatment facilities or remediation operations. Baccalaureate degree programs must prepare graduates to:

a. Perform field and laboratory measurements of environmental parameters, including use of common instruments and equipment appropriate to environmental engineering technology;
b. Prepare documents such as permit applications or reports to describe results of environmental sampling and measurement;
c. Apply quality control methods in sampling and measurement and utilizing basic statistical techniques in analysis of the results;
d. Apply the concepts of professional practice and assist in project management;
e. Understand the roles and responsibilities of public and private organizations pertaining to environmental regulations, including applicable standards, reporting requirements and other permitting requirements;
f. Explain the operating principles of a range of unit processes for environmental protection;
g. Apply probability and statistics to measured data and perform risk analyses;
h. Formulate material balances;
i. Apply basic-science principles in areas relevant to the program objectives; and
j. Design unit processes for pollution prevention and waste treatment.

Faculty

The program must demonstrate that a majority of faculty teaching courses that are primarily design in content are qualified to teach the subject matter by virtue of professional licensure, board certification in environmental engineering, or by education and design experience.

PROGRAM CRITERIA FOR ~~BIOENGINEEERING~~ HEALTHCARE ENGINEERING TECHNOLOGY AND SIMILARLY NAMED PROGRAMS

Lead Society: ~~Biomedical Engineering Society~~ Association for the Advancement of Medical Instrumentation

Cooperating Societies: American Ceramic Society, American Institute of Chemical Engineers, American Society of Agricultural and Biological Engineers, American Society of Mechanical Engineers, and IEEE

These program criteria apply to engineering technology programs that include healthcare, bioengineering, biomedical, biomedical equipment, clinical technology, medical equipment, medical electronics, or similar modifiers in their titles. An accreditable program in ~~in the design, application, installation, operation, an/or maintenance of biomedical equipment.~~ healthcare engineering technology will prepare graduates with the technical skills necessary to enter careers to work with clinicians and other healthcare professionals as part of a team to ensure the highest standards and best practices in medical device safety, security, interoperability and functionality.

~~Graduates of associate degree programs typically have strengths in the building, testing, operation, and maintenance of existing biomedical equipment or systems, whereas baccalaureate degree graduates are well prepared for development and implementation of biomedical equipment or systems.~~

~~Applicability~~

~~These program criteria apply to engineering technology programs that include bioengineering, biomedical, medical electronics, biomedical equipment, or similar modifiers in their titles.~~

~~Objectives~~

~~An accreditable program in Bioengineering Technology will prepare graduates with the technical skills necessary to enter careers in the design, application, installation, operation and/or maintenance of biomedical equipment. Graduates of associate degree programs typically have strengths in the building, testing, operation, and maintenance of existing biomedical equipment or systems, whereas baccalaureate degree graduates are well prepared for development and implementation of biomedical equipment or systems.~~

~~Outcomes~~

~~Graduates of associate degree programs must demonstrate knowledge and hands-on competence appropriate to the goals of the program in:~~

~~a. the application of circuit analysis and design, analog and digital electronics, microcomputers, bioengineering systems, and safety in the building, testing, operation, and maintenance of biomedical equipment.~~
~~b. the applications of physics, chemistry, and biological sciences to building, testing, operation, and maintenance of biomedical equipment in a rigorous mathematical environment at or above the level of algebra and trigonometry.~~

~~In addition to the above, graduates of baccalaureate degree programs must demonstrate:~~

~~c. the ability to analyze, design, and implement bioengineering systems.~~

~~d. the ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of bioengineering systems.~~

~~e. an understanding of the clinical application of biomedical equipment.~~

I. PROGRAM CRITERIA FOR ASSOCIATE LEVEL PROGRAMS

Curriculum
The curriculum must prepare associate degree graduates with the knowledge, techniques, skills, and use of modern equipment in healthcare engineering technology. Graduates of associate degree programs will be well prepared to work in equipment planning, purchasing, installation, maintenance, troubleshooting, and on-call technical support of medical device technology and systems.

The curriculum for associate degree programs must include analog and digital electronics, medical device principles, applicable codes and regulations, medical vocabulary, the structure and function of the human body, an internship at a clinical site, as well as IT concepts including computers, peripherals, networks, and software. The associate degree curriculum will prepare graduates to have competency in the following curricular areas:

a. the interaction of medical equipment* with the human body;
b. the principles of medical equipment, safety and operational tests, the use of test results in order to improve processes and ensure that equipment is functioning properly and safely with appropriate documentation;
c. information technology principles applied to medical equipment systems, including data security and privacy standards; and
d. potential unsafe conditions related to the use of medical equipment and systems, preventative and corrective actions including risk mitigation.

*Source: ANSI/AAMI EQ89

II. PROGRAM CRITERIA FOR BACCALAUREATE LEVEL PROGRAMS

Curriculum

The curriculum must prepare baccalaureate degree graduates with the knowledge, techniques, skills, and use of modern equipment in healthcare engineering technology. Baccalaureate degree graduates will be well prepared to support the use of medical devices in healthcare, focusing on selecting safe and effective medical equipment, maintenance of medical equipment and systems, contribute toward improving patient outcomes, educating clinical staff, and controlling costs through financial stewardship.

The curriculum for baccalaureate degree programs must include analog and digital electronics, medical device principles, applicable codes and regulations, medical vocabulary, the structure and function of the human body, an internship at a clinical site, as well as IT concepts including computers, peripherals, networks, cybersecurity, and software. In addition, baccalaureate degree curriculum must include asset management, imaging modality fundamentals, risk analysis, and process improvement. The curriculum will prepare graduates to have competency in the following curricular areas:

a. the interaction of medical equipment* with the human body;
b. the principles of medical equipment, safety and operational tests, the use of test results in order to improve processes and ensure that equipment is functioning properly and safely with appropriate documentation;
c. the clinical application of computer networks, networking protocols, and medical device interoperability including data security and privacy standards;
d. potential unsafe conditions related to the use of medical equipment and systems, preventative and corrective actions including risk mitigation;
e. technology utilized in specialized clinical areas such as patient imaging and the operating room, including the interconnectedness (connectivity) of medical devices and systems;
f. the principles of project management to the healthcare setting; and
g. the financial information associated with the process of clinical equipment acquisition, management and support including budgeting and life-cycle planning.

*Source: ANSI/AAMI EQ89

Comments relative to the proposed criteria should be submitted by the link for comments available here and on the ACCREDITATION ALERTS section of the ABET website.

COMMENT: Proposed Revisions to Criteria for Accrediting Engineering Technology General Criterion 3, 5, 6 Faculty, and Program Criteria Preamble >

https://www.surveymonkey.com/r/proposedetac

COMMENT: Proposed Program Criteria for Engineering Graphics/Design/Drafting/ Engineering Technology (Mechanical) and Similarly Named Programs >

https://www.surveymonkey.com/r/engineeringgraphics

COMMENT: Proposed Program Criteria for Environmental Engineering Technology and Similarly named Programs >

https://www.surveymonkey.com/r/proposedenvironmentalscicriteria

COMMENT: Proposed Program Criteria for Healthcare Engineering Technology and Similarly named Programs >

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