Engineering Technology Accreditation Commission

CRITERIA FOR ACCREDITING

ENGINEERING TECHNOLOGY PROGRAMS

Effective for Reviews during the 2024-2025 Accreditation Cycle
Incorporates all changes approved by the ABET Board of Delegates
Engineering Technology Area Delegation as of November 3, 2023

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Criteria for Accrediting Engineering Technology Programs

Effective for Reviews during the 2024-2025 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 FOR BACCALAUREATE LEVEL PROGRAMS

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 with a documented and effective process for the periodic review and revision of these student outcomes.

For purposes of this section, well-defined activities or problems are practical, narrow in scope, use conventional processes and materials in traditional ways, and require knowledge of standard operating processes. Broadly-defined activities or problems are practical, broad in scope, relatively complex, and 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 elements:

(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 the 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 elements:

(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 as well as a leader on technical teams.

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 program's continuous improvement actions. Other available information may also be used to assist in the continuous improvement of the program.

Criterion 5. Curriculum

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 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 curricula will include the application of algebra and trigonometry at a level appropriate to the student outcomes and the discipline.

B. Baccalaureate degree curricula 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 the discipline.

Discipline Specific Content: The discipline specific content of the curriculum must focus on the applied aspects of science and engineering and must:

a. Represent at least one-third of the total credit hours for the curriculum but no more than two-thirds of the total credit hours for the curriculum;
b. Include a technical core preparing students for the increasingly complex technical specialties later in the curriculum;
c. Develop student competency in the discipline;
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. Combine technical, professional, and general education components to prepare students for a career, further study, and lifelong professional development.

Other Content: The curriculum must include topics related to professional and ethical responsibilities, diversity and inclusion awareness, quality, and continuous improvement.

Physical and Natural Science: The physical or natural science content of the curriculum must be appropriate to the discipline and must include laboratory experiences.

The Integration of Content: Baccalaureate degree curricula 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 degree requirements, credits based upon cooperative/internships or similar experiences must include an appropriate academic component evaluated by a member of the program faculty.

Advisory Committee: An advisory committee with representation from organizations being served by the program graduates must periodically review the program's 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, communication skills, and other factors important to the program. 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 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 satisfy all applicable Program Criteria. Applicability is determined by the official program title as it appears on the most recent request for ABET evaluation. Program Criteria provide specific requirements needed for interpretation of General Criteria for a given discipline. Requirements stipulated in Program Criteria are limited to curriculum and faculty. If a program, by virtue of its program 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.

Aeronautical Engineering Technology and Similarly Named Programs

Lead Society: American Institute of Aeronautics and Astronautics

These program criteria apply to engineering technology programs that include aeronautical or similar modifiers in their titles. Much of aeronautical/aerospace engineering technology involves the translation of engineering ideas and concepts into functioning vehicles, engines, avionics, mission systems, payloads and components. It is anticipated that fundamental experiential skills may incorporate portions of the approved FAA Airframe and Powerplant or equivalent curriculum.

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide associate degree graduates with instruction in the knowledge, techniques, skills, and use of modern equipment in aeronautical engineering technology. 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, ground support systems and component support. The curriculum must contain the following curricular areas:

a. a minimum of three subject areas chosen from: engineering materials, applied structures, applied mechanics, applied aerodynamics, applied propulsion, and fundamentals of electricity;
b. 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; and
c. applied physics having an emphasis in applied mechanics and other technical topics in physics appropriate to the program objectives.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide baccalaureate degree graduates with instruction in applying the knowledge, techniques, skills, and use of modern equipment in aeronautical engineering technology to the analysis, development, implementation, or oversight of aeronautical/aerospace systems and processes. The curriculum must contain the following curricular areas:

a. engineering materials, statics, strength of materials, applied aerodynamics, applied propulsion, and either electrical power or electronics
b. 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; and

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

Air Conditioning, Refrigerating, Heating and Ventilating Engineering Technology and Similarly Named Programs

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

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

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide associate degree graduates with instruction in the knowledge, techniques, skills, and ability to use modern equipment in air conditioning, refrigerating, heating, and ventilating engineering technology. The curriculum must include instruction in the following topics:

a. basic HVAC&R principles, including heat transfer, fluid mechanics, combustion, air conditioning and refrigeration processes, heating and cooling load calculations, electrical circuits, and controls;
b. application of HVAC&R principles for well-defined technical activities, including sizing of pipe and duct, analysis of ladder logic diagrams, evaluation of equipment performance, and use of computerized tools for energy calculations and equipment selection; and
c. application of HVAC&R principles for system operations, including troubleshooting, servicing, and maintenance tasks.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide baccalaureate degree graduates with instruction in the knowledge, techniques, skills, and ability to use modern equipment in air conditioning, refrigerating, heating, and ventilating engineering technology. Baccalaureate degree graduates are well prepared for design and development of complex systems complementing and expanding on lower division work. The curriculum must include instruction in the following topics:

a. basic HVAC&R engineering principles, including heat transfer, fluid mechanics, combustion, air conditioning and refrigeration processes, heating and cooling load calculations, electrical circuits, and controls;
b. application of HVAC&R principles for broadly-defined technical activities, including analysis of equipment and system performance, analysis of system controls, and computerized evaluation of system energy performance;

c. design and analysis of HVAC&R systems for commercial buildings, including pipe and duct design, HVAC&R equipment and system selection, building energy modeling, and economic analysis; and
d. project management for design and installation of HVAC&R systems.

Faculty

The majority of faculty teaching courses that are primarily design in content must be qualified to teach the subject matter by professional licensure or by education and design experience.

Architectural Engineering Technology and Similarly Named Programs

Lead Society: American Society of Civil Engineers

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

I. Program Criteria for Associate Level Programs

Curriculum

Graduates of associate degree programs typically enter careers in the construction, testing, operation, and maintenance of building systems; they may also produce and utilize basic construction documents and perform basic analysis and design of system components. The curriculum must provide instruction in the following curricular areas:

a. employment of architectural theory and design in a design environment;
b. utilization of instruments, methods, software, and techniques that are appropriate to produce A/E documents and presentations;
c. utilization of measuring methods that are appropriate for field, office, or laboratory; and
d. application of fundamental computational methods and elementary analytical techniques in sub-disciplines related to architectural engineering.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

Baccalaureate degree graduates typically enter 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. The curriculum must provide instruction in the following curricular areas:

a. employment of architectural theory and design in a design environment;
b. utilization of instruments, methods, software, and techniques that are appropriate to produce A/E documents and presentations;
c. utilization of measuring methods that are appropriate for field, office, or laboratory;
d. application of fundamental computational methods and elementary analytical techniques in sub-disciplines related to architectural engineering;
e. creation, utilization, and presentation of documents related to design, construction, and operations;
f. performance of economic analyses and cost estimates related to design, construction, and maintenance of building systems;
g. selection of appropriate materials and practices for building construction;

h. application of principles of construction law and ethics in architectural practice; and
i. performance of standard analysis and design in at least one recognized technical specialty within architectural engineering technology that is appropriate to the goals of the program.

Automotive Engineering Technology and Similarly Named Programs

Lead Society: SAE, International

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. 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.

Level and scope of career preparation will depend on the degree level and specific program orientation as portrayed by its educational objectives.

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide associate degree graduates with instruction in the knowledge of operations, maintenance, manufacturing, and use of modern equipment in automotive 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's educational objectives. The following curricular areas are required:

a. application of computer technologies commonly used in industry, governmental service, and private practice associated with land, sea, air, or space mobility;
b. application of probability and statistics to the solution of problems related to land, sea, air, or space mobility; and
c. working knowledge of the design, manufacture, and maintenance of major subsystems and technologies associated with land, sea, air, or space mobility.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide baccalaureate degree graduates with instruction in design and management in the automotive field. Baccalaureate degree graduates build on the strengths of associate degree programs by gaining the knowledge, skills and abilities for entry into careers in applied design and management. The following curricular areas are required:

a. application of computer technologies commonly used in industry, governmental service, and private practice associated with land, sea, air, or space mobility;
b. application of probability and statistics to the solution of problems related to land, sea, air, or space mobility;
c. the design, manufacture, and maintenance of major subsystems and technologies associated with land, sea, air, or space mobility;
d. application of modern and effective skills in identification and investigation of problems, analysis of data, synthesis and implementation of solutions, and operations of facilities related to land, sea, air, or space mobility; and

e. 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.

Chemical/Refinery Process Engineering Technology and Similarly Named Programs

Lead Society: American Institute of Chemical Engineers

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

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide associate degree graduates with instruction in the knowledge, techniques, skills, and use of modern equipment in chemical engineering technology. Graduates typically enter the profession as process, maintenance or laboratory/quality control technicians. Graduates of associate degree programs have strengths in the safe operation, maintenance and sampling/analysis of chemical processes. The following curriculum topics are required:

a. operating principles, including testing and troubleshooting, of chemical processes and equipment in accordance with applicable safety (including process hazards), health and environmental standards;
b. application of chemical engineering principles (such as fluid mechanics, heat transfer, reactions, and separations) to the operation of chemical processes and appropriate to program educational objectives;
c. application of instrumentation and process control, quality control, and computer applications to the operation of chemical processes; and
d. chemistry with laboratory experience and coursework topics in both inorganic and organic chemistry.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide baccalaureate degree graduates with instruction in the knowledge, techniques, skills, and use of modern equipment in chemical engineering technology. Graduates of baccalaureate degree programs build on the strengths of associate degree programs by gaining the knowledge, skills and abilities for careers in process design and management. The following curriculum topics are required:

a. operating principles (including testing and troubleshooting) of chemical processes and equipment in accordance with applicable safety (including process hazards), health and environmental standards;
b. application of chemical engineering principles (such as fluid mechanics, material and energy balances, heat transfer, reactions, thermodynamics, and separations) to the design, improvement, and operation of chemical processes and appropriate to program educational objectives;

c. application of instrumentation and process control, quality control, computer applications, and materials of construction to the design, improvement, and operation of chemical processes;
d. chemistry with laboratory experience and coursework topics in both inorganic and organic chemistry; and
e. application of statistical process and quality control to chemical operations.

Civil Engineering Technology and Similarly Named Programs

Lead Society: American Society of Civil Engineers

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

I. Program Criteria for Associate Level Programs

Curriculum

Graduates of associate degree programs typically enter careers in construction testing, operation, and maintenance of buildings and infrastructure and may produce and utilize basic construction documents and perform basic analysis and design of system components. The curriculum must provide instruction in the following curricular areas:

a. utilization of principles, hardware, and software that are appropriate to produce drawings, reports, quantity estimates, and other documents related to civil engineering;
b. performance of standardized field and laboratory tests related to civil engineering;
c. utilization of surveying methods appropriate for land measurement and/or construction layout; and
d. application of fundamental computational methods and elementary analytical techniques in sub-disciplines related to civil engineering.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

Graduates of baccalaureate degree programs typically analyze and design systems, specify project methods and materials, perform cost estimates and analyses, and manage technical activities in support of civil engineering projects. The curriculum must provide instruction in the following curricular areas:

a. utilization of principles, hardware, and software that are appropriate to produce drawings, reports, quantity estimates, and other documents related to civil engineering;
b. performance of standardized field and laboratory tests related to civil engineering;
c. utilization of surveying methods appropriate for land measurement and/or construction layout;
d. application of fundamental computational methods and elementary analytical techniques in sub-disciplines related to civil engineering;
e. planning and preparation of documents appropriate for design and construction;

f. performance of economic analyses and cost estimates related to design, construction, operations and maintenance of systems associated with civil engineering;
g. selection of appropriate engineering materials and practices; and
h. performance of standard analysis and design in at least three sub-disciplines related to civil engineering.

Computer Engineering Technology and Similarly Named Programs

Lead Society: IEEE

Cooperating Society: Institute of Industrial and Systems Engineers

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

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must enable the program to provide graduates with instruction in the knowledge, techniques, skills, and use of modern tools in computer engineering technology. Graduates of associate degree programs have strengths in the building, testing, operation, and maintenance of computer systems and their associated software systems. The curriculum must include instruction in the following topics:

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

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide graduates with instruction in the knowledge, techniques, skills, and use of modern tools in computer engineering technology. Graduates of baccalaureate degree graduates are well prepared for development and implementation of computer systems. Given the breadth of technical expertise involved with computer systems, and the unique objectives of individual programs, some baccalaureate programs may focus on in-depth but narrow fields of instruction, while other programs may choose to provide instruction in a broad spectrum of the field. The curriculum must include instruction in the following topics:

a. application of electric circuits, computer programming, associated software applications, analog and digital electronics, microcontrollers, operating systems, local area networks, and engineering standards to the building, testing, operation, and maintenance of computer systems and associated software systems;
b. 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;
c. analysis, design, and implementation of computer system hardware and software;
d. application of project management techniques to computer systems; and

e. utilization of statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of computer systems and networks.

Construction Engineering Technology and Similarly Named Programs

Lead Society: American Society of Civil Engineers

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

I. Program Criteria for Associate Level Programs

Curriculum

Graduates of associate degree programs typically enter careers in the construction, testing, operation, and maintenance of buildings and infrastructure; they may also utilize basic construction documents to participate in construction activities. The curriculum must provide instruction in the following curricular areas:

a. utilization of techniques that are appropriate to administer and evaluate construction contracts, documents, and codes;
b. estimation of costs, estimation of quantities, and evaluation of materials for construction projects;
c. utilization of measuring methods, hardware, and software that are appropriate for field, laboratory, and office processes related to construction; and
d. application of fundamental computational methods and elementary analytical techniques in sub-disciplines related to construction engineering.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

Graduates of baccalaureate degree programs typically specify project methods and materials, perform cost estimates and analyses, and manage construction activities. The curriculum must provide instruction in the following curricular areas:

a. utilization of techniques that are appropriate to administer and evaluate construction contracts, documents, and codes;
b. estimation of costs, estimation of quantities, and evaluation of materials for construction projects;
c. utilization of measuring methods, hardware, and software that are appropriate for field, laboratory, and office processes related to construction;
d. application of fundamental computational methods and elementary analytical techniques in sub-disciplines related to construction engineering;
e. production and utilization of documents related to design, construction, and operations;
f. performance of economic analyses and cost estimates related to design, construction, and maintenance of systems associated with construction engineering;

g. selection of appropriate construction materials and practices;
h. application of appropriate principles of construction management, law, and ethics; and
i. performance of standard analysis and design in at least one sub-discipline related to construction engineering.

Construction Management Technology and Similarly Named Programs

Lead Society: Construction Management Association of America

These program criteria apply to engineering technology programs that include Construction Management Technology, or similar modifiers in their titles. An accreditable program prepares graduates, through specialized curriculum, with the necessary knowledge and skills to meet the needs of the constituents that they serve.

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must prepare associate degree graduates with skills necessary to apply their knowledge to support the delivery of construction projects with respect to scope, schedule, cost, quality, and safety. The following curricular areas are required:

a. Construction project management from pre-design through completion;
b. Construction materials, estimates, and plans;
c. Schedule management including development and planning;
d. Contract administration, legal requirements, and delivery methods;
e. Leadership including business, communication skills, and behavioral awareness; and
f. Construction health and safety, accident prevention, and regulatory compliance.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must prepare baccalaureate degree graduates with skills necessary to enter careers in the construction management industry. Through the inclusion of specialized curricula, graduates of baccalaureate degree programs are prepared to apply their knowledge in the delivery of construction projects with respect to scope, schedule, budget, quality, safety, and sustainability. The depth and breadth of expertise demonstrated by baccalaureate graduates must be appropriate to support the educational objectives of the program. The following curricular areas are required:

a. Construction project management from pre-design through completion.
b. Risk management including identification, analysis, and mitigation.
c. Cost estimating including types, levels, and accuracy.
d. Principles and methods of value engineering.
e. Financial management including budgeting, cost control, and forecasting.
f. Schedule management including development, forecasting, and planning.
g. Contract administration, legal requirements, and delivery methods.
h. Project sustainability including materials and methods of construction.
i. Construction systems and constructability analyses.
j. Leadership including business, communication skills, and behavioral awareness.
k. Labor and workforce planning and management.

l. Construction health and safety, accident prevention, and regulatory compliance.
m. Advancements in construction technology.

Faculty

A full-time faculty member must be identified as administratively in charge of the program.

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 provide associate degree graduates with instruction in the knowledge, techniques, skills and use of modern tools necessary to enter careers in the application, installation, manufacturing, operation and/or maintenance of electrical/electronic(s) systems. Graduates of associate degree programs have strengths in the building, testing, operation, and maintenance of electrical systems.

The curriculum must include the following topics:

a. application of circuit analysis and design, computer programming, associated software, analog and digital electronics, microcomputers, and engineering standards to the building, testing, operation, and maintenance of electrical/electronic(s) systems; and
b. 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 provide baccalaureate degree graduates with instruction in the knowledge, techniques, skills and use of modern tools 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 include the following topics:

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

b. application of natural sciences and mathematics at or above the level of trigonometry to the building, testing, operation, and maintenance of electrical/electronic systems;
c. analysis, design, and implementation of one or more of the following: control systems, instrumentation systems, communications systems, computer systems, power systems or energy systems;
d. application of project management techniques to electrical/electronic(s) systems; and
e. utilization of differential and integral calculus, as a minimum, to characterize the performance of electrical/electronic systems.

Electromechanical Engineering Technology and Similarly Named Programs

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

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

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide associate degree graduates with instruction in the knowledge, techniques, skills and use of modern tools necessary to enter careers in the building, installation, application, and operation and/or maintenance of electromechanical hardware and software systems. Graduates of associate degree programs typically have strengths in the building, installation, application, and operation and maintenance of electromechanical hardware and software systems.

The following curricular areas are required:

a. application of computer-aided drafting or design tools to prepare graphical representations of electromechanical systems;
b. application of circuit analysis, analog and digital electronics, basic instrumentation, associated software and computers to aid in the characterization, analysis, and troubleshooting of electromechanical systems; and
c. application of 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.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide baccalaureate degree graduates with instruction in the knowledge, techniques, skills and use of modern tools necessary to enter careers in the design, building, installation, application, and operation and/or maintenance of electromechanical hardware and software systems. Graduates of baccalaureate degree programs are well prepared for applied design, development, and management 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 providing in-depth but narrow instruction, while other programs may choose to provide instruction in a broad spectrum of the field. The following curricular areas are required:

a. graphical representations of electromechanical systems;

b. application of circuit analysis, analog and digital electronics, basic instrumentation, associated software and computers to aid in the characterization, analysis, and troubleshooting of electromechanical systems;
c. application of 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;
d. appropriate computer programming languages for operating electromechanical systems;
e. electrical/electronic devices such as amplifiers, motors, relays, power systems, and computer and instrumentation systems for applied design, operation, or troubleshooting electromechanical systems;
f. advanced topics in engineering mechanics, engineering materials, and fluid mechanics for applied design, operation, or troubleshooting of electromechanical systems;
g. fundamentals of control systems for the applied design, operation, or troubleshooting of electromechanical systems;
h. utilization of differential and integral calculus, as a minimum, to characterize the static and dynamic performance of electromechanical systems; and
i. application of project management techniques in the investigation, analysis, and design of electromechanical systems.

Engineering Graphics/Design/Drafting Engineering Technology (Mechanical) and Similarly Named Programs

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

These program criteria apply to engineering technology programs 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.

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide associate degree graduates with instruction in 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 instruction 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:

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.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must prepare baccalaureate degree graduates with instruction in 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 instruction for baccalaureate graduates must support the program educational objectives. The following curriculum topics are required:

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. application of 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.

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.

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

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

The curriculum must provide associate degree graduate with instruction in the knowledge, techniques, skills, and use of modern equipment in environmental engineering technology. Graduates of associate degree programs 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. The following curriculum topics are required:

a. Field and laboratory measurements of environmental parameters, including use of common instruments and equipment appropriate to environmental engineering technology;
b. Preparation of documents such as permit applications or reports to describe results of environmental sampling and measurement;
c. Quality control methods in sampling and measurement and utilizing basic statistical techniques in analysis of the results;
d. Concepts of professional practice and application of project management;
e. Roles and responsibilities of public and private organizations pertaining to environmental regulations, including applicable standards, reporting requirements and other permitting requirements; and
f. Operating principles of commonly used unit processes for environmental protection.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide baccalaureate degree graduates with instruction in the knowledge, techniques, skills, and use of modern equipment in environmental engineering technology. Graduates of baccalaureate degree programs have strengths in their knowledge of design of sampling plans, and design, operation, and management of

treatment facilities or remediation operations. The following curriculum topics are required:

a. Field and laboratory measurements of environmental parameters, including use of common instruments and equipment appropriate to environmental engineering technology;
b. Preparation of documents such as permit applications or reports to describe results of environmental sampling and measurement;
c. Quality control methods in sampling and measurement and utilizing basic statistical techniques in analysis of the results;
d. Concepts of professional practice and application of project management;
e. Roles and responsibilities of public and private organizations pertaining to environmental regulations, including applicable standards, reporting requirements and other permitting requirements;
f. Operating principles of commonly used unit processes for environmental protection;
g. Application of probability and statistics to measured data and performing risk analyses;
h. Formulation of material balances;
i. Application of basic environmental science principles; and
j. Design of unit processes commonly used for environmental protection.

Faculty

The program must demonstrate that a majority of faculty members 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.

Fire Protection Engineering Technology and Similarly Named Programs

Lead Society: Society of Fire Protection Engineers

These program criteria apply to engineering technology programs that include fire protection or similar modifiers in their titles. An accreditable program in fire protection engineering technology will prepare graduates with instruction in knowledge, hands-on skills and problem-solving ability related to fire protection in the built environment, 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. The curriculum shall provide instruction in the concepts of ethical professional practice and the roles and responsibilities of public institutions and private organizations pertaining to fire protection engineering technology. Level and scope of career preparation will depend on the degree level and specific program orientation as portrayed by its educational objectives.

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide associate degree graduates with instruction in the knowledge, techniques, skills, and use of modern equipment in fire protection engineering technology. Graduates typically enter the profession as engineering technicians or transfer to a baccalaureate degree program as appropriate to the program's educational objectives. Graduates of associate degree programs typically will have knowledge in the areas of fire science, fire detection and alarm systems, fire protection systems, fire prevention, and fire investigation. The curriculum must include instruction in the following topics:

a. basic fire science;
b. fire safety strategies, fire inspection, fire prevention and mitigation;
c. active fire protection systems including detection, alarm, and suppression systems; and
d. building materials, construction methods and passive fire protection systems.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide baccalaureate degree graduates with instruction in the knowledge, techniques, skills, and use of modern equipment in fire protection 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 applying mathematics and physical sciences to fire protection design and analysis using advanced tools and techniques. The curriculum must also include instruction in the following topics:

a. basic fire science;
b. fire safety strategies, fire inspection, fire prevention and mitigation;

c. active fire protection systems including detection, alarm, and suppression systems;
d. building materials, construction methods and passive fire protection systems;
e. fire hazard recognition, evaluation and mitigation;
f. fire risk analysis and fire control;
g. fundamentals of fire and explosion dynamics, and human behavior in fire;
h. codes and standards for life and fire safety;
i. design, analysis, and maintenance of active and passive fire protection systems;
j. hazardous materials and chemistry; and
k. forensic science and scientific method for fire and explosion investigations.

Healthcare Engineering Technology and Similarly Named Programs

Lead Society: Association for the Advancement of Medical Instrumentation
Cooperating Society: 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 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.

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide associate degree graduates with instruction in the knowledge, techniques, skills, and use of modern equipment in healthcare engineering technology. Graduates of associate degree programs will typically 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 must include 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 provide baccalaureate degree graduates with instruction in the knowledge, techniques, skills, and use of modern equipment in healthcare engineering technology. Baccalaureate degree graduates typically 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, clinical laboratory equipment fundamentals, risk analysis, and process improvement. The curriculum must include 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*

Industrial Engineering Technology and Similarly Named Programs

Lead Society: Institute of Industrial and Systems Engineers

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

Industrial Engineering Technology is concerned with the design, implementation and improvement of integrated processes and the resulting products or services within an organization. It draws upon specialized knowledge and skill in the mathematical, natural, physical, and social sciences together with the principles and methods of engineering analysis and design, to specify, predict, and evaluate the results to be obtained from such systems.

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide associate degree graduates with instruction in the knowledge, techniques, skills, and use of modern tools and equipment skills necessary to enter careers in industrial engineering technology in organizations within manufacturing, service, healthcare, transportation, or other operating environments or to continue their education at the baccalaureate level. The curriculum must include the following topics:

a. Probability and statistics;
b. Creating and reviewing engineering drawings;
c. Workplace design and measurement;
d. Quality and process control.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide baccalaureate degree graduates with the knowledge, techniques, skills, and use of modern tools and equipment skills necessary to enter careers in industrial engineering technology in organizations within manufacturing, service, healthcare, transportation, or other social or complex operating environments. The curriculum must include the following topics:

a. Probability and statistics;
b. Creating and reviewing engineering drawings;
c. Workplace design and measurement;
d. Quality and process control;
e. Engineering economics; and
f. Application of project management techniques.

Information, Information Security, Cybersecurity, Information Assurance Engineering Technology and Similarly Named Programs

Lead Society: IEEE
Cooperating Society: CSAB

These program criteria apply to engineering technology programs that include information, information security, cybersecurity, information assurance or similar modifiers in their titles.

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide graduates with instruction in the knowledge, techniques, skills and use of modern tools necessary to enter careers in the 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 in Information Engineering Technology have strengths in the building, testing, operation, and maintenance of hardware and software systems. Graduates of associate degree programs that contain the modifier "information security," "cybersecurity," or "information assurance" in the title will also have strengths in computer and network security.

The curriculum must include instruction in the following topics:

a. 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;
b. application of electrical, electronic, telecommunications, and digital signal propagation fundamentals in the building, testing, operation, and maintenance of hardware and software systems; and
c. Application of legal, ethical and security issues involving data and information

The curriculum for programs containing the modifier "information security," "cybersecurity" or "information assurance" in the title must also include instruction in:

d. application of cybersecurity principles, techniques and tools to protect devices and systems that incorporate interconnected hardware and software, and human aspects of a system.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide graduates with instruction in the knowledge, techniques, skills and use of modern tools 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 baccalaureate degree programs in Information Engineering Technology are well prepared for design, development, and management of computer systems, networks, and telecommunication systems. Graduates of baccalaureate degree programs that contain the modifier "information security," "cybersecurity" or "information assurance" in the title will also be well prepared for design of secure systems, evaluation and measurement of security risk, and ensure proper levels of privacy are maintained.

Given the breadth of technical expertise involved with information systems, and the unique objectives of individual programs, some baccalaureate programs may provide instruction with in-depth but narrow focus, while other programs may choose to provide instruction in a broad spectrum of the field. The curriculum must include instruction in the following topics:

a. 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;
b. application of electrical, electronic, telecommunications, and digital signal propagation fundamentals in the building, testing, operation, and maintenance of hardware and software systems;
c. application of legal, ethical and security issues involving data and information.
d. design, implementation, maintenance, and security of facilities involved with the processing and transfer of information;
e. application of project management techniques to facilities that process and transfer information; and
f. utilization of discrete mathematics, and probability and statistics in the support of facilities that process and transfer information.

The curriculum for programs containing the modifiers "information security," "cybersecurity" or "information assurance" in the title must also include instruction in the following topics:

g. application of cybersecurity principles, techniques and tools to protect devices and systems that incorporate interconnected hardware and software, and human aspects of a system;
h. design, implementation, maintenance, and security of facilities involved with the processing and transfer of data and information; and
i. procurement, testing analysis and maintenance of components interconnected into larger systems.

Instrumentation and Control Systems Engineering Technology and Similarly Named Programs

Lead Society: International Society of Automation

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

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide associate degree graduate with instruction in 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.

The following curricular areas are required:

a. concepts of automatic control, including measurement, feedback and feedforward regulation for the operation of continuous and discrete systems;
b. design and implementation of systems utilizing analog and/or digital control devices;
c. concepts of chemistry, physics, and electricity/electronics to measurement and control systems;
d. concepts of digital and microprocessor systems and functionality of system components/devices for the automation of processes;
e. concepts of measurements and sensor selection;
f. communicating the technical details of control systems using current techniques and graphical standards; and
g. fundamental concepts of economics and management to problems in automatic control systems.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide baccalaureate degree graduates with instruction in 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. Baccalaureate degree graduates have strengths to undertake the design and specification of control systems and for the subsequent management of their installation and operation.

The following curricular areas are required:

a. concepts of automatic control, including measurement, feedback and feedforward regulation for the operation of continuous and discrete systems;
b. design and implementation of systems utilizing analog and/or digital control devices;
c. concepts of chemistry, physics, and electricity/electronics to measurement and control systems;
d. concepts of digital and microprocessor systems and functionality of system components/devices for the automation of processes;
e. concepts of measurements and sensor selection;
f. communicating the technical details of control systems using current techniques and graphical standards;
g. concepts of mechanics, fluid mechanics, and heat transfer to the design of process control systems;
h. utilization of programmable logic controllers (PLC), distributed control systems (DCS) and supervisory control systems for control of manufacturing and processing systems; and
i. utilization of modern and effective management skills for performing investigation analysis, and synthesis in the implementation of automatic control systems.

Manufacturing Engineering Technology and Similarly Named Programs

Lead Society: SME

These program criteria apply to engineering technology programs that include manufacturing or similar modifiers in their titles. An accreditable degree program in manufacturing engineering technology will provide graduates with instruction in 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. Level and scope of career preparation will depend on the degree level and specific program orientation as portrayed by its program educational objectives.

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide associate degree graduates with instruction in the knowledge, techniques, skills, and use of modern equipment in manufacturing engineering technology. Graduates typically enter the professions in manufacturing operations and service functions or are prepared for transfer to a baccalaureate degree program, as appropriate to the program educational objectives. The curriculum must include instruction in the following topics:

a. materials and manufacturing processes;
b. product design process, tooling, and assembly;
c. manufacturing systems, automation, and operations; and
d. statistics, quality and continuous improvement, and industrial organization and management.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide baccalaureate degree graduates with instruction in the knowledge, techniques, skills, and use of modern equipment in manufacturing engineering technology. Baccalaureate degree graduates build on the strengths of associate degree programs by gaining the knowledge, skills, and abilities for entry into manufacturing careers practicing various tools, techniques and processes. The depth and breadth of expertise demonstrated by baccalaureate graduates must support the program educational objectives. The curriculum must include instruction in the following topics:

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; and

e. capstone or integrating experience that develops and illustrates student competencies in applying both technical and non-technical skills in successfully solving manufacturing problems.

Marine Engineering Technology and Similarly Named Programs

Lead Society: Society of Naval Architects and Marine Engineering

These program criteria apply to engineering technology programs that include marine or similar modifiers in their titles. The field of marine engineering technology is dependent on the application of the technical sciences to marine equipment, systems, and vehicles. An accreditable program will prepare graduates to enter a variety of different careers in the field of marine engineering technology.

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide associate degree graduates with instruction in the knowledge, techniques, skills, and use of modern equipment in marine engineering technology. The curriculum must contain the following topics:

a. the use of the principles of college-level physics to problems associated with marine engineering technology applications;
b. the application of the technical sciences to marine equipment, systems and/or vehicles;
c. the use and application of modern instrumentation for measuring physical phenomena related to marine engineering technology, including data collection, analysis, and formal report writing; and
d. the operation and maintenance of modern marine power plants and associated marine auxiliary equipment and systems, including the use of design manuals, material/equipment specifications, and industry regulations applicable to marine engineering technology.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide baccalaureate degree graduates with instruction in the knowledge, techniques, skills, and use of modern equipment in marine engineering technology. The curriculum must contain the following topics:

a. application of the principles of college-level physics and chemistry to problems associated with marine engineering technology applications;
b. the principles of fluid mechanics, hydrostatic stability, solid mechanics, materials, dynamics, and thermodynamics and their application to marine equipment, systems and/or vehicles;
c. the use and application of modern instrumentation for measuring physical phenomena related to marine engineering technology, including the design of experiments, data collection, analysis, and formal report writing; and
d. the operation, maintenance, analysis, design and management of modern marine power plants and associated marine auxiliary equipment and systems, including

the use of design manuals, material/equipment specifications, and industry regulations applicable to marine engineering technology.

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.

Mechatronics Engineering Technology and Similarly Named Programs

Lead Societies: ASME, IEEE, SME

These program criteria apply to engineering technology programs that include mechatronics, or similar modifiers in their titles. An accreditable program prepares graduates, through specialized curriculum, with the necessary knowledge and skills to meet the needs of the constituents that they serve.

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must prepare associate degree graduates with the skills necessary to enter careers in the associated industries such as robotics, automotive, advanced manufacturing, and automation. Through the inclusion of specialized curricula, graduates of associate degree programs typically have strengths in applying their knowledge to the occupational areas of: building, testing, installing, documenting, operating, or maintaining basic mechatronics systems. Given the breadth of technical expertise involved with knowledge and use of modern equipment in mechatronics engineering technology, and the unique objectives of individual programs, some associate degree 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 associate degree graduates must be appropriate to support the educational objectives of the program. The following curricular areas are required:

a. Mechatronics component and system application; tooling and assembly (with respect to electrical components and circuits (digital and analog); embedded systems and control; pneumatic, hydraulic, industrial controls; automation and PLCs);
b. Mechatronics systems software analysis tools; connectivity, industrial communication protocols and information security;
c. Quality and continuous improvement techniques;
d. Selection, set-up, and calibration of measurement tools, instrumentation and sensors;
e. Preparation of laboratory reports and systems integration, drawings associated with development, installation, or maintenance of mechatronics components and systems;
f. Troubleshooting of mechatronics system including maintenance or repair; and
g. An integrating experience or capstone project that illustrates student competencies in applying both technical and non-technical skills in successfully solving industrial mechatronics problems.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must prepare baccalaureate degree graduates with skills necessary to enter careers in the associated industries such as robotics, automotive, advanced manufacturing, and automation. Through the inclusion of specialized curricula, graduates of baccalaureate degree programs are prepared to apply their knowledge in the occupational areas of: specifying, designing, building, testing, installing, documenting, operating, or maintaining basic mechatronics systems. Given the breadth of technical expertise involved with knowledge and use of modern equipment in mechatronics engineering technology, 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 educational objectives of the program. The following curricular areas are required:

a. Mechatronics component and system integration; tooling and assembly (with respect to digital and analog electrical components and circuits; embedded systems and control; mechanics (statics and dynamics); pneumatic, hydraulic, industrial controls; automation and PLCs);
b. Mechatronics systems software analysis tools, programming and control systems engineering; connectivity, industrial communication protocols and information security;
c. Design, selection, set-up, and calibration of measurement tools, instrumentation and sensors;
d. Troubleshooting of mechatronics system including test and adjust, maintenance or repair;
e. Preparation of laboratory reports and systems integration, drawings associated with development, installation, or maintenance of mechatronics components and systems;
f. Familiarity with and use of industry codes, specifications, and standards;
g. Statistics, quality and continuous improvement techniques, and industrial organization and management; and
h. Capstone or integrating experience that illustrates skills acquired in the program applying both technical and non-technical skills in successfully solving industrial mechatronics problems.

Nuclear Engineering Technology and Similarly Named Programs

Lead Society: American Nuclear Society

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

An accredited program in nuclear engineering technology will prepare graduates with instruction in the 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.

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide associate degree graduates with instruction in the knowledge, techniques, skills, and use and maintenance of modern equipment in nuclear engineering technology. The following topics or activities are required:

a. Nuclear systems and operations, and radiological safety, including:
    1. radiation protection procedures,
    2. current 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. Problem solving using foundation mathematics and the fundamental principles, conservation laws, and rate processes of the physical sciences commonly encountered in segments of the nuclear industry served by the program; and
c. Analyzing and interpreting laboratory analyses measuring nuclear and radiation processes.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must provide baccalaureate degree graduates with instruction in the knowledge, techniques, skills, and use and maintenance of modern equipment in nuclear engineering technology. The following curriculum topics are required:

a. Nuclear systems and operations, and radiological safety, including:
    1. radiation protection procedures;
    2. current 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. Problem solving using foundation mathematics and the fundamental principles, conservation laws, and rate processes of the physical sciences commonly encountered in the segment of the nuclear industry served by the program;
c. Analyzing and interpreting laboratory analyses that measure nuclear and radiation processes;
d. Applying advanced mathematics, including differential/integral calculus, to the solution of problems commonly encountered in the segment of the nuclear industry served by the program; and
e. Design processes for nuclear systems used in the segment of the nuclear industry served by the program.

Surveying/Geomatics Engineering Technology and Similarly Named Programs

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

These program criteria apply to surveying engineering technology, geomatics engineering technology or similarly named programs.

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must prepare associate degree graduates with the knowledge, techniques and skills in the application of surveying/geomatics. Graduates of associate degree surveying/geomatics programs possess a foundation in geodesy, geodetic science, professional land surveying, property law, and mapping and are prepared to use modern equipment and techniques to construct products through the surveying/geomatics workflow. The curriculum must contain the following topics:

a. Mathematical concepts to execute basic surveying/geomatics analysis.
b. Basic historical elements of land ownership legal processes where surveying/geomatics are an integral part.
c. Data science analysis for conformance of precision/accuracy and blunders/error detection.
d. Use of modern measurement equipment in field laboratories to construct or locate features above, below or on the Earth's surface.
e. Basic communications that include oral, graphical and electronic forms.
f. Additional material from a minimum of three subject areas chosen from:
   - boundary surveying
   - property law
   - route surveying
   - construction surveying
   - mapping
   - geodesy
   - drainage and elementary roadway design

Faculty

Faculty members teaching courses that are primarily design or professional practice in content must be qualified to teach the subject matter by virtue of professional licensure or by educational and professional experience.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must prepare baccalaureate degree graduates to become licensed surveyors with the knowledge, techniques and skills in the art and science of

surveying/geomatics. Graduates of a baccalaureate degree in surveying/geomatics engineering technology programs possess a strong foundation in geodesy, geodetic science, photogrammetry and remote sensing, professional land surveying, mapping, geospatial data science, and the ability to select modern equipment and techniques to design, construct or locate products through the surveying/geomatics workflow. The curriculum must contain the following topics:

a. Mathematical concepts to support analyses of advanced surveying/geomatics problems.
b. Historical elements of land ownership, particularly where surveying/geomatics are an integral part.
c. Data science and analysis for conformance of precision/accuracy and blunder/error detection.
d. Data structure/format, storage/management, publication/visualization and the related legal responsibilities to the public.
e. Modern measurement and design technologies necessary to model, construct, or locate features above, below or on the Earth's surface.
f. Additional material from a minimum of four subject areas below, consistent with the program's educational objectives:
    - boundary surveying
    - engineering surveys
    - photogrammetry and remote sensing
    - geodesy
    - cartography including map projections and coordinate systems
    - geospatial data science
    - drainage and roadway design

Faculty

Faculty members teaching courses that are primarily design or professional practice in content must be qualified to teach the subject matter by virtue of professional licensure, or by educational and professional experience.

Telecommunications Engineering Technology and Similarly Named Programs

Lead Society: IEEE

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

I. Program Criteria for Associate Level Programs

Curriculum

The curriculum must provide graduates with instruction in the knowledge, techniques, skills and use of modern tools necessary to enter careers in the application, installation, management, operation, and/or maintenance of telecommunication systems. Graduates of associate degree programs have strengths in the building, testing, operation, and maintenance of telecommunication systems. The curriculum must include instruction in the following topics:

a. application of electric circuits, computer programming, associated software applications, analog and digital electronics, voice and data communications and engineering standards, and the principle of telecommunications systems in the solution of telecommunications problems; and
b. application of natural sciences and mathematics at or above the level of algebra and trigonometry to the building, testing, operation, and maintenance of telecommunication systems.

II. Program Criteria for Baccalaureate Level Programs

Curriculum

The curriculum must enable the program to provide graduates with instruction in the knowledge, techniques, skills and use of modern tools necessary to enter careers in design, application, installation, management, operation, and/or maintenance of telecommunications systems. Graduates of baccalaureate degree programs are well prepared for development and implementation of telecommunications systems. Given the breath of technical expertise involved with telecommunication systems, and the unique objectives of individual programs, some baccalaureate programs may provide instruction with an in-depth but narrow expertise, while other programs may choose to provide instruction in a broad spectrum of the fields. The curriculum must include instruction in the following topics:

a. application of electric circuits, computer programming, associated software applications, analog and digital electronics, voice and data communications and engineering standards, and the principle of telecommunications systems in the solution of telecommunications problems;
b. application of natural sciences and mathematics at or above the level of algebra and trigonometry to the building, testing, operation, and maintenance of telecommunication systems;
c. analysis, design, and implementation of telecommunications systems;

d. application of project management techniques in the design, maintenance and implementation of telecommunication systems;
e. analysis, and implementation of switching technologies, wired and wireless networking technologies, and policy;
f. management, design, and planning of telecommunication and computer networks; and
g. utilization of statistics/probability, transform methods, or applied differential equations in support of telecommunication systems and computer networks.

III. PROPOSED CHANGES TO THE CRITERIA

The following sections presents proposed changes to these criteria as approved by the ABET Engineering Technology Area Delegation on November 3, 2023 for a 180-day review and comment period. Comments will be considered until June 15, 2024. The ABET Engineering Technology Area Delegation will determine, based on the comments received and on the advice of the ETAC, the content of the adopted criteria. The adopted criteria will then become effective following the ABET Engineering Technology Area Delegation meeting in the fall of 2024 and would first be applied by the ETAC for accreditation reviews during the 2025-26 accreditation review cycle.

Proposed Changes to ETAC Definitions and General Criteria - Natural Science

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.

Natural Science

Increases the knowledge base of a field of research and science collectively that are involved in the study of the physical world and its phenomena. Natural science consists of but is not limited to biology, physics, chemistry, geology and other natural sciences including life, earth and space sciences.

General Criteria for Accrediting Engineering Technology Programs

Criterion 5. Curriculum

[…]

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

Proposed Changes to ETAC Definitions and General Criteria - Diversity, Equity & Inclusion

General Criteria for Accrediting Engineering Technology Programs

Criterion 5. Curriculum

[…]

Other Content: The curriculum must include topics related to professional and ethical responsibilities~~,~~; diversity, equity, and inclusion awareness for professional practice consistent with the institution's mission~~,~~; quality~~,~~; and continuous improvement.

Proposed Changes to ETAC Definitions – Respectful Environment

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.

Respectful Environment

A respectful environment is inclusive and supports, values, and treats all members fairly and with dignity.

Proposed Changes to ETAC General Criteria - Criterion 8

General Criteria for Accrediting Engineering Technology Programs

Criterion 8. Institutional Support

Institutional support, resources, and leadership must be ~~adequate~~ sufficient to: a) 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~~ b) attract, retain, and provide for the continued professional development of a qualified faculty.~~;~~ ~~The resources available to the program must be sufficient to~~ c) acquire, maintain, and operate infrastructures, facilities and equipment appropriate for the program~~,~~; and ~~to provide an~~ d) create and foster a respectful environment ~~in which~~ among the program's students, faculty, staff, and administrators such that the student outcomes can be attained. Resources include institutional services and policies, financial support, and administrative and technical staff.