PROGRAM-SPECIFIC CRITERIA

1.0 PURPOSE OF THIS DOCUMENT

The purpose of this document is to describe the program-specific criteria for evaluating engineering programs by the Board of Accreditation for Engineering and Technical Education (BAETE) of the Institution of Engineers, Bangladesh (IEB).

2.0 SCOPE OF THIS DOCUMENT

The program-specific criteria presented here apply to specific engineering programs offered by the Higher Educational Institutions (HEI) in Bangladesh.

3.0 ROLES AND RESPONSIBILITIES

3.1 Engineering Programs Applying for BAETE Accreditation

- Perform a self-assessment of the program curriculum to show how its curriculum meets the BAETE program-specific criteria.

4.0 BAETE

- Conduct an evaluation of the program curriculum based on the requirements mentioned in this document.

5.0 DEFINITIONS AND ACRONYMS

See ACC-MAN-06 for *definitions and acronyms*.

6.0 PROGRAM-SPECIFIC CRITERIA

6.1 Criteria for Aerospace Engineering or Similar Program

Aeronautical engineering programs must prepare graduates with knowledge of aerodynamics, aerospace materials, structures, propulsion, flight mechanics, and stability and control. Astronautical engineering programs must prepare graduates with knowledge of orbital mechanics, space environment, attitude determination and control, telecommunications, space structures, and rocket propulsion. Aerospace engineering programs or other engineering programs combining aeronautical engineering and astronautical engineering must prepare graduates with knowledge covering one of the areas (i.e., aeronautical engineering or astronautical engineering) described above and knowledge of some topics from the other area. Programs must also prepare graduates to have design competence that includes the integration of aeronautical or astronautical topics.

6.2 Criteria for Biomedical Engineering or Similar Program

The structure of the curriculum must provide both breadth and depth across the range of engineering and science topics consistent with the program's educational objectives and student outcomes. The curriculum must prepare graduates with experience in the following: (a) Applying the principles of engineering, biology,

CC BY

human physiology, chemistry, calculus-based physics, mathematics (through differential equations) and statistics, (b) Solving bio/biomedical engineering problems, including those associated with the interaction between living and non-living systems, (c) Analyzing, modeling, designing, and realizing bio/biomedical engineering devices, systems, components, or processes, (d) Measuring and interpreting data from living systems.

6.3 Criteria for Chemical Engineering or Similar Program

The curriculum shall provide a thorough grounding in the basic sciences that include chemistry, physics and mathematics as appropriate to the objectives of the program. Due emphasis shall also be given to social sciences and communications. The curriculum must include topics such as engineering thermodynamics, fluid mechanics, heat and mass transfer, process control and design. The Process Design Project shall be a requirement for completion of the degree.

6.4 Criteria for Civil Engineering, Civil and Environmental Engineering or Similar Program

The curriculum must prepare graduates to apply knowledge of mathematics through differential equations, calculus-based physics, chemistry, and at least one additional area of basic science; apply probability and statistics to address uncertainty; analyze and solve problems in at least four technical areas appropriate to civil engineering; conduct experiments in at least two technical areas of civil engineering and analyze and interpret the resulting data; design a system, component, or process in at least two civil engineering contexts; include principles of sustainability in design; explain basic concepts in project management, business, public policy, and leadership; analyze issues in professional ethics; and explain the importance of professional licensure.

6.5 Criteria for Computer Science and Engineering or Similar Program

The structure of the curriculum must provide both breadth and depth across the range of engineering and science topics consistent with the program's educational objectives and student outcomes. The curriculum must include the following: probability and statistics, differential and integral calculus, discrete mathematics, basic sciences, computer science, and engineering sciences for the analysis and design of complex electrical and electronic devices, software, and systems containing hardware and software components; concepts of programming languages, data structures, algorithms and complexity, software design, digital logic, computer organization and architecture, operating systems and networking systems must be addressed; the integration of theory, practice, and tools for the specification, design, implementation, testing and maintenance of software systems; exposure to a variety of programming languages and systems, including proficiency in at least one higher-level language; and advanced coursework that builds on the fundamental coursework to provide depth.

6.6 Criteria for Electrical Engineering, Electrical and Electronic Engineering, Electronic and Telecommunication Engineering or Similar Program

The structure of the curriculum must provide both breadth and depth across the range of engineering topics implied by the title of the program. The curriculum must include probability and statistics, including applications appropriate to the program's name; mathematics through differential and integral calculus; sciences (defined

CC BY

as biological, chemical, or physical science); and engineering topics (including computing science) necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components. The curriculum for programs containing the modifier "electrical," "electronic(s)," "communication(s)," or "telecommunication(s)" in the title must include advanced mathematics such as differential equations, linear algebra and complex variables. The curriculum for programs containing the modifier "communication(s)" or "telecommunication(s)" in the title must include topics in communication theory and systems. The curriculum for programs containing the modifier "telecommunication(s)" must include the design and operation of telecommunication networks for services such as voice, data, image, and video transport.

6.7 Criteria for Environmental Engineering or Similar Program

The curriculum must prepare graduates to apply knowledge of mathematics through differential equations, probability and statistics, calculus-based physics, chemistry (including stoichiometry, equilibrium, and kinetics), an earth science, a biological science, and fluid mechanics. The curriculum must prepare graduates to formulate material and energy balances and analyze the fate and transport of substances in and between air, water, and soil phases; conduct lab experiments and analyze and interpret the resulting data in more than one major environmental engineering focus area (e.g., air, water, land, environmental health); design environmental engineering systems that include considerations of risk, uncertainty, sustainability, life-cycle principles, and environmental impacts; and apply advanced principles and practices relevant to the program objectives. The curriculum must prepare graduates to understand concepts of professional practice, project management, and the roles and responsibilities of public institutions and private organizations pertaining to environmental policy and regulations.

6.8 Criteria for Industrial and Production Engineering or Similar Program

The curriculum must prepare graduates to design, develop, implement, and improve integrated systems that include people, materials, information, equipment and energy. The curriculum must include in-depth instruction that promotes the integration of systems using appropriate analytical, computational, and experimental practices.

The program must prepare graduates to have proficiency in (a) materials and manufacturing processes: the ability to design manufacturing processes that result in products that meet specific material and other requirements; (b) process, assembly and product engineering: the ability to design products and the equipment, tooling, and environment necessary for their manufacture; (c) manufacturing competitiveness: the ability to create competitive advantage through manufacturing planning, strategy, quality, and control; (d) manufacturing systems design: the ability to analyze, synthesize, and control manufacturing operations using statistical methods; and (e) manufacturing lab or facility experience: the ability to measure manufacturing process variables and develop technical inferences about the process.

6.9 Criteria for Metallurgical and Materials Engineering or Similar Program

The curriculum must prepare graduates to apply advanced science (such as chemistry, biology and physics), computational techniques and engineering principles to the materials systems implied by the program modifier (e.g., ceramics, metals, polymers, biomaterials, composite materials); to integrate the understanding of the

CC BY

scientific and engineering principles underlying the four major elements of the field: structure, properties, processing, and performance related to the appropriate material systems; to apply and integrate knowledge from each of the above four elements of the field using experimental, computational and statistical methods to solve materials problems, including selection and design, consistent with the program's educational objectives.

6.10 Criteria for Mechanical Engineering or Similar Program

The curriculum must require students to apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations) and to model, analyze, design, and realize physical systems, components or processes; additionally, it must prepare students to work professionally in either thermal or mechanical systems while requiring coursework in both areas.

6.11 Criteria for Naval Architecture and Marine Engineering or Similar Program

The program must prepare graduates to apply probability and statistical methods to naval architecture and marine engineering problems; to have basic knowledge of fluid mechanics, dynamics, structural mechanics, materials properties, hydrostatics, and energy/propulsion systems in the context of marine vehicles; and to have familiarity with instrumentation appropriate to naval architecture and/or marine engineering.

6.12 Criteria for Programs Not Listed Above

Criteria for programs that are not listed in between sections 6.1 through 6.11 may be found in the documents listed in ACC-LST-00-01. If the program-specific criteria are not available here or in documents listed in ACC-LST-00-01, the program will be evaluated based on the program-specific criteria closest to the program under consideration.

7.0 THE BAETE ACCREDITATION MANUAL, STANDARD OPERATING PROCEDURES, TEMPLATES, FLOWCHARTS, SCHEDULE, AND WORK INSTRUCTIONS

See ACC-MAN-00 for details.

8.0 REVISION HISTORY

Date	Version	Description of Change
23 March 2017	1.0	Initial Release
05 March 2019	2.0	No change
16 May 2022	2.1	No change
23 April 2024	3.0	Released as a standalone document; purpose, scope, definition and acronym, and roles and responsibilities added; reference for programs not listed is provided in Section 6.12.

CC BY