ACCREDITATION CRITERIA

1.0 PURPOSE OF THIS DOCUMENT

The purpose of this document is to describe the ten accreditation criteria that are the basis for evaluating a program 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 accreditation criteria presented here apply to the Higher Educational Institutions (HEI) which offer undergraduate engineering programs in Bangladesh.

3.0 ROLES AND RESPONSIBILITIES

3.1 Engineering programs applying for BAETE Accreditation

- Prepare a Self-assessment report (SAR) based on the ten accreditation criteria. The Self-assessment report template for the programs must be prepared as per ACC-TMP-04-04 (V2.1 – effective till 30 June 2026; V3.0 – effective from 1 July 2025; programs may apply using template V2.1 or V3.0 between 1 July 2025 and 30 June 2026).

3.2 BAETE

- Conducts the program evaluation based on the accreditation criteria presented in this document.

4.0 DEFINITIONS AND ACRONYMS

See ACC-MAN-06 for definitions and acronyms.

5.0 ACCREDITATION CRITERIA

This section presents the ten accreditation criteria which are the basis for evaluating a program for accreditation. The following sub-sections sequentially outline the required and desired attributes of each criterion in terms of sub-criteria. Required attributes are indicated through the word must, while the desired attributes are indicated through the word should. This section does not provide any quantitative bench-mark requirement to satisfy a criterion or sub-criterion adequately or appropriately. Adequacy or appropriateness is to be decided qualitatively in consideration of what is necessary for the students to attain the outcomes. It should be noted that no sub-criterion is assigned any weight. Each criterion is to be holistically evaluated in terms of the qualitative bench-mark requirements. The evaluation teams shall prepare the reports as per ACC-TMP-04-05.

5.1 Organization and Governance

Requirements and desirable attributes under this criterion are described in terms of the following sub-criteria.

i. Major positions of the institution must be filled. These positions include Vice Chancellor, Pro-Vice Chancellor, Treasurer, Dean, and Chairperson.
ii. The statutory bodies/committees of the institution must be formed in accordance with the applicable rules and guidelines. These bodies/committees include the Board of Trustees, Syndicate, Academic Council, Admission Committee, Finance Committee, Curriculum Committee, and the Faculty Selection Committee.

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iii. The position appointees and committee members must function effectively as per the roles defined in the relevant act/statute.
iv. The institution must have published policies, including a mechanism for addressing grievances, regarding academic and administrative matters involving students, faculty members and non-teaching employees.
v. The academic and administrative policies must be put into practice.

5.2 Financial and Physical Resources

Requirements and desirable attributes under this criterion are described in terms of the following sub-criteria.

i. The financial resources of the institution must be adequate to fulfill its mission and vision. The financial resources committed to the program must also be adequate for the appropriate functioning of the program, including recruiting and retaining qualified faculty members, and procuring the necessary lab equipment and equipment and tools to support teaching and learning.
ii. The institution must have a process for budget planning and allocate resources to the priority areas as required.
iii. The campus infrastructure, such as the extent of the land and built-up area, extra- and co-curricular facilities, and support facilities, including maintenance support for infrastructure and facilities, must be adequate for the total number of students and employees at the institution.
iv. The possibility of any risk from manmade or natural hazards should be properly assessed and addressed in the Safety Plan, which must address safety issues as the situation demands. Adequate measures must be in place to make the campus safe for students, employees and visitors.
v. Fire detection and firefighting facilities must be adequate.
vi. All labs must have their own plans to prevent and manage incidents and accidents.

5.3 Faculty

Requirements and desirable attributes under this criterion are described in terms of the following sub-criteria.

i. The department must have a sufficient number of full-time faculty members to ensure that the faculty are not overloaded with courses and that the program does not become overly dependent on part-time faculty members.
ii. The proportion of senior faculty members and junior faculty members should be appropriate.
iii. Adequate interaction between students and faculty members both within and outside classes is essential. The teacher-student ratio, class size and teaching load must not compromise opportunities for interaction.
iv. The faculty members must have adequate academic qualifications with specializations in areas closely related to the program(s) offered by the department.
v. Faculty members should be motivated to improve their pedagogy and assist the students in achieving outcomes. They should be committed to the continuous quality improvement activities of the department.
vi. Faculty members must have the responsibility and authority to design and update the curriculum, establish course and program outcomes, and select and use appropriate assessment tools for evaluating student performance in classes and the achievement of outcomes.

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vii. Faculty members must be engaged in research, development and professional activities such as consulting. They should also be involved in relevant professional societies. The results of these activities should benefit the students.

viii. The institution or department must periodically arrange training for the faculty members on outcome-based education and assessment. All the faculty members must be adequately trained on how to establish course outcomes, conduct teaching-learning activities that are appropriate for the outcomes and assess the level of outcome achievement.

5.4 Students

Requirements and desirable attributes under this criterion are described in terms of the following sub-criteria.

i. There must be a published policy for the admission and transfer of students into the program. The admission or transfer requirements should be appropriate for the selection of students with the potential to achieve the program's outcomes.

ii. The policy must be implemented in practice. Transfer students must also show the attainment of program outcomes from courses in the institution.

iii. Students' academic performance must be continuously monitored in terms of the achievement of outcomes, and feedback should be provided to the students. There should be provisions for remedial or corrective measures when necessary.

iv. Every student must be assigned an advisor. The advisor should counsel, guide and mentor the student on all academic and professional matters.

v. Students must have opportunities to participate in extra- and co-curricular activities and the activities of relevant professional societies. The institution should ensure the participation of a significant number of students.

5.5 Academic Facilities and Technical Support

Requirements and desirable attributes under this criterion are described in terms of the following sub-criteria.

i. The institution must have a well-stocked library. The books, e-books, journals and other resources available in the library should be adequate for the program and the faculty members.

ii. The number of classrooms available must be adequate to properly run the program. The classroom facilities and the environment should be conducive to learning.

iii. The number of laboratories and equipment must be adequate for conducting the program's various laboratory courses.

iv. Every student must have the opportunity for hands-on activity in the laboratories.

v. Students and faculty members must have access to adequate computing and Internet facilities, including hardware, software tools and support.

5.6 Curriculum and Teaching-Learning Processes

Requirements and desirable attributes under this criterion are described in terms of the following sub-criteria.

i. The curriculum must satisfy the relevant program-specific criteria.

ii. The breadth and depth of the curriculum must be appropriate for solving complex engineering problems in the relevant discipline.

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iii. The curriculum must contain an adequate number of courses on mathematics, physical science, humanities and non-engineering subjects.
iv. The teaching-learning processes and activities selected for each course must be effective and appropriate for achieving the relevant outcomes including solution of complex engineering problems and activities, if applicable.
v. Adequate hands-on activities must be an integral part of teaching and learning. Learning should be enhanced through student participation.
vi. The program must demonstrate the culmination of program outcomes (POs) at the level of solving complex engineering problems, preferably through a final-year design project or capstone project extending over a period of one year.

5.7 Program Educational Objectives

Program Educational Objectives (PEOs) are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve. PEOs are assessable based on the attributes and accomplishments of graduates, preferably those who have worked for 3 to 5 years after graduation. Requirements and desirable attributes under this criterion are described in terms of the following sub-criteria.

i. Published PEOs must be clear, concise, assessable and realistic within the context of the available resources.
ii. PEOs must be consistent with the vision and mission of the institution or the department offering the program.
iii. Curriculum and teaching-learning processes must support the attainment of PEOs. Justifications must be provided for how these contribute to the attainment of the PEOs.
iv. A process must be developed to assess the level of attainment of each PEO to evaluate the academic program's effectiveness. Adequate evidence and documentation on the assessment of PEO attainment must be provided. The assessment tools should be indicated, and the way in which these tools are used should be explained.
v. PEO assessment must lead to the periodic review of PEOs.

5.8 Program Outcomes and Assessment

Program Outcomes (POs) or graduate attributes are narrower statements that describe what students are expected to know and be able to do by the time of graduation. These statements relate to the knowledge, skills and attitudes acquired by students while progressing through the program. The program must demonstrate that by the time of graduation, students have achieved an acceptable minimum level of certain knowledge, skills and behavioral traits. The BAETE specifically requires that students acquire the following graduate attributes:

a) Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in K1 to K4 respectively to the solution of complex engineering problems.
b) Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (K1 to K4)

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c) Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (K5)
d) Conduct investigations of complex problems using research-based knowledge (K8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
e) Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations. (K6)
f) Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (K7)
g) Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (K7)
h) Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (K7)
i) Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
j) Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
k) Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
l) Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

In addition to incorporating the above-listed POs (graduate attributes), the educational institution may include additional outcomes in its learning programs. An engineering program that aims to attain the abovementioned POs must ensure that its curriculum encompasses all the attributes of the Knowledge Profile (K1 – K8) as presented in Table 5.8.1 and as included in the PO statements. The ranges of Complex Problem Solving (P1 – P7) and Complex Engineering Activities (A1 – A5) are given in Tables 5.8.2 and 5.8.3, respectively.

Table 5.8.1: Knowledge Profile

	Attribute
K1	A systematic, theory-based understanding of the natural sciences applicable to the discipline
K2	Conceptually based mathematics, numerical analysis, statistics and the formal aspects of computer and information science to support analysis and modeling applicable to the discipline
K3	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline
K4	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline
K5	Knowledge that supports engineering design in a practice area

K6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline
K7	Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the engineer's professional responsibility to public safety; the impacts of engineering activity; economic, social, cultural, environmental and sustainability
K8	Engagement with selected knowledge in the research literature of the discipline

Table 5.8.2: Range of Complex Engineering Problem Solving

Attribute	**Complex Engineering Problems** have characteristic P1 and some or all of P2 to P7:
Depth of knowledge required	P1: Cannot be resolved without in-depth engineering knowledge at the level of one or more of K3, K4, K5, K6 or K8 which allows a fundamentals-based, first principles analytical approach
Range of conflicting requirements	P2: Involve wide-ranging or conflicting technical, engineering and other issues
Depth of analysis required	P3: Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models
Familiarity of issues	P4: Involve infrequently encountered issues
Extent of applicable codes	P5: Are outside problems encompassed by standards and codes of practice for professional engineering
Extent of stakeholder involvement and conflicting requirements	P6: Involve diverse groups of stakeholders with widely varying needs
Interdependence	P7: Are high-level problems including many component parts or sub-problems

Table 5.8.3: Range of Complex Engineering Activities

Attribute	**Complex activities** means (engineering) activities or projects that have some or all of the following characteristics:
Range of resources	A1: Involve the use of diverse resources (and for this purpose resources include people, money, equipment, materials, information and technologies)
Level of interaction	A2: Require resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering or other issues
Innovation	A3: Involve creative use of engineering principles and research-based knowledge in novel ways
Consequences for society and the environment	A4: Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation
Familiarity	A5: Can extend beyond previous experiences by applying principles-based approaches

Requirements and desirable attributes under this criterion are described in terms of the following sub-criteria.

i. POs specified by the program must be significantly equivalent to the twelve graduate attributes or POs of BAETE.
ii. POs must contribute to each PEO.
iii. The process involved in defining and refining the POs must be described. The correlation between the course outcomes (COs) and POs must be demonstrated through the mapping of COs onto POs.
iv. The way in which each attribute of the Knowledge Profile (K1 – K8) is addressed in the curriculum must be demonstrated through mapping. The program must also demonstrate how the attributes of the Range of Complex Engineering Problems (P1 – P7) and Complex Engineering Activities (A1 – A5) are incorporated in the teaching, learning and assessment.
v. A course file must be maintained for each course. The course file should include the assessment of outcomes, curriculum, examination questions and answer scripts, other assessment tools and samples of corresponding student works, and a summary of performance and attainment of course outcomes with suggestions or feedback for future development.
vi. POs must be assessed using direct methods. Direct methods of assessment are accomplished through the direct examination or observation of students' knowledge or skills against measurable performance indicators or rubrics. In addition, indirect methods may also be used for PO assessment. Indirect methods of assessment are based on opinions or self-reports from different stakeholders. The way in which various assessment tools, including examinations and rubrics, contribute to the evaluation of attainment of each PO must be described. The results of the evaluation of PO attainment must be shown.
vii. It must be demonstrated through evidence from appropriate evaluation that the students attain all the POs by the time of the graduation.

5.9 Continuous Quality Improvement

The program must have a continuous quality improvement mechanism. Requirements and desirable attributes under this criterion are described in terms of the following sub-criteria.

i. The program must demonstrate an established system for periodically compiling the level of attainment of PEOs, including a mechanism for tracking and obtaining feedback from graduates and their employers.
ii. The findings of the CQI exercises for PEOs must be evaluated, and the identified shortcomings and limitations must be used to refine and improve the program.
iii. POs must be assessed on a regular cycle. The program must prepare CQI file for each of the 12 POs to review considering feedback from relevant stakeholders including graduates.
iv. Each course must have clear quality requirements and facilitate the achievement of COs through teaching-learning and assessment methods.
v. The concerned course instructor must prepare course review reports including CQI files for the courses he/she is teaching.
vi. The program must evaluate the curriculum and teaching quality on a regular basis while considering feedback from faculty members and students. The program must demonstrate that the results of this periodic evaluation are used for continuous improvement.

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5.10 Interactions with the Industry

A communication channel between the educational institution and the industry should be in place. The industry should be encouraged to provide feedback concerning the quality of the teaching-learning process. Requirements and desirable attributes under this criterion are described in terms of the following sub-criteria.

i. The industry must participate in the development of the curriculum to ensure that it is relevant, regularly updated, and meets the needs of the industry, particularly in areas experiencing rapid changes.
ii. The program should have an Industry Advisory Panel (IAP) and an Alumni Association (AA) for this purpose. The IAP or AA may meet at certain intervals with the department to provide feedback.
iii. The program must provide students with the opportunity to obtain industrial experience through internships, industry visits or design projects conducted by practicing engineers and faculty members with industrial experience.

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

See ACC-MAN-00 for details.

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7.0 REVISION HISTORY

Date	Version	Description of Change
23 March 2017	1.0	Initial Release
05 March 2019	2.0	Year-long Final Year Design Project or Capstone Project is no longer obligatory in the curriculum. Demonstration of culminated POs in solving complex engineering problems remains required, and the year-long Final Year Design Project or Capstone Project is the preferred method. The descriptions of POs have been updated following IEA Version 3.21, June 2013. Requirements of the Knowledge Profiles (K1-K8) have been explicitly mentioned in the description of each PO. The tables describing the Range of Complex Engineering Problem-Solving and Range of Complex Engineering Activities have been updated following IEA Version 3.21, June 2013. The program should map out how each attribute of the Knowledge Profile (K1 – K8) is addressed in the curriculum. The program should also demonstrate how each attribute of the Range of Complex Engineering Problems (P1 – P7) and Complex Engineering Activities (A1 – A5) is incorporated in teaching, learning and assessment. Results of evaluation of PO attainment should be reported.
16 May 2022	2.1	The required and desired attributes of each of the ten criteria, in terms of sub-criteria, has been listed. The required attributes are indicated through the word must, while the desired attributes are indicated through the word should. Section 4.8: Titles for the POs have been removed. Reference to Annex III Evaluation Team Report (ETR) template has been added in the first paragraph of chapter 4.
23 April 2024	2.2	Released as a standalone document; purpose and scope of the document added; roles and responsibilities added; definitions and acronyms added; no changes in the criteria/sub-criteria level.

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