

BOARD OF ACCREDITATION FOR ENGINEERING AND TECHNICAL EDUCATION

### BAETE New Program Accreditation Manual and Self-Assessment Report (SAR) – An Overview for Program Evaluators

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# Session Outcomes (SOs) !!

Upon successful completion of the session, the attendees will be able to

- SO1: Explain the policy and procedure for evaluating BAETE program accreditation
- SO2: Identify the requirements of general and program-specific criteria
- SO3: Verify the contents of different criteria presented in the SAR as per BAETE requirements

### Pretext

- Outcome based Education- A Paradigm Shift
  - Outcome based Accreditation Objectives

### **Outcome Based Education (OBE)**

- OBE is an educational process that focused at achieving certain specified outcomes in terms of individual student learning.
- Outcomes (Attributes) key things students should understand and be able to do
  or the qualities they should develop.
- Both program structures and curricula are designed to achieve those capabilities or qualities (*constructive alignment*).
- Program structures & curriculum are regarded as means not ends. If they do not do the job they need to be changed (*Continuous Quality Improvement - CQI*)

### **A Paradigm Shift in Focus**



### **Shifting Focus – Input-based to Outcome-based**



OBE

### **Anticipation of OBE Benefits**

- Curriculum more "directed" and "coherent"
- Graduates more "well rounded" and "relevant" to industry and other stakeholders
- Continuous Quality Improvement (CQI) is an inevitable consequence





### **Components of OBE**



### **OBE Hierarchy**



### **Continuous Quality Improvement**



### **Objectives of Accreditation**

 Accreditation is a process by which educational programs or institutions are reviewed to determine if they meet certain standards of quality

• Objectives:

- To ensure that graduates acquire a required set of attributes (outcomes) of national and international standards
- To assist all stakeholders (*Student, Alumni, Parent, Faculty, Industry*) in identifying specific engineering programs that meet national and international standards
- To provide a mechanism for the **continual quality improvement (CQI)** of existing engineering programs through evaluation and feedback
- BAETE under the new manual in line with Washington Accord adopted Outcome-based Accreditation that requires strong emphasizes on Program Outcomes/Graduate Attributes

### Outline

Core knowledge and competencies required of program evaluators include the following:

- ✓ Accreditation policy
- ✓ Accreditation procedure

✓ Requirements of general accreditation and program-specific criteria

- Evaluation and judgment of compliance with benchmark standards of accreditation criteria
- Outcome-based assessment
- DOs and DON'Ts during on-site accreditation visit.

Covered in this Session

# **Accreditation Policy**

- Eligibility for Accreditation
- Evaluation
- Accreditation Decisions
- Deferment of Accreditation
- Confidentiality
- Conflicts of Interest

# **Eligibility/Consideration for Accreditation**

- ✓ Both Institution and Program are approved by appropriate authority
- ✓ Program duration four (4) years
- ✓ Admission after 12 years of schooling
- ✓ Graduation at least one cohort has graduated
- ✓ Program must follows outcome-based education (OBE)
- ✓ Credit requirement Minimum130 credit hours

1 credit of lecture  $\geq$  750 minutes of formal contact , 1 credit of lab  $\geq$  1500 minutes of formal contact

- The VC, Pro-VC and Treasurer are appointed according to the relevant act/statute
- The statutory bodies (e.g., Syndicate, Academic Council, Finance Committee, Disciplinary Committee, etc.) exist and are functional
- The department have adequate number of full-time faculty members, including senior faculty members, with relevant academic specialization
- The institution have adequate laboratory facilities for the program

# **Evaluation**

- Evaluation shall be conducted in accordance with the BAETE Criteria (General and Program-specific)
- Evaluation process includes
  - Examination of the information provided in the Self-Assessment Report (SAR)
  - Findings of the Evaluation Team from an on-site visit.
- Evaluation should be based on a quality holistic judgment on accreditation criteria in terms of compliance, concern, weakness and deficiency
- Evaluation will be evidence based
- Evaluation recommendations must be supported with reasons

# **Important Terminologies**

#### Compliance

- Adequately satisfied the benchmark requirements.
- No corrective measure is required

#### Concern

- Broadly in compliance but requires improvement
- Currently in compliance but there is chance for the situation to change, resulting in noncompliance in future.

#### Weakness

- Lacks strength of compliance, leading to compromise the quality of the program.
- Corrective measures are required

#### Deficiency

- Either does not exist or is in the elementary stage. Compliance is required.

## **Accreditation Decision**

- No marking system
- No grades, like 'A', 'B' or 'C'
- Either 'Accredited' or 'Not Accredited'
- If Accredited then maximum length is 6 years

Deficiency	Weakness	Decision
None	None	Maximum 6 years
None	Weakness found in not more than three criteria	Shorter than 6 years
Any deficiency identified in any criterion	-	Not Accredited

### **Deferment of Accreditation**

- In case of deficiency that can be corrected within a short period of time, the Evaluation Team may recommend a deferment decision
- The deferment is valid for a specified time not exceeding twelve months.
- The Evaluation Team will report the deferment decision to the Board through the Sectoral Committee

## Confidentiality

- All information including the SAR and all on-site observations and findings are confidential.
- This information may not be revealed to any unauthorized persons under any circumstances without written permission from the concerned educational institution.
- Similarly, the institution may not reveal any part of the Evaluation Team's report without explicit written permission from the BAETE.

### **Conflicts of Interest**

- Evaluation Team member should not create situations that may result in conflicts of interest or questions regarding the objectivity and credibility of the accreditation process.
- Team members are required to behave in a professional and ethical manner
- Each individual is <u>required to disclose</u> real or perceived <u>conflicts of interest</u>.
- Examples of conflicts of interest include, but are not limited to,
  - Being a current or former faculty member or staff of the concerned institution
  - Serving as a member in any of the committees of the concerned institution,
  - Being involved currently or in the past in any for-profit activity with the concerned institution
  - Having a dependent who is a student at the concerned institution

### **Accreditation Procedure**

- Steps in Accreditation Process
- Pre-visit Activities
- Onsite Visit
- Post-visit Activities

### **Steps of Accreditation Process**



### **Pre-visit Activities**



### **Some Required Documents to Review at Pre-visit**

- i. Latest copy of the prospectus of all programs and a copy of the latest academic calendar of the institution.
- ii. Copy of the letter of approval for the establishment of the institution from the authority.
- iii. Copy of the letter of approval for the establishment of the program.
- iv. Copy of statutes/academic ordinances.
- v. List of members of the statutory committees in accordance with the acts/statutes.

### **Accreditation Visit**

#### On-site visit allows the Evaluation Team

- To assess factors that may not be adequately described in the SAR
- To obtain further clarifications from the educational institution

### Some common factors to be assessed during the on-site visit

- a. Objectives and outcomes of the education provided;
- b. Quality assurance processes, including internal reviews;
- c. Assessment of student learning outcomes;
- d. Activities and work of the students;
- e. Entry standards and selection for admission of students;
- f. Motivation and enthusiasm of faculty members;
- g. Qualifications and activities of faculty members;
- h. Facilities;
- i. Industry participation

### Accreditation Visit – *Meeting with Constituencies*

#### The Evaluation Team should have meetings with:

i. The Head of the institution, the Dean and Head of the Department, and relevant program and course coordinators;

ii. A member of the senior administration/management, *preferably the Head of the Institution*, to discuss how the program fits into the overall strategic direction and focus of the university and management support for continued resourcing and development of the program;

iii. Faculty members;

iv. Supporting staff and heads of the support/service departments;

v. Employer representatives

vi. Alumni

vii. Students

### **Accreditation Visit – Examination of Documents**

#### The Evaluation Team should examine the documents:

- i. Curriculum vitae of all faculty members;
- ii. Evidence that the results of the assessment of course and program outcomes are being applied to the review and ongoing improvement of the program;
- iii. List of publications by all faculty members of the program;
- iv. Sample teaching materials, examination papers, quizzes and class tests for all subjects;
- v. Sample examination scripts, including at least one excellent, one good and one marginal
- vi. Sample Transcripts of immediate past graduates, which should also include those who were given advanced standing or who were in the part-time program, if applicable;
- vii. Sample student project and design reports (excellent, good and marginal pass);
- viii. Sample student feedback form;
- ix. Results of quality assurance reviews and other internal or external reviews of the program, department and faculty;
- x. Records of meetings of committees relevant to the program; meetings with stakeholders;
- xi. Records of employment of graduates;
- xii. Any other documents that the Evaluation Team may request.

### Accreditation Visit – Physical Resource Verification

### The Evaluation Team should visits to:

- i. Faculty office rooms;
- ii. Classrooms;
- iii. Laboratories, especially those for the teaching of undergraduates;
- iv. The library;
- v. IT facilities;
- vi. Career/placement center, co- and extra-curricular facilities, medical facilities;
- vii. Canteen
- viii. Washrooms/toilet facilities.

### Accreditation Visit – Exit Meeting

- At the end of the on-site visit, the Evaluation Team will hold an exit meeting to present its preliminary findings
- Exit Meeting should address to the key personnel including the Head of the institution and the Head of Department/Chair of School in which the program is being evaluated.

### **Post-visit Activities**

- The Evaluation Team will submit its evaluation report to the Registrar of BAETE within three (3) weeks of the visit.
- The Evaluation Team may consider additional submissions requested from the institution during the on-site visit while finalizing its report with findings and recommendations,
- The Evaluation Team will make a holistic quality judgment on each criterion against the benchmark requirements in terms of compliance, concern, weakness and deficiency
- The findings and recommendations of the Evaluation Team must be supported with reasons.
- The Evaluation Team should not prescribe details of corrective measures.
- Only broad-level recommendations and suggestions are required.
- The evaluation report may briefly highlight the strengths of the program and the institution

# **Accreditation Criteria**

### A. General Criteria

- 1. Organization and Governance
- 2. Financial and Physical Resources
- з. Faculty
- 4. Students
- 5. Academic Facilities and Technical Support
- 6. Curriculum and Teaching-Learning Processes
- 7. Program Educational Objectives (PEO)
- 8. Program Outcomes and Assessment
- 9. Continuous Quality Improvement (CQI)

10. Interactions with the Industry

### в. Program-Specific Criteria

### **Criteria 1: Organization and Governance**

- Compliance with relevant acts and statutes
  - Process for appointing Vice Chancellor, Pro-Vice Chancellor and Treasurer
- Statutory bodies of the institution
  - Formation of the bodies
    - Syndicate, Academic Council
    - Finance Committee, Faculty Selection Committee
    - Admission Committee, Curriculum Committee
  - Function of the bodies Meeting minutes, dates etc.

#### Existence of and adherence to policies

- Service rules, Academic rules, Code of conduct, Disciplinary codes
- Recruitment and promotion policies, Salary structure, Leave rules
- Scholarship and financial aid policies
- Grievance redress system: Existence of a grievance redress mechanism
- Alumni association: existence, formation, membership and operating process
- **Convocation:** dates of convocations and number of students received a degree

### **Criteria 2: Financial and Physical Resources**

#### Finance and budget

- Assets calculation and revenue
- $_{\circ}~$  Adequacy of budget
- Appropriateness of budgetary allocation
- Scholarships and financial aid for students
  - Total amount of scholarships and financial aid
- Accommodations for male and female students
- Safety measures: infrastructure, practices, training and compliance
  - Firefighting policy, facility and rehearsal;
  - Emergency evacuation and assembly plan and rehearsal;
  - Campus safety and security measures in place
- Sports and recreational facilities : Outdoor games and sports facilities
- Placement center:

Activities and functions of the placement center, name and designation and qualifications of each staff member

### **Criteria 3: Faculty**

### Faculty Attributes:

- Number of full-time faculty members
- Part-time faculty members
- Academic qualifications with specialization in areas related to the program
- Proportion of senior and junior faculty members
- Opportunity to have adequate interactions between students and faculty both within and outside the classes
- Class size: minimum/maximum/average class size of all courses/sections in last three years

#### Student-teacher ratio:

- $_{\circ}$  For each semester during last three years
- No specific method has been proposed

### Criteria 3: Faculty (contd.)

- Role of faculty members in directing the course and the improvements of the program
  - $_{\odot}\,$  Faculty involvements in course outcomes
  - Selecting appropriate pedagogical and assessment tools
  - Updating course content
  - o Making decisions regarding quality improvements to the program.
- Check the copies of the minutes of relevant faculty meetings
- Training event of faculty members on outcome-based education in
  - Establishing appropriate course outcomes
  - Conducting effective teaching-learning activities
  - Conducting suitable assessments
  - Measuring outcome achievement
- Involvement of faculty members in research, development and professional activities

### **Criteria 4: Students**

#### Admission Policy

- Existence of well-formulated Policy
- $_{\circ}\,$  Adherence of the Policy
- Admission criteria

#### Transfer students Policy

- $_{\odot}\,$  Policy for accepting transfer students into the program
- Number of student transferred and number of credit transfer (last three years)

#### Continuous monitoring of student performance

- Process for continuously monitoring of students' academic performance
- Process of providing continuous feedback to students regarding their academic performance and outcome achievement.
- $_{\odot}$  Corrective measures to help students who fall behind

### Criteria 4: Students – contd.

#### Advising and counseling

- $_{\odot}\,$  Process of providing academic advising to the students.
- Information about designated faculty advisor (if any) for each semester of the last three calendar years
- Process for professional counseling support to students in need.

#### Extra- and co-curricular activities

- Policy (if any exists) regarding students' co-curricular activities
- How extra- and co-curricular activities are encouraged/supported institutionally.
- $_{\odot}\,$  List students who participated in student activities
- Any notable achievements

### Professional society activities

- $_{\odot}\,$  Professional societies that have a student branch/chapter
- Related support/facilities/activities within the institution.
- List of the names of the student members of each branch/chapter for last 3 calendar years.

### **Criterion 5: Academic Facilities and Technical Support**

### Library

- $_{\circ}\,$  Space and hours of operation
- Library resources (books, journals, proceedings, etc.)
- Modernization of the library IT and other modern technologies have influenced the use, operation and record-keeping of the library for both users and library officials.
- **Classrooms:** Adequacy of the number of appropriately equipped classrooms for the program

### Laboratories and equipment

- $_{\odot}\,$  Laboratories for all relevant courses of the curriculum
- Availability of equipment
- Full-time technical support staff for laboratories (technician/instructor and assistant)

### Internet and computing facilities

- $_{\odot}$  Internet facilities available for the students.
- o Total bandwidth, number of PCs with Internet connections, daily hours, areas covered by Wi-Fi
- o Number of laboratories, number of PCs accessible to students outside of class/laboratory times.
- $_{\odot}$  Types of uses available to students.

### **Criterion 6: Curriculum and Teaching-Learning Processes**

The curriculum should satisfy the program-specific criteria

The **breadth and depth** of the curriculum and the **teaching-learning activities** should be appropriate for the solution of **complex engineering problems** 

- Minimum credit hours of the program expressed in contact hours with formula used
  - BAETE required minimum credit hours is 130

(1 credit of lecture  $\geq$  750 minutes of formal contact , 1 credit of lab  $\geq$  1500 minutes of formal contact)

- Course content (for each course):
  - Credit hours, contact hours, Prerequisites
  - Category (mathematics/ science/ language/ humanities/ non-engineering/core engineering, Required/ Elective)
  - Catalog description, list of the textbooks and reference books
- Flow chart
  - semester-by-semester flow chart of the program
- List of offered courses and lecture plans
  - Course offering list for each semesters of the last three calendar years
  - Lecture plan for each course offered for each semester of the last three calendar

### **Criterion 6: Curriculum and Teaching-Learning Processes – contd.**

#### Course files:

- Lecture plan detailing course outcomes, course contents, assessment tools for each course outcome, and grading policy
- Questions and three representative examples responses (one excellent, one average, one marginal pass) for each exam, class test and quiz
- Laboratory sheet and three representative examples of laboratory reports
- Assessment criteria or rubrics for assignment/project reports. Three representative examples for each assignment and project report
- Final grade assigned to each student
- Assessment and analysis of outcome achievement
- The course instructor's recommendations for continuous quality improvement

#### Laboratory activities

- Hands-on laboratory activities
- Measures in place to emphasize laboratory activities.
- List of experiments, projects/assignments conducted in each laboratory course.

### **Criterion 6: Curriculum and Teaching-Learning Processes – contd.**

#### Final-year Design or Capstone Project

- Extending over a period of one year
- Represents a culminating demonstration of the program outcomes at the level of solving complex engineering problems.
- List of the final-year design projects completed in the last three calendar years
- Sample of original final reports

#### Teaching-learning activities

- The teaching-learning processes and activities selected for each course should be effective and appropriate for achieving the outcomes.
- Process used to select appropriate teaching-learning activities for different courses
- Interactive/non-traditional activities adopted for different courses

#### Academic calendar

- Published academic calendar for each semester of the last three calendar years.
- Check whether semester actually progressed according to the calendar

### **Criterion 7: Program Educational Objectives (PEOs)**

#### **Program Educational Objectives :**

- Broad statements describing the career and professional accomplishments of graduates (usually 3 to 5 years after graduation)
- Consistent with the Vision and Mission of the institution/department
- Clear, concise, assessable and realistic within the context of the available resources
- Supported by a curriculum and teaching-learning processes that lead to the attainment of these objectives.
- Objectives are based on needs of constituencies and need to be evaluated periodically
- Evaluation process to demonstrate achievement of the PEOs and to improve the effectiveness of the program

### **Criterion 7: Program Educational Objectives (PEOs)**

#### Mission and Vision

- Vision and mission of the Institution
- Vision and mission of the program offering department/faculty/school

#### PEO Statements and mapping with the institutional vision and mission

No.	PEO	Institutional missions			
	statement	Mission	Mission		Mission
		statement 1	statement 2		statement n

### **Criterion 7: Program Educational Objectives – contd.**

Relationship/Mapping between the POs and PEOs

No.	PO	PEO 1	PEO 2	 	PEO n
	statement				

#### Process for PEO measurement

- Process used to measure the achievement of each PEO.
- Documents (meeting minutes, survey results, etc.) that support the assertion.
- How different stakeholders are involved
- How the PEO measurement results are used to redefine and improve the PEOs.

# Criterion 8: Program Outcomes (POs) and Assessment

#### **Program Outcomes (POs)**

- Narrower statements describing what students are expected to know and be able to do by the time of graduation
- Relate to the knowledge, skills and attitudes that students acquire throughout the program
- The program must demonstrate the attainment POs to some acceptable level by the time of students' graduation
- BAETE has adopted 12 Graduate Attributes/POs (a-I) from Washington Accord. Generic for any Engineering program

(a) Engineering knowledge	(g) Environment & sustainability
(b) Problem analysis	(h) Ethics
(c) Design/development of solutions	(i) Individual and team work
(d) Investigation	(j) Communication
(e) Modern tool usage	(k) Project management & finance
(f) Engineer and society	(I) Life-long learning

#### **BAETE Graduate Attributes / POs**

### **Criterion 8: Program Outcomes (POs) and Assessment**

- Course outcomes (COs): Course Outcomes (CO) address the abilities to be attained by students upon the completion of a course
  - **o Statements of COs**

SI.	COs	Corresponding	Bloom's taxonomy	Delivery methods	Assessment
No.		POs	domain/level	and activities	tools

#### $_{\rm O}$ Assessment of COs:

- The processes and attainment criteria of CO assessment
- Evidence of CO assessment in each semester of the last three calendar years

#### Relationship between COs and POs

Course no.	COs	POs-1	POs-2		 POs-n
					46

# Criterion 8: Program Outcomes (POs) and Assessment – contd.

#### Achievement of POs required by the BAETE

- Evidence that each PO has been achieved by the time of graduation.
- Justification of the assessment tools and assessment criteria

#### Achievement of additional POs

- Required by the department/school/faculty/institution
- Evidence that each additional PO has been achieved by the time of graduation
- Justification of the assessment tools and assessment criteria

### **Criterion 9: Continuous Quality Improvement (CQI)**

The program should have a continuous quality improvement mechanism.

#### Feedback from students

- Student evaluation of courses
- Student survey
- Feedback from course instructors
- Feedback from external stakeholders
  - Feedback from alumni
  - Feedback from employers

- Process of receiving feedback from different stakeholders
- Process for utilizing the feedback to update PEOs/POs/COs/ curriculum/ delivery/assessment methods.
- Copies of supporting documents (meeting minutes, analysis reports, etc.)

### CQI loops

- CQI loops for COs, POs and PEOs.
- How achievements of outcomes and objectives are assessed, analyses are conducted and improvements are made
- Addressing deficiencies, weaknesses and concerns identified during the previous accreditation evaluation(s) (not applicable for new accreditation applications)

### **Criterion 9: Continuous Quality Improvement (CQI)**

# Addressing deficiencies, weaknesses and concerns identified during the previous accreditation evaluation(s)

(not applicable for new accreditation applications)

	Statement	Remedial actions taken	Improvements made
Deficiencies			
Weaknesses			
Concerns			

### **Criterion 10: Interactions with the industry**

### Industrial advisory panel (IAP)

- Formation (names, designations and professional qualifications of the members) of IAP
- $_{\odot}$  Copies of notices for the IAP meetings
- Attendee lists of IAP meetings
- $_{\circ}\,$  Minutes of the IAP meetings

#### Participation of the industry in academic process

- How industry participate to update and improvement of the objectives, outcomes and curriculum to ensure the relevancy to the industry.
- Provide copies of documents

### **Criterion 10: Interactions with the industry - contd**

- Students' opportunities to gain industrial experience
  - Internship
    - Requirements, nature and the duration of the internship
    - Assessment of performance and outcome achievements during the internship
    - Copies of supporting documents

### $_{\odot}$ Final-year design project

- Any industry collaboration to conduct final-year design projects
- How industry's involvement in selecting the project topic, supervising project activities and providing assessment.
- Copies of supporting documents

### $\circ$ Industry visits

- Requirement, nature and duration of of industrial visit
- Assessment of student learning and outcome achievement of such visits
- Copies of supporting documents

### **Program-specific Criteria**

- Chapter 6 of BAETE Accreditation Manual describe program specific criteria for the following programs:
  - Aerospace Engineering or Similar Program
  - Biomedical Engineering or Similar Program
  - Chemical Engineering or Similar Program
  - o Civil Engineering, Civil and Environmental Engineering or Similar Program
  - Computer Science and Engineering or Similar Program.
  - Electrical Engineering, Electrical and Electronic
  - Electronic and Telecommunication Engineering or Similar Program
  - Environmental Engineering or Similar Program
  - Industrial and Production Engineering or Similar
  - Metallurgical and Materials Engineering or Similar
  - Mechanical Engineering or Similar Program
  - Naval Architecture and Marine Engineering or Similar Program

### **Example: Criteria for Biomedical Engineering or Similar Program**

#### The curriculum must prepare graduates with experience in the following:

- a. Applying principles of engineering, biology, 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; and
- d. Making measurements of and interpreting data from living systems.

### Example: 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
- 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.

### References

http://www.baetebangladesh.org/index.php

Thank you very much !