BOARD OF ACCREDITATION FOR
ENGINEERING AND TECHNICAL EDUCATION

OBE TRAINING FOR PROGRAMS

WRITING SELF-ASSESSMENT REPORT (SAR)

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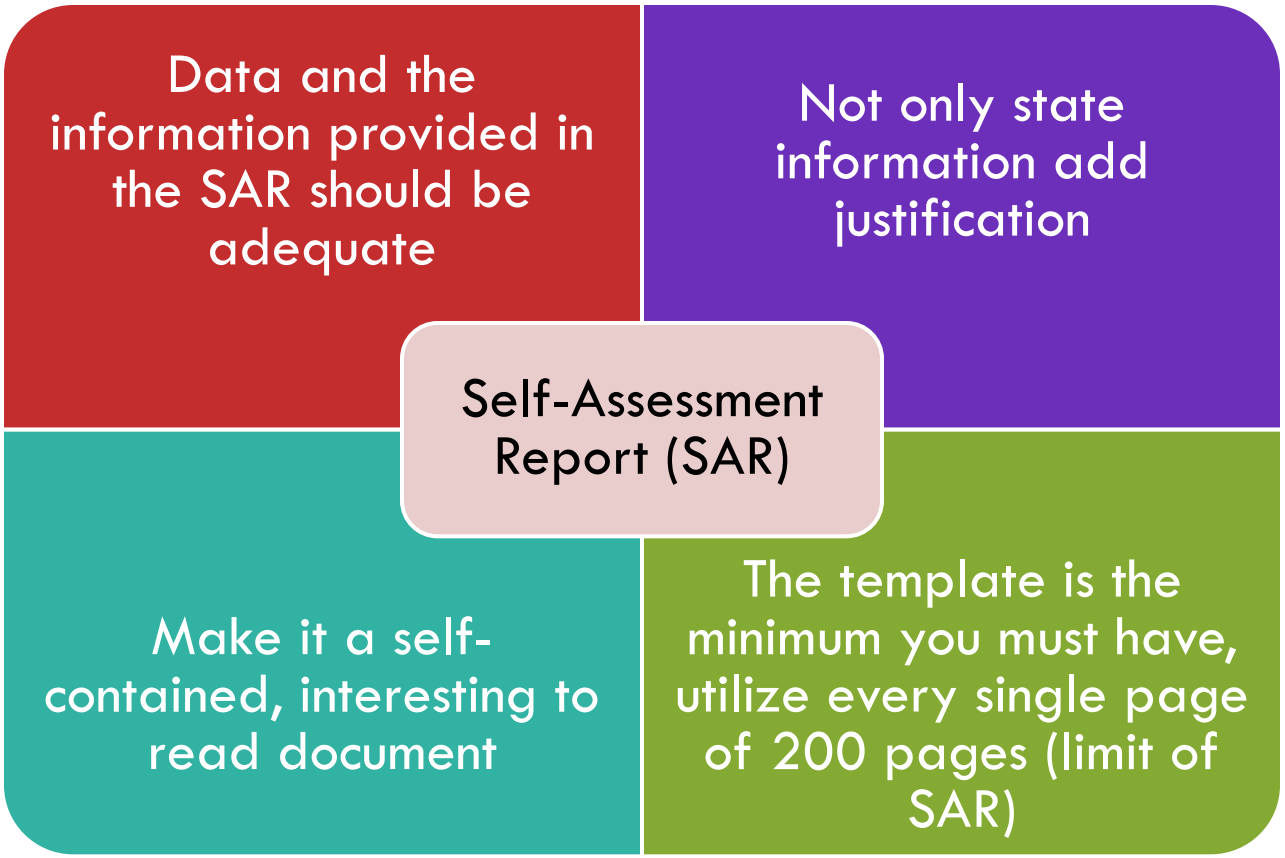
Outcome of this presentation: Writing the Self-Assessment Report (SAR)

- Best practices in BAETE accreditation preparation
- Identify the gaps between the current practice a program follows and the BAETE accreditation process
- Writing SAR: Where to start?
- Attaining different outcomes and demonstrating complex engineering problems and activities (CEP and CEA)
- Identify the policies and processes a program should develop and practice

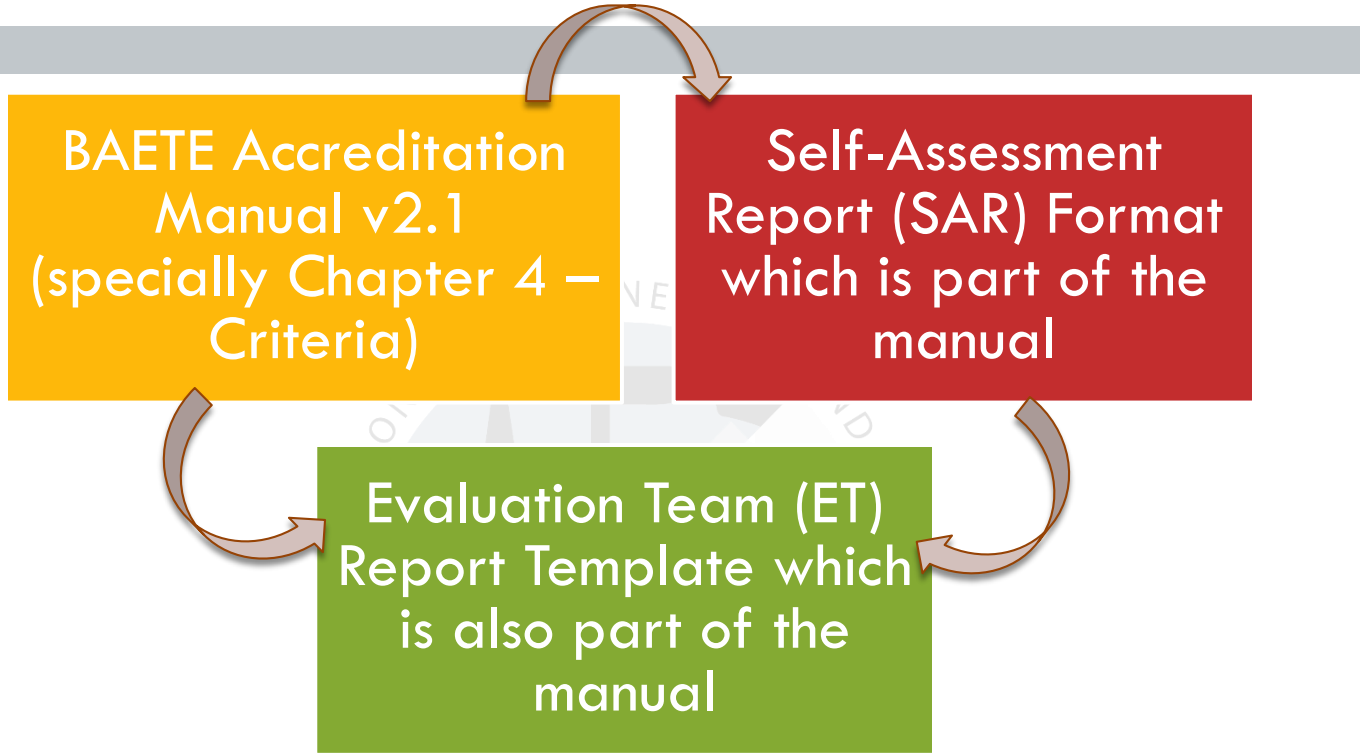
What is an SAR?

- SAR (Self-Assessment Report) is the Self assessment of the program in terms of strengths and weakness as per BAETE benchmark requirements
- SAR contains detailed step-by-step description of the status of the program in each of the ten criteria

Writing the SAR



Writing the SAR: Where to start ?



These three documents are correlated
All are available in the BAETE's website

Data & Evidence Collection

- Accreditation decisions are taken based on evidences
- Program must develop necessary systems to collect and store necessary data and evidences
- An OBE management tool is really helpful
- Data collection should not be an occasional events (e.g., just before accreditation application)

A program will be considered for accreditation only if

Q1. and Q2. Institution and Program have appropriate approval

Q3. Duration of the program is four years

Q4. Admission to the program requires a minimum of 12 years of schooling

Q5. The program follows an outcome-based education approach

Q6. Minimum130 credit hours program

Q7. The statutory bodies (e.g., Syndicate, Academic Council, Finance Committee, Disciplinary Committee, etc.) exist and are functional

Q8. The department has adequate number of full-time faculty members, including senior faculty members, with relevant academic specialization

Q9. The institution have adequate laboratory facilities for the program

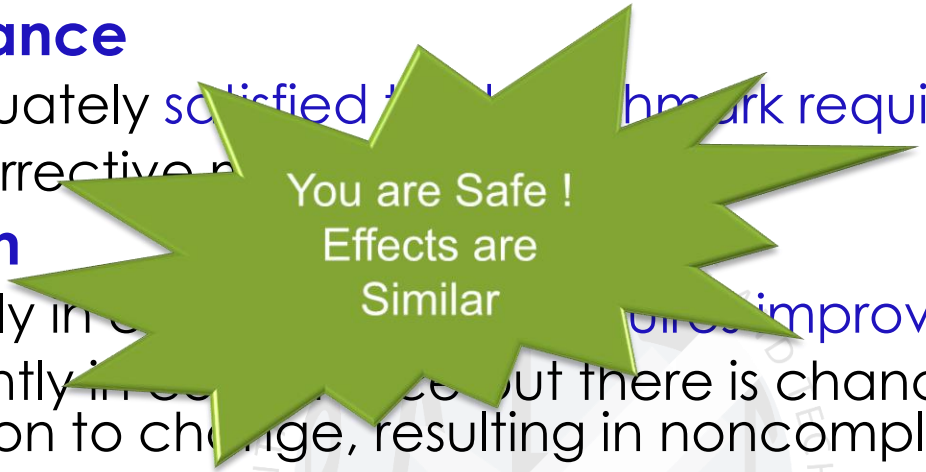
If answer of any question is negative, take immediate step to address that issue.

Calculating Credit Hours

- Minimum total credit hours for the program is 130
- Definition of Semester Credit Hour
  - Lecture Classes: One semester credit hour will be awarded for a minimum of 750 minutes of classroom contact hours in a semester.
  - Laboratory Classes: One semester credit hour will be awarded for a minimum of 1500 minutes of classroom or laboratory or studio contact hours in a semester.
- Convert the total hours of lecture and laboratory classes of your program BAETE stipulated credit hours
  - That should be at least 130

Important terminologies

- **Compliance**
  - Adequately satisfied the benchmark requirements.
  - No corrective n
- **Concern**
  - Broadly in c improvement
  - Currently in co but there is chance for the situation to change, resulting in noncompliance in future.
- **Weakness**
  - Lacks strength of com leading to compromise the quality of the p
  - Corrective
- **Deficiency**
  - Either does elementary stage.
  - Compliance is equired.



Accreditation decision

Deficiency	Weakness	Decision
None	None	Maximum 6 years
None	Weakness found in not more than three criteria	(6 – No. of weakness) years
Any deficiency identified in any criterion	-	Not accredited

Correlation between Manual and ET Report

- All accreditation criteria have been divided into several sub-criteria
- One-to-one mapping between sub-criteria and ET Report template
- "must" means required attributes, "should" means desired attributes

...overnance 4.1

Requirements and desirable attribute... ...cribed 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.
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.

One-to-one mapping

Criterion 1: Organization and Governance
Sub-criteria
i. Major positions of the institution are filled.
ii. The statutory bodies/committees of the institution are formed in accordance with the applicable rules and guidelines.
iii. The position appointees and committee members function effectively as per the roles defined in the relevant act/statute.
iv. The institution has published policies including a mechanism for addressing grievance.
v. The academic and administrative policies are put into practice.

Use of the SAR by the ET

- Reviewing the SAR is the first and foremost activity by the ET in the evaluation process
- Analysis of SAR provide preliminary evaluation of the program's readiness for accreditation
  - Preliminary evaluation whether the program meets threshold for accreditation
  - Familiarize about the strengths, weaknesses and practices of the program
  - Identify any inconsistency or incompleteness in the information provided
- SAR review is done by ET to prepare "Findings from SAR" part of the ET Report before on-site visit.

Use of the SAR by the ET: Prepare "Findings from SAR" part

Criterion----------

Sub-Criteria	Findings from SAR	Findings from On-Site Visit	Evaluation
i.	❑ Review the SAR against each sub-criterion, write to-the-point findings that justifies the given evaluation ❑ Findings should not be limited to one word, e.g., Yes, No, Satisfactory, etc. ❑ Should not apply personal knowledge about the program or institution		Write down primary evaluation that may change after on-site visit
ii.			

SAR Template

There are ten accreditation criteria defined by BAETE

1. Organization and Governance
2. Financial and Physical Resources
4. Students
5. Academic Facilities and Technical Support
6. Curriculum and Teaching-Learning Processes
7. Program Educational Objectives (PEO)
9. Continuous Quality Improvement (CQI)
10. Interactions with the Industry

- The SAR template provided the placeholder of the information and data required for each criterion as stipulated in BAETE Manual

SAR Review by ET

- ET assesses the data and information provided in the SAR for each criterion to evaluate the adequacy against the benchmark requirements
- For each criterion and sub-criterion, ET evaluates whether the SAR generally addresses the following three questions
  - Is there a policy/process in place ?
  - If 'yes', is the policy/process in practice?
  - Does any improvement mechanism exist for the policy/process?

Criteria 1: Organization and Governance

- Are statutory positions, bodies and committees of the institution duly filled and function effectively?
  - Whether the positions/bodies/committees etc. do exist as per applicable rules and guidelines of the institution
  - Review for meeting notices, dates, minutes etc. to understand how active these bodies and committees
- Are academic and administrative policies for students and staff exist and appropriately practiced?
  - Review institution policies as per applicable rules and guidelines of the institution
  - Are these policies well published: check web links, submitted booklets, documents etc.
  - How frequently these policies are updated
  - Whether decisions taken by the institution are as per relevant policies
    - If not, then any explanation of deviation from policies

Criteria 2: Financial and Physical Resources

- Are the financial resources adequate for achieving institutional mission and appropriate functioning of the program?
  - Review different heads of the budget allocation for the program
  - Whether the allocated fund is adequate for recruitment and retention of qualified faculty members, procurement of necessary laboratory equipment, scholarship and financial aid for the students of the program etc.
- Is there any process for budget planning and resource allocation exist?
  - Review the process of budget preparation
  - Whether the feedback of the program regarding budget and resource allocation are considered

Criteria 2: Financial and Physical Resources

- Are Campus infrastructure, extra- and co-curricular facilities, support and maintenance facilities adequate for all the students and staff?
  - Whether the campus infrastructure is adequate for all students and staff of the institution
  - Whether the institution has adequate facilities for extra- and co-curricular activities
  - Whether the infrastructure and facilities are adequately maintained
- What are the plans to assess and address safety risks and issues?
  - Review the institutional plan for safety risks and issues
- Whether Fire detection and fighting facilities are adequate

- Whether the institution has adequate fire detection and fire fighting scheme

- What are the provisions to prevent and manage accidents and safety related incidents in the Laboratories?
  - Whether laboratories are adequately equipped to handle accidents or other safety related incidents

Criteria 3: Faculty

- **Does the department have adequate number of full-time faculty members?**

- The number of faculty obtained from SAR may be an indication, but, may not give the full picture always. Additional information may need to be checked, such as:
  - Faculty teaching load (class time + consultation hours) per week
  - Average number of students taught by per faculty per semester
  - Average number of students assigned to each faculty for academic advising
  - Research and Professional activities (Check Faculty CV)
  - Number of part-time faculty members under the program
- Qualitatively, the adequacy of the number of faculty may be understood by checking whether faculty members perform the following tasks without getting overworked
  - Teach courses with proper attention to appropriate teaching-learning, assessment and CQI activities
  - Provide academic support, advising and counselling to students outside of class hours
  - Conduct own research and professional activities
  - Complete the assigned administrative tasks timely

Criteria 3: Faculty

- Whether Academic qualifications and experiences of full-time and part-time faculty members are adequate

- A few good indicators for faculty qualifications are:
  - Highest Academic degree
  - Area of Specialization
  - Academic and Professional experiences
  - Research and development activities
- Whether faculty members set and revise curriculum, outcomes, and assessment tools
  - Review departmental meeting minutes, curriculum revision documents etc. to verify the faculty role on those issues

- Are faculty members motivated and committed to improving pedagogy and students' outcomes achievements?

Criteria 3: Faculty

- Are faculty members involved in research, development and professional activities?

- Review faculty CV to obtain information on:
  - Recent research publications, thesis supervising, research projects etc.
  - Involvement in technical events, technical conferences, journals and other professional society activities as organizer/editor/reviewer/participant etc.
  - Involvement in Professional consultancy and advisory work

Criteria 3: Faculty

- Are Faculty members adequately trained on OBE?
- Following information are good indicators:
  - Number of OBE training sessions
  - Topics of the training sessions covering different aspects of OBE
  - Number of participants from the program in each session
- Faculty understanding on OBE
  - Review minutes of the faculty meeting, curriculum committee etc. on objectives, outcomes, curriculum, teaching-learning and assessment
  - Review CQI process

Criteria 4: Student

- Does policy for admission and transfer of students exist and appropriately practiced?
  - Check for website, admission brochures/guidelines, bulletin etc. to understand whether admission and transfer policies are well published
  - Review whether applicants skill and knowledge in mathematics and science is considered in admission into the program
  - Review meeting minutes of admission committee, academic council etc. to verify whether the admission policies are practiced appropriately
  - Review whether credit transfers are as per transfer policy

Criteria 4: Student

- Is students' achievement of outcomes monitored and feedback given?
  - Review whether a mechanism exists for continually determining the state of students' achievement of course outcomes
  - Review whether students get regular feedback on assessments (quiz, assignments, etc.)
- Does every student have access to an academic advisor who counsels, guides and mentors the student?
  - Whether policy or mechanism exists for academic advising by faculty advisor
  - Whether too many students assigned to per faculty advisor
  - Whether faculty members are overburdened with teaching and administrative work load to give time to academic advising
- Do students of the program participate in extra- and co-curricular activities and professional society activities?

Criteria 5: Academic Facilities and Technical Support

- Are resources in the library adequate for the program?
  - Review number of hardcopy and electronic copies of books, journals etc. for the relevant program
  - Review the space allocated for library
  - Review the competence of library staff
  - Review the extent of IT and modern technology used in library
- Are the number, facilities and environment of the classrooms adequate and conducive for learning?
  - Check the number of classrooms available to the program
  - Review the facilities in the classrooms

Criteria 5: Academic Facilities and Technical Support

- Are the number of laboratories and equipment adequate for the program?
  - Check the number of laboratories for the program
  - Review the types of equipment for different experiments in each laboratory
  - Check the room size of each of the laboratory
- Do laboratories have sufficient equipment for hands-on activity of every student?
  - Check the number of sets of equipment in each laboratory
- Are Internet and computing facilities and support adequate?
  - Check the Internet bandwidth, WiFi coverage
  - Check the number of computing laboratories and computers available for the students and faculty of the program

Criteria 1 to 5

- Mainly based on
  - Policy, practice of that policy and resources (financial, human, etc.)
- If a required policy is missing (e.g., firefighting policy) the policy must be defined and then practiced
- If a policy/process is not practiced (e.g., grievance redress mechanism, faculty hiring policy) it must be practiced
- If any resource is not adequate (e.g., qualified faculty members, lab equipment) allocate more resources
- May need approval/support from top authority of university

Criteria 6: Curriculum and Teaching-Learning Process

- Check whether minimum credit hour requirement satisfy at least130 credit hours equivalent as defined by BAETE
- Does the curriculum satisfy relevant program-specific criteria?
  - Check for course lists, course contents and topics etc. to verify whether the program comply with the program-specific requirements as defined by BAETE manual (Chapter 6)
- Does the curriculum have adequate breadth and depth for solving complex engineering problems ?
  - Review the titles and contents of the courses in the curriculum
- Are the courses adequate for the practice of relevant engineering?
  - Review whether the curriculum has advanced courses that prepare students for the practice of relevant engineering
- Does the curriculum include adequate number of humanities and non-engineering courses?

Criteria 6: Curriculum and Teaching-Learning Process

- Teaching-learning processes and activities are appropriate for achieving the outcomes

- Review the following information :
  - Selection of assessment tools and activities
  - Any adaptation of Interactive/non-traditional methods for teaching, learning, and assessing the knowledge, skills and attitudes appropriate to the outcomes

Criteria 6: Curriculum and Teaching-Learning Process

- Are adequate hands-on activities conducted in the laboratories?
- Review the following information related to the laboratory courses
  - List of laboratory experiments
  - Open-ended experiments or other types of activities that require solution of complex engineering problems
  - List of Projects
  - List of software and hardware tools used in the laboratory activities
  - Number of sets of equipment and group size
- Does the program culminate the POs at the level of solving complex engineering problems?
  - Check whether the program use Final-year design Project for demonstrating PO culmination
  - If not, whether any justified alternate pathway exists

Criteria 7: Program Educational Objectives (PEO)

- Are PEOs statements unambiguous, realistic, assessable and aligned with the institutional/departmental mission?
  - Review the Mission statement of the institution/department
  - Review whether PEO statements are clear, concise and realistic
  - Review whether the mapping between PEOs to Missions are appropriately aligned
- Do curriculum, outcomes and teaching-learning processes lead to the attainment of PEOs?
  - Review whether the statement provided by the program is justified.
  - Review whether it statement demonstrates that the curriculum, outcomes and teaching-learning processes lead to the attainment of PEOs.

Criteria 7: Program Educational Objectives (PEO)

- Does appropriate process to assess PEO attainment exist which includes feedback from stakeholders?
  - Review how the criteria, scale, target level and assessment tools of PEO achievements are devised in the PEO assessment process
  - Review survey, meeting minutes, focus group discussion etc. that have been used for receiving feedback from stakeholders (industry, alumni, faculty etc.) in the PEO assessment process
- Does the program periodically review PEO statements after assessment?
  - Review the initial process for establishing PEO statements
  - Review whether stakeholders' feedback has been considered in PEO establishment process
  - Review whether the results of the PEO assessment has been used to review the PEO statements

Criteria 8: Program Outcomes and Assessment

- Are POs of the program substantially equivalent to the 12 BAETE specified PO statements?
  - Review the stated PO statements to verify whether the description of the POs are substantially equivalent to 12 BAETE specified POs. Note that program's POs need not be identical to the BAETE specified POs
- Are POs constructively aligned with PEOs?
  - Review the mapping between POs and PEOs to verify the constructive alignment
- Are the CO statements clear, assessable and at appropriate domain/level of learning taxonomy?
  - Review whether the taxonomy domain/level of COs are appropriate

Criteria 8: Program Outcomes and Assessment

- Are COs constructively aligned with the description of the POs?
  - Review the mapping between COs and POs to verify the constructive alignment
  - Whether the CO-PO mapping cover all the POs of the program

- Are the attributes of knowledge profile, ranges of complex engineering problems and activities appropriately addressed through mapping, teaching-learning and assessment?

- The mapping given in SAR provide a plan on addressing the attributes of knowledge profile and ranges of complex problem and activities

Criteria 8: Program Outcomes and Assessment

- Are there course files?
  - Preferable contents of course file
    - Assessment of outcomes
    - Curriculum
    - Exam question and sample answer scripts
    - The results of other assessment tools and sample work of the students
    - Summary of performance and attainment of CO with suggestions or feedback for future development

Criteria 8: Program Outcomes and Assessment

- Does the program demonstrate through evidence from appropriate evaluation that the students attain the POs by the time of the graduation?
  - Review whether the program devised any assessment and evaluation process for each of the POs
  - Review whether the PO Assessment method includes Direct assessment achieved through relevant CO assessment
  - Review whether the assessment method, tools including examinations and rubrics, criteria are identified for each of the Pos
  - Review whether the results obtained after the assessment and analysis are used in demonstrating the extent to which each of the POs is being attained

Criteria 9: Continuous Quality Improvement (CQI)

- Is there any process for periodically evaluate PEO attainment?
  - Check how often the evaluation of PEO attainment conducted (evaluation cycle)
  - Review whether the assessment methods, tools, criteria etc. mentioned in the evaluation process are appropriate for each PEO
- Does the program have an established process for evaluating PO attainment in a regular basis?
  - Check how often the evaluation of PO attainment conducted (evaluation cycle)
  - Review whether the assessment methods, tools, criteria etc. mentioned in the evaluation process are appropriate for each PO
  - Review whether the Direct assessment of relevant COs has been incorporated in the PO assessment method

Criteria 9: Continuous Quality Improvement (CQI)

- Is there any process to regularly evaluate the COs, curriculum, teaching-learning and assessment?
  - Check how often the review of curriculum, teaching-learning and assessment are conducted (review cycle)
  - Review whether the assessment method, tools including examinations and rubrics, criteria are identified for all of the program core and elective courses
  - Review how the results of evaluation of CO, PO, PEO are utilized to review and update the curriculum and teaching-learning and assessment process

Criteria 9: Continuous Quality Improvement (CQI)

- Is there any mechanism to collect feedback from relevant stakeholders in the periodic evaluation process?
  - Review how feedback from students are collected (student evaluation, student survey, exit survey, focus group discussions etc.)
  - Review how feedback from course instructors are collected (faculty meeting, curriculum committee meeting, course file report, informal discussion etc.)
  - Review how feedback from employers/industry are collected (IAP meeting, survey, focus group discussion, job fair etc.)
  - Review how feedback from alumni are collected (alumni meeting, survey, focus group discussion etc.)

Criteria 9: Continuous Quality Improvement (CQI)

- Are the results of periodic evaluation used to improve the objectives, outcomes, curriculum and teaching-learning and assessment?
  - Review whether any PEO updates have been done as per schedule following the CQI process
  - Review whether any PO updates have been done as per schedule following the CQI process
  - Review whether any CO updates have been done as per schedule following the CQI process
  - Review whether any Curriculum and Teaching-learning and assessment updates have been done as per schedule following the CQI process

Criteria 10: Interactions with the Industry

- Does industry provide feedback on the curriculum?
  - Review how Industry Advisory Panel participates in curriculum update
  - Review how industry professionals participate in establishing and updating the PEOs
  - Review survey, focus group discussion for receiving feedback from industry regarding program objective, outcomes, curriculum etc.
- Does alumni provide feedback on the curriculum?
  - Check whether there is any Alumni Association for the program graduates
  - Review whether any mechanism exists for receiving feedback on curriculum from alumni
  - Review survey, focus group discussion, alumni meeting minutes etc. regarding program objectives, outcomes, curriculum etc.

Criteria 10: Interactions with the Industry

- Do students have opportunities to obtain industrial experience?

  - Check whether any internship required by the program
  - Check the number and type of industrial visits
  - Check whether there is any industry collaboration in final-year design projects
  - Check whether any faculty member supervises the final-year design projects providing experiences similar to that in real-life industry
  - Check whether there are experience sharing workshops/seminars participated by industry professionals

What needs to be updated?

Curriculum	• Course content to suit specified Course Outcomes, necessary courses to adequately cover ALL Knowledge Profiles, POs, CEPs and CEAs.
Teaching-Learning Methods	• Introducing innovative/flexible teaching methods/delivery tools
Assessment & Evaluation Tools	• Introducing variety of assessment and evaluation tools to reduce heavy dependency on written exams
Data & Evidence Collection	• Collecting evidences of process involved and the achievement of different outcomes
OBE Management System	• Create a sustainable OBE management system.

Curriculum and Teaching-Learning Processes

- Curriculum should satisfy
  - The relevant program-specific criteria
  - Breadth (K3 - Engineering fundamentals) and depth (K4 - Engineering specialist knowledge) requirements
- Appropriate teaching-learning for achieving the relevant outcomes including solution of CEPs and CEAs
- Adequate hands-on activities
- The preferred approach of demonstrating PO culmination is the Final-year design Project or Capstone Project

Curriculum and Teachi… Processes

A similar mapping needs to be developed to see the big picture

Course #	Program Outcomes												Knowledge Profile								Complex Engineering Problem Solving							Complex Engineering Activities				
	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l	K1	K2	K3	K4	K5	K6	K7	K8	P1	P2	P3	P4	P5	P6	P7	A1	A2	A3	A4	A5
	Needs K1-K4		K5	K8	K6	K7	K7																					Related to PO j				
	Needs complex engineering problem solution (P1 + another P)																															
	Knowledge	Analysis	Design	Investigation	Tool usage	Society	Environment	Ethics	Individual & teamwork	Communication	Project management & finance	Life-long learning	Science	Math	Eng fundamentals	Eng specialization	Design	Technology	Society	Research	Knowledge K3-K6, K8	Wide ranging/conflicting	No obvious solution	Infrequentissues	Outsideproblems	Diverse groups	Many components	Range of resources	Level of interaction	Innovation	Consequences	Familiarity
Course 1	X	X												X	X						X		X								
Course 2			X			X				X							X		X		X	X			X		X				X	
Course 3			X	X	X												X	X		X	X			X								
Course 4	X				X											X		X			X	X										
Course 5	X											X	X	X	X						X		X									
Course 6		X			X											X		X			X				X							
Course 7		X		X					X							X				X	X					X						
…….	..	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…
FYDP	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Attainment of Outcomes

- Showing attainment of different outcomes for ALL students is NOT mandatory for BAETE. In the manual,

  "It must be demonstrated through evidence from appropriate evaluation that the students attain all the POs by the time of the graduation".

  There must be a process to make sure that "the students attain all the POs by the time of the graduation"

- It is not mandatory to show attainment of COs (and therefore POs) for all courses in every trimester
  - Note that assessment of CO attainment after certain interval is necessary to close the CQI loop of CO
  - For multiple sections of the same course, sampling through one section is possible

Attainment of outcomes

- POs must be assessed using direct methods.
- Select an appropriate model for PO attainment (culminating, dominating, etc.), not mandatory to bring all courses
- It is NOT mandatory to show PO attainment for all semesters, however most recent ones must be present
- Attainment of each PO must be demonstrated
  - State how the relevant Knowledge Profile attribute is incorporated
  - Identify the Complex Engineering Problems (P1 – P7) that are addressed through the attainment of PO(a) to PO(g)
  - Identify the Complex Engineering Activities (A1 – 57) that are addressed through the attainment of PO(j)

Complex Engineering Problems and Activities (CEPs and CEAs)

- The program must also demonstrate how each attribute of the Range of Complex Engineering Problems (P1 – P7) and Complex Engineering Activities (A1 – A5) is incorporated in the teaching, learning and assessment
- Students must learn
  - PO(a) to PO(g) through solving Complex Engineering Problems (CEP)
  - PO(j) through Complex Engineering Activities (CEA)
- In the attainment of PO(a) to PO(g) and PO(j)
  - Program must demonstrate through mapping how CEPs and CEAs are incorporated respectively in teaching, learning and assessment

Complex Engineering Problems and Activities (CEPs and CEAs)

POs	Example Assessment Tools
PO(a) Engineering Knowledge	Final Exam, Assignment
PO(b) Problem Analysis	Quiz, Final Exam, Assignment
PO(c) Design	Assignment, Laboratory Project

In case the program claims that CEPs and CEAs are incorporated through these assignments and Laboratory project

Program must demonstrate through mapping that the assignments and the laboratory project completed by the students meet the requirements of CEP and CEA

Culmination of POs

"The program must demonstrate the culmination of program outcomes (POs) at the level of solving complex engineering problems, preferably [illegible]al-year design project or capstone projec[illegible]ver a period of one year."

Performance indicators

- A PO encompasses a number of performance indicators
  - PO(b): "Identify, formulate, research literature and analyse complex engineering problems….."
  - Culmination of a PO demonstrates that students learn all performance indicators of a specific PO while solving a single problem, which should be a CEP in case of PO(a) to PO(g)
  - Note that using performance indicator is not mandatory in Manual-v2.1

Culmination of POs through FYDP

- Although introducing FYDP is not mandatory in Manual-v2.1, culmination of POs are easily possible through FYDP
  - A number of COs need to be defined for each semester
  - COs can be mapped to sub-POs/performance indicator of POs
  - Assessment criteria for each CO and the corresponding deliverable(s) should be well defined
  - The problem solved in the FYDP must be a CEP and there should be activities to meet CEA
  - All necessary mappings should be present

Use of Rubrics

"The way in which various assessment tools, including examinations and rubrics, contribute to the evaluation of attainment of each PO must be described."

- Rubric is an assessment tool that clearly indicates achievement criteria across all the components of a student's work (assignment, project, term-paper, etc.)
- Rubrics might be generic for a program or across faculty
  - For example one common rubric for presentation, another for assignments, etc.
- Assessment specific rubrics can also be developed

Attainment of Program Educational Objectives (PEO)

"Curriculum and teaching-learning processes must support the attainment of PEOs."

- Program shows mappings between each PEO statement and Topics and Teaching-Learning processes in various courses supporting the attainment of that PEO

"A process must be developed to assess the level of attainment of each PEO..."

- Even a new program without any graduating students must develop the process

Continuous Quality Improvement (CQI)

Program must complete the CQI loops periodically for

COs	• Feedback from course instructors
POs	• Feedback from relevant stakeholders including graduates
PEOs	• Feedback from graduates and their employers
Curriculum and teaching quality	• feedback from faculty members and students

CQI loops should be a regular practice not done occasionally just before the accreditation visit

Interactions with the Industry

- Formalizing interactions through
  - Industry Advisory Panel (IAP)
  - Alumni Association (AA)
- Involvement of industry
  - in the development of the curriculum
  - Improving quality of the teaching-learning process
- Students must have opportunity to obtain industrial experience through
  - internships, industry visits or design projects

What's next?

Back to your own program and read the Chapter 4 of Manual carefully

Find out the gaps in your present practice

Take necessary actions to establish policy and practice

Collect necessary data and evidence

Start writing the SAR

Thank You

Self-Assessment Report (SAR) Writing

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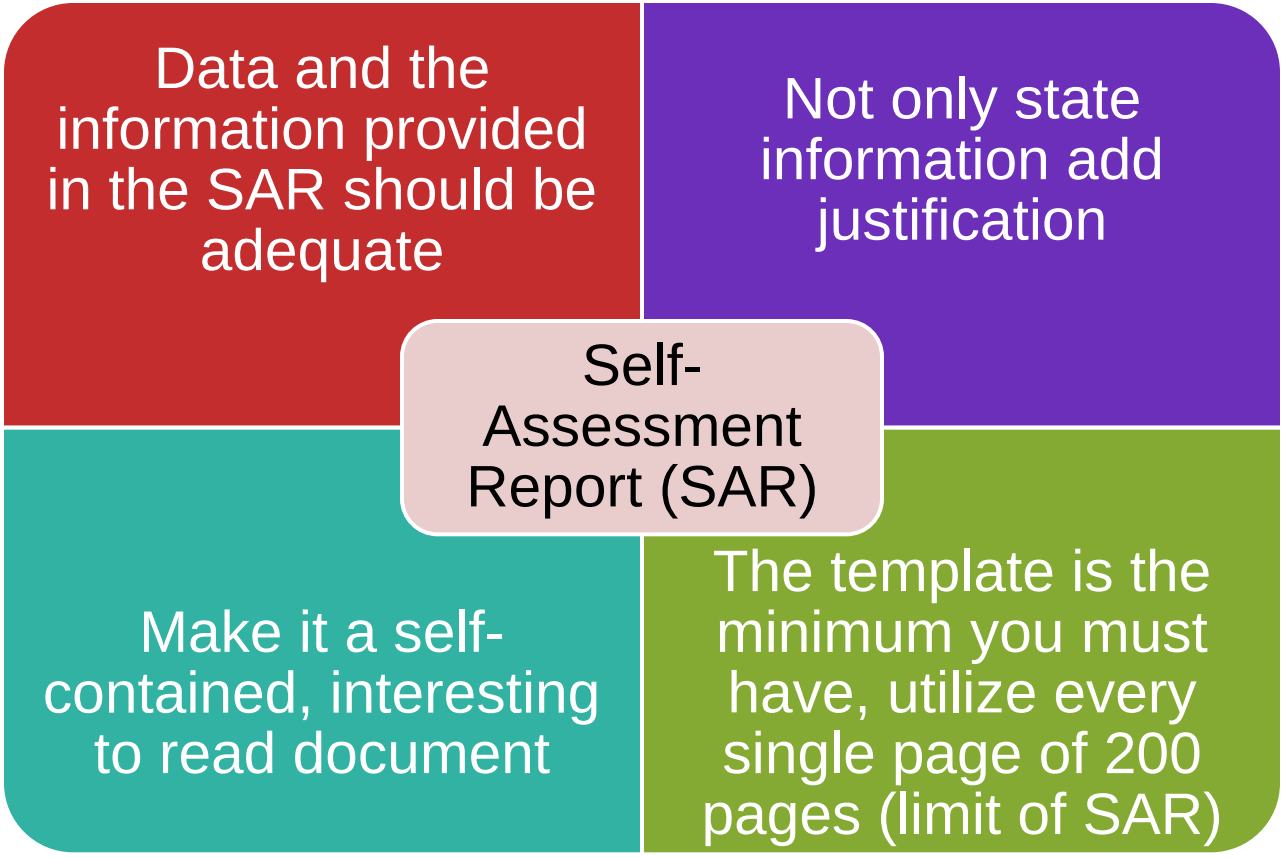
Self-Assessment Report

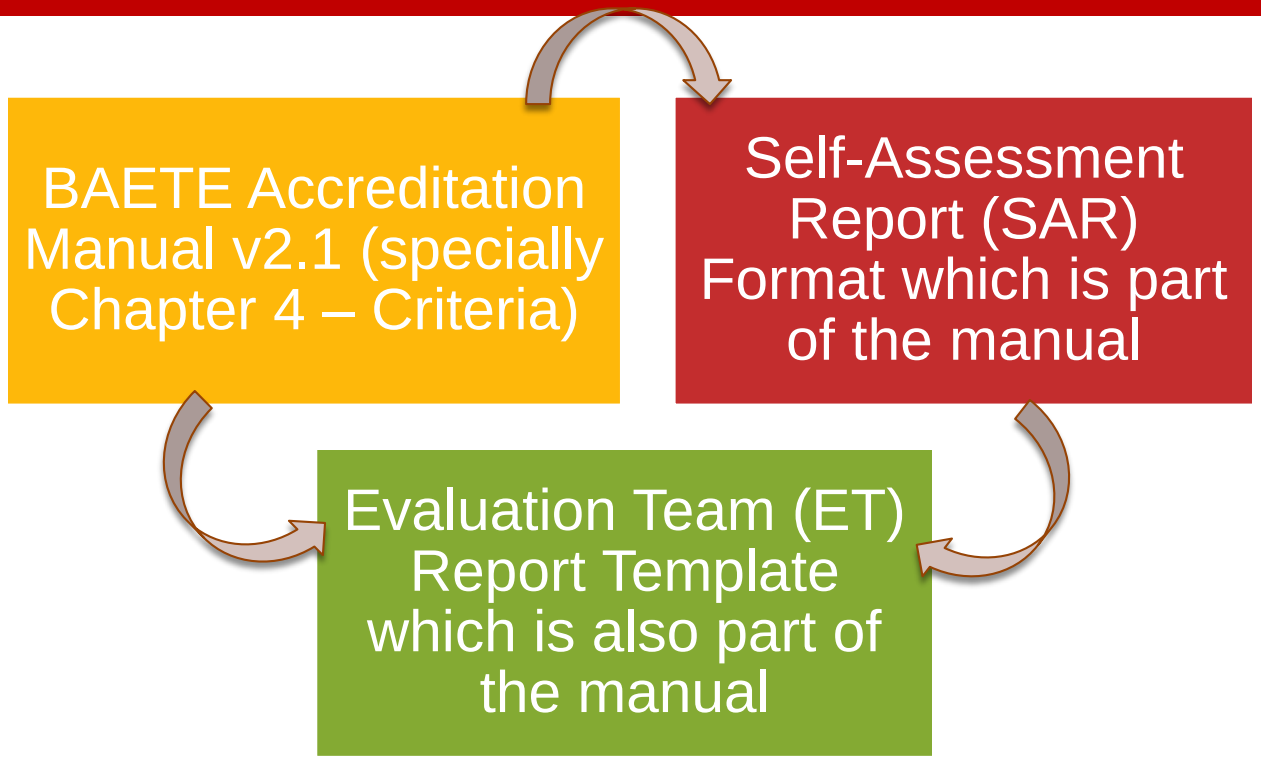
What is an SAR?

- SAR (Self-Assessment Report) is the Self assessment of the program in terms of strengths and weakness as per benchmark requirements
- SAR contains detailed step-by-step description of the status of the program in specific criteria
  - BAETE benchmark
  - 10 Criteria

Writing the SAR



Writing the SAR: Where to start ?



These three documents are correlated
All are available in the BAETE's website

Data and Evidence Collection

- Accreditation decisions are taken based on evidences
- Program must develop necessary systems to collect and store necessary data and evidences
- An OBE management tool is really helpful
- Data collection should not be an occasional events (e.g., just before accreditation application)

A program will be considered for accreditation only if

A program will be considered for accreditation only if

Q1. and Q2. Institution and Program have appropriate approval

Q3. Duration of the program is four years

Q4. Admission to the program requires a minimum of 12 years of schooling

Q5. The program follows an outcome-based education approach

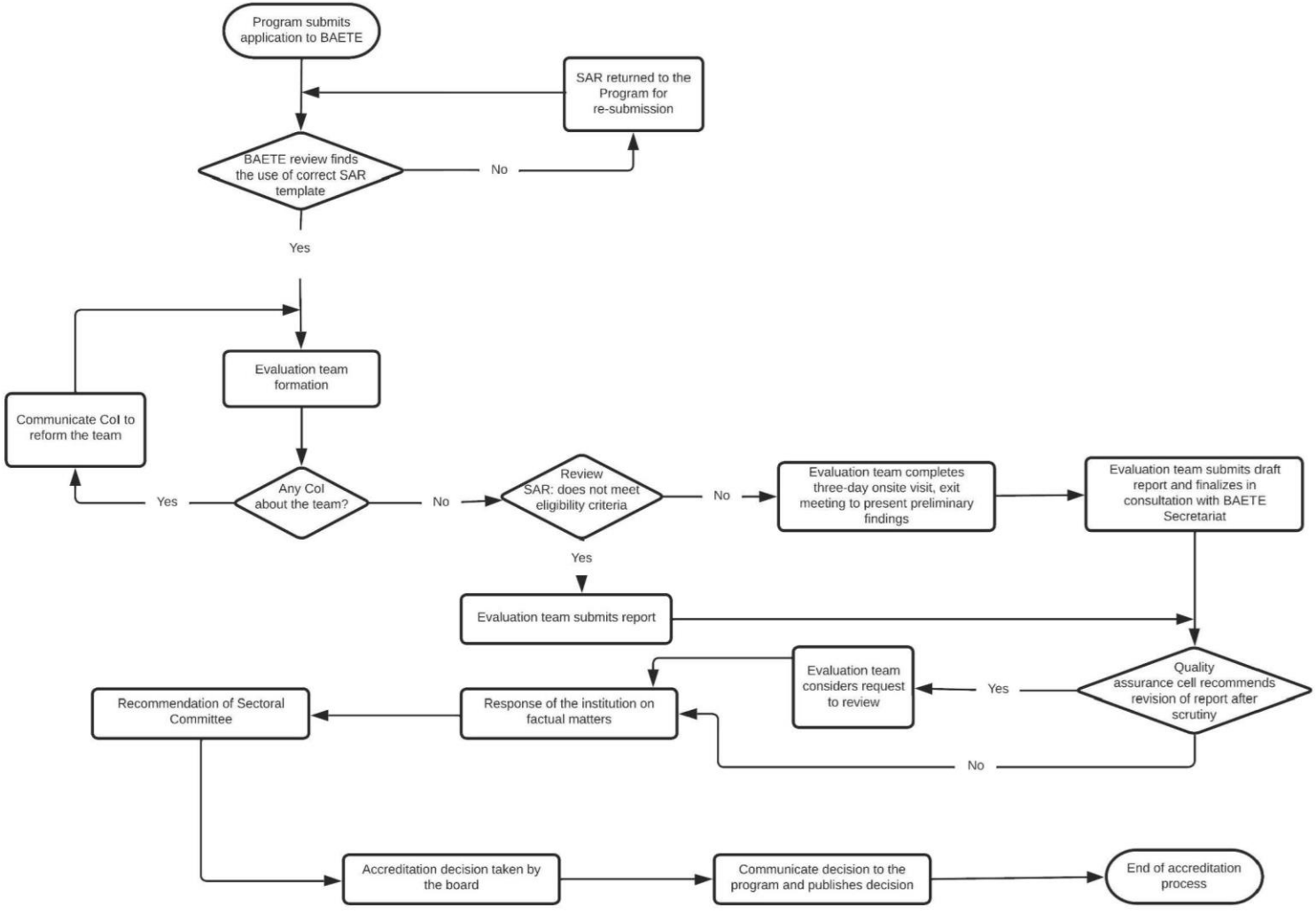
Q6. Minimum130 credit hours program

Q7. The statutory bodies (e.g., Syndicate, Academic Council, Finance Committee, Disciplinary Committee, etc.) exist and are functional

Q8. The department has adequate number of full-time faculty members, including senior faculty members, with relevant academic specialization

Q9. The institution have adequate laboratory facilities for the program

Accreditation Workflow



https://www.baetebangladesh.org/acc-man-00-f.html

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

Deficiency	Weakness	Decision
None	None	Maximum 6 years
None	Weakness found in not more than three criteria	(6 – No. of weakness) years
Any deficiency identified in any criterion	-	Not accredited

Use of the SAR by the ET

- Reviewing the SAR is the first and foremost activity by the ET in the evaluation process
- Analysis of SAR provide preliminary evaluation of the program's readiness for accreditation
  - Preliminary evaluation whether the program meets threshold for accreditation
  - Familiarize about the strengths, weaknesses and practices of the program
  - Identify any inconsistency or incompleteness in the information provided
- SAR review is done by ET to prepare "Findings from SAR" part of the ET Report before on-site visit.

Correlation between Manual and ET Report

- All accreditation criteria have been divided into several sub-criteria
- One-to-one mapping between sub-criteria and ET Report template
- "must" means required attributes, "should" means desired attributes

...overnance 4.1

Requirements and desirable attribute... ...cribed 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.
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.

One-to-one mapping

Criterion 1: Organization and Governance
Sub-criteria
i. Major positions of the institution are filled.
ii. The statutory bodies/committees of the institution are formed in accordance with the applicable rules and guidelines.
iii. The position appointees and committee members function effectively as per the roles defined in the relevant act/statute.
iv. The institution has published policies including a mechanism for addressing grievance.
v. The academic and administrative policies are put into practice.

Use of the SAR by the ET: Prepare "Findings from SAR" part

Criterion----------			
Sub-Criteria	**Findings from SAR**	**Findings from On-Site Visit**	**Evaluation**
i.	❑ Review the SAR against each sub-criterion, write to-the-point findings that justifies the given evaluation ❑ Findings should not be limited to one word, e.g., Yes, No, Satisfactory, etc. ❑ Should not apply personal knowledge about the program or institution		Write down primary evaluation that may change after on-site visit
ii.			

SAR Review by ET

- ET assesses the data and information provided in the SAR for each criterion to evaluate the adequacy against the benchmark requirements
- For each criterion and sub-criterion, ET evaluates whether the SAR generally
  - Is there a policy/process in place ?
  - If ‘yes’, is the policy/process in practice?
  - Does any improvement mechanism exist for the policy/process?

SAR Template

There are ten accreditation criteria defined by BAETE

1. Organization and Governance
2. Financial and Physical Resources
4. Students
5. Academic Facilities and Technical Support
6. Curriculum and Teaching-Learning Processes
7. Program Educational Objectives (PEO)
9. Continuous Quality Improvement (CQI)
10. Interactions with the Industry

- The SAR template provided the placeholder of the information and data required for each criterion as stipulated in BAETE Manual

SAR Content

Criteria	ET Evaluation
1	**Organization and Governance**
2	**Financial and Physical Resources**
3	**Faculty Members**
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**

Session 2: Institutional and departmental resources

Session 1: Curriculum and OBE

Session 3: Industry

OBE Documentation in SAR

Criteria 6: Curriculum and Teaching-Learning Process

- Check whether minimum credit hour requirement satisfy at least130 credit hours equivalent as defined by BAETE
- Does the curriculum satisfy relevant program-specific criteria?
  - Check for course lists, course contents and topics etc. to verify whether the program comply with the program-specific requirements as defined by BAETE manual (Chapter 6)
- Does the curriculum have adequate breadth and depth for solving complex engineering problems ?
  - Review the titles and contents of the courses in the curriculum
- Does the curriculum include adequate number of mathematics, physical science, humanities and non-engineering courses?
  - Review whether the curriculum relevant courses

Criteria 6: Curriculum and Teaching-Learning Process

- Teaching-learning processes and activities are appropriate for achieving the outcomes

- Review the following information :
  - Selection of assessment tools and activities
  - Any adaptation of Interactive/non-traditional methods for teaching, learning, and assessing the knowledge, skills and attitudes appropriate to the outcomes

Criteria 6: Curriculum and Teaching-Learning Process

- Are adequate hands-on activities conducted in the laboratories?
  - Review the following information related to the laboratory courses
    - List of laboratory experiments
    - Open-ended experiments or other types of activities that require solution of complex engineering problems
    - List of Projects
    - List of software and hardware tools used in the laboratory activities
    - Number of sets of equipment and group size
- Does the program culminate the POs at the level of solving complex engineering problems?
  - Check whether the program use Final-year design Project for demonstrating PO culmination
  - If not, whether any justified alternate pathway exists

Criteria 7: Program Educational Objectives (PEO)

- Are PEOs statements clear, concise, assessable, and realistic?
  - Review whether PEO statements are clear, concise and realistic
- Are PEOs aligned with the institutional/ departmental vision and mission?
  - Review the Mission statement of the institution/department
  - Review whether the mapping between PEOs to Missions are appropriately aligned
- Do curriculum, outcomes and teaching-learning processes lead to the attainment of PEOs?
  - Review whether the statement provided by the program is justified.
  - Review whether statement demonstrates that the curriculum, outcomes and teaching-learning processes lead to the attainment of PEOs.

Criteria 7: Program Educational Objectives (PEO)

- Does appropriate process to assess PEO attainment exist which includes feedback from stakeholders?
  - Review how the criteria, scale, target level and assessment tools of PEO achievements are devised in the PEO assessment process
  - Review survey, meeting minutes, focus group discussion etc. that have been used for receiving feedback from stakeholders (industry, alumni, faculty etc.) in the PEO assessment process
- Does the program periodically review PEO statements after assessment?
  - Review the initial process for establishing PEO statements
  - Review whether stakeholders' feedback has been considered in PEO establishment process
  - Review whether the results of the PEO assessment has been used to review the PEO statements

Criteria 8: Program Outcomes and Assessment

- Are POs of the program substantially equivalent to the 12 BAETE specified PO statements?
  - Review the stated PO statements to verify whether the description of the POs are substantially equivalent to 12 BAETE specified POs. Note that program's POs need not be identical to the BAETE specified POs
- Are POs constructively aligned with PEOs?
  - Review the mapping between POs and PEOs to verify the constructive alignment
- Are the CO statements clear, assessable and at appropriate domain/level of learning taxonomy?
  - Review whether the taxonomy domain/level of COs are appropriate

Criteria 8: Program Outcomes and Assessment

- Are COs constructively aligned with the description of the POs?
  - Review the mapping between COs and POs to verify the constructive alignment
  - Whether the CO-PO mapping cover all the POs of the program

- Are the attributes of knowledge profile, ranges of complex engineering problems and activities appropriately addressed through mapping, teaching-learning and assessment?
  - The mapping given in SAR provide a plan on addressing the attributes of knowledge profile and ranges of complex problem and activities

Criteria 8: Program Outcomes and Assessment

- Are there course files for each course?
  - Preferable contents of course file
    - Course outline along with textbook and reference books
    - Curriculum, CO-PO mapping
    - Class handout/ lecture material
    - Exam question and sample answer scripts
    - The results of other assessment tools and sample work of the students
    - Assessment of outcomes
    - Summary of performance and attainment of CO with suggestions or feedback for future development

Criteria 8: Program Outcomes and Assessment

- Are the POs assessed directly?
  - Direct examination of knowledge or skills against measurable performance indicators or rubrics
  - Describe assessment tools including examinations and rubrics
  - Direct assessment using the relationship between CO and PO
  - Indirect assessment of Program Outcomes using Exit Surveys

Criteria 8: Program Outcomes and Assessment

- Does the program demonstrate through evidence from appropriate evaluation that the students attain the POs by the time of the graduation?
  - Review whether the program devised any assessment and evaluation process for each of the POs
  - Review whether the PO Assessment method includes Direct assessment achieved through relevant CO assessment
  - Review whether the assessment method, tools including examinations and rubrics, criteria are identified for each of the POs
  - Review whether the results obtained after the assessment and analysis are used in demonstrating the extent to which each of the POs is being attained

Criteria 9: Continuous Quality Improvement (CQI)

- Is there any process for periodically evaluate PEO attainment?
  - Check how often the evaluation of PEO attainment conducted (evaluation cycle)
  - Review whether the assessment methods, tools, criteria etc. mentioned in the evaluation process are appropriate for each PEO
- Does the program have an established process for evaluating PO attainment in a regular basis?
  - Check how often the evaluation of PO attainment conducted (evaluation cycle)
  - Review whether the assessment methods, tools, criteria etc. mentioned in the evaluation process are appropriate for each PO
  - Review whether the Direct assessment of relevant COs has been incorporated in the PO assessment method

Criteria 9: Continuous Quality Improvement (CQI)

- Is there any process to regularly evaluate the COs, curriculum, teaching-learning and assessment?
  - Check how often the review of curriculum, teaching-learning and assessment are conducted (review cycle)
  - Review whether the assessment method, tools including examinations and rubrics, criteria are identified for all of the program core and elective courses
  - Review how the results of evaluation of CO, PO, PEO are utilized to review and update the curriculum and teaching-learning and assessment process

Criteria 9: Continuous Quality Improvement (CQI)

- Is there any mechanism to collect feedback from relevant stakeholders in the periodic evaluation process?
  - Review how feedback from students are collected (student evaluation, student survey, exit survey, focus group discussions etc.)
  - Review how feedback from course instructors are collected (faculty meeting, curriculum committee meeting, course file report, informal discussion etc.)
  - Review how feedback from employers/industry are collected (IAP meeting, survey, focus group discussion, job fair etc.)
  - Review how feedback from alumni are collected (alumni meeting, survey, focus group discussion etc.)

Criteria 9: Continuous Quality Improvement (CQI)

- Are the results of periodic evaluation used to improve the objectives, outcomes, curriculum and teaching-learning and assessment?
  - Review whether any PEO updates have been done as per schedule following the CQI process
  - Review whether any PO updates have been done as per schedule following the CQI process
  - Review whether any CO updates have been done as per schedule following the CQI process
  - Review whether any Curriculum and Teaching-learning and assessment updates have been done as per schedule following the CQI process

What needs to be updated?

Teaching-Learning Methods	• Introducing innovative/flexible teaching methods/delivery tools
Assessment & Evaluation Tools	• Introducing variety of assessment and evaluation tools to reduce heavy dependency on written exams
Data & Evidence Collection	• Collecting evidences of process involved and the achievement of different outcomes
Curriculum	• Course content to suit specified Course Outcomes, necessary courses to adequately cover all Knowledge Profiles, POs, CEPs and CEAs.
OBE Management System	• Create a sustainable OBE management system.

Before you start writing the SAR: Gap Analysis

- Go through each criteria by considering details of each sub-criteria
- Evaluate your program against each sub-criteria and find the gaps in
  - Policy and practice (policy may exist but not in practice) of that policy
  - Resources (e.g., labs, classrooms, human resources, etc.)
  - Curriculum, teaching, learning
  - Attainment of outcomes including Complex Engineering Problems and activities
  - Documentations (course files, meeting minutes)
  - Role of external stakeholders (alumni, industry, employee)
- Find the gaps that need attention

Curriculum and Teaching-Learning Processes

- Curriculum should satisfy
  - The relevant program-specific criteria
  - Breadth (K3 - Engineering fundamentals) and depth (K4 - Engineering specialist knowledge) requirements
- Appropriate teaching-learning for achieving the relevant outcomes including solution of CEPs and CEAs
- Adequate hands-on activities
- The preferred approach of demonstrating PO culmination is the Final-year design Project or Capstone Project

Curriculum and Teaching-Learning Processes

- Starts with a complete mapping between all the courses and
  - Program Outcomes (PO-a to PO-l)
  - Knowledge Profiles (K1 to K8)
  - Complex Engineering Problems (P1 to P8) and Activities (A1 to A5)
- Need addition of courses or contents if not all POs, Ks, Ps and As are comprehensively covered
- Make sure the constructive alignment between POs and Ks

Curriculum and Teaching-Learning Processes

A similar mapping needs to be developed to see the big picture

Course #	Program Outcomes												Knowledge Profile																Complex Engineering Activities				
	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l	K1	K2	K3	K4	K5	K6											A3	A4	A5
	Needs K1-K4		K5	K8	K6	K7	K7																						Related to PO j				
	Needs complex engineering problem solution (P1 + another P)																																
	Knowledge	Analysis	Design	Investigation	Tool usage	Society	Environment	Ethics	Individual & teamwork	Communication	Project management & finance	Life-long learning	Science	Math	Eng fundamentals	Eng specialization	Design	Technology		Research	Knowledge K3-K6	Wide ranging/conflicting	No obvious solution	Infrequentissues	Outsideproblems	Diverse groups	Many components	Range of resources	Level of interaction	Innovation	Consequences	Familiarity
Course 1	X	X												X	X						X		X								
Course 2			X			X				X							X		X		X	X			X			X			X	
Course 3			X	X	X												X	X		X	X			X								
Course 4	X				X											X		X														
Course 5	X											X	X	X	X						X		X									
Course 6		X			X											X		X														
Course 7		X		X					X							X				X	X					X						
…….	..	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…
FYDP	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Attainment of Outcomes

- Showing attainment of different outcomes for ALL students is NOT mandatory for BAETE. In the manual,

  "It must be demonstrated through evidence from appropriate evaluation that the students attain all the POs by the time of the graduation".

  There must be a process to make sure that "the students attain all the POs by the time of the graduation"

- It is not mandatory to show attainment of COs (and therefore POs) for all courses in every semester
  - Note that assessment of CO attainment after certain interval is necessary to close the CQI loop of CO
  - For multiple sections of the same course, sampling through one section is possible

Attainment of Outcomes

- POs must be assessed using direct methods.
- Select an appropriate model for PO attainment (culminating, dominating, etc.), not mandatory to bring all courses
- It is NOT mandatory to show PO attainment for all semesters, however most recent ones must be present
- Attainment of each PO must be demonstrated
  - State how the relevant Knowledge Profile attribute is incorporated
  - Identify the Complex Engineering Problems (P1 – P7) that are addressed through the attainment of PO(a) to PO(g)
  - Identify the Complex Engineering Activities (A1 – 57) that are addressed through the attainment of PO(j)

Complex Engineering Problems and Activities (CEPs and CEAs)

- The program must also demonstrate how each attribute of the Range of Complex Engineering Problems (P1 – P7) and Complex Engineering Activities (A1 – A5) is incorporated in the teaching, learning and assessment
- Students must learn
  - PO(a) to PO(g) through solving Complex Engineering Problems (CEP)
  - PO(j) through Complex Engineering Activities (CEA)
- In the attainment of PO(a) to PO(g) and PO(j)
  - Program must demonstrate through mapping how CEPs and CEAs are incorporated respectively in teaching, learning and assessment

Complex Engineering Problems and Activities (CEPs and CEAs)

POs	Example Assessment Tools
PO(a) Engineering Knowledge	Final Exam, Assignment
PO(b) Problem Analysis	Quiz, Final Exam, Assignment
PO(c) Design	Assignment, Laboratory Project

In case the program claims that CEPs and CEAs are incorporated through these assignments and Laboratory project

Program must demonstrate through mapping that the assignments and the laboratory project completed by the students meet the requirements of CEP and CEA

Culmination of POs

"The program must demonstrate the culmination of program outcomes (POs) at the level of solving engineering problems, preferably through a final-year project or capstone project extending over a period of one year."

Performance indicators

- A PO encompasses a number of performance indicators
  - PO(b): "Identify, formulate, research literature and analyse complex engineering problems….."
  - Culmination of a PO demonstrates that students learn all performance indicators of a specific PO while solving a single problem, which should be a CEP in case of PO(a) to PO(g)
  - Note that using performance indicator is not mandatory in Manual-v2.1

Culmination of POs through FYDP

- Although introducing FYDP is not mandatory in Manual-v2.1, culmination of POs are easily possible through FYDP
  - A number of COs need to be defined for each semester
  - COs can be mapped to sub-POs/performance indicator of POs
  - Assessment criteria for each CO and the corresponding deliverable(s) should be well defined
  - The problem solved in the FYDP must be a CEP and there should be activities to meet CEA
  - All necessary mappings should be present

Attainment of Program Educational Objectives (PEO)

"Curriculum and teaching-learning processes must support the attainment of PEOs."

- Program shows mappings between each PEO statement and Topics and Teaching-Learning processes in various courses supporting the attainment of that PEO

"A process must be developed to assess the level of attainment of each PEO..."

- Even a new program without any graduating students must develop the process

Continuous Quality Improvement (CQI)

Program must complete the CQI loops periodically for

COs	• Feedback from course instructors
POs	• Feedback from relevant stakeholders including graduates
PEOs	• Feedback from graduates and their employers
Curriculum and teaching quality	• feedback from faculty members and students

CQI loops should be a regular practice not done occasionally just before the accreditation visit

Documenting Interaction with the Industry in the SAR

Criteria 10: Interactions with the Industry

- Does industry provide feedback on the curriculum?
  - Review how Industry Advisory Panel participates in curriculum update
  - Review how industry professionals participate in establishing and updating the PEOs
  - Review survey, focus group discussion for receiving feedback from industry regarding program objective, outcomes, curriculum etc.
- Does alumni provide feedback on the curriculum?
  - Check whether there is any Alumni Association for the program graduates
  - Review whether any mechanism exists for receiving feedback on curriculum from alumni
  - Review survey, focus group discussion, alumni meeting minutes etc. regarding program objectives, outcomes, curriculum etc.

Criteria 10: Interactions with the Industry

- Does the program have an Industry Advisory Panel (IAP) and an Alumni Association (AA)

- Do students have opportunities to obtain industrial experience?
  - Check whether any internship required by the program
  - Check the number and type of industrial visits
  - Check whether there is any industry collaboration in final-year design projects
  - Check whether any faculty member supervises the final-year design projects providing experiences similar to that in real-life industry
  - Check whether there are experience sharing workshops/seminars participated by industry professionals

Interactions with the Industry

- Formalizing interactions through
  - Industry Advisory Panel (IAP)
  - Alumni Association (AA)
- Involvement of industry
  - in the development of the curriculum
  - Improving quality of the teaching-learning process
- Students must have opportunity to obtain industrial experience through
  - internships, industry visits or design projects

What to Include in the SAR

- IAP and AA related
  - Terms of References of the IAP
  - List of the members
  - Modalities of their participation in curriculum updates
- Industrial experience of students
  - Show evidence of such experiences
  - Internships, field visit, industrial attachment, professional training, interaction with industry for capstone or other design project

What's next?

Back to your own program and read the Manual carefully

Find out the gaps in your present practice

Take necessary actions to establish policy and practice

Collect necessary data and evidence

Start writing the SAR

Documentation is the key

Thank You

Acknowledgment:

- https://www.baetebangladesh.org/acc-man-00-f.html
- Presentation slides by Prof. Dr. Md. Saidur Rahman, CSE, BUET
- Presentation slides by Prof. Dr. Salekul Islam, CSE, UIU
- SAR of CE, BUET

14.11 Summary of the Requirements for B.Sc. Engg. (Civil) Degree

Courses	Requirements (Total Credits to be Offered)
A. Natural Science	12 (15)
B. Mathematics	9 (9)
C. Humanities and Social Sciences	9.5 (11.5)
D. Basic Engineering	48 (48)
E. Civil Engineering Practice	12.5 (18.5)
F. Structural Engineering	20.5 (38)
G. Environmental Engineering	8.5 (22)
H. Geotechnical Engineering	8.5 (22)
I. Transportation Engineering	8.5 (22)
J. Water Resources Engineering	8.5 (18.5)
Total	144.5
UG Thesis	3.0
Capstone Project	4.5
Optional Courses**: Theory	8.0 (38 in F to J, Max. 4 from each division)
Grand Total	161