

# BAETE Workshop for Program Evaluators

## Evidence-Based On-site Assessment during Accreditation Visits

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Dhaka

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Organized by

Board of Accreditation for Engineering and Technical Education (**BAETE**)

# Key Points

- Target audience – PEVs
- Criteria-based accreditation
- Evidence-based on-site assessment during accreditation visits
- Program outcomes (POs) attainment-assessment methodology.
- The DOs and DON'Ts during accreditation visit

# Attributes of PEVs

- Trust
- Integrity
- Competent
- Professionalism

# Conflict of interest

- Definition of possible conflict of interest:
  - have **financial or personal interest** in the university;  
or
  - have or have had a **close, active association with the programme or faculty/school** in the university. Close or active association are, for example:
    - **Employment**, as staff or consultant by the faculty/school;
    - **Attendance**, as student at the faculty/school;
    - **Business**, significant business dealing
    - **Receipt** of honorary degree from the faculty/school;
    - **Membership** of a board of the university or any committee advising on the programme being accredited.

# Part 1: BAETE's Accreditation Criteria

All the Accreditation Activities are  
for the purpose of deciding whether  
the program has satisfied the  
**8** BAETE Accreditation Criteria

# BAETE Accreditation Criteria

- 8 criteria in BAETE new Accreditation Manual
  - 1) **Organization and Governance**
  - 2) **Financial and Physical Resources**
  - 3) **Faculty**
  - 4) **Students**
  - 5) **Academic Facilities and Technical Support**
  - 6) **Curriculum and Teaching-Learning Process**
  - 7) **Objectives, Outcomes and Assessment**
  - 8) **Continuous Improvements**

# BAETE Accreditation Criteria

## - Enabling Resources & Facilities

- 8 criteria in BAETE new Accreditation Manual
  - 1) **Organization and Governance**
  - 2) **Financial and Physical Resources**
  - 3) **Faculty**
  - 4) **Students**
  - 5) **Academic Facilities and Technical Support**
  - 6) **Curriculum and Teaching-Learning Process**
  - 7) **Objectives, Outcomes and Assessment**
  - 8) **Continuous Improvements**

# Outcomes Focused Criteria

- 8 criteria in BAETE new Accreditation Manual
  - 1) Organization and Governance
  - 2) Financial and Physical Resources
  - 3) Faculty
  - 4) Students
  - 5) Academic Facilities and Technical Support
  - 6) Curriculum and Teaching-Learning Process
  - 7) Objectives, Outcomes and Assessment
  - 8) Continuous Improvements

# Criterion 1 - Program Educational Objectives (PEOs)

- Definition
  - “Program educational objectives (PEO) are broad statements that describe the **career and professional accomplishments** that the programme is preparing graduates to achieve.”
- Normally assessment conducted for alumni 3 to 5 years after graduation

# Criterion 1 - Program Educational Objectives (PEOs)

The program seeking accreditation must demonstrate that following are in place:

- a) Well-defined and published Program Mission
- b) Program's educational objectives defined and consistent with the mission & other criteria 2 to 11
- c) Program's educational objectives based on the stakeholder's needs
- d) A process in place to evaluate periodically the attainment of educational objectives **from attributes and accomplishments of graduates**
- e) Evaluation results used for continual improvement of the program

# Evidences - PEOs

- SAR – information on Criteria 1
- Check website and verify when interviewing faculty, students and alumni – “well-defined and published”
- Verify that PEO well-articulated, not in the form of SLOs (a common mistake)
- Check evidence of stakeholders involvement: industry advisory board, employers, alumni, faculty, students – survey, focus groups, etc
- Verify that “A process in place to evaluate periodically the attainment of educational objectives”
- Check that “evaluation results used for continual improvement of the program”
  - Who conduct evaluation?
  - Who receives evaluation results?
  - Who implement CQI?

# Criterion 2 – Program/Student Learning Outcomes (SLOs)

- Definition:
  - *“SLOs are the narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviours that the students acquire in their matriculation through the program.”*
- The program must demonstrate that by the time of graduation the students have attained a certain set of knowledge, skills and behavioral traits, at least to some acceptable minimum level (SLO).

# Criterion 3– Curriculum and Teaching-Learning Process

- 4-year, full-time program or equivalence.
- One-year full time study => 32 semester credit hours
- A culminating demonstration of learning outcomes at complex engineering problems via final year or capstone project
- Note: this slide is not based on actual BAETE requirements – for illustration only

# Evidences

- Not less than 128 semester credit hours (4 years full-time equivalence)
- Appropriate components of Math and Sciences
- Humanities
- Facilities for teaching-learning
- Systematic progress over the years
- Note: this slide is not based on actual BAETE requirements – for illustration only

# Criterion 3– Curriculum and Learning Process

- Internship program
- Laboratory work
- Design projects
- Final year project
- Co-curricular activities to hone personal skills
- Assessment of learning outcomes
- Student feedback
- Internal reviews of quality assurance procedure

# Assessment of learning outcomes

- The appropriateness of the assessment methods along with the level of achievement against the targeted outcomes must be evaluated.
- Mapping of program outcomes to individual courses, nature of assessment tools (direct/indirect/rubrics) and the process of evaluation to determine the attainment of SLOs should be demonstrated through reasonably convincing evidences.

# Criterion 4 - Students

- Admission criteria
- Annual intake
- Admission response
- Transfer of students
- Academic counseling
- Career and student wellness counseling

# Criterion 4 - Students

- Class size (theory)
- Class size (practical)
- Semester academic load
- Completion of courses and student feedback
- Participation in competition
- Student performance evaluation

# Student Performance Evaluation

- This aspect pertains to the various mechanisms being used for evaluating students' performance in the program courses, and their suitability and affectivity for assessment of the level of achievement of course learning outcomes.
- This may include a review of various class assignments, quizzes, research reports, examinations as well as lab projects and viva-voce.
- The number and variety of such assessment tools and their coverage of subject topics in a manner which ensures a reasonably accurate assessment of students' level of achievement against various learning outcomes is the key to monitor students' progress in a direct manner.
- It is expected that the program should demonstrate a minimum number of such class assignments, quizzes and examinations for assessment of SLOs.

# Criterion 5–Faculty

- Faculty strength – expertise to cover all curricular areas
- Full-time dedicated faculty
- Shared faculty
- Visiting faculty
- Faculty qualifications
- Student/faculty ratio

# Criterion 5–Faculty

- Faculty training & mentoring
- Faculty Retention, Development and Career Planning
- Pyramid of Academic Structure
- Faculty workload
- Faculty Research & Publications
- Faculty members should be trained on outcomes assessment, to set appropriate course outcomes and to apply a combination of direct and indirect assessment tools to determine the level of outcomes achievement

# Criterion 5–Faculty

- New faculty members without sufficient teaching experience should undergo training on teaching methodology. All faculty members should be trained on outcomes assessment to enable them to set appropriate course outcomes and to apply a combination of direct and indirect assessment tools to determine the level of outcomes achievement.

# Criterion 6–Facilities and Learning Environment

- adequacy of teaching and learning facilities such as classrooms, learning-support facilities, study areas, information resources (library), computing and information-technology systems, laboratories, workshops, and associated equipment to cater for multi-delivery modes.

# Criterion 7–Institutional Support and Financial Resources

- Financial resources and their commitment to support an engineering program.
- Adequacy of these resources to attract and retain well-qualified staff, continued development and career growth
- Acquisition, repair, maintenance & replacement of facilities and equipment

# Criterion 8– Governance & Continuous Quality Improvement

- Governance structure for formulation and implementation of policies
- Defined process for quality improvement, proficient closed-loop system
- Steps taken for improvement of program quality, particularly in the light of the observations of last accreditation visit.
- Information and reports that are prepared for continuous quality improvement related to different accreditation criteria

# Criterion 8– Governance & Continuous Quality Improvement

- The educational institution should have well defined process for continuous quality improvement.
- Continuous improvement is assured if a proficient closed-loop system is in place.
- The shortcomings and non-conformance identified during the last accreditation visit must be addressed.
- The educational institution should also provide details of the procedure of internal quality assessment, together with information of remedial measures taken for programme quality improvement.

# Criterion 9– Interaction between Educational Institution and Industry

- Industry participation in curriculum
- Students to have opportunity to acquire industrial experience – internship, design projects
- Industrial attachment to stipulate learning outcomes to be assessed

## Criterion 9– Interaction between Educational Institution and Industry

- There must be in place a form of communication channel between the educational institution and the industry.
- The industry should be encouraged to give feedback concerning the quality of the teaching-learning process and the relevance of the curriculum content to the local industry and the global market place.

# Criterion 10 – Specific Programme Criteria (Engineering Science)

- An Engineering Science programme should place greater emphasis on scientific and engineering fundamentals without compromising on engineering design component of the curriculum. It is expected that the content and depth of coverage of science subjects (e.g. mathematics, physics, chemistry, computing, materials science) are somewhat greater than that in a typical disciplinary engineering programme. Science and engineering subjects should be taught in an integrated manner so that the students are able to develop the ability to solve complex multi-disciplinary engineering problems. The programme should include design project courses providing students with hands-on learning of basic principles. Students should take a major design project, multidisciplinary in nature, incorporating different facets of engineering and an independent research project which preferably requires synthesis of both scientific and engineering knowledge. Provision of opportunities for industrial attachment is encouraged.

# Evidence-Based On-site Assessment

# Purpose of campus visit

- Assessment of qualitative factors which cannot be documented in written submission
  - intellectual atmosphere, morale, professional attitudes, quality of staff and students
- Examination of materials compiled by educational institution, i.e. those which cannot leave the campus
  - examination papers, student reports, instruction materials
- Clarify issues in the written submission by educational institution

# Outcomes of Campus Visits & Assessment based on Pre-Visit Documents

- The role of the Evaluation Team is for the sole purpose of determining whether the program satisfies the 8 BAETE accreditation criteria
- For each criterion, the degree of compliance to be summed up as:
  - Compliance
  - Concerns
  - Weakness
  - Deficiency

# Outcomes of Campus Visits & Assessment based on Pre-Visit Documents

- Where requirements of a particular criterion are not fully met, the Team will include:
  - Recommendation - aspects which are suggestions rather than mandatory requirements
  - Requirement - items requiring follow-up action as a condition of accreditation
- The Team may include observations/comments/suggestion to assist improvement process, not affecting accreditation decision

# What the PEVs looks for?

- PEVs are sent to evaluate programs, certifying that they satisfy the criteria stipulated
- They look for evidences that the required criteria are met
- They identify deficiencies, weaknesses, concerns

# Focus of Outcomes-based Accreditation

- Attainment of published Program Education Objectives
- Attainment of Program Learning Outcomes
- Continuous Quality Improvement system in place to sustain and improve PEO & PLO
- Resources and system available

# Outcomes of Significance

- The focus of accreditation is on “Outcomes of Significance”
- Spady articulated as something that “really mattered in the long run”, long after that particular segment of curriculum or time block was over – something that learners could ultimately “take out the door and apply” .... when they “exited” the system.
- That outcomes-of-significance is encapsulated in the set of WA graduate attributes which form the multi-lateral recognition of substantial equivalency of programs within the WA framework.

# Evaluation of SLOs

- Attainment of each SLOs must be carefully evaluated in terms of depth and breadth stipulated – going through evidences provided
- Application to Complex Engineering Problems

New Accreditation Manual -  
Program Learning Outcomes

# BAETE's 12 PLOs are identical to WA GAs



## Constituent Agreements

Washington Accord  
Sydney Accord  
Dublin Accord

International Professional Engineers Agreement  
International Engineering Technologists Agreement  
APEC Engineer Agreement

## **Graduate Attributes and Professional Competencies**

**Version 3: 21 June 2013**

This document is available through the IEA website: <http://www.ieagrements.org>.

# Graduate Attributes

- *Graduate attributes form a set of individually assessable outcomes indicative of the graduate's potential competency.*
- *Attributes expected of graduate from an accredited programme - expected capability appropriate to the type of programme.*
- The graduate attributes are intended to assist outcomes-based accreditation criteria.

# PLO #1

- **Engineering Knowledge:**
  - Apply the knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

# PLO #2

- **Problem Analysis:**
  - Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

# PLO #3

- **Design/Development of Solutions:**
  - 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.

# PLO #4

- **Investigation:**

- Conduct investigation of complex engineering problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

# PLO #5

- **Modern Tool Usage:**
  - Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities, with an understanding of the limitations.

# PLO #6

- **The Engineer and Society:**
  - Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

# PLO #7

- **Environment and Sustainability:**
  - Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

# PLO #8

- **Ethics:**
  - Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

# PLO #9

- **Individual and Team Work:**
  - Function effectively, as an individual, as as a member or leader in diverse teams, and in multidisciplinary settings.

# PLO #10

- **Communication:**

- 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.

# PLO #11

- **Project Management & Finance:**
- Demonstrate knowledge and understanding of the engineering and management principles and economic decision-making, and apply to one's own work, as a member and leader in a team, to manage projects in a multidisciplinary environment.

# PLO #12

- **Lifelong Learning:**
  - Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broader context of technological change.

# Assessment of Attainment of Student Learning Outcomes



# Student Learning Outcomes (SLO)

- SLOs formulated for each programme by the institution must be consistent with the WA's Graduate Attributes. (Best practice to follow WA's Graduate Attributes, and add additional SLOs where required)
- SLOs must foster the attainment of the PEOs – mapping of SLOs to PEOs
- How and where SLOs are published and disseminated



# Student Learning Outcomes

- Illustrations of how
  - course outcomes
  - modes of delivery of the courses
  - assessment tools
  - laboratory
  - project course workare used to assess the impact of course delivery/course content, and are contributing towards the attainment of the SLOs
- Attainment of SLOs assessed by direct and indirect methods

## Student Learning Outcomes

- Results of assessment of each SLO shall be indicated as they play a vital role in implementing the Continuous Improvement process of the programme
- How the results of assessment of the SLOs are used to improve the programme in terms of
  - curriculum
  - course delivery
  - assessment methods
  - processes of revising/redefining the SLOs

**3.1. Establish the correlation between the courses and the Program Outcomes (POs) & Program Specific Outcomes (25)**

**Program Articulation Matrix**

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
C101												
C202												
C303												
....												
....												
C4...												

1. Enter correlation levels 1, 2 or 3 as defined below:

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

*If there is no correlation, put "-"*

## Programme Curriculum

- Programme curriculum that leads to the attainment of the PEOs and the SLOs must be designed
- Flow diagram that shows the prerequisites for the courses shall also be provided
- Each programme should cover general and specialized professional content of adequate breadth and depth
- Appropriate components in the Sciences and Humanities.

# Programme Curriculum

- The relevance of curriculum components including core engineering courses to the SLOs
- How the core engineering subjects in the curriculum lend the learning experience with the complex engineering problems
- Programme must satisfy Programme Specific Criteria
- Continuous Improvement process in curriculum refinement
- Evidence of assessment, evaluation and review methods – attainment of COs

**2.1.3. State the components of the curriculum (5)**

*Program curriculum grouping based on course components*

<b>Course Component</b>	<b>Curriculum Content (% of total number of credits of the program )</b>	<b>Total number of contact hours</b>	<b>Total number of credits</b>
Basic Sciences			
Engineering Sciences			
Humanities and Social Sciences			
Program Core			
Program Electives			
Open Electives			
Project(s)			
Internships/Seminars			
Any other (Please specify)			
<b>Total number of Credits</b>			

**Table 3.1: Curriculum and teaching processes to achieve Student Learning Outcomes, and evaluation method/criteria**

Module title	Category <sup>#</sup>	Evaluation method & criteria	Student Learning Outcomes*								
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	--	
		• •		•							
		• •			•						
		• •					•				
		• •									
		• •									
		• •									

# Category is to indicate whether module is Core, Electives, Faculty Requirements, Major Requirements, University Requirements, Unrestricted Elective, etc

**Table 3.2: Curriculum / Course Time Allocation and Content**

**(A) Course Time Allocation by semester**

Semester n Year n:

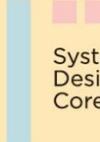
Course Title	Total Number of Contact Hours					No of MCs or AUs <sup>2</sup>
	Lec <sup>3</sup>	Tut/Con <sup>4</sup>	Lab <sup>5</sup>	Proj <sup>6</sup>	Total Hrs	
<b>Total</b>						

# ***Complex problems***

*(A requirement of WA)*

- *Involve wide-ranging or conflicting technical, engineering and other issues*
- *Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models*
- *Requires research-based knowledge much of which is at, or informed by, the forefront of the professional discipline and which allows a fundamentals-based, first principles analytical approach*
- *Involve infrequently encountered issues*
- *Are outside problems encompassed by standards and codes of practice for professional engineering*
- *Involve diverse groups of stakeholders with widely varying needs*
- *Have significant consequences in a range of contexts*
- *Are high level problems including many component parts or sub-problems*

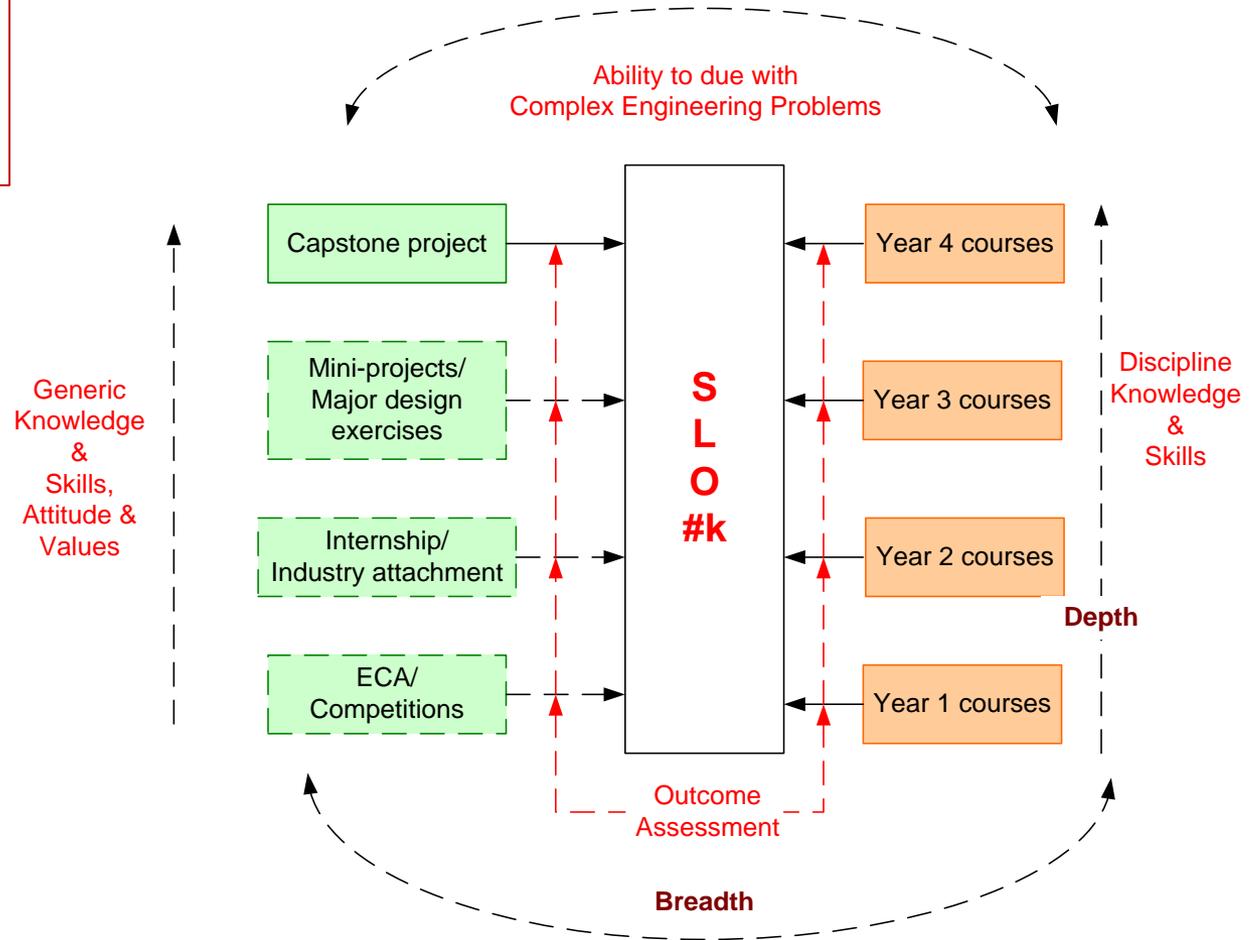
**Unique Academic Structure at Singapore University of Technology and Design**  
<http://www.sutd.edu.sg/Education/>

		ARCHITECTURE AND SUSTAINABLE DESIGN (ASD)	ENGINEERING PRODUCT DEVELOPMENT (EPD)	ENGINEERING SYSTEMS AND DESIGN (ESD)	INFORMATION SYSTEMS TECHNOLOGY AND DESIGN (ISTD)
<b>PILLAR</b>	<b>TERM 4 TO 8</b>	Capstone: Integrated Design Experience			
		Technical Application Electives			
		 Architecture Core	 Product Design Core	 System Design Core	 Info Design Core
		Entrepreneurship, Management, Social Sciences, Economics, Humanities, Arts			
<b>FRESHMORE</b>	<b>TERM 3</b>	Modelling the Systems World, Engineering in the Physical World, The Digital World, Introduction to Biology* and Introduction to Physical Chemistry*			
	<b>TERM 2</b>	Advanced Math II, Physics II, Introduction to Design, and Theorising Society, the Self, and Culture			
	<b>TERM 1</b>	Advanced Math I, Physics I, Chemistry and Biology: Natural World, and World Texts and Interpretations			

# Evaluation of SLOs

- Attainment of each SLOs must be carefully evaluated in terms of depth and breadth stipulated – going through evidences provided
- Application to Complex Engineering Problems

The achievement of each SLO, both breadth and depth, should be assessed and evaluated.



# SLO Folder

- For accreditation evaluation, good to prepare a folder for each outcomes
- Contains relevant subjects and assessment details which support achievement of the SLO
- Includes other student learning activities and assessment details
- Samples of student work



# Evidence beyond mapping exercise

- Program Accreditation Committee undertake the task of mapping subjects/courses to each outcomes
- Faculty teaching a particular subject is not aware of the outcomes contribution from his subject, and has not conducted proper outcomes assessment
- Just a mapping exercise – not acceptable

# Evidences from Meetings/Interviews

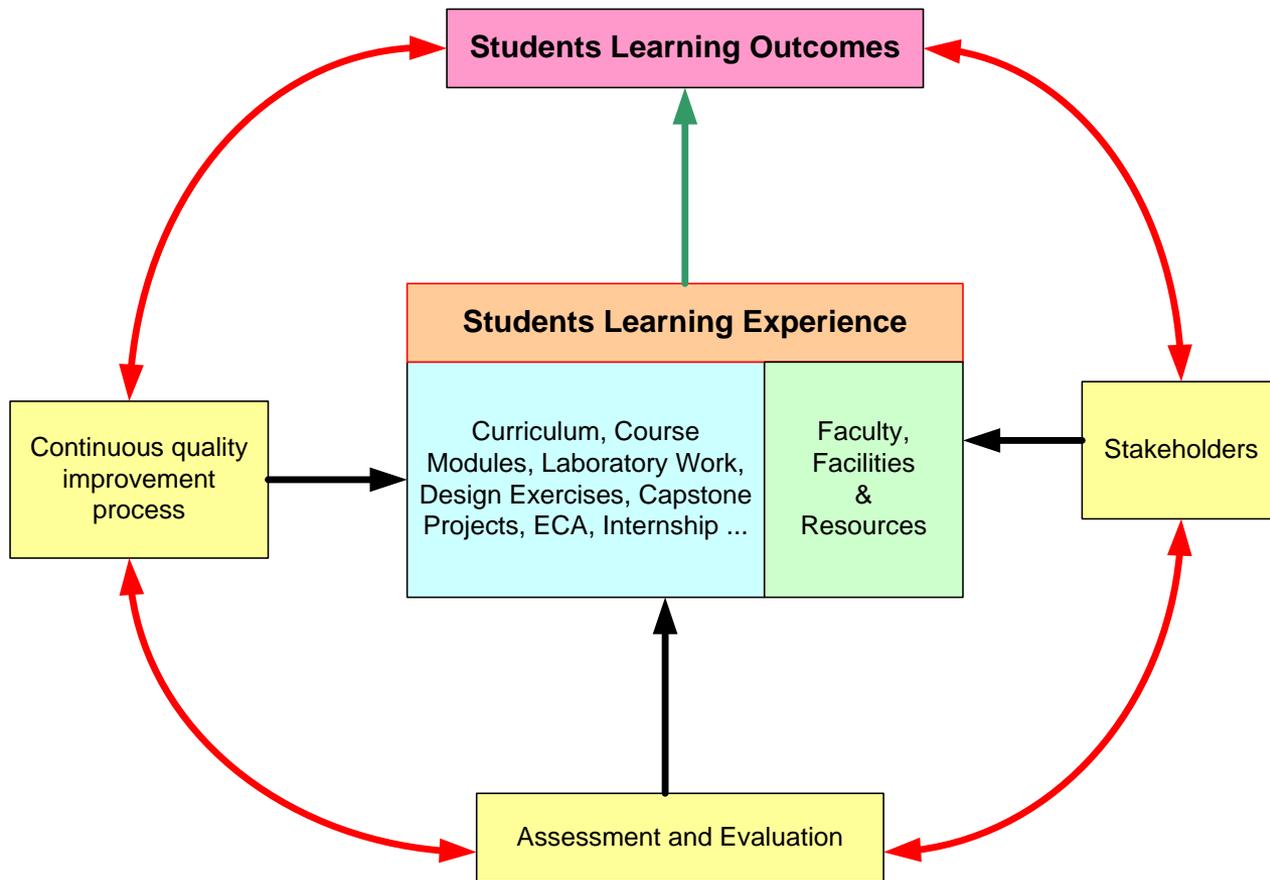
- Provost/President
- Dean and Head of Department/Program
- Group of faculty members
- Group of alumni
- Group of students
- Group of other constituencies, e.g. members of industrial advisory board, employers

# Evidences from Examination of Exhibits (1)

- Sample of teaching materials
- CV of faculty staff, publications
- Sample of exam papers
- Sample of exam scripts –excellent, good, marginal
- Transcripts of immediate past graduates
- Sample project and design reports
- Sample of industry attachment reports & assessment

# Evidences from Examination of Exhibits (2)

- Samples of student feedback form
- Reports of other internal or external reviews of the course, department and faculty
- Results of quality assurance reviews
- Statistics of graduate employment
- Other documents requested by the evaluation team



# Course Learning Outcomes (COs)

- A learning outcome is what a student can do as a result of a learning experience.
- It describes a specific task that student is able to perform at a given level of competence under a certain situation.
- The three broad types of learning outcomes are:
  - Disciplinary knowledge and skills
  - Generic skills
  - Attitudes and values

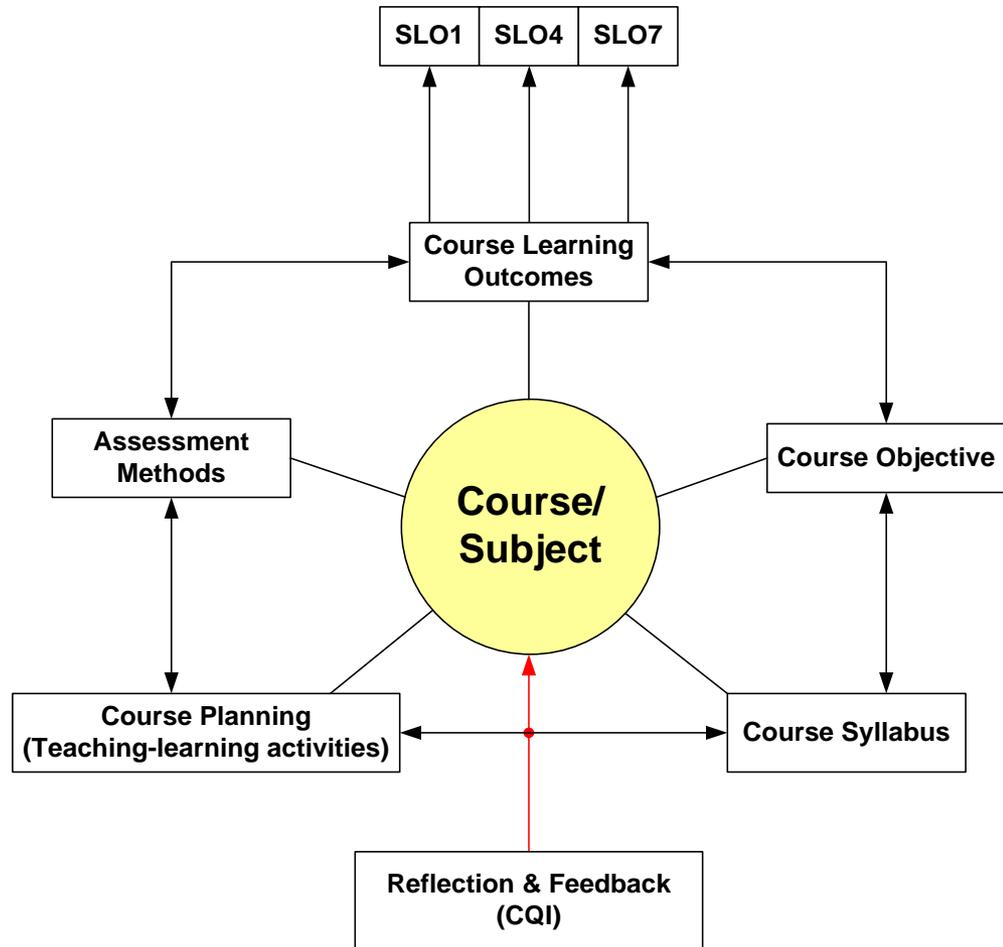


# Course Learning outcomes

- Course Learning Outcomes describe the complex performances a student should be capable of as a result of learning experiences within a course.
- These are determined by the course instructor (s)
- Mapping course learning outcomes to program outcomes and how overall learning experience meet the accreditation criteria

Learning outcomes of a subject/course may support several SLOs.

Evidence of course assessment to be documented.



# Contribution of each course

- Each undergraduate course in the programme contributes to a list of SLOs
- Usually, a course may contribute strongly to some SLOs and less strongly to other SLOs
- While a course may contribute to several SLOs, usually only a subset of its strong outcomes need to be used for SLO assessment.

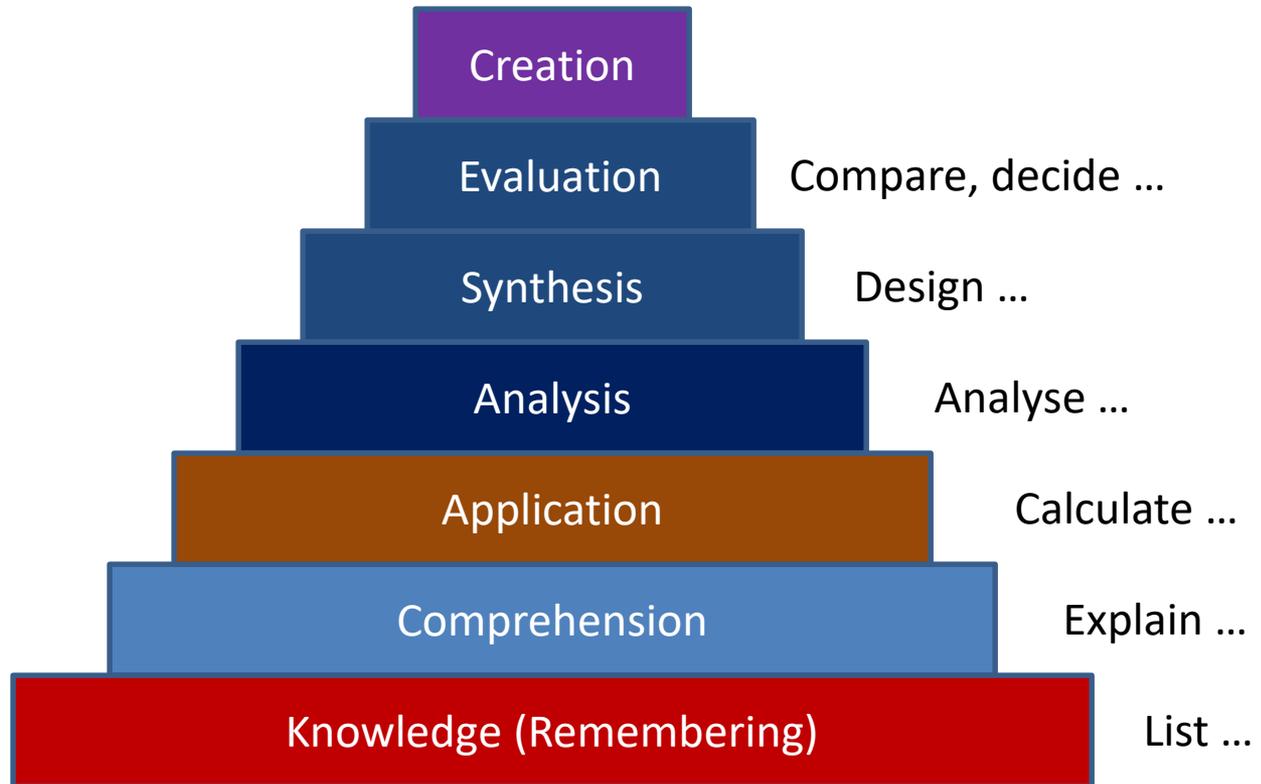
# Evidences of Outcomes Assessment

- Not merely mapping of courses to outcomes
- Evidence of outcomes assessment at course level
- Evidence that faculty has training in conducting outcomes assessment
- Going beyond subject/course marks & grading being used as justification that overall outcomes are contributed by the subject(s)

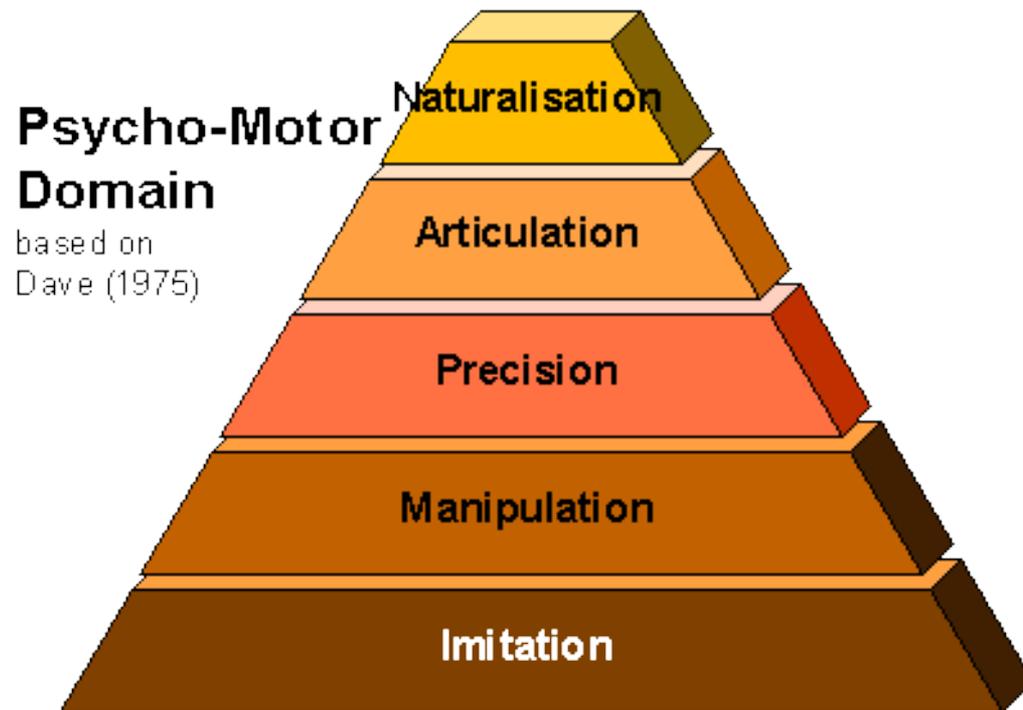
## Evidence of Faculty actively involved in outcomes assessment

- Do faculty members know the requirements of outcome-based accreditation?
- Are they trained in outcomes assessment?
- Evidence of faculty conducting outcomes assessment at their courses
- Reflection and continuous improvement at course level

Bloom's Taxonomy – Cognitive Domain  
(modified by Anderson & Krathwohl)



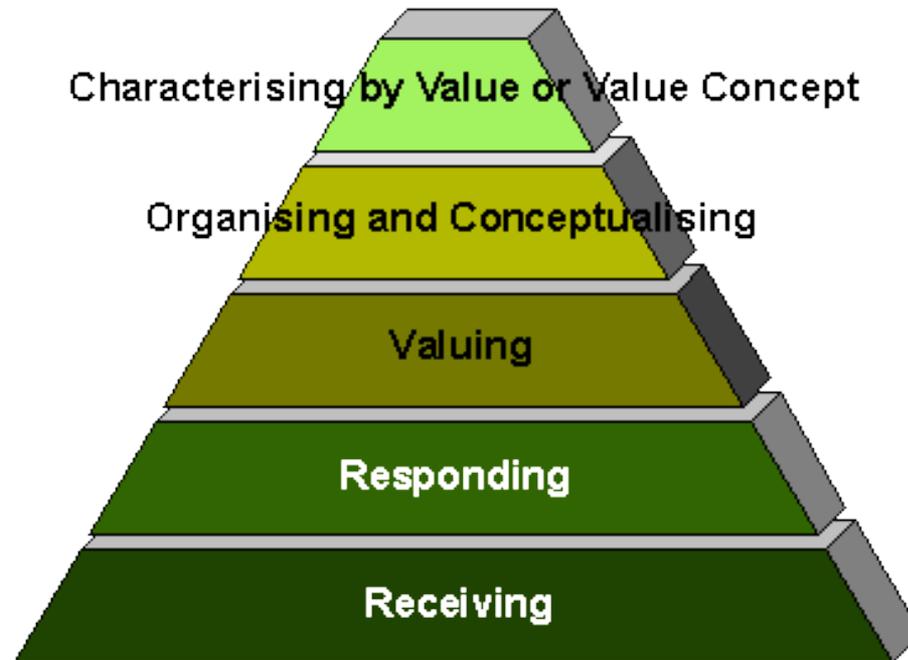
# Psychomotor Domain



26/2/11/09

# Affective Domain

Affective domain



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<http://www.learningandteaching.info/learning/bloomtax.htm>

**COGNITIVE** learning is demonstrated by knowledge recall and the intellectual skills: comprehending information, organizing ideas, analyzing and synthesizing data, applying knowledge, choosing among alternatives in problem-solving, and evaluating ideas or actions.

Level	Illustrative Verbs	Definition	Example
Knowledge	arrange, define, describe, duplicate, identify, label, list, match, memorize, name, order, outline, recognize, relate, recall, repeat, reproduce, select, state	remembering previously learned information	memory of specific facts, terminology, rules, sequences, procedures, classifications, categories, criteria, methodology, principles, theories, and structure
Comprehension	classify, convert, defend, describe, discuss, distinguish, estimate, explain, express, extend, generalize, give examples, identify, indicate, infer, locate, paraphrase, predict, recognize, rewrite, report, restate, review, select, summarize, translate	grasping the meaning of information	stating problem in own words, translating a chemical formula, understanding a flow chart, translating words and phrases from a foreign language
Application	apply, change, choose, compute, demonstrate, discover, dramatize, employ, illustrate, interpret, manipulate, modify, operate, practice, predict, prepare, produce, relate, schedule, show, sketch, solve, use, write	applying knowledge to actual situations	taking principles learned in math and applying them to figuring the volume of a cylinder in an internal combustion engine
Analysis	analyze, appraise, break down, calculate, categorize, compare, contrast, criticize, diagram, differentiate, discriminate, distinguish, examine, experiment, identify, illustrate, infer, model, outline, point out, question, relate, select, separate, subdivide, test	breaking down objects or ideas into simpler parts and seeing how the parts relate and are organized	discussing how fluids and liquids differ, detecting logical fallacies in a student's explanation of Newton's 1st law of motion
Synthesis	arrange, assemble, categorize, collect, combine, comply, compose, construct, create, design, develop, devise, design, explain, formulate, generate, integrate, manage, modify, organize, plan, prepare, propose, rearrange, reconstruct, relate, reorganize, revise, rewrite, set up, summarize, synthesize, tell, write	rearranging component ideas into a new whole	writing a comprehensive report on a problem-solving exercise, planning a program or panel discussion, writing a comprehensive term paper
Evaluation	appraise, argue, assess, attach, choose, compare, conclude, contrast, defend, describe, discriminate, estimate, evaluate, explain, judge, justify, interpret, relate, predict, rate, select, summarize, support, value	making judgments based on internal evidence or external criteria	evaluating alternative solutions to a problem, detecting inconsistencies in the speech of a student government representative

Gronlund, N. E. (1981). *Measurement and evaluation in teaching, 4th ed.* New York, Macmillan Publishing.

McBeath, R. J., (Ed.). (1992). *Instructing and evaluating in higher education: A guidebook for planning learning outcomes.* Englewood Cliffs, NJ: Educational Technology

**AFFECTIVE** learning is demonstrated by behaviors indicating attitudes of awareness, interest, attention, concern, and responsibility, ability to listen and respond in interactions with others, and ability to demonstrate those attitudinal characteristics or values which are appropriate to the test situation and the field of study.

Level	Illustrative Verbs	Definition	Example
Receiving	asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits erect, replies, uses	willingness to receive or attend	listening to discussions of controversial issues with an open mind, respecting the rights of others
Responding	answers, assists, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes	active participation indicating positive response or acceptance of an idea or policy	completing homework assignments, participating in team problem-solving activities
Valuing	completes, describes, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works	expressing a belief or attitude about the value or worth of something	accepting the idea that integrated curricula is a good way to learn, participating in a campus blood drive
Organization	adheres, alters, arranges, combines, compares, completes, defends, explains, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes	organizing various values into an internalized system	recognizing own abilities, limitations, and values and developing realistic aspirations
Characterization by a value or value complex	acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, uses, verifies	the value system becomes a way of life	a person's lifestyle influences reactions to many different kinds of situations

Gronlund, N. E. (1981). *Measurement and evaluation in teaching, 4th ed.* New York, Macmillan Publishing.

McBeath, R. J., (Ed.). (1992). *Instruction and evaluating in higher education: A guidebook for planning learning outcomes.* Englewood Cliffs, NJ: Educational Technology Publications.

**PSYCHOMOTOR** learning is demonstrated by physical skills: coordination, dexterity, manipulation, grace, strength, speed; actions which demonstrate the fine motor skills such as use of precision instruments or tools, or actions which evidence gross motor skills such as the use of the body in dance or athletic performance.

Level	Illustrative Verbs	Definition	Example
Perception	chooses, describes, detects, differentiates, distinguishes, identifies, isolates, relates, selects, separates	using sense organs to obtain cues needed to guide motor activity	listening to the sounds made by guitar strings before tuning them, recognizing sounds that indicate malfunctioning equipment
Set	begins, displays, explains, moves, proceeds, reacts, responds, snobs, starts, volunteers	being ready to perform a particular action: mental, physical or emotional	knowing how to use a computer mouse, having instrument ready to play and watching conductor at start of a musical performance, showing eagerness to assemble electronic components to complete a task
Guided response	assembles, builds, calibrates, constructs, dismantles, displays, dissects, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches	performing under guidance of a model: imitation or trial and error	using a torque wrench just after observing an expert demonstrate a its use, experimenting with various ways to measure a given volume of a volatile chemical
Mechanism	(same list as for guided response)	being able to perform a task habitually with some degree of confidence and proficiency	demonstrating the ability to correctly execute a 60 degree banked turn in an aircraft 70 percent of the time
Complex or overt response	(same list as for guided response)	performing a task with a high degree of proficiency and skill	dismantling and re-assembling various components of an automobile quickly with no errors
Adaptation	adapts, alters, changes, rearranges, reorganizes, revises, varies	using previously learned skills to perform new but related tasks	using skills developed learning how to operate an electric typewriter to operate a word processor
Origination	arranges, combines, composes, constructs, creates, designs, originates	creating new performances after having developed skills	designing a more efficient way to perform an assembly line task

Gronlund, N. E. (1981). *Measurement and evaluation in teaching, 4th ed.* New York, Macmillan Publishing.

McBeath, R. J., (Ed.). (1992). *Instruction and evaluating in higher education: A guidebook for planning learning outcomes.* Englewood Cliffs, NJ: Educational Technology Publications.

# SLOs & Assessment Domains

	SLO	Assessment Domain	Evidence?
1	Engineering Knowledge	Cognitive	
2	Problem Analysis	Cognitive	
3	Design/Development of Solutions	Cognitive, Affective	
4	Investigation	Cognitive, Psychomotor	
5	Modern Tool Usage	Psychomotor, Cognitive	
6	Engineer & Society	Affective	
7	Environment & Sustainability	Affective, Cognitive	
8	Ethics	Affective	
9	Individual & Team Work	Psychomotor, Affective	
10	Communication	Psychomotor, Affective	
11	Project Management & Finance	Cognitive, Psychomotor	
12	Life-long Learning	Affective, Psychomotor	

# Avoid Obsession with Assessment

- Assessment involves:
  - Cognitive domain (thinking, knowledge)
  - Psychomotor domain (doing, skills)
  - Affective domain (feeling & attitude)
- Is the assessment efforts sustainable?

# Wrong Justification of Outcomes Attainment

- Wrong interpretation of the Bloom's Taxonomy
- Entry level courses are used to map achievement of outcomes at mastery level simply because some assessment exercises include activities of
  - Write
  - Evaluate
  - Design, etc
- Note that Complex Engineering Problems should be used for assessment at masterly level

# Evidences that Curriculum adequate to support all the 12 SLOs

- Curriculum adequately structured to achieve all the 12 SLOs?
- Common curriculum deficiencies
  - The engineer and society
  - Environment and sustainability
  - Ethics
  - Finance and project management

# Curriculum

- Does the curriculum satisfy the program specific criteria of the particular engineering discipline?
- Are performance indicators established to measure the outcomes of the courses with respect to the student learning outcomes of accreditation criteria)?
- Major design experience?
- Prerequisites
- Course syllabi
- Cores and electives

# Adequate evidences to demonstrate compliance with criteria?

- Sufficient evidences to demonstrate compliance with criteria?
- Best practices
  - Course folders
  - Folders for each outcomes
  - Samples of student portfolio

# Check Samples of Student Works

- Each course is required to save samples of student homework solutions, laboratory reports, project or design reports, and exam solutions, typically from poor to good quality.
- At the end of each quarter, the lecturers of all undergraduate courses must compile a binder containing in addition to the solutions, the corresponding homework questions, exam questions, lab description, and project description.

Assessment  
&  
Demonstration of Outcomes Achievement

Breadth  
Depth  
Where gained  
Learning Process  
Assessment Methods

**Reference:** **Designing Better Engineering Education Through Assessment**  
*by JE Spurlin, SA Rajala & JP Lavelle*  
*Stylus Publishing LLC, 2008*

# Assessment of SLO

- Assessment is big subject and probably the major challenge of the teaching faculty
- Are assessment methods adequate to provide evidence of achievement of SLO?
- Each SLO may be measured or evaluated in terms of performance indicators
- Is there a system in place to ensure that students will acquire the stated SLO before graduation? (bearing in mind the various core and optional subjects available, and overseas attachment)

# Sustainable Program Assessment Processes

- Direct and indirect methods of assessment to be applied to measure a wide variety of different student abilities
- Consider best fit between program needs, satisfactory validity and affordability (time, money and effort)
- Need to use multiple methods to maximise validity and reduce bias of any approach – triangulation.

Terms	Definition
Program Educational Objective	Broad statements that describe the career and professional accomplishments that the program is preparing the graduates to achieve.
Student outcomes	Narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire in their matriculation through the program.
Performance Indicators (Criteria)	Specific, measurable statements identifying the performance(s) required to meet the outcome; confirmable through evidence.
Assessment	Assessment is one or more processes that identify, collect, and prepare data to evaluate the attainment of student outcomes and program educational objectives. Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the objective or outcome being measure. Appropriate sampling methods may be used as part of an assessment process.
Evaluation	Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment processes. Evaluation determines the extent to which student outcomes and program educational objectives are being attained. Evaluation results in decisions and actions regarding program improvement

## ABET Definitions

# Assessment

- Assessment is one or more processes that identify, collect, and prepare data to evaluate the attainment of student learning outcomes and program educational objectives.
- Effective assessment uses relevant direct, indirect, quantitative and qualitative measures as appropriate to the objective or outcome being measured.
- Appropriate sampling method may be used as part of an assessment process.

# Evaluation

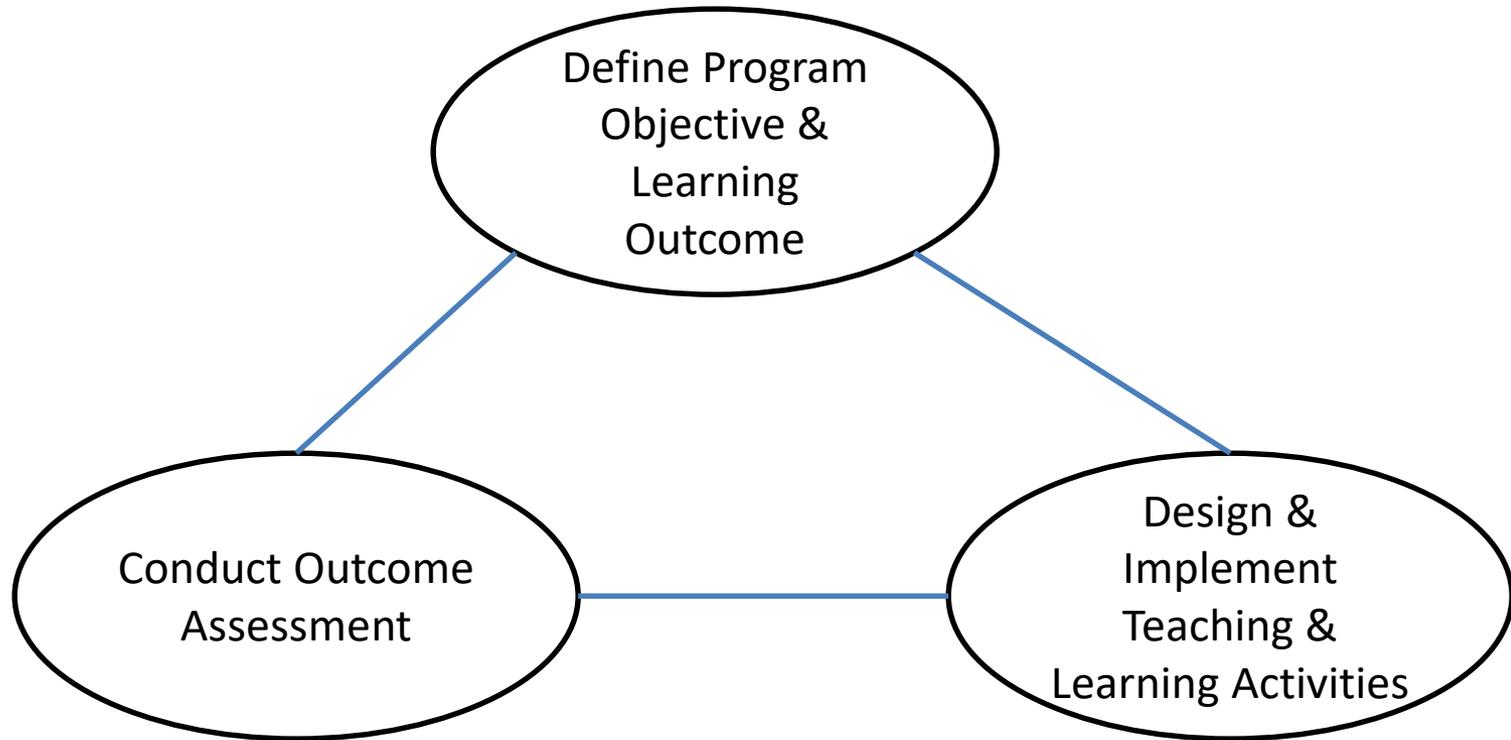
- Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment processes.
- Evaluation determines the extent to which student outcomes and program educational objectives are being attained.
- Evaluation results in decisions and actions regarding program improvement.

# Outcome based education & assessment

- An OBE curriculum means starting with a clear picture of what is important for students to be able to do, then organizing the curriculum, instruction and assessment to make sure this learning ultimately happens.

A learning outcome is what a student CAN DO as a result of a learning experience. It describes a specific task that he/she is able to perform at a given level of competence under a certain situation. The three broad types of learning outcomes are:

- Disciplinary knowledge and skills
- Generic skills
- Attitudes and values



What students are able to do once they have completed a course or program?  
What evidence that they are able to do so?  
How to assess each learning outcome?  
What evidence of student learning is most relevant for each learning outcome?  
What standard or criteria to be used to evaluate that evidence?

Selecting teaching and learning activities to help students to attain the intended learning outcomes and engage them in these learning activities through the teaching process.

# Steps for assessment design

- 1) Define results to be measured
- 2) Identify data required and sources
- 3) Review existing assessment method
- 4) Define additional methods and measures
- 5) Implement & evaluate

# Assessment tools and methods

- **Formative assessment**

The collection of information about student learning during the progression of a course or program in order to improve students learning. Example: reading the first lab reports of a class to assess whether some or all students in the group need a lesson on how to make them succinct and informative.

# Summative assessment

- The gathering of information at the conclusion of a course, program, or undergraduate career to improve learning or to meet accountability demands. When used for improvement, impacts the next cohort of students taking the course or program. Examples: examining student final exams in a course to see if certain specific areas of the curriculum were understood less well than others; analyzing senior projects for the ability to integrate across disciplines.

# Rubric

- A rubric is a set of criteria for assessing student work or performance. Rubrics are particularly suited to learning outcomes that are complex or not easily quantifiable, for which there are no clear “right” or “wrong” answers, or which are not evaluated with standardized tests or surveys. Assessment of writing, oral communication, critical thinking, or information literacy often requires rubrics.

Figure 2: Example of Rubrics (Accessed from Rogers, 2010)

Communication Skills				
	Performance Criteria	Performance Criteria	Performance Criteria	Performance Criteria
Exemplary 4				
Satisfactory 3				
Developing 2				
Unsatisfactory 1				

The diagram illustrates the structure of a rubric for Communication Skills. It consists of a table with four columns labeled 'Performance Criteria' and four rows labeled 'Exemplary 4', 'Satisfactory 3', 'Developing 2', and 'Unsatisfactory 1'. A vertical bracket on the left side of the table groups the rows into 'Scales'. A horizontal bracket at the top of the table groups the columns into 'Dimensions'. A horizontal bracket at the bottom of the table groups the columns into 'Descriptors'. The 'Developing 2' row is highlighted in yellow.



## Rubric For Conducting Laboratory Experiments

Criteria	1	2	3	4	5
<b>Set-up and Equipment Care</b>	<ul style="list-style-type: none"> <li>Set-up of equipment is not accurate, help is required with several major details</li> <li>Many necessary supplies must be found in mid-lab</li> </ul>	<ul style="list-style-type: none"> <li>Set-up of equipment is generally workable with several details that need refinement</li> <li>Some necessary supplies must be searched out</li> </ul>	<ul style="list-style-type: none"> <li>Set-up of equipment is generally accurate with 1 or 2 small details that need refinement</li> <li>All necessary supplies on hand</li> </ul>	<ul style="list-style-type: none"> <li>All equipment accurately placed</li> <li>All necessary supplies on hand</li> </ul>	<ul style="list-style-type: none"> <li>All equipment accurately placed</li> <li>All necessary supplies on hand</li> <li>Very neat and organized</li> </ul>
<b>Following Procedure</b>	<ul style="list-style-type: none"> <li>Lacks the appropriate knowledge of the lab procedures</li> <li>Often requires help from the teacher to even complete basic procedures</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrates general knowledge of lab procedures</li> <li>Requires help from teacher with some steps in procedures</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrates good knowledge of the lab procedures</li> <li>Will ask peers for help with problems in lab procedures</li> <li>Works to follow each step before moving on to the next step</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrates sound knowledge of lab procedures</li> <li>Will discuss with peers to solve problems in procedures</li> <li>Carefully follows each step</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrates very good knowledge of the lab procedures</li> <li>Gladly helps other students to follow procedures</li> <li>Thoroughly and carefully follows each step before moving on to next step</li> </ul>
<b>Data Collection</b>	<ul style="list-style-type: none"> <li>Measurements are incomplete, inaccurate and imprecise</li> <li>Observations are incomplete or not included</li> <li>Symbols, units and significant figures are not included</li> </ul>	<ul style="list-style-type: none"> <li>Measurements are somewhat inaccurate and very imprecise</li> <li>Observations are incomplete or recorded in a confusing way</li> <li>There are 3 or more minor errors using symbols, units and significant digits or 2 major errors</li> </ul>	<ul style="list-style-type: none"> <li>Measurements are mostly accurate</li> <li>Observations are generally complete</li> <li>Work is organized</li> <li>Only 2 or 3 minor errors using symbols, units and significant digits</li> </ul>	<ul style="list-style-type: none"> <li>Measurements are accurate with reasonable precision</li> <li>Observations are thorough</li> <li>Work is generally neat and organized</li> <li>Includes symbols, units and significant digits</li> </ul>	<ul style="list-style-type: none"> <li>Measurements are both accurate and precise</li> <li>Observations are very thorough and may recognize possible errors in data collection</li> <li>Work is neat and organized</li> <li>Includes appropriate symbols, units and significant digits</li> </ul>
<b>Safety</b>	<ul style="list-style-type: none"> <li>Proper safety precautions are consistently missed</li> <li>Needs to be reminded often during the lab</li> </ul>	<ul style="list-style-type: none"> <li>Proper safety precautions are often missed</li> <li>Needs to be reminded more than once during the lab</li> </ul>	<ul style="list-style-type: none"> <li>Proper safety precautions are generally used</li> <li>May need to be reminded once during the lab</li> </ul>	<ul style="list-style-type: none"> <li>Proper safety procedures are consistently used</li> <li>Uses general reminders of safe practices independently</li> </ul>	<ul style="list-style-type: none"> <li>Proper safety precautions are consistently used</li> <li>Consistently thinks ahead to ensure safety</li> <li>Will often help other students to conduct labs safely</li> </ul>
<b>Clean-up</b>	<ul style="list-style-type: none"> <li>Proper clean-up procedures are seldom used</li> <li>Often requires help to complete clean-up</li> <li>3 or more items left at station or station not cleaned</li> </ul>	<ul style="list-style-type: none"> <li>Needs to be reminded more than once during the lab to use proper clean-up procedures</li> <li>1 or 2 items left at station or not cleaned</li> </ul>	<ul style="list-style-type: none"> <li>Proper clean-up procedures generally used</li> <li>May need some help on occasion to complete tasks</li> <li>Station generally left clean</li> </ul>	<ul style="list-style-type: none"> <li>Consistently uses proper clean-up procedures</li> <li>Station generally neat and clean</li> </ul>	<ul style="list-style-type: none"> <li>Consistently uses proper clean-up procedures</li> <li>Often will help other students to complete tasks properly</li> <li>Station always left neat and clean</li> </ul>

**RBG: RUBRIC FOR EVALUATING PROGRAM OUTCOME B**

***"DESIGN AND CONDUCT ELECTRICAL ENGINEERING EXPERIMENTS, AS WELL AS TO ANALYZE AND INTERPRET DATA"***

<b>Performance Indicator</b>	<b>Exemplary 4</b>	<b>Satisfactory 3</b>	<b>Developing 2</b>	<b>Unsatisfactory 1</b>
<b>Ability to conduct experiment</b>	Quite able to conduct the entire experiment with negligible help from the lab instructor.	Able to conduct experiment with some help from the lab instructor.	Able to conduct experiment with a lot of help from the lab instructor.	Unable to conduct experiment on his own; lab instructor provides help in almost every step of the experiment.
<b>Data collection and presentation</b>	Collects data very accurately; very systematically; presents data very clearly using appropriate graphics; figure captions and units are always included.	Collects data accurately most of the time; systematically most of the time; presents data clearly using appropriate graphics; figure captions and units are included most of the time.	Some of the data collected is inaccurate; somewhat systematic in data collection; data presentation is not that clear; figure captions and units are not always included.	Much of the data collected is inaccurate; not at all systematic in data collection; presents data in a very obscure manner.
<b>Data analysis and interpretation</b>	Always analyzes and interprets data correctly and precisely; always draws correct and useful conclusions; always compares theory against experiment and calculates related error.	Analyzes and interprets data correctly most of the time; most of the conclusion are correct and useful; compares theory against experimental data and calculates related error most of the time.	Analyzes and interprets data correctly occasionally; some conclusion are incorrect; occasionally compares theory against experimental data and calculates related error.	Analyzes and interprets data incorrectly most of the time; many conclusions are incorrect; most of the time never attempts to compare theory against experiment data.
<b>Subject Knowledge</b>	Fully understands the experiment, including its purpose and results; able to discuss experimental protocols in a clear and precise manner.	Has very good understanding of the experiment, its purpose and results; able to discuss experimental protocols in a reasonably clear manner.	Has some understanding of the experiment, its purpose and results; almost able to discuss experimental protocols in a clear manner.	Has poor understanding of the experiment, its purpose and results; unable to discuss experimental protocols.

Notes:

- 1) This rubric, RBG, is to be used for program outcome (b) assessment in any EE lab with the exception of EE 390 lab.
- 2) Evaluation of students' performance using this rubric is to be reported using the corresponding excel file **RBG-EEXXX Lab-Section (yyy)-zzz.xls**.
- 3) Before sending the filled excel file, please rename it using the following naming codes: **XXX** = core course number, **yyy** = lab section number and **zzz** = current semester code. Example: **RBG-EE201 Lab-Section (051)-081.xls**.

**Figure 2: Example of Analytic Rubrics (Accessed from Rogers, 2010)**

<b>Work Effectively in Teams</b>				
	<b>Unsatisfactory 1</b>	<b>Developing 2</b>	<b>Satisfactory 3</b>	<b>Exemplary 4</b>
<b>Research &amp; Gather Information</b>	Does not collect any information that relates to the topic.	Collects very little information--some relates to the topic.	Collects some basic information--most relates to the topic.	Collects a great deal of information--all relates to the topic.
<b>Fulfill Team Role's Duties</b>	Does not perform any duties of assigned team role.	Performs very little duties.	Performs nearly all duties.	Performs all duties of assigned team role.
<b>Share in work of team</b>	Always relies on others to do the work.	Rarely does the assigned work--often needs reminding.	Usually does the assigned work--rarely needs reminding.	Always does the assigned work without having to be reminded.
<b>Listen to Other Teammates</b>	Is always talking--never allows anyone else to speak.	Usually doing most of the talking--rarely allows others to speak.	Listens, but sometimes talks too much.	Listens and speaks a fair amount.

# Evidences Required

- Demonstrate that students have achieved the specified learning outcomes at appropriate level by the time of graduation, and
- Provide evidence that the program has contributed to students' ability to achieve the SLOs

# Performance Indicators

- **PIs** indicate what concrete actions the student should be able to perform as a result of participation in the program.
- They are measurable/observable knowledge and skills necessary for the mastery of learning
- They allow the desired behavior of the students to be described, and will eliminate ambiguity concerning demonstration of expected competencies.
- PIs are made up of at least two main elements; action verb and content (referent).
- The expected behavior must be specified by name, using an observable action verb such as demonstrate, interpret, discriminate, or define.

# Sample PIs (G. Rogers)

- Students will know a professional code of ethics. (knowledge)
- Students will be able to describe the problem solving process. (comprehension)
- Students will solve research problems through the application of scientific methods. (application)

# Assessment of SLO – Where?

- Course work & curricular activities
  - Classes chosen, major
- Classroom experience
  - Pedagogy, facilities, faculty & student interaction
- Out-of-class experience
  - Co-curricular, internships, support services

# Capstone/Final Year Project

- A well-designed capstone/final year project is a culminating demonstration of whole range of learning outcomes
- Depth of specialized topic, e.g. design, analysis, investigation, ..
- Breadth of other outcomes, e.g. communication, environment, project management, ...

# Assessment Methods

- Written exams
- Class tests
- Project reports
- Final Year/Capstone projects
- Design assignments
- Locally developed examinations, e.g. FEE for Professional Engineers
- Oral exam
- Internship/Industry Attachment report
- Lab reports
- Written surveys and questionnaires
- Exit and other interviews
- Focus groups
- External examiner
- End-of-course instructor survey
- End-of-course student survey
- Portfolios
- ...

The Program Learning Outcomes  
are supported by learning outcomes of  
individual modules of student learning  
activities

We should therefore look for  
evidences that assessment of learning  
outcomes is carried out at individual  
modules of student learning activities



# Writing Intended Learning Outcomes

- Intended learning outcomes need to be written at both program and course levels.
- Both of them need two essential elements:
  - A statement of what content are the students expected to be able to do at the end of learning experience;
  - The levels of understanding or performance in those content areas.

# Course Learning outcomes

- Course Learning Outcomes describe the complex performances a student should be capable of as a result of learning experiences within a course.
- These are determined by the course instructor (s)
- Mapping course learning outcomes to program outcomes and how overall learning experience meet the accreditation criteria

# Contribution of each course

- Each undergraduate course in the department contributes to a list of SLOs.
- Usually, a course may contribute strongly to some BAETE SLOs and less strongly to other outcomes.
- While a course may contribute to several BAETE SLOs, usually only a subset of its strong outcomes need to be used for BAETE assessment.

# Two Assessment Mechanisms

- The End-of-Course Instructor Survey and
- The Instructor Evaluation of Students' Performance on an BAETE-related Problem
  - It is the main mechanism used to obtain instructor feedback on whether the students in the course achieved some of the desired course outcomes.

# BAETE – outcome problem

- The BAETE problem is meant to measure how well the students in a course learned some of the most significant (strong) SLOs that a course contributes to.
- The BAETE problem could be chosen as any of the following:
  - One of the problems in a midterm or a final examination in a lecture course.
  - One of the problems in a quiz in a laboratory course.
  - The instructor’s personal evaluation of a student ability to participate in teamwork, to successfully complete a design assignment, to write good technical reports, or to make good presentations. This option, in combination with others, may be useful for laboratory courses required to assess student ability to function in a team or for design courses that do not have examinations or quizzes.
  - The instructor’s personal evaluation of a student performance in a supervised research course.

# Student Survey

- End-of-Course Student Surveys.
- The Student Surveys collect student input on course material, course organization, and instruction.
- Besides asking students questions about the quality of a course and its instruction, the surveys also assess, for each course, the main topics that students are expected to have been exposed to during the course.

# Student Survey

- Students are asked to rate, on a scale from Poor to Excellent, whether they feel they have had an opportunity to learn the Specific Course Outcomes well.
- The student input is then summarized and tracked in:
  1. Individual reports on Course Performance for each course offering.
  2. Yearly reports on Course Performance during an academic year.
  3. Quarterly reports on Department Performance.
  4. Yearly reports on Department Performance.

# Other student feedback mechanisms

- Student feedback may be collected through two additional mechanisms:
  - *Exit surveys administered to graduating seniors.*
  - *Student Advisory Committee.*

# Saving Samples of Student Works

- Each course is required to save samples of student homework solutions, laboratory reports, project or design reports, and exam solutions, typically from poor to good quality.
- At the end of each quarter, the lecturers of all undergraduate courses must compile a binder containing in addition to the solutions, the corresponding homework questions, exam questions, lab description, and project description.

# Concluding Remarks

- Onsite accreditation visits should focus on evidence-based assessment of attainment of outcomes
- Adequate breadth and depth of POs
- Evidences of outcomes assessment – at course level
- Evidence of Continuous Improvement process
- Outcomes folder, course folder, portfolio of student work
- Evidences from interactions with stakeholders – faculty, students, alumni, ...

**Part 2:**  
**Role of PEVs & Convener in**  
**Accreditation Visits**

# Pre-visit Activities

- The University
  - Determine need & readiness for accreditation
  - Request for accreditation visit – a few months before visit
  - Preparation of documents for submission (self-study materials)
- Accreditation Board
  - Notify acceptance to conduct accreditation visit and communicate with university to clarify accreditation requirements
  - Arrange timeline of accreditation visit and the submission of self-study materials
  - Assemble the evaluation team.

# Team Convener

- has the overall responsibility for the accreditation visit
- assigns duties to each team member keeping in view the overall perspective
- be familiar with the accreditation process and gather in advance the earlier reports
- has the responsibility for the preparation of the consolidated team report and its timely submission, for the consideration of the BAETE

# Attributes of Program Evaluators

- Enthusiastic volunteer
- Technically competent
- Well-regarded
- Effective communication
- Listening skill
- Interpersonal skill
- Team-oriented
- Professional approach
- Courteous
- Time management
- Organised

# Communication – Active Listening

(耳) Ear

Physiologically, we need ears to listen. As someone once said, “God made us with a pair of ears and one mouth so that we can listen more and talk less!” Listening involves bending our ears to people.

(目) Eyes

We listen with our eyes. We know someone is listening to us when there is eye contact. The non-listener tends to look at his watch or elsewhere or becomes distracted by more important people.

(一) Undivided attention

Active listeners focus their attention on the person who is talking. People go to counselors and psychiatrists because in that one hour, they are given an uninterrupted hearing. We show concern when we are focused.

(心) Heart

Effective listening involves paying attention to verbal and non-verbal communication. Too often, we neglect the latter. We must learn to listen not just to facts but also to feelings being communicated. We should be sensitive to the frown, sweaty palms, indifferent posture, or anxious cracking of knuckles.

(王) King

True listening treats the other person as royalty. We honor the person when we listen. We acknowledge that what he or she says is important.



# Role & Responsibilities of PEV

- Team Members, including Chairman
  - Evaluate programme together with Team Leader
  - Received training
  - Familiar with accreditation system in general
  - Well-versed with accreditation criteria
  - Good understanding of outcomes-based system and assessment
  - Go through self study report, and seek clarification or additional information
  - Thorough evaluation of criteria and outcomes
  - Professional approach, unbiased, free of conflict of interest
  - Committed full-time during accreditation visit, focused

# Role & Responsibilities of Secretary

## - If provided for

- Secretary
  - Liaise with university on additional information, changes to schedule, etc
  - Take notes of comments, concerns, etc
  - Obtain from Chairman & Team members main issues to be included in report
  - Draft report – use standardise format of report for consistency
  - Refrain from acting as PEV

# Role & Responsibilities of Convener/Chairman (1)

- Team Convener/Chairman:
  - Lead the evaluation team
  - Chair Team meetings
  - Chair Exit Interview with HOD
  - Spoke person for the Team
  - Harmonise comments from team members when preparing report
  - Collate Team inputs from review of Self-Study-Report and request clarification or further information

# Role & Responsibilities of Convener/Chairman (2)

- Team Convener:
  - Meet/interview Provost/President/Top Management
  - Sign and be responsible for evaluation report
  - Liaise with BAETE, and with the institution where necessary
  - Receive factual clarification from institution on draft report and make report adjustment accordingly (with input from other team members if issue is major)

# Desirable Attributes of Convener/Chairman

- Good professional standing
- Expertise in subject matter and/or accreditation system & process
- Professional approach
- Leadership skills
- Communication skills – Listening in particular

# Conflict of interest

- Definition of possible conflict of interest:
  - have **financial or personal interest** in the university;  
or
  - have or have had a **close, active association with the programme or faculty/school** in the university. Close or active association are, for example:
    - **Employment**, as staff or consultant;
    - **Attendance**, as student at the faculty/school;
    - **Receipt** of honorary degree from the faculty/school;
    - **Membership** of a board of the university or any committee advising on the programme being accredited.

# BAETE Guidelines on Conflict of interest??

- Does BAETE has documented definition of conflict of interest?

# Confidentiality of information

- Information provided by University and derived from evaluation process, including reports, should be classified as confidential
- They should not be released to any unauthorised persons except with written permission from the University
- BAETE has Non-Disclosure Agreements with universities:
  - Accreditation documents are classified as confidential
  - Use the information provided for the purpose of the specific evaluation exercise only
  - Do not share any of the given information with any party outside of the evaluation team

# Pre-visit activities of Evaluation Team

- Pre-visit communication among team members
- Analyse the self-study documents from university
- Check whether additional information required
- Preliminary assessment (identify concerns, if any) and prepare list of questions for campus visit
- Pre-visit meeting with team members, briefing on accreditation process and admin program
- Team to discuss initial assessment & issues specific to each Team

# Campus Visit

- Normally 3 days for BAETE
- Detailed visit time-table proposed by institution based on template of accreditation body
- Adjustments could be made after pre-visit discussion

# Purpose of campus visit

- Assessment of qualitative factors which cannot be documented in written submission
  - intellectual atmosphere, morale, professional attitudes, quality of staff and students
- Examination of materials compiled by educational institution, i.e. those which cannot leave the campus
  - examination papers, student reports, instruction materials
- Clarify issues in the written submission by educational institution

# Outcomes of Campus Visits & Assessment based on Pre-Visit Documents

- The role of the Evaluation Team is for the sole purpose of determining whether the program satisfies the accreditation criteria
- For each criterion, the degree of compliance to be summed up as:
  - Compliance
  - Concerns
  - Weakness
  - Deficiency

# Outcomes of Campus Visits & Assessment based on Pre-Visit Documents

- Where requirements of a particular criterion are not fully met, the Team will include:
  - Recommendation - aspects which are suggestions rather than mandatory requirements
  - Requirement - items requiring follow-up action as a condition of accreditation
- The Team may include observations/comments/suggestion to assist improvement process, not affecting accreditation decision

# Evaluation of PLOs

- Attainment of each PLOs must be carefully evaluated in terms of depth and breadth stipulated – going through evidences provided
- Application to Complex Engineering Problems

# The DO'S

# During Campus Visit

- Discuss issues of concern
- Interview Dean, HOD, management team, faculty, alumni and students to assess:
  - Morale, attitudes and motivation
  - Institutional and industry support
  - Theoretical and practical aspects of curriculum
- Tour **relevant** physical facilities
- Review of examination papers, student reports, instruction materials
- Exit Interview –present Team’s prelim findings

# What the PEVs looks for?

- PEVs are sent to evaluate programs, certifying that they satisfy the criteria stipulated
- They look for evidences that the required criteria are met
- They identify deficiencies, weaknesses, concerns

# Meetings/Interviews

- Provost/President
- Dean and Head of Department/Program
- Group of faculty members
- Group of alumni
- Group of students
- Group of other constituencies, e.g. members of industrial advisory board, employers

# Examination of Exhibits (1)

- Sample of teaching materials
- CV of faculty staff, publications
- Sample of exam papers
- Sample of exam scripts –excellent, good, marginal
- Transcripts of immediate past graduates
- Sample project and design reports
- Sample of industry attachment reports & assessment

# Examination of Exhibits (2)

- Samples of student feedback form
- Reports of other internal or external reviews of the course, department and faculty
- Results of quality assurance reviews
- Statistics of graduate employment
- Other documents requested by the evaluation team

# Visits

- Laboratories (teaching)
- Classrooms
- Library
- Computer facility
- Others if necessary

# Major focus

- Quality assurance processes, including internal reviews
- Entry standards for admission of students
- Qualifications, enthusiasm, workload of faculty
- Facilities
- Industry participation

# Major focus

- **Undergraduate degree** in engineering
  - equivalent to a 4-year full-time course
- Title of a programme as shown on graduate's certificate and transcript
- All modes of delivery have to satisfy the accreditation criteria
  - full-time on-campus
  - evening or part-time

# Post-visit activities

- Coordinate with team members to finalize evaluation report, if this is not completed at the end of the accreditation visit
- Secretary may help to draft report under guidance of Chairman
- Team members to review report through e-mail
- Submit report to Consistency Committee
- Team members to review any comments and changes by Consistency Committee
- Submit final draft report to university for comments on errors of fact
- Submit final report to Secretary
- Accreditation Board to meet and decide on recommendation by Evaluation Team
- Secretary will notify Chair/Team Members of Board decisions

# Understanding the Terminology

- Observation – a comment or suggestion not affecting accreditation decision; is to assist improvement process
- Concern – indicates criterion, policy or procedure is met, but situation could potentially exist for criterion, policy or procedure not to be met in near future
- Weakness – criterion, policy or procedure met substantially, but lacks strength of compliance; remedial action to strengthen compliance is necessary before next evaluation
- Deficiency – criterion, policy or procedure is not met
- Recommendation - aspects which are suggestions rather than mandatory requirements
- Requirement - items requiring follow-up action as a condition of accreditation

# Possible accreditation decisions

- Full accreditation - for maximum of 5 years:
  - Possible even when there are some concerns
  - If weaknesses are **not** severe, need to indicate:
    - whether the adequacy of the corrective action(s) can be determined on the basis of a written report (with appropriate supporting documentation); or
    - whether a follow-up review visit is required in order to assess the adequacy of the action(s)

# Possible accreditation decisions

- Full accreditation but for a shorter term, say 2 to 3 years:
  - If weaknesses are severe
  - If deficiencies are not severe
  - Need to indicate:
    - Whether corrective action(s) can be determined on the basis of a written report (with appropriate supporting documentation); or
    - whether a follow-up review visit is required in order to assess the adequacy of the action(s)

# Possible accreditation decisions

- Not to be accredited
  - If deficiencies are severe
  - When one or more of BAETE's criteria are not met
  - Requirements in order to achieve accreditation should be specified

# The DON'Ts

# DON'Ts

- Don't keep on talking most of the time
- Don't waste time listening to presentation of information already well-documented (e.g. in self-study report)
- Don't give solutions/advices to problems identified – no need to tell how you would have run the program
- Don't group diverse stakeholders in a joint feedback session, e.g. employers, alumni and parents all together

# DON'Ts

- Don't group HOD, senior Professors in management position and junior staff in a single session for faculty feedback
- Don't engage in non-accreditation activities during the campus visit
- Don't be aloof, abusive – but should be assertive at times
- Don't be overly fault-finding – adopt a balanced assessment of strengths and weaknesses

# DON'Ts

- Don't engage in bean-counting – rather look at the bigger picture & the outcomes
- Don't examine all thoroughly – sufficient samples are good enough
- Don't delay in completing and submitting the evaluation report
- Don't engage in conflict-of-interest activities

## Part 3

What the WA Verification Team  
Will Focus On When Observing  
On-site Visits

# Summary of visits and observations to two HEIs

- Background
  - Background information about the HEI, including location, type (publicly or privately funded, undergraduate only, research, etc.), when established, overall student enrolment numbers, programs / courses offered, financial situation (e.g., research funding from external sources), organizational structure, etc
  - Background information about the academic unit delivering the engineering program, including range of engineering disciplines covered by programs / courses, overall student enrolment numbers, annual number of degrees awarded, financial situation (e.g., research funding from external sources), organizational structure, etc

# Summary of visits and observations to two HEIs

- The accreditation process
  - details about the visit, including timing, programs observed, student enrolment by years as well as number of graduates, other contextual data
  - Observations about how the visit conformed to the BAETE accreditation process, noting any deviations or anomalies

# Summary of visits and observations to two HEIs

- The visit schedule
  - Provide the visit schedule
- Visiting team
  - Describe the visiting team, including roles and previous experiences, training, including performance of the team during the visit.
- Documentation
  - Provide comments on the documentation that was submitted by the HEI prior to the visit, as well as information that was made available on-site during the visit.

# Summary of visits and observations to two HEIs

- Observations
  - Comments about the conformance of the program(s) with the BAETE criteria, including issues raised by the visiting team during or at the end of the visit; provide an assessment of whether the program(s) observed can be considered to be substantially equivalent to the engineering programs of WA signatory jurisdictions
- Visit outcomes
  - Describe the end of visit procedures, i.e., exit meeting, and comment on whether the outcomes conform to expectations based on the BAETE criteria.

# Summary of visits and observations to two HEIs

- Comments on the performance of the visiting team
  - Summary comments about the qualifications, performance, conduct of visiting team members; include a statement indicating **whether the team's interpretation and application of BAETE criteria was appropriate and whether prescribed procedures were thoroughly and fairly followed.**

# Decision Meeting

- Background
  - Explanation of decision-making procedures and policies, including allowable outcomes
- Meeting progress
  - Description of the conduct of the meeting, including processes to avoid conflicts of interest
- Discussion of programs and decisions
  - Insert comments about the decision(s) taken, especially for the programs that were observed, indicating whether decisions conform with published policies and whether the decisions reflect verification team's expectations.

# Compliance with stated policies and procedures

- Pre-visit documentation
  - adequacy of the pre-visit documentation, including timeliness, comprehensiveness, alignment with on-campus observations
- On-campus activities
  - adequacy of the on-campus activities, including actions of the visiting team, interactions with HEI, noting any anomalies
- Decision meeting
  - the conduct of the decision meeting, including appropriateness of decisions, alignment with policies and procedures, noting any anomalies.

# Summary

- Desirable attributes of program evaluation team
- Role of Chairman in accreditation visit
- DO's and DON'Ts during accreditation visit
- What the WA verification team will focus on when observing on-site visits

Q&A

Thank you for listening!