Outcome Based Education (OBE)

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Traditional Education

- Provides students with a learning environment with little attention to whether or not students ever learn the material.
- Students are given grades and rankings compared to each other – students become exam oriented or CGPA driven.
- Graduates are not completely prepared for the workforce.
- Lack of emphasis on soft skills needed in jobs e.g. communication skills, interpersonal skills, analytical skills, working attitude etc

Outcome Based Education (OBE)

- Starting with a **clear picture** of what is important for students to be **able to do…**
- Then organizing the **curriculum**, **delivery** and **assessment** to make sure learning happens…

Course, Degree, Programme

- Course
  - **Course** is a unit of teaching, which encompasses various topics, that typically lasts one semester, is led by one or more faculty and has a fixed registered students.
- Programme
  - Cohesive arrangement of courses, co-curricular and extra-curricular activities to accomplish predetermined objectives leading to the awarding of a degree.
- Degree
  - Academic award conferred upon a student on successful completion of a program designed to achieve the defined attributes

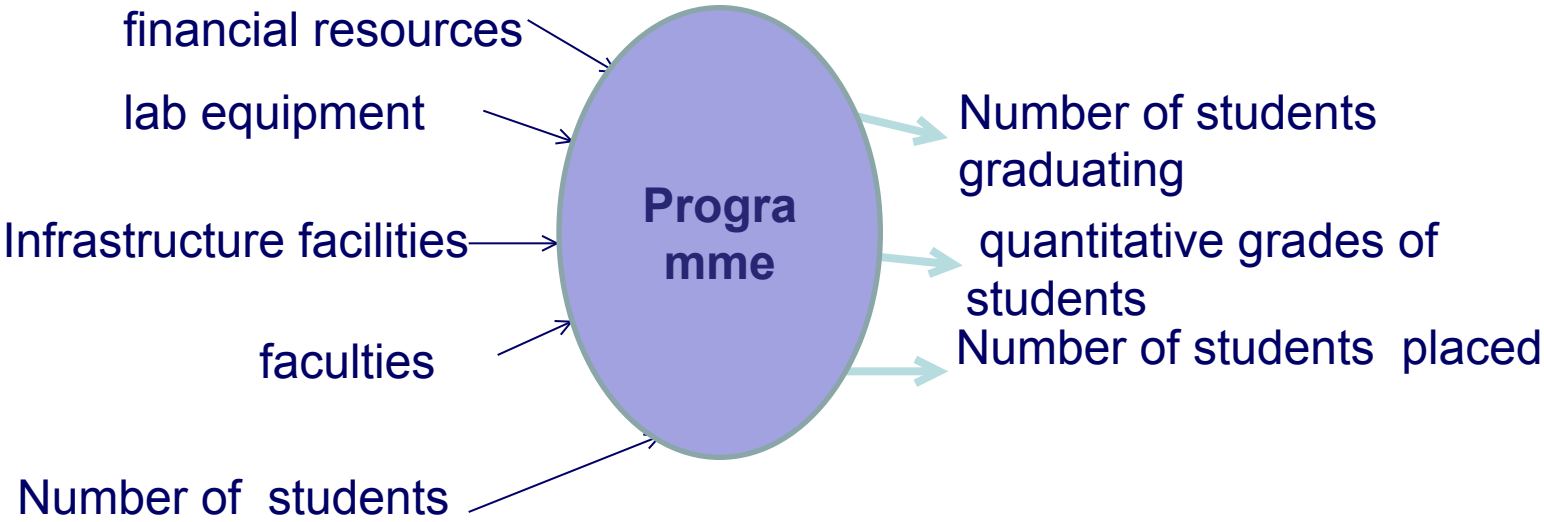
Outcome Based Education

- What students will be able to do by the time and after few years of graduation?
- ‘Learner Centric’, rather than the traditional ‘Teacher Centric’
- Continuous improvement in the educational (Teaching-Learning) process
- Preparing Graduates to fit themselves globally
- Effective and innovative Content delivery methods, assessment methods and procedures
- Enrichment of Faculty involvement in the Teaching-Learning Process

Why OBE

- International recognition and Global employment opportunities
- More employable and innovative graduates with professional and soft skills, social responsibility and ethics
- Better visibility and reputation of technical institution among stakeholders
- Improving the commitment and involvement of all stakeholders
- Enabling graduates to excel in their profession and career accomplishments
- Preparing graduates with leadership positions and challenging technology development opportunities

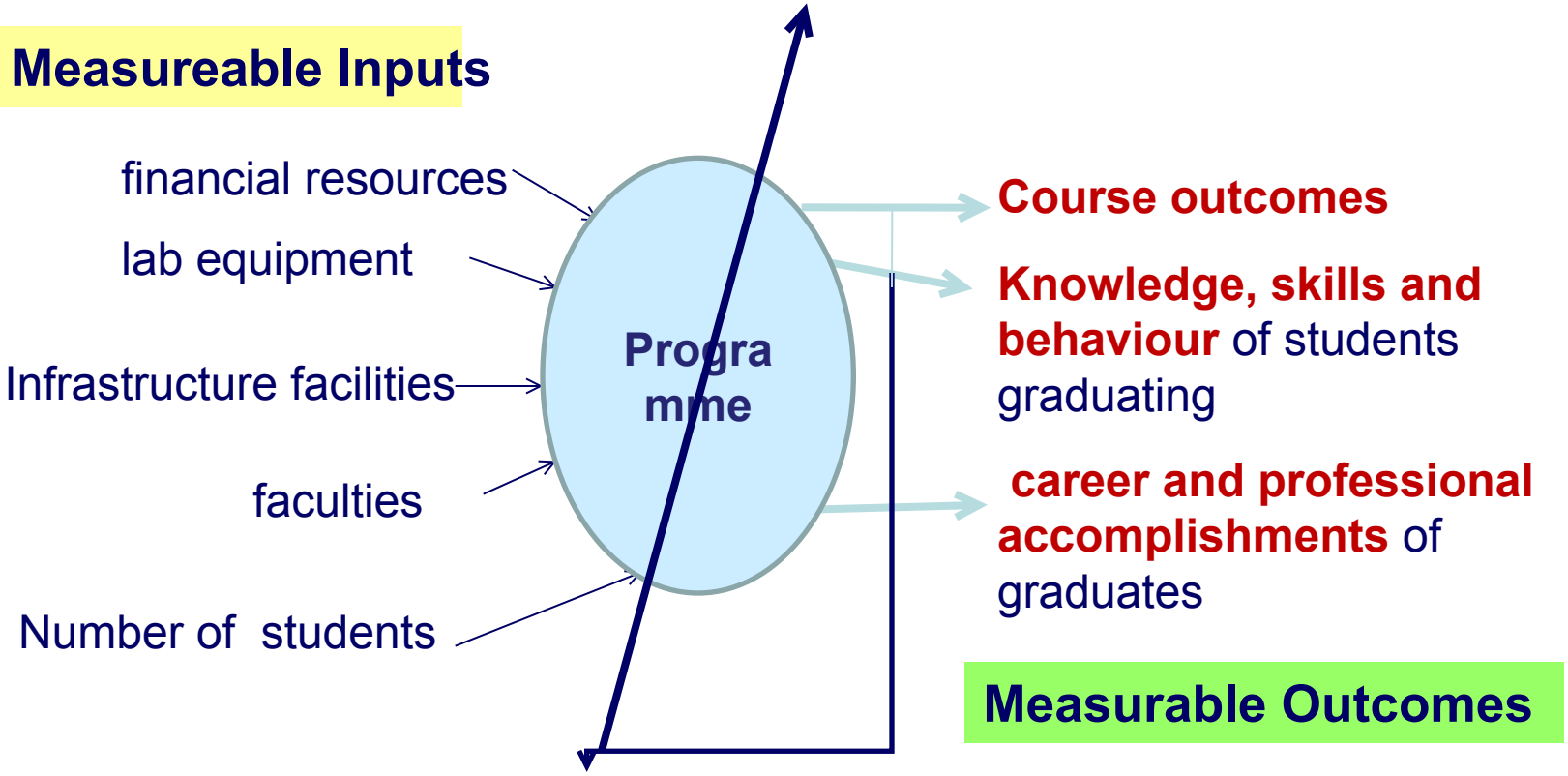
Traditional Education



Measureable Input

Measurable Outputs

Outcome Based Education



Benefits of OBE -Teacher

- Teaching will become a far more creative and innovative career.
- Lecturers will no longer feel the pressure of having to be the “source of all knowledge”
- *Producing thinking, caring students.*

OUTCOME BASED ACCREDITATION (OBA)

- Programmes to be accredited from March 2013 onwards will have to be based on OBE approach!

- NO OBE = NO ACCREDITATION

Keys of OBE System
(William G. Spady)

- Developing a clear set of learning outcomes around which all of the system's components can be focused

- Establishing the conditions and opportunities within the system that enable and encourage all students to achieve those essential outcomes

- Having learners do important things with what they know is a major step beyond knowing itself

OBE -5 D's

- ✓ Define Outcomes
- ✓ Design Curriculum
- ✓ Deliver Instruction
- ✓ Document Results
- ✓ Determine Advancement

OBE Assumptions

- all learners can learn and succeed;
- success breeds success; and
- “teaching institutions” control the conditions of success.

OBE Framework

(Education)

What the student should be able to do?

OBC

(Curriculum)

How to make the student achieve the outcome?

(Learning & Teaching)

How to measure what the student has achieved?

(Assessment)

Key Components of OBE

- Vision and Mission of the Institute
- Vision and Mission of the Department
- Programme Educational Objectives (PEOs)
- Graduate Attributes (GAs)
- Programme Outcomes (POs)
- Course Outcomes (COs)
- Programme Specific Criteria

VISION AND MISSION OF THE INSTITUTION

Vision:

- Vision is a picture of the future you seek to create, described in the present tense, as if it were happening now. It shows where we want to go, and what we will be like when we get there.

Mission:

- Mission statement defines what an institution is, why the institution exists, its reason for being. It defines what are we here to do together

Department - VISION AND MISSION

- The vision and mission of the department should be correlated with the mission and vision of the institution.
- more focused on the theme area and based on the SWOT analysis.
- A mission statement might include a brief history and philosophy of the academic programme, the type of students to be served, the academic environment and primary focus of the curriculum, faculty roles, the contributions to and connections with the community, the role of research.

Programme Educational Objectives (PEOs)

- PEOs are broad statements that describe the career and professional accomplishments that the programme is preparing graduates to accomplish after 3 to 5 years of graduation.
- PEOs should be measurable, appropriate, realistic, and achievable.
- PEOs addresses needs of the stakeholders

Guidelines for the PEOs

- PEOs should be consistent with the mission of the Institution
- The number of PEOs should be manageable
- PEOs should be achievable by the programme
- PEOs should be specific to the programme and not too broad
- PEOs should be based on the **needs of the constituencies**

Program Educational objectives (PEOs) –An Example

- **Successful Careers** (PEO#1): Graduates of the programme will have successful technical or professional careers.

- **Lifelong Learning** (PEO#2): Graduates of the programme will continue to learn and to adapt in a world of constantly evolving technology.

PEOs

- Develop assessment methods for each PEO to measure the attainment with expected attainment level for each PEO
- generally a good idea to identify between three and five PEOs.
- Publish and Disseminate the PEOs among the stakeholders.
- Check for the consistency of the PEOs with the mission statements of the Department.

PEOs Assessment

PEO #1:

- *Level of technical or professional contribution according to employer*
  - *Goal: 95% or more of graduates meet or exceed expectations*
- *Percentage of graduates working in technical or professional careers or enrolled in graduate or professional school*
  - *Goal: 95% or more of graduates meet or exceed expectations*
- *Percentage who are working towards another degree since graduation*
  - *Goal: 30% or more of graduates meet or exceed expectations*
- *Percentage who have published a conference or journal article since graduation*
  - *Goal: 10% or more of graduates meet or exceed expectations*
- *Percentage who have filed for a patent since graduation*
  - *Goal: 5% or more of graduates meet or exceed expectations*
- *Percentage who have had a patent granted since graduation*
  - *Goal: 3% or more of graduates meet or exceed expectations*

PEOs Assessment

PEO#2:

- Level of success in learning new areas, engaging in professional development, and adapting to technological change according to employer.
  Measurement: Employer survey. **Goal**: 95% or more of graduates meet or exceed expectations.
- Percentage of graduates who consulted a journal or conference article to solve a problem since graduation.
  Measurement: Alumni survey. **Goal**: 25% or more.
- Percentage who have taken a class or attended a seminar since graduation.
  Measurement: Alumni survey. **Goal**: 50% or more.
- Percentage who attended a conference or professional meeting since graduation.
  Measurement: Alumni survey. **Goal**: 50% or more.
- Percentage who obtained another degree since graduation.
  Measurement: Alumni survey. **Goal**: 25% or more.

Graduate Attributes (GAs)

- A set of individually assessable outcomes that are the components indicative of the graduate's potential to acquire competence to practice at the appropriate level.
- The GAs are exemplars of the attributes expected of a graduate from an accredited programme.
- International Engineering Alliance – IEA
  Washington Accord (UG-Engg), Sydney Accord (Diploma) , Dublin Accord (ITI)
- Seoul Accord -Computer professionals

Summary of Graduate Attributes

- Engineering knowledge
- Problem analysis
- Design & Development of Solutions
- Investigation of Complex Problem
- Modern tool usage
- Engineer and society
- Environment& sustainability
- Ethics
- Individual & team work
- Communication
- Lifelong learning

+ Project management & finance

IEA-Graduate Attributes Ver-3.0

- Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialisation to the solution of complex engineering problems.
- Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

IEA-Graduate Attributes Ver-3.0

- 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.
- The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for the sustainable development.
- Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

IEA-Graduate Attributes Ver-3.0

- 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.

- Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

- Life-long learning: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Outcomes (POs)

- POs describe what students should know and be able to do at the end of the programme.
- POs are to be in line with the graduate attributes of IEA.
- POs are to be specific, measurable and achievable.
- POs transform the PEOs into specific student performance and behaviors that demonstrate student learning and skill development

Programme Outcomes -Dimensions

Knowledge Outcomes

- Pertain to grasp of fundamental cognitive content, core concepts, basic principles of inquiry, a broad history

Skills Outcomes

- Focus on capacity for applying basic knowledge, analyzing and synthesizing information, assessing the value of information, communicating effectively and collaborating

Attitudes and Values outcome

- Encompass affective states, personal/professional/social values and ethical principles

Behavioral Outcomes

- Reflect a manifestation of knowledge, skills and attitudes as evidenced by performance, contributions.

Programme Outcomes -Guidelines

- Describe student performance, not teacher/professor performance
- Describe learning product, not process
- Are specific without simply stating the subject matter to be learned
- Stick to one type of result for each outcome (e.g., do not say “Knows the scientific method and applies it effectively”)
- Start with an action verb that indicates observable and measurable behavior

Programme Outcomes –Contd.

- Develop assessment methods for each PO to measure the attainment.
- Publish and Disseminate the POs among the students and faculty.
- Check for the consistency of the POs with the PEOs of the Programme and Graduate Attributes.

PROGRAMME SPECIFIC CRITERIA (PSC)

- Each programme must satisfy a set of criteria specific to it, known as Programme Specific Criteria which deal with the requirements for engineering practice particular to the related sub-discipline.
- concern about curricular issues and qualifications of faculty.
- The programme curriculum is to be provided in correlation with the programme specific criteria.
- NBA adopts PSC specified by appropriate American Professional societies such as ASME, ASCE, IEEE etc.
- The institution shall provide evidence that the programme curriculum satisfies the PSC , and industry specific criteria and industry interactions/internship.

PROGRAMME SPECIFIC CRITERIA

Program Criteria for Civil and Similarly Named Engineering Programs

Lead Society: American Society of Civil Engineers (ASCE)

These program criteria apply to engineering programs including "civil" and similar modifiers in their titles.

1. Curriculum

- *The program must prepare graduates to apply knowledge of mathematics through differential equations, calculus-based physics, chemistry, and at least one additional area of basic science, consistent with the program educational objectives; apply knowledge of four technical areas appropriate to civil engineering; conduct civil engineering experiments and analyze and interpret the resulting data; design a system, component, or process in more than one civil engineering context; explain basic concepts in management, business, public policy, and leadership; and explain the importance of professional licensure.*

PROGRAMME SPECIFIC CRITERIA

Program Criteria for Computer Science and Similarly Named Computing Programs

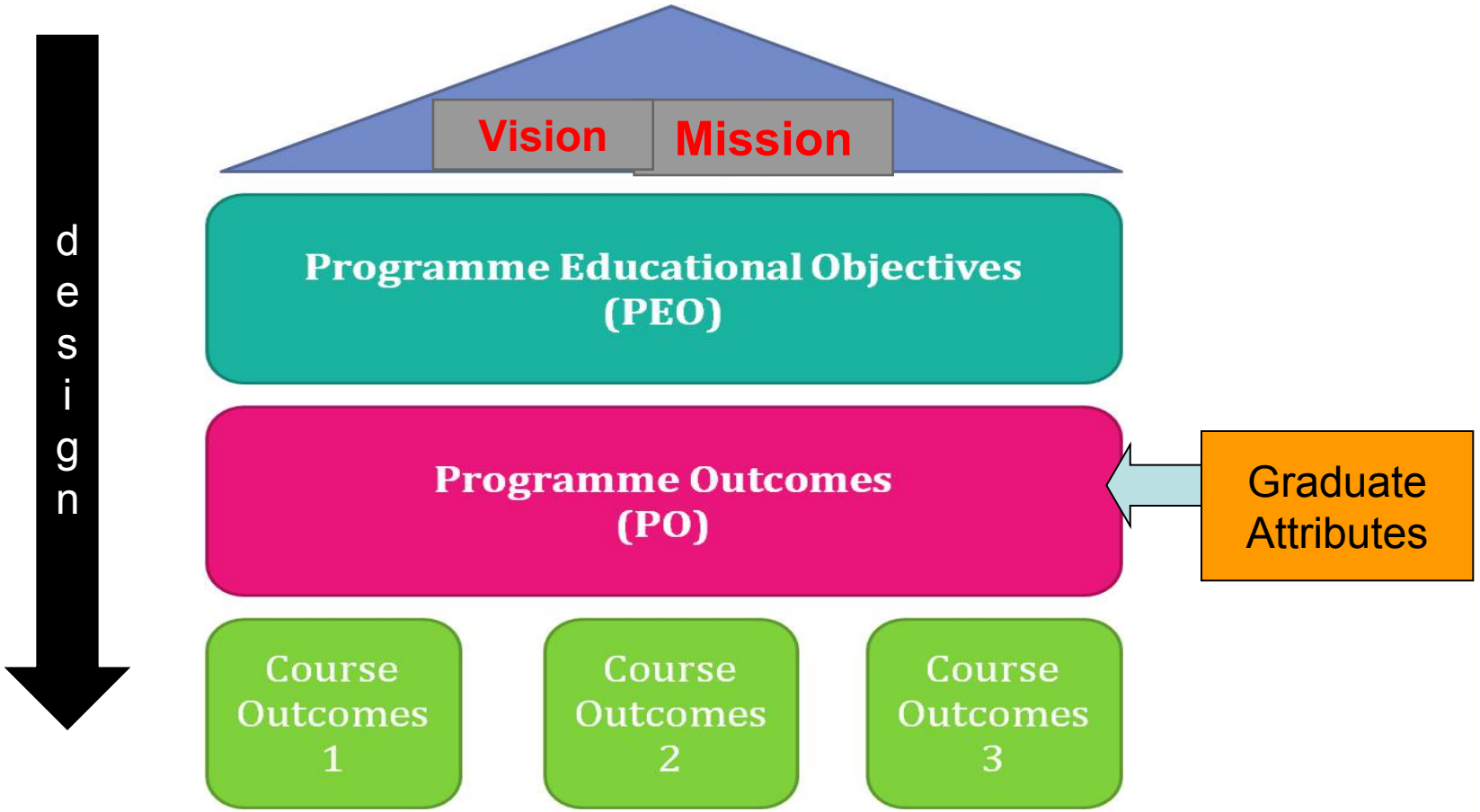
- ***Lead Society: Institute of Electrical and Electronics Engineers (IEEE) Cooperating Society for Computer Engineering Programs: CSAB***

- *These program criteria apply to computing programs using computer science or similar terms in their titles. The program must enable students to attain, by the time of graduation:*
- *An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.*
- *An ability to apply design and development principles in the construction of software systems of varying complexity.*

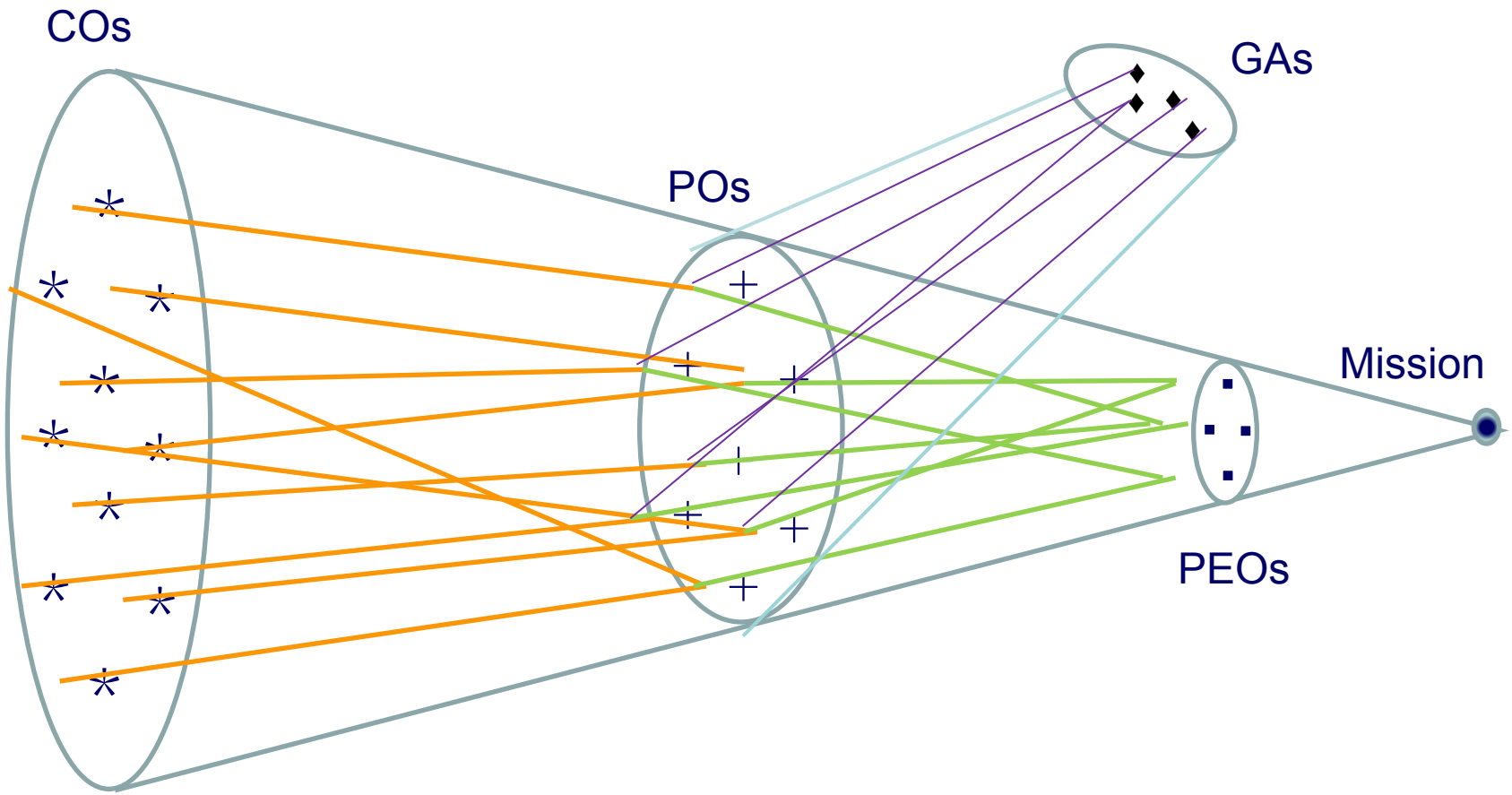
Course Outcomes

- The course outcomes must state the **major** skills, knowledge, attitude or ability that students will acquire.
- Course outcomes should be expressed in terms of measurable and/or observable behaviors
- Course Outcomes should be agreed upon by the faculty in a program and should drive program outcomes.
- Course outcomes should begin with an action verb (e.g., write, install, solve, and apply).

OBE Design


design
Vision
Mission
Programme Educational Objectives (PEO)
Programme Outcomes (PO)
Graduate Attributes
Course Outcomes 1
Course Outcomes 2
Course Outcomes 3

Mapping between PEOs,POs and COs



Content delivery

- Lecture
- Lecture with discussion
- Demonstrations
- Group discussion
- Debate
- Technical Quiz
- Seminar
- Mini-project
- Asynchronous discussions

Assessment Tools

- ***Direct methods*** display the student's knowledge and skills from their performance in the continuous assessment tests, end-semester examinations, presentations, and classroom assignments etc.

- These methods provide a sampling of what students know and/or can do and provide strong evidence of student learning.

Assessment Tools

- ***Indirect methods*** such as surveys and interviews ask the stakeholders to reflect on student's learning.
- They assess opinions or thoughts about the graduate's knowledge or skills.
- Indirect measures can provide information about graduate's perception of their learning and how this learning is valued by different constituencies.

Assessment methods and tools

- Direct Assessment Method: using measurable performance indicators of students
  - Exams
  - Assignments
  - Projects
  - Tutorials
  - Labs
  - Presentations

- Indirect Assessment Method: Ascertaining opinion or self-reports
  - Alumni survey
  - Employer survey
  - Exit survey
  - Course-end survey, etc.,.

Rubrics

- Rubrics is set of performance indicators which define and describe the important component of the work being completed

- Information to/about individual student competence (Analytic)
  - Communicate expectations
  - Diagnosis for purpose of improvement and feedback

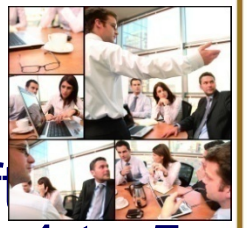
- Overall examination of the status of the performance of a group of students? (Holistic)

Generic or Task Specific ?

- Generic
  - General rubric that can be used across similar performance (used across all communication task or problem solving tasks)
  - Big picture approach
  - Element of subjectivity
- Task specific
  - Can only be used for a single task
  - Focused approach
  - Less subjective

When to Assess

Program Educational Objectives(PEOs)



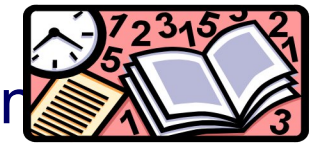
Few years af
Graduation – 4 to 5 ye

Program Outcomes (POs)

Upon
graduatic

Course Outcomes (COs)

Upon
course
completion



PEO Assessment tools

- The data may be collected progressively
- Survey questions should elicit the required information
  - **Not to confirm the objective**
- Ex. PEO: producing the graduates with leadership qualities
  - Employer survey
  - Q1: At which level/position our graduates (year) are working in your organization

Assessment Tool (frequency)
Employer satisfaction survey (Yearly)
Alumni survey (Yearly).
Placement records, higher education records

Administrative System-OBE

- *Course Coordinator*
- *Module Coordinator*
- *Program Assessment Committee*
- *Program Coordinator*
- *Department Advisory Board (DAB)*
- *Internal Quality Assurance Cell (IQSC)*

Thank you