

Procedure for CO-PO attainment

The assessment processes used to gather the data upon which the evaluation of Course Outcomes of first year is done

Assessment Strategy for Outcome-Based Education

1. Mapping Program Outcomes to Assessment (Examinations)

Program Outcomes (POs) articulate the generic abilities to be looked for in a graduate of any undergraduate degree program. They form the Program Outcomes (POs) that reflect the skills, knowledge and abilities of graduates regardless of the field of study. This does not mean that POs are necessarily independent of disciplinary knowledge rather, these qualities may be developed in various disciplinary contexts. In outcome-based education, a “design down” process is employed which moves from POs to Course Outcomes (COs) and outcomes for individual learning experiences. Outcomes at each successive level need to be aligned with, and contribute to, the program outcomes. Courses are the building blocks of a program. Teaching strategies, learning activities, assessments and resources should all be designed and organized to help students achieve the learning outcomes at the course level. In the assessment activities, students demonstrate their level of achievement of the course learning outcomes. In a constructively aligned program, the courses are carefully coordinated to ensure steady development or scaffolding from the introduction to mastery of the learning outcomes, leading to the achievement of the intended POs. For the effectiveness of the program, the achievement of POs is crucial which needs to be proven through accurate and reliable assessments.

2. Two-step Process for Bringing Clarity to POs

POs give useful guidance at the program level for the curriculum design, delivery and assessment of student learning. However, they represent fairly high-level generic goals that are not directly measurable. Real observability and measurability of the POs at course level is very difficult. To connect high-level learning outcomes (POs) with course content, course outcomes and assessment, there is a necessity to bring further clarity and specificity to the program outcomes [5]. This can be achieved through the following two-step process of identifying Competencies and Performance Indicators (PI). (1) Identify Competencies to be attained: For each PO define competencies – different abilities implied by program outcome statement that would generally require different

assessment measures. This helps us to create a shared understanding of the competencies we want students to achieve. They serve as an intermediate step to the creation of measurable indicators.

Example: Program Outcome (Attribute 3)

Design: PO3: 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 public health and safety, and cultural, societal, and environmental considerations. Competencies

1. Demonstrate an ability to define a complex, open-ended problem in engineering terms.
2. Demonstrate an ability to generate a diverse set of alternative design solutions.
3. Demonstrate an ability to select the optimal design scheme for further development.
4. Demonstrate an ability to advance an engineering design to the defined end state.

Define Performance Indicators: For each of the competencies identified, define performance Indicators (PIs) that are explicit statements of expectations of the student learning. They can act as measuring tools in assessment to understand the extent of attainment of outcomes. They can also be designed to determine the appropriate achievement level or competency of each indicator so that instructors can target and students can achieve the acceptable level of proficiency.

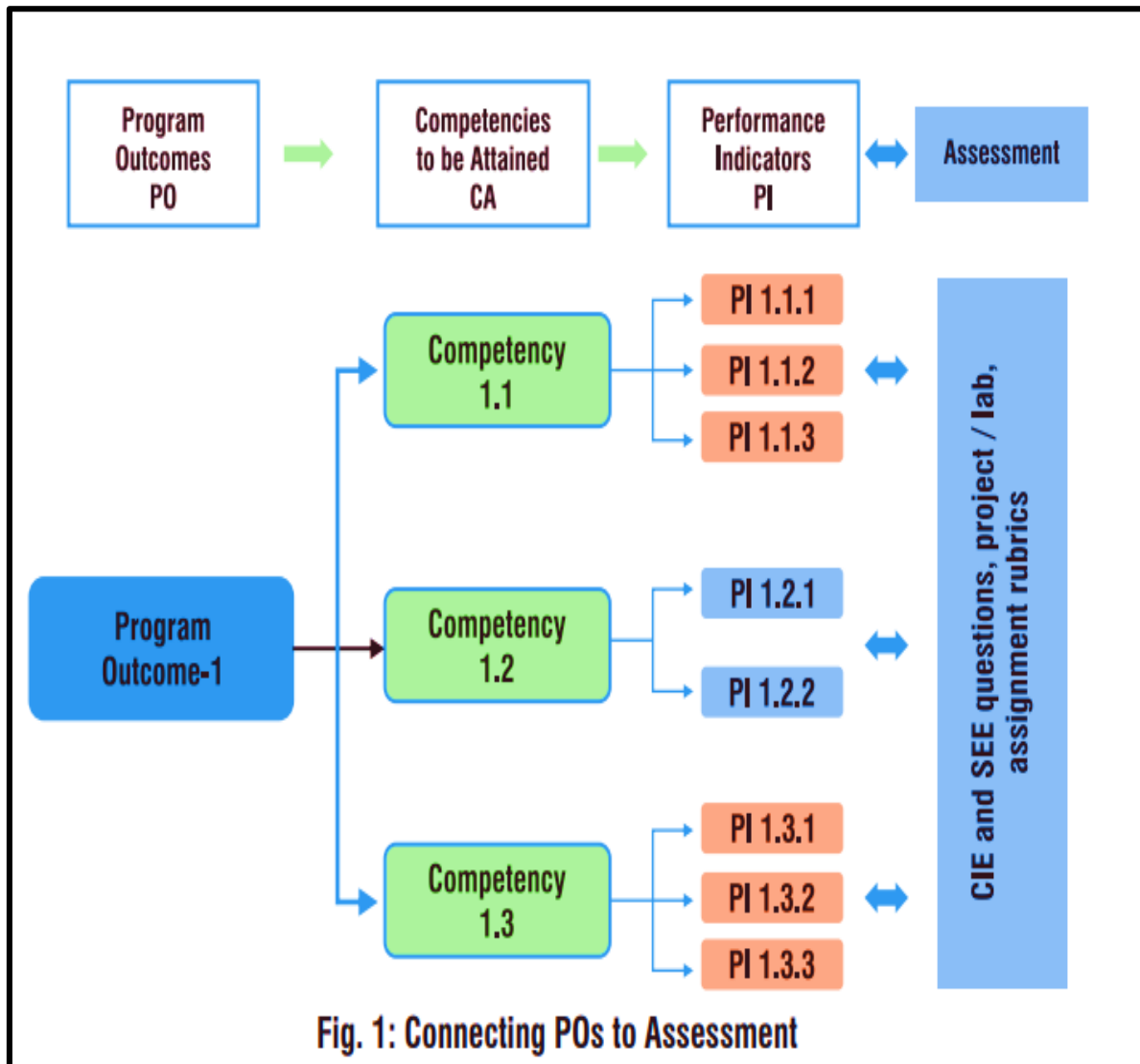
Example: For the Competency -2

Demonstrate an ability to generate a diverse set of alternative design solutions

Performance Indicators:

1. Apply formal idea generation tools to develop multiple engineering design solutions
2. Build models, prototypes, algorithms to develop a diverse set of design solutions
3. Identify the functional and non-functional criteria for evaluation of alternate design solutions. It should be noted that, when we consider the program outcome, it looks like, it can be achieved only in the Capstone project. But if we consider the competencies and performance indicators, we start seeing the opportunities of addressing them (and hence PO) in various courses of the program.

Once the above process is completed for the program, the assessment of COs for all the courses is designed by connecting assessment questions (used in various assessment tools) to the PIs. By following this process, where examination questions map with PIs, we get clarity and better resolution for the assessment of COs and POs. The pictorial representation of the process is given in Fig. 1



Reference: AICTE Examination Reform Policy November 2018

As per University curriculum, articulation matrix is formed for all subjects.

Data Collection Process & Procedure:

In Outcome Based Education (OBE), assessment is done through one or more than one processes, carried out by the institution, that identify, collect, and prepare data to evaluate the achievement of course outcomes (CO's).

Assessment tools are categorized into two methods: Direct methods and indirect methods.

Direct methods measures the student's knowledge and skills based on the performance in the continuous internal assessment tests, semester examinations and classroom and laboratory assignments etc. These methods measures the level of what students know and/or can do after learning.

Indirect methods such as surveys will reflect on student's learning. They assess opinions or thoughts about the graduate's knowledge or skills and they are valued through survey from different stakeholders.

Attainment level measured in terms of student performance with respect to internal assessments of a subject plus the performance in the University examination

Target & Attainment Levels of Cos for Internal and External Assessment

Level of CO attainment	
No. of students having marks > cut-off	Level
No. of students having marks $\geq 60\%$	3
No. of students having marks 50% to 59%	2
No. of students having marks 40% to 49%	1

Note: High Scoring subjects can elevate the attainment level with justification for e.g. PCE I and PCE II

Internal Evaluation

Sr. No.	Assessment Methods
1	Internal Term Test
2	Assignments
3	Experiments
4	Course Project

End Semester Examination (University Examination)

Sr. No.	Assessment Methods
1	Theory examination
2	Laboratory examination

Direct Assessment of Theory & Lab:

Internal test are conducted as per the Academic Calendar set by institution and IA marks are computed considering the performance of the students in internal test.

The lab evaluations are calculated as per the rubrics and assigned

The Maximum Internal assessment for 2019 C Scheme is 15 or 20 marks.

