



2.6. Student Performance and Learning Outcomes

2.6.1 The institution has stated learning outcomes (Program and Course outcomes), graduate attributes, which are integrated into the assessment process and widely published through the website and other documents, and the attainment of the same is evaluated by institution.





Record of tools required for calculation of attainment



CO PO Attainment Tool

These are measurable instruments used to evaluate students' performance against predefined learning outcomes.

A. Direct Assessment Tools

1. Continuous Internal Assessment (CIA):

- *Description:* Includes sessional examinations, assignments, and quizzes conducted twice a semester.
- *Purpose:* Helps identify individual student learning gaps and overall progress.
- *Example Tool:*
 - Rubrics for sessional exam evaluation.
 - Marksheets for assignments and sessional exam.

2. End-Term Examination:

- *Description:* Comprehensive exams that evaluate students' grasp of the entire syllabus.
- *Purpose:* Contributes to final CO attainment by testing higher-order cognitive skills.
- *Example Tool:* Detailed answer evaluation matrices mapped to COs.
 - Questions designed to assess basic understanding and foundational knowledge.
 - Inclusion of analytical or case-based questions.

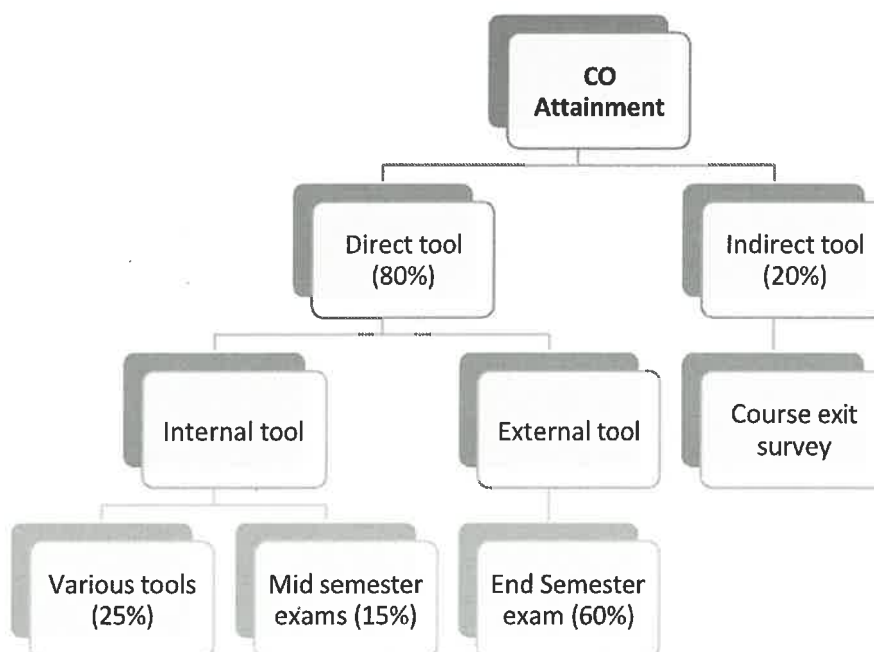


Figure 1: List of Course Assessment tools



3. Project-Based Learning (PBL):

- *Description:* Model-making, group projects or case studies.
- *Purpose:* Encourages hands-on learning and collaboration.
- *Example Tool:* Peer and faculty evaluation rubrics.
 - Guided projects with predefined outcomes.

4. Simulation-Based Learning:

- *Description:* Virtual experiments using engineering simulation tools (e.g., MATLAB, Simulink, ANSYS).
- *Purpose:* Enables experiential learning without ethical constraints.
- *Example Tool:* Performance reports generated by simulation software.

B. Indirect Assessment Tools

These tools measure students' perceptions, opinions, and satisfaction levels regarding their learning outcomes.

1. Course Exit Surveys:

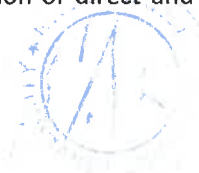
- *Description:* Surveys conducted at the end of each course.
- *Purpose:* Capture students' self-perceived achievement of COs and overall satisfaction.
- *Example Tool:* Survey covering CO-specific and generic learning aspects.

Table 3: List of Course Assessment Tools

S. No.	Assessment tool	Sub category	Methodology	Weightage	Overall Percentage
1	Direct	Internal	Various tools • Assignments/ Class tests/ Group projects or Presentations/ Viva/Quiz/Open book tests/MCQs	10%	80%
			Mid Semester Exams • Theory exam • Practical exam (where applicable)	30%	
			End Semester exam • Theory • Practical (wherever applicable)	60%	
3	Indirect	Course exit survey			20%

3. Evaluation and Attainment Analysis

The attainment of learning outcomes is calculated through a weighted combination of direct and indirect assessments:



Formula for Attainment:

Total Attainment= (Direct Attainment Weightage) × (Direct Assessment Average) + (Indirect Attainment Weightage) × (Indirect Assessment Average)

4. Tools for Advanced Learners

- Encouragement for completing certificate courses for MOOCs
- Encouragement for participating in competitions/Seminars/conferences etc
- Challenging assignments for increased engagement Application-based assignments requiring critical thinking.

5. Tools for Slow Learners

- Remedial classes
- Peer tutoring groups adopted for better learning
- Motivation and personal attention by faculty mentor.

Conclusion:

The implementation of CO-PO attainment tools, complemented by robust technological integration and faculty training ensures an effective evaluation of learning outcomes. Direct and indirect assessments provide a balanced approach, accommodating the diverse needs of slow and advanced learners. By leveraging data-driven insights and stakeholder feedback, institutions can continuously enhance the alignment of course outcomes with program objectives, ultimately driving student success and institutional excellence.

