



Arya College of Engineering (ACE)

(Previously known as Arya Institute of Engineering & Technology - AIET)

Approved by AICTE, New Delhi

Affiliated to Rajasthan Technical University, Kota

SP-40, RIICO Industrial Area, Kukas, Jaipur (Rajasthan) – 302028

ATTAINMENT PROCEDURE

Course Identification

Preparation of Course Outcome

- Bloom's Taxonomy
- RTU Syllabus

- Department Vision, Mission
- PO's / PSO's / PEO's

Calculations for CO Attainment

External Assessment (End Semester Exams)

- RTU Theory Exams
- RTU Practical Exams
- Project Assessment
- Practical Training Assessment

Internal Assessment (Internal Exams)

- Mid Term Exams
- Assignment / Unit Tests
- Internal Lab Assessments
- Internal Project Assessments
- Internal Practical Training/
Internship Assessment

Set Target % as per
Difficulty level to achieve

CO Attainment through
Attainment tools / ERP
(For End Semester Exam)

CO Attainment through
Attainment tools / ERP
(For Internal Exam)

External Examination Assessment

- 70% Weightage For Theory Courses
- 40% Weightage For Practical / Lab Courses

Internal Examination Assessment

- 30% Weightage For Theory Courses
- 60% Weightage For Practical / Lab Courses

CO Direct Attainment

CO Indirect Assessment through
End Term Survey from
Stack Holders

CO Attainment = 90% of Direct
+ 10% of Indirect

CO Attainment Level

Attainment Level 1 : 60% of Student score more than 60% marks (Low)
Attainment Level 2 : 70% of Student score more than 60% marks (Moderate)
Attainment Level 3 : 80% of Student score more than 60% marks (Substantial)

CO
Attainment
≥
Target

Yes

No

Revise and Increase CO target
for the Course / Subject

Plan strategies for improvement
and recommend action plan to
Course / subject Coordinator

Overall PO Attainment Level

80% Direct

(Assessment with Respect to CO's)

Corresponding Cell Value
(CO/PO Mapping)

X

Overall CO
Attained Value

3 (Three)

20% Indirect

End Semester Survey ●

Program Exit Survey ●

Alumni Feedback ●

Employers Feedback ●

Attainment of Course Outcomes (Program)

Assessment Process:

The tools such as tests, assignments, examinations etc. are taken on the questions that relate to specific course outcomes in each course. Presentations and seminars are aimed towards wider scope of the subject including its impact on society and environment as a whole. The questions at the presentations/seminars make the scope even wider and relate with the course outcomes and give the student a feel that things are almost never complete, thus the need for continuous independent life-long learning is emphasized.

Tools used in measuring CO:

Assessment Tool Type	Assessment Tool Title	Tool Description
Assessment Tools	Assignment	The assignment is a qualitative performance assessment tool designed to assess student's knowledge of engineering practices, framework, and problem solving. It also helps to guide written presentation skills and improve the thinking capability of the students.
	Internal Practical Assessment	This is mainly to assess student's practical knowledge with their designing capabilities. The students are tested for their confidence in terms of design of experimentation and viva voce.
	Midterm Exams	Midterm examination is conducted twice per semester. Midterm examination is metric for assessing whether the entire COs is attained or not. Examination is more focused on attainment of course outcomes and program outcomes using a descriptive exam.
	Final University Exam (Theory + Practical)	External examination is conducted at the end of the semester by the Rajasthan Technical University. This tool examines at all cognitive levels the ability & understanding of the students with respect to the concepts taught and their applicability in solving complex engineering problems.
	Industrial Internship / Seminar	The industrial internship offered at the end of the second, fourth & sixth semester and the students presents his work in the form of Seminar to the department which is used to measure the CO.
	Project Evaluation	The projects are mandatory for Final Year students. The students make their projects under the supervision of respective Guide of department which helps to measure the CO.

The weighted distribution of components used to record the attainment of course outcome is given as per following table:

Select Type	Assesment Type	Assessment Components	Weightage (%)
Theory	Internal Assesment	Assignments	10%
		Mid Semester Examination	20%
	External Assesment	Final University Examination	70%
Practical (Lab / Project / Seminar)	Internal Assessment	Internal Lab Examination	60%
	External Assessment	External Laboratory Exam	40%

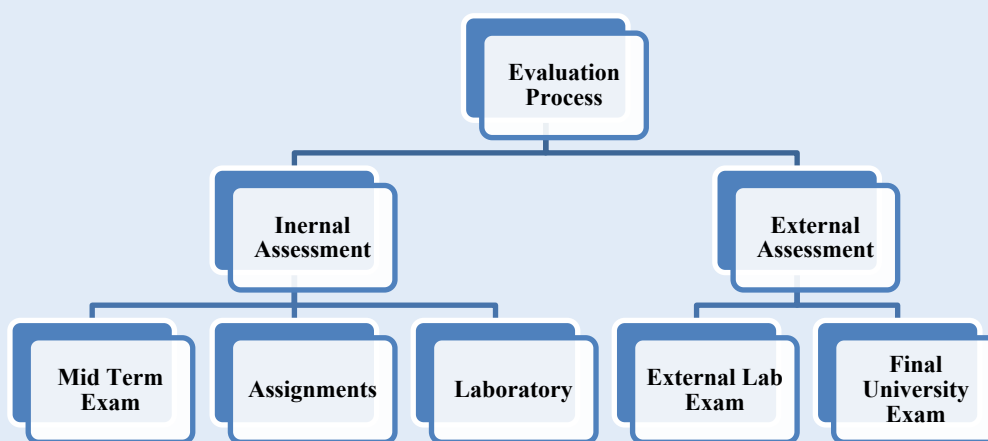


Fig: Process used to obtain attainment level of course outcome

Course Outcome Attainment:

- Attainment Level 1** : 60% of students score more than 60% marks out of the maximum relevant marks. (Low)
- Attainment Level 2** : 70% of students score more than 60% marks out of the maximum relevant marks. (Moderate)
- Attainment Level 3** : 80% of students score more than 60% marks out of the maximum relevant marks. (Substantial)

For Example:

Attainment through University Examination: Moderate i.e., 2,

Attainment through Internal Assessment: Substantial i.e., 3

We have given 70% weightage to University examination and 30% weightage to internal assessment,

The attainment calculations are

$$(70\% \text{ of University Level}) + (30\% \text{ of Internal Level}) = 70\% \text{ of } 2 + 30\% \text{ of } 3 = 1.4 + 0.9 = 2.3$$

Attainment of Course Outcomes (1st Year)

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

The Direct assessment tools such as tests, assignments, examinations etc. are taken on the questions that relate to specific course outcomes in each course. Presentations and seminars are aimed towards wider scope of the subject including its impact on society and environment as a whole. The questions at the presentations/seminars make the scope even wider and relate with the course outcomes and give the students a feel that things are almost never complete, thus the need for continuous independent life-long learning is emphasized. They all contribute equally towards indirect attainment of course outcomes.

Tools used in measuring CO:

Assessment Tool Type	Assessment Tool Title	Tool Description
Assessment Tools	Assignment	The assignment is a qualitative performance assessment tool designed to assess student's knowledge of engineering practices, framework, and problem solving. It also helps to guide written presentation skills and improve the thinking capability of the students.
	Internal Practical Assessment	This is mainly to assess student's practical knowledge with their designing capabilities. The students are tested for their confidence in terms of design of experimentation and viva voce.
	Midterm Exams	Midterm examination is conducted twice per semester. Midterm examination is metric for assessing whether the entire COs is attained or not. Examination is more focused on attainment of course outcomes and program outcomes using a descriptive exam.
	Final University Exam (Theory + Practical)	External examination is conducted at the end of the semester by the Rajasthan Technical University. This tool examines at all cognitive levels the ability & understanding of the students with respect to the concepts taught and their applicability in solving complex engineering problems.

The individual COs of the courses are mapped with correlation level and are being evaluated by prescribed assessment tools. The attainment of individual CO is calculated by assigning separate weightage to the continuous assessment tests, end term examinations, assignments, or quizzes. The attainment of COs is compared with the target level. The CO is said to be attained if its attainment value is greater than or equal to target attainment level.

The weighted distributions of components to Record the attainment of Course Outcomes are given in the following table:

Select Type	Assesment Type	Assessment Components	Weightage (%)
Theory	Internal Assesment	Assignments	10%
		Mid Semester Examination	20%
	External Assesment	Final University Examination	70%
Practical	Internal Assessment	Internal Laboratory Examination	60%
	External Assessment	External Laboratory Exam	40%

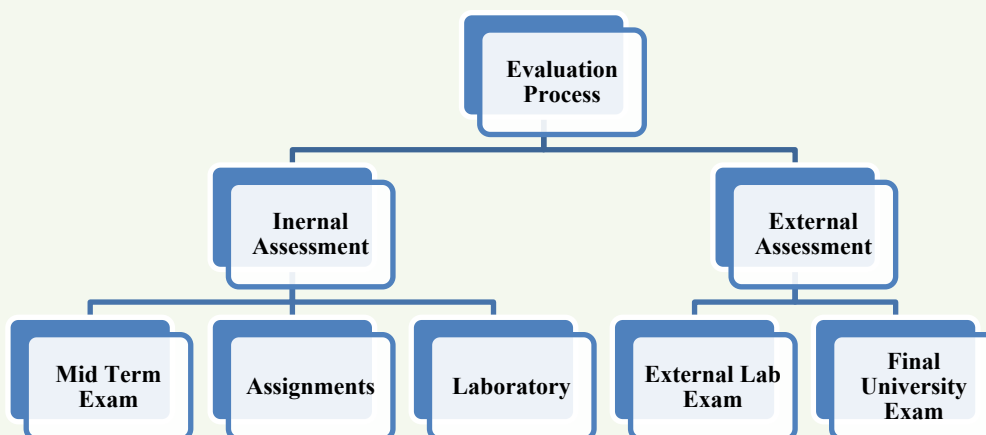


Fig: Processes are used to obtain attainment level of course outcome

Course Outcome Attainment:

- Attainment Level 1** : 60% of students score more than 60% marks out of the maximum relevant marks. (Low)
- Attainment Level 2** : 70% of students score more than 60% marks out of the maximum relevant marks. (Moderate)
- Attainment Level 3** : 80% of students score more than 60% marks out of the maximum relevant marks. (Substantial)

For Example:

- Attainment through University Examination: Moderate i.e., 2, Attainment through Internal Assessment: Substantial i.e., 3
- We have given 80% weightage to University examination and 20% weightage to Internal assessment, the attainment calculations are :

$$(70\% \text{ of University level}) + (30\% \text{ of Internal level}) = 70\% \text{ of } 2 + 30\% \text{ of } 3 = 1.4 + 0.9 = 2.3$$

Attainment Level of POs and PSOs

The assessment process includes both the direct and indirect measurement. The list of assessment tools for both direct and indirect methods is given below:

Assessment Tools used in measuring POs and PSOs :

Assessment Tool Type	Assessment Tool Title	Tool Description
Direct Assessment Tools	Assignment	The assignment is a qualitative performance assessment tool designed to assess student's knowledge of engineering practices, framework, and problem solving. It also helps to guide written presentation skills and improve the thinking capability of the students.
	Internal Practical Assessment	This is mainly to assess student's practical knowledge with their designing capabilities The students are tested for their confidence in terms of design of experimentation and viva voce.
	Midterm Exams	Midterm examination is conducted twice per semester. Midterm examination is metric for assessing whether the entire POs with respect to COs are attained or not. Examination is more focused on attainment of course outcomes and program outcomes using a descriptive exam.
	Final University Exam (Theory + Practical)	External examination is conducted at the end of the semester by the Rajasthan Technical University. This tool examines at all cognitive levels the ability & understanding of the students with respect to the concepts taught and their applicability in solving complex engineering problems.
	Project Evaluation	The projects are mandatory for Final Year students. The students make their projects under the supervision of respective Guide of department which helps to measure the CO.
	Industrial Internship / Seminar	The industrial internship offered at the end of the fourth semester & sixth semester is used to measure the PO.
Indirect Assessment Tools	Alumni Survey	Alumni, particularly who has graduated within the 3-4 years of current academic year, feedback is taken with reference to the achievement of POs.
	Graduate Exit Survey	In the last semester i.e., 8th semester, feedback is taken by the student of last year. Achievement of POs and graduate attributes (GA) are taken as criteria in the feedback.
	Industrial Feedback	Students who have undergone vocational/summer training and internship in the industries as well as who got the jobs in the industries. Feedback is taken from the industries for the performance of students. Verbal feedback is taken from industry persons when our faculty meets them at any conference or when they come to our institute for giving lectures or training.
	Faculty Survey	Feedback is taken from faculties regarding attainment of PO's for an academic year. The Feedback is taken on questions which directly or indirectly related to PO's specified by NBA.

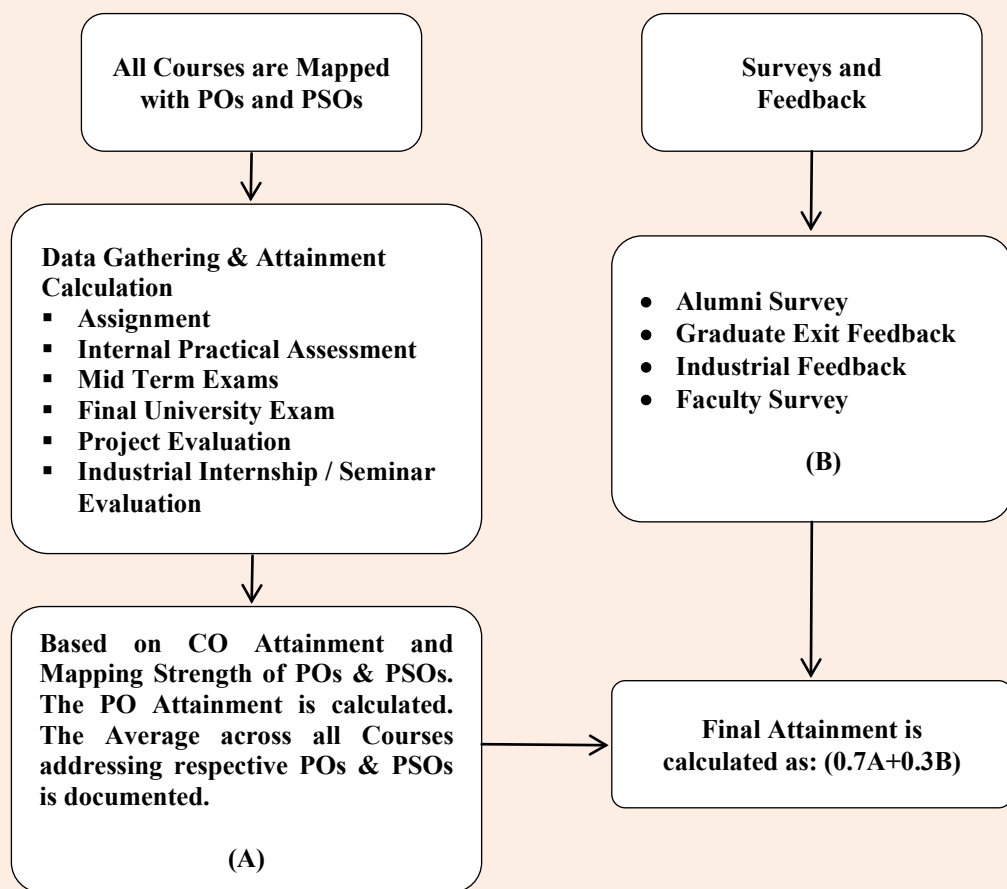


Figure: Measuring Attainment of PO and PSO