

# COURSE OUTCOMES & PROGRAM OUTCOMES

## ASSESSMENT PROCESS

### **1. Attainment of Course Outcomes:**

The assessment process used for measuring the attainment of each of the course outcomes is described below.

The assessment process is broadly classified in to two types.

- i. Direct Assessment
- ii. Activity based assessment

#### **Direct Assessment:**

The various assessment tools used to gather the data for evaluation of course outcomes using direct assessment are as follows.

- i. Internal (Mid) Examinations:** Two Mid Examinations are conducted for 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year students in each semester as per the university prescribed norms. Each mid examination is conducted from 50% of the course syllabus. Four descriptive questions each carrying 5 marks are given out of which students have to answer any two questions for a maximum of 5 marks each. Each question is related to one or more course outcomes. It is expected that a student should score at least 3 marks (60%) out of 5 marks for the attainment of that course outcome.
- ii. Assignment Questions:** 5 assignment questions are given in each assignment. Each question is mapped to one or more course outcomes. Each question carries 5 marks. It is expected that a student should score at least 70% for the attainment of that course out come. Two assignments are given for each course.
- iii. End semester University examinations:** The question paper for each course is set by the affiliating university. Since the answer scripts are retained by the university, the information regarding the attainment levels of each course outcome cannot be ascertained. However, the marks scored by the students in the end semester examination are used to assess the attainment level of the whole course and the same is transferred to each course outcome attainment level, while calculating the overall attainment level. It is expected that a student should score at least 50% of the maximum marks of the course (i.e. 37.5 out of 75) for the attainment of course outcomes.

The following table illustrates the assessment criterion for the theory courses for all semesters/ years.

<b>S.No</b>	<b>Assessment Tool</b>	<b>Maximum Marks per Question</b>	<b>Threshold level (%)</b>	<b>Attainment level Criteria</b>	<b>Attainment level</b>
<b>1</b>	<b>Mid Exams</b>	<b>5</b>	<b>60%</b>	At least 70% of attempted students surpass threshold level (60%) marks	<b>3</b>
				At least 60%-69% of attempted students surpass threshold level (60%) marks	<b>2</b>
				At least 50%-59% of attempted students surpass the threshold level (60%) marks	<b>1</b>
<b>2</b>	<b>Assignments</b>	<b>1</b>	<b>70%</b>	At least 70% of attempted students surpass threshold level (70%) marks	<b>3</b>
				At least 60%-69% of attempted students surpass threshold level (70%) marks	<b>2</b>
				At least 50%-59% of attempted students surpass the threshold level (70%) marks	<b>1</b>
<b>3</b>	<b>University Exams</b>	<b>15*5=75</b>	<b>50%</b>	At least 70% of attempted students surpass threshold level (50%) marks	<b>3</b>
				At least 60%-69% of attempted students surpass threshold level (50%) marks	<b>2</b>
				At least 50%-59% of attempted students surpass the threshold level (50%) marks	<b>1</b>

The assessment level of a particular course outcome using direct assessment is calculated by giving 40% weightage to internal assessment tools and 60% weightage to end semester university examination.

The following table illustrates the attainment level calculation for all course outcomes.

Course outcome	Course outcome attainment level from internal assessment				Course outcome attainment level from university exams	Direct CO Attainment Level
	Mid-1	Mid-2	Assignment	Average Value		
<b>CO-1</b>	a <sub>1</sub>	b <sub>1</sub>	c <sub>1</sub>	$d_1 = a_1 + b_1 + c_1 / 3$	e <sub>1</sub>	$(0.6)e_1 + 0.4 (d_1)$
<b>CO-2</b>	a <sub>2</sub>	b <sub>2</sub>	c <sub>2</sub>	$d_2 = a_2 + b_2 + c_2 / 3$	e <sub>2</sub>	$(0.6)e_2 + 0.4 (d_2)$
<b>-----</b>	-----	-----	-----	-----	-----	-----
<b>CO-N</b>	a <sub>n</sub>	b <sub>n</sub>	c <sub>n</sub>	d <sub>n</sub>	e <sub>n</sub>	$(0.6)e_n + 0.4 (d_n)$

As an example for assessment of course outcome attainment of a course is shown in the table below.

ASSESSMENT OF COs FOR THE COURSE					
CO	Method	Value	CO Attainment (Internal)	CO Attainment (University)	Direct CO Attainment
CO1	MI Q1	3.0	3.00	2.00	2.40
	AI Q1	3.0			
	AI Q2	3.0			
CO2	MI Q2	3.0	2.25	2.00	2.10
	MI Q3	0.0			
	AI Q3	3.0			
	AI Q4	3.0			
CO3	MI Q4	0.0	2.40	2.00	2.16
	AI Q5	3.0			
	MII Q3	3.0			
	MII Q4	3.0			
	AII Q1	3.0			
CO4	MII Q1	3.0	3.00	2.00	2.40
	AII Q2	3.0			
	AII Q3	3.0			
CO5	MII Q2	2.0	2.67	2.00	2.27
	AII Q4	3.0			
	AII Q5	3.0			

### **Activity Based Assessment:**

Under this process rubrics are developed for various activities like Innovative assignments, Guest Lectures, Workshops etc. These activities are related to corresponding courses. The course outcomes of courses are assessed by mapping the rubrics parameters of activities with course outcomes.

### **Final CO Attainment:**

The final CO attainment value of each CO is calculated by giving 80% weightage to direct CO attained values and 20% weightage to activity based CO attained values.

## **2. Attainment of Program Outcomes:**

The assessment tools and process used for measuring the attainment of each of the program outcomes and program specific outcomes are described below.

The assessment tools are broadly classified in to two types.

- i. Direct Assessment tools
- ii. Indirect Assessment tools

### **Direct Assessment Tools:**

Direct assessment tool consist of the curriculum courses as prescribed by the affiliating university. These courses consist of all theory courses, elective courses, laboratory courses, student's technical seminar, comprehensive viva-voce, mini project work and major project work.

The PO attainment level for all the courses is calculated as per the table given below:

<b>PO</b>	<b>Values of Relevant CO's</b>	<b>Final PO Attainment</b>
<b>PO1</b>	CO1, CO3	$d1 = (CO1 + CO3) / 2$
<b>PO2</b>	CO3, CO6, CO1	$d2 = (CO1 + CO3 + CO6) / 3$
---	-----	-----
----	-----	-----

From the above table the attainment level of each PO is determined for a particular course. This way for all the courses under direct assessment, the PO attainment levels are determined. The overall attainment level of each PO and PSO is obtained by taking the average value of the mapped courses PO's / PSO's attainment levels.

The following table illustrates the process.

Course code	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>C101</b>	2.3											
<b>C102</b>	1.5											
<b>C103</b>	2.6											
----	---											
---	---											
----	---											
<b>C406</b>	3.0											
	Avg. PO1 value	Avg. PO2 value	Avg. PO3 value									

### **Indirect Assessment Tools:**

PO Attainment through Indirect Assessment is categorized into two methods.

- i. Survey based evaluation
- ii. Activity based evaluation

1. Following surveys used for calculation of indirect PO Attainment levels using Survey based evaluation:

#### **a) Course End Survey**

- i. At the end of each semester a questionnaire related to program outcomes is distributed to all the enrolled students to take feedback on effectiveness of the course.
- ii. Calculate each PO attainment value from the feedback forms for all courses.
- iii. The final PO attainment value is the average upon PO attainment values of all courses.

#### **b) Graduate Exit Survey**

- i. At the end of 4 years after graduation, a questionnaire is given to graduates to obtain Graduate Exit feedback.
- ii. Calculate each PO attainment value from the feedback forms.

**c) Alumni Survey**

- i. A questionnaire is distributed to Alumni members during the periodical meetings that are arranged by the program. Their feedback is obtained.
- ii. Calculate each PO attainment value from the feedback forms.

**d) Employer survey**

- i. The employer's feedback is periodically taken to know the performance of the employed graduates. A questionnaire is distributed to the HR personal.
- ii. Calculate each PO attainment value from the feedback forms.

2. Following activities are used for calculation of indirect PO Attainment levels using activity based evaluation:
  - a) Workshops
  - b) Innovative Assignments
  - c) Learning Emerging Advancements in Domain (LEAD)
  - d) Advanced Technology Lab (ATL)
  - e) Hobby Projects
  - f) Soft/ Life Skills
  - g) Internships

Rubrics are developed for above activities and each PO attainment is calculated through these rubrics.

**Final PO Attainment:**

The final PO attainment value of each PO is calculated by taking 80% weightage of direct PO attained values, 10% weightage of indirect PO attained values using Surveys and 10% weightage of indirect PO attained values using activities.

**3. Attainment of Program Specific Outcomes:**

PSO attainment value of each PSO is calculated from rubrics.

1. Rubrics are prepared for:
  - a. Laboratory courses
  - b. Comprehensive viva-voce
  - c. Student technical seminars
  - d. Mini project work
  - e. Major project work
2. Calculate each PSO attainment value through rubrics.