

3.2 Process for Attainment of Course Outcomes (COs)

The assessment processes used to gather the data upon which the evaluation of Course Outcomes is based on the internal and external assessment as follows:

1. The assessment of course outcomes for each course is calculated with the help of assessment tools and attainment level is evaluated for each course of the program.
2. The Internal assessment has weightage of 40% and External assessment is of 60%. (According to structure of program)
3. Target level of each course is defined in the beginning of the semester by considering different threshold levels at FE, SE, TE and BE courses of the program.
4. The evaluation metrics for internal assessment are Unit test, Prelim exam, Laboratory explanation / Project, Assignment, Mock oral/ Practice Exam, Theory/Practical Attendance, etc.
5. The evaluation metrics for External assessment are University Insem Exam, Oral/Practical Exam, End Sem Exams, etc.
6. The final attainment of COs are calculated according the weightage.

A. List of Assessment metrics

The evaluation metrics used for attainment of COs are listed in table 3.2.1.-a

Table 3.2.1-a: Assessment Metrics

Internal Assessment Metrics	External Assessment Metrics
Unit Test	Insem Exam
Preliminary Exam	Oral/Practical Exam
Laboratory Experiments	End Sem Exam
Assignments	
Mock Oral / Practice Exam	
Theory/Practical Attendance	
Students Portfolios	

B) The quality/relevance of assessment processes & tools used

Internal assessment is carried at department level by course teacher for different courses. There are different parts of internal assessment. The following table describes assessment process of internal assessment. The details of the target levels for evaluation of COs by internal and external assessment are given in Table 3.2.1-b

Table 3.2.1-b: Target levels for evaluation of COs

SE TE BE		
Assessment	Target Levels (Marks in IA)	
Internal Assessment (40%)	Level 0(0)	<45% students score more than 45 % marks in IA
	Level 1 (1)	>45 <=55% students score more than 60 % marks in IA
	Level 2 (2)	>55, <=65% students score more than 60 % marks in IA
	Level 3 (3)	>65% students score more than 60 % marks in IA
Assessment	Target Levels (Marks in UE)	
University Assessment (60%)	Level 0(0)	<40 % students score more than 40 % marks in UE
	Level 1 (1)	>40, <=50% students score more than 50 % marks in University Exam
	Level 2 (2)	>50, <=60% students score more than 50 % marks in University Exam
	Level 3 (3)	>60% students score more than 50 % marks in University Exam

After collection, verification and analysis, decision is taken on the basis of internal assessment and university examinations. As per the curriculum of the affiliating university internal assessment has 40% weightages and university examinations are 60%. The calculations of outcome for each course is done according to the formula given in equation (1)

$$\text{Course Outcome} = (40\% \text{ Internal Assessment} + 60\% \text{ University Examinations}) \text{ ---- (1)}$$

$$= (0.4 * \text{IA}) + (0.6 * \text{UE})$$

The complete process of calculating COs and POs Mapping, Attainment is given in Table 3.2.1-c

Table 3.2.1-c: Calculation of COs and POs

3.3.2 Program level Course-PO matrix : Course CO-PO Attainment

3.2.2 CO- Attainment (Internal+ University)

		CO1	CO2	CO3	CO4	CO5	CO6	Avg							
1	C304184	2.67	2.67	2.67	2.67	2.67	2.67	2.67							

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Course	Outcome	Engineering Knowledge	Problem Analysis	Design/Development of Solutions	Conduct Investigation of Complex Problems	Modern Tool Usage	The Engineering and Society	Environment and Sustainability	Ethics	Individual and Team Work	Communication	Project Management and Finance	Life-long Learning	PSO 1	PSO 2
C-304184	CO1	3	2	2	1	2	1	3	1	1	1	2	2	1	2
	CO2	2	1	2	2	3	1	2	1	1	2	2	2	2	2
	CO3	3	2	2	1	2	1	3	0	1	0	2	3	1	1
	CO4	2	1	3	2	2	1	1	1	2	1	1	2	3	3
	CO5	2	1	3	1	3	2	2	0	2	1	2	2	2	3
	CO6	3	1	2	1	2	1	0	1	1	1	3	2	3	1
	S Map	15	8	14	8	14	7	11	4	8	6	12	13	12	12
1	Avg	2.50	1.33	2.33	1.33	2.33	1.17	1.83	0.67	1.33	1.00	2.00	2.17	2.00	2.00
PO Attainment Formula	PO attainment =[(Attainment *mapping)/Sum of Mapping]= [((CO1*PO1)+ (CO2*PO1)+ (CO3*PO1)+ (CO4*PO1)+ (CO5*PO1)+ (CO6*PO1))/ Sum of PO1Mapping]														
C304184		2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67
PO Attainment		P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

A. Data Collection, Verification and Analysis

The sample data collection verification and analysis for the calculation of COs, attainment according to table is 3.2.1 for internal assessment and university examinations are given in table 3.2.3 and 3.2.4 respectively

Table3.2.4: Sample for University Examinations

University Exams (CO-Wise Marks)				
Class: T.E[E&TC] Division: A		Subject :		Microcontrollers [C-304184]
Roll No.	Name of Student	In Sem	Practical / Oral	END Sem
		30		
TEA-01	JADHAV SAGAR CHANGDEO	15	35	28
TE A 02	GAVHANE RATNADIP DAMODAR	14	34	32
TEA-03	TODKARI SHUBHAM MALLIKARJUN	18	34	31
TEA-04	SABLE SUYASH SHRIHARI	22	45	40
TEA-05	MAMDGE ROHINI TUKARAM	23	36	37
TEA-61	JADHAV NAVNATH JAGANNATH	AB	AB	AB
TEA-62	GAIKWAD PUNAM MARUTI	7	32	33
TEA-63	PHAPALE SHUBHANGI BALASAHEB	6	30	39
TEA-64	ASHTEKAR MANSI PRAVIN	13	34	28
TEA-65	DESHMUKH RUSHIKESH TANAJI	10	AB	30
TEA-66	PATIL AMIT CHHOTURAO	4	AB	AB
TEA-67	GORE RAVIRAJ ASHOK	6	24	14
SUBJECT:		In sem	Practical / Oral	END Sem
No of students getting 40% Marks		50	62	52
Absent		2	5	2
Level 0 (<40 % of students getting 40% Marks)		76.92	100.00	80.00
Level 1 (>40,<=50 % of students getting 40% Marks)				
Level 2 (>50,<=60 % of students getting 40% Marks)				
Level 3 (>60 % of students getting 40% Marks)				
CO		CO1-CO6	CO1-CO7	CO1-CO8
CO Achievement Level		3	3	3

B. Decision Making

After collection, verification and analysis decision is taken on the basis of internal assessment and university examinations. As per the curriculum of the affiliating university internal assessment has 40% weightages and university examinations are 60%.. The calculations of outcome for each course is done according to the formula given in equation (1)

$$\text{Course Outcome} = (40\% \text{ Internal Assessment} + 60\% \text{ University Examinations}) \text{ --- (1)}$$

$$= (0.4 * \text{IA}) + (0.6 * \text{UE})$$

Table 3.2.5, 3.2.6 and 3.2.7 gives details of calculations of Internal assessment according to the data collected, University examinations and final calculation of attainment which are listed in Table 3.2.2

Table 3.2.5: Calculation of Internal assessment

Class: TE[E&TC] Division: A					Subject		Microcontroller[C-304184]			
Sr. No	COs	Test 1	Prelim	Lab (Expt.)	Assignment	Mock	Theory Attendance	Practical Attendance	Total	Average assessment
1	CO 1	0		3	3	3	2	2	13	2.2
	CO 2	0		3	3	3	2	2	13	2.2
	CO 3		0	3	3	3	2	2	13	2.2
	CO 4		0	3	3	3	2	2	13	2.2
	CO 5		0	3	3	3	2	2	13	2.2
	CO 6		0	3	3	3	2	2	13	2.2

Table 3.2.6: Calculation of University Examinations

Class: TE[E&TC] Division: A		Subject		Microcontrollers [C-304184]		
CO ATTAINMENT (University Examinations)						
Sr No	COs	Insem	PR	ENDSEM	TOTAL	Avg
1	CO 1	3	3	3	9	3.0
	CO 2	3	3	3	9	3.0
	CO 3	3	3	3	9	3.0
	CO 4	3	3	3	9	3.0
	CO 5	3	3	3	9	3.0
	CO 6	3	3	3	9	3.0

Table 3.2.7: Calculation of Course Attainment

Class: TE[E&TC] Division: A		Subject		Microcontrollers [C-304184]	
Attainment=(0.4*IA)+(0.6*UA)					
S.r No	COs	Internal Assessment (IA)	University Examinations	FINAL Attainment	
1	CO 1	2.17	3.00	2.67	
	CO 2	2.17	3.00	2.67	
	CO 3	2.17	3.00	2.67	
	CO 4	2.17	3.00	2.67	
	CO 5	2.17	3.00	2.67	
	CO 6	2.17	3.00	2.67	
			CO Attainment	2.67	