# **Procedure of Calculating CO PO Attainment**

Step 1: Formation of Domain Group / Mapping, Validation and Formation of Rubrics of CO PO as per syllabus content / Creation of Articulation Matrix / Specific remarks for CO PO attainment level

#### MATRIX FOR CO PO MAPPING FOR COURSE:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	X	X	X	X	-							X		
CO2	X	X	X	X	X						X	X		
CO3	X	X	X	X	X	X	X	X			X	X		
CO4	X	X	X	X	X		X				X	X		
CO5	X	X	X	X			-				X	X		
CO6	X	X	X	X	X	X	X	X		1	X	X		

ARTICULATION MATRIX FOR SUBJECT / COURSE (Assigning weightages as per curriculum)

High - 3

Moderate - 2

Low - 1

#### ATTAINMENT OF PO THROUGH COURSE OUTCOMES

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	2	1		1	1	1	1		2		
CO2	2	2	2	3	1			-		1	2	2		
CO3	2	3	3	3	2	2	1	2			2	2		
CO4	2	2	1	2	2		1				1	1		
CO5	1	1	1	1							2	2		
CO6	2	3	3	3	3	2	2	1			2	2		
AVG	2	2.17	1.83	2.33	2.00	2.00	1.33	1.50	-	-	1.80	1.83		

• Calculate the Average Value of PO through Course Outcomes

Average Value PO =  $\frac{Total\ of\ attainment\ level}{Total\ No.of\ COs\ mapped\ with\ PO}$ 

#### PROGRAM OUTCOME ARTICULATION MATRIX

(After entering the Average values of Course Outcomes of all subjects of a Program)

Year	Sem.	Subject Code	Name of Subject	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	<b>PO</b> 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
	I	FEC101															
FE	II	FEC201															
	III	MEC301															
SE	IV	MEC401															
	V	MEC501															
TE		MEC502	Thermal Engineering	2	2.17	1.83	2.33	2.00	2.00	1.33	1.50	-	-	1.80	1.83		
	VI	MEC601															
	VII	MEC701															
BE	VIII	MEC801															
Targe	t Value																

Calculate Average Value of PO of all subjects

Average Value PO =  $\frac{Total\ of\ attainment\ level}{Total\ No.of\ subjects\ mapped\ with\ PO}$ 

## Step 2: CALCULATION FOR DIRECT ATTAINMENT FOR CO PO MAPPING

#### 1. Direct Tools:

- Internal Assessment I & II
- Assignments
- Tutorials
- Experiments
- Subject / Course Project
- Industrial Visits
- Presentation
- Final University Examination (Subject / Oral /Practical)

#### CALCULATION OF COURSE OUTCOME ATTAINMENT LEVEL

<b>Estimating the Levels wrt students marks</b>	
Cut-off %	Level
No. of students having marks>=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 (If the results are observed consistently high, No failures or Number of failures are less, any other) for e.g. PCE I and PCE II

#### Enter the data of each student:

	IA	1	IA	12	ASSIGN	MENT	EXPER	RIMENT	COURSE	UNIVER
Name of students	Q1	Q2	Q1	Q2	A1	A2	E1	E2	PROJECT / IV / PRESENTATION	- SITY EXAM
Max Marks										
Student 1										
Student 2										
Student 3										
Student 100										
Total No. of										
students appeared										
Total No. of										
students scored										
above 60										
Total No. of										
students scored										
=>50 and <59										
Total No. of										
students scored										
=>40 and <49										
Mapping CO										All COs
<b>Attainment Level</b>										

#### **Calculation of Attainment Level**

Ex.

#### If Total no of students are 100

Total No. of students scored above 60 = 50
Total No. of students scored above 50 and <59 = 25
Total No. of students scored above 40 and <49 = 25

Then Attainment Level =  $(50 \times 3 + 25 \times 2 + 25 \times 1) / 100 = 2.25$ 

# External Assessment 80% and Internal Assessment 20% Calculation

		Internal As	sessment (20%	(o)	External Assessment (80%)	80% of External+20%
Course Outcome	IA-I OR IA- II	Experiment	Assignment	Internal Evaluation Average	University Evaluation	of internal examination
CO1	2.87	2.87	2.66	2.8	1.7	1.92
CO2	2.92	2.81	2.66	2.8	1.7	1.92
CO3	2.66		2.66	2.66	1.7	1.89
CO4	2.82		2.66	2.74	1.7	1.91
CO5			2.66	2.66	1.7	1.89
CO6			2.66	2.66	1.7	1.89

## **Articulation Matrix: (Converting Levels to Scores)**

• Level 3 = Actual score

• Level  $2 = Actual Score \times 2/3$ 

• Level 1 = Actual Score x 1/3

Actual Score	CO PO Atta	inment as per	weightage
	3	2	1
1.89	1.89	1.26	0.42
1.87	1.87	1.24	0.41
1.79	1.79	1.20	0.40
1.79	1.79	1.19	0.40
1.92	1.92	1.28	0.43
1.93	1.93	1.29	0.43

# **DIRECT ATTAINMENT OF COURSE OUTCOMES WITH PO (Articulation Matrix gets converted to Score Based Matrix)**

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1.89	1.26	0.42	1.26								1.26		
CO2	1.24	1.24	1.24	1.87	0.41						1.24	1.24		
CO3	1.2	1.79	1.79	1.79	1.2	1.2	0.4	1.2			1.2	1.2		
CO4	1.19	1.19	0.4	1.19	1.19		0.4				0.4	0.4		
CO5	0.4	0.43	0.43	0.43							1.28	1.28		
CO6	1.28	1.93	1.93	1.93	1.93	1.29	1.29	0.43			1.29	1.29		
AVG	1.2	1.31	1.04	1.41	1.18	1.25	0.70	0.82	-	-	1.08	1.11		

# **DIRECT ATTAINMENT OF PROGRAM OUTCOMES (Considering all Subjects)**

Year	Sem.	Name of Subject	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	P09	P10	P11	P12	PSO1	PSO2
	I	FEC101														
FE		FEC102														
FL	II	FEC201														
		FEC202														
	Ш	MEC301														
CE		MEC302														
SE	IV	MEC401														
		MEC402														
	V	MEC501														
TE		MEC502	1.2	1.31	1.04	1.41	1.18	1.25	0.70	0.82	-	-	1.08	1.11		
TE	VI	MEC601														
		MEC602														
	VII	MEC701														
BE		MEC702														
DL	VIII	MEC801														
		MEC802														
Avera	age	<u> </u>														
Direct	t 80 %															

For Calculation of Direct attainment level of PO =  $\frac{\text{Total of attainment Level}}{\text{No of courses for that particular PO}}$ 

## 2. INDIRECT ATTAINMENT TOOLS:

• Program Exit Survey

• Employer Feedback: Rubrics is given in department

• Alumni Feedback: Rubrics is available in Academic Diary

• Parents Feedback: Rubrics is available in Academic Diary

• Feedback from Industry

# Rubrics of Indirect Attainment for all types of Feedback and Survey

Name of Alumni	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PSO1	PSO2
Student 1	1		1		1		1			1		1		
Student 2	2	1	2		2		2			2		2		
Student 3	2	1	2		1		2			2		2		
Student 4	2	2	1				1			1		1		
Student 5	3						2			2		2		
Student 6	2		2							2		2		
Student 7														
Student 8	2	1	2		1		2			2		2		
Student 9	2	2	1				1			1		1		
Student 10	3						2			2		2		
Student 11	2		2							2		2		
Student 12	2	1	2		1		2			2		2		
Student 13	2	2	1				1			1		1		
Student 14	3						2			2		2		
Student 15	2		2							2		2		
Student 16	2	1	2		1		2			2		2		
Student 17	2	2	1				1			1		1		
Student 18	3						2			2		2		
Student 19	2		2							2		2		
Student 20	2	2	1				1			1		1		
Average	2.2	1.5	1.6	0.0	1.2	0.0	1.6	0.0	0.0	1.7	0.0	1.7		

# RUBRICS FOR INDIRECT ATTAINMENT

Tools	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	P08	P09	P10	P11	P12	PSO 1	PSO 2
Program														
Exit Survey														
Employer														
Feedback														
Alumni														
Feedback														
Parents														
Feedback														
Feedback														
from														
Industry														
Average														
20% of														
Indirect														
Attainment														

### INDIRECT ATTAINMENT OF PROGRAM OUTCOMES

Ear Calculation of Indianat attainment level of DO	Total of attainment Level
For Calculation of Indirect attainment level of PO =	No of Feedbacks for that particular PC

## OVERALL ATTAINMENT OF PROGRAM OUTCOMES

0.8 x Attainment Level of PO as per Direct + 0.2 x Attainment Level of PO as per Indirect

Program Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	<b>PO</b> 7	P08	P09	P10	P11	P12	PSO 1	PSO 2
Direct Attainment														
Indirect Attainment														
Overall attainment														

## PROGRAM EXIT SURVEY

(To be collected for BE Sem. VIII students)

**Branch:** 

PO12: Life-long learning

PSO1: Entrepreneur PSO2: Hobbies

Name of the student: PROGRAM OUTCOMES / PROGRAM S	_ Roll No.: PECIFIC OUTCOMES
PO1: Engineering knowledge	PO8: Ethics
PO2: Problem analysis	PO9: Individual and Team Work
PO3: Design/development of solutions	PO10: Communication.
POA: Conduct investigations of complex problems	PO11: Project Management and Finance

Div:

As you have undergone through all the above courses from Sem I to Sem VIII, we request you to kindly fill Survey form. You are required to fill the level of attainment of Program Outcome by you in your understanding/opinion.

Scale to be used for the attainment of Program Outcomes:

Class: B.E.

PO5: Modern tool usage

PO6: The engineer and society

PO7: Environment and sustainability

High-3 Moderate -2 Low -1

You are requested to fill in mapped blocks with the above values.

Year	Sem.	Subject Code	Name of Subject	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
	I	FEC101	EM – I														
DE		FEC102															
FE	II	FEC201	EM – II														
	III	MEC301															
SE																	
SE	IV	MEC401															
	V	MEC501															
TE																	
	VI	<b>MEC601</b>															
	VII	MEC701															
BE																	
	VIII	MEC801															
Average																	