PO Attainment Procedure-Direct and Indirect Assessments
PO Attainment Procedure for Internal Examination-Direct Assessment

Step wise	Procedure
Step 1	Define the COs for each course. Each course contains five units. Define five COs for five units. Each Course/Subject contains two internal exams in a Semester. **Mid Exam (30% Weightage):** The syllabus for the internal exam-1 is Unit-1 and Unit-2. Internal exam-1 consists of six descriptive questions from Unit-1 and Unit-2 (Three questions from each) and it attains two course outcomes i.e CO1& CO2. Internal exam-2 consists of six descriptive questions from Unit-3, Unit-4 and Unit-5 (Two questions from each) and it attains three course outcomes i.e CO3, CO4 & CO5. **Quiz (10% Weightage):** Each test contains 20 multiple choice questions. For test-1 the syllabus is two units i.e Unit-1 and Unit-2. For test-2 the syllabus is three units i.e Unit-3, Unit-4 and Unit-5.The two tests are conducted along with the internal exams.

Step 2

Define how these COs are relate to each PO
(Twelve POs are taken which are given in the NBA user manual)

Course Name	CO's	Statement	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12
Course1	CO 1		√		√									√
	CO 2		√		√							√		√
	CO 3		√	√		√			√					√
	CO 4		√		√		√					√		√
	CO 5			√	√	√	√							√

Step 3

Set the question paper (Mid I-CO1 &CO2, Mid II-CO3, CO4 & CO5) such that all the CO s are covered and mark against each question which CO the question is addressing

Question No.	Unit No.	Max. Marks	CO 1	CO 2	CO 3	CO 4	CO 5
Mid Exam-I							
Q1 or Q2 or Q3	Unit 1	10	√				
Q4 or Q5 or Q6	Unit 2	10		√			
QUIZ		10		√			
Mid Exam-II							
Q1 or Q2	Unit 3	10			√		
Q3 or Q4	Unit 4	10				√	
Q5 or Q6	Unit 5	10					√
QUIZ		10			√		

Step 4

Evaluate the answer sheets (Mid I & Mid II). Enter the marks scored by students against each question. Also make a column of max marks allotted to each question.

EXAMS →	Mid Exam-I						Mid Exam-II					
CO's→ Reg. No. ↓	CO1			CO2			CO3		CO4		CO5	
Reg. No.	Q1	Q2	Q3	Q4	Q5	Q6	Q5	Q6	Q7	Q8	Q9	Q10
XXX1	7			8			5		8			9
XXX2		8			7			8		9	8	
XXX3	9				8		7		8			9
XXX4		8		7				9		8	7	
XXX5	7				8		8		8		9	

Step 5	**Set the Attainment Levels**
	Attainment Level 1: 60% of the students score more than 60% of the internal marks
	Attainment Level 2: 70% of the students score more than 60% of the internal marks
	Attainment Level 3: 80% of the students score more than 60% of the internal marks
	Note: Depending on the subject severity and marks obtained by the students, attainment level may change.

Step 6

Based on the marks obtained by the students give the attainment level.

COs→ Reg. No.↓	CO1			CO2			Quiz 1	CO3		CO4		CO5		Quiz 2
Reg. No.	Q1	Q2	Q3	Q4	Q5	Q6		Q5	Q6	Q7	Q8	Q9	Q10	
XXX1	7			8			6	5		8			9	8
XXX2		8			7		7		8		9	8		9
XXX3	9					8	6	7		8			9	6
XXX4		8		7			8		9		8	7		7
XXX5	7				8		9	8		8		9		8
No. Of students attained	A/B			A/B			A/B	A/B		A/B		A/B		A/B
Percentage	%			%			%	%		%		%		%
Attainment Level	1or2or3			1or2or3			1or2or3	1or2or3		1or2or3		1or2or3		1or2or3

Where A → No. Of students attained that particular CO
B → Total No. Of students multiplied by 3 (High level of attainment)

Example of attainment calculation:

	CO Number	CO1	CO2	CO3	CO4	CO5	QUIZ
AVERAGE	**Attained**	83	99	80	92	104	92
	Total Students	124	124	124	124	124	124
	External Exam	66.93	79.83	64.51	74.19	83.87	74.19
	CO Attainment level	1	2	1	2	3	2
	60% OF INTERNAL MARKS						
	60% OF EXTERNAL MARKS						

The same procedure is repeat for all the courses to calculate the attainment level of POs.

PO Attainment Procedure for Semester End Examination-Direct Assessment

Step wise	Procedure
Step 1	Define the COs for each course. Each course contains five units. Define five COs for five units. Sixty percent weightage is given to assess the each course having all COs covered.

Step 2

Define how these Cos are relate to each PO
(Twelve POs are taken which are given in the NBA user manual)

Course Name	COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Course1	CO1		√		√									√
	CO2		√		√							√		√
	CO3		√	√		√			√					√
	CO4		√		√		√					√		√
	CO5			√	√	√	√							√

Step 3	Set the question paper such that all the CO s are covered and mark against each question which CO the question is addressing						

Question No.	Unit No.	Max. Marks	CO 1	CO 2	CO 3	CO 4	CO 5
Q1 or Q2	Unit 1	12	√				
Q3 or Q4	Unit 2	12		√			
Q5 or Q6	Unit 3	12			√		
Q7 or Q8	Unit 4	12				√	
Q9 or Q10	Unit 5	12					√

Step 4

Evaluate the answer sheets. Enter the marks scored by students against each question. Also make a column of max marks allotted to each question.

CO's→ Reg. No.↓	CO1		CO2		CO3		CO4		CO5	
Reg. No.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
XXX1	10			9	11			8		10
XXX2		11	9		8		9		10	
XXX3	9			11		9		10		9
XXX4	10				10		11		11	
XXX5		8	7			11		8		9

Step 5

Set the Attainment Levels

Attainment Level 1: 60% of the students score more than 60% of the internal marks

Attainment Level 2: 70% of the students score more than 60% of the internal marks

Attainment Level 3: 80% of the students score more than 60% of the internal marks

Note: Depending on the subject severity and marks obtained by the students, attainment level may change.

Step 6	Based on the marks obtained by the students give the attainment level.

Based on the marks obtained by the students give the attainment level.

COs→ Reg. No.↓	CO1		CO2		CO3		CO4		CO5	
Reg. No.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
XXX1	10			9	11			8		10
XXX2		11	9		8		9		10	
XXX3	9			11		9		10		9
XXX4	10				10		11		11	
XXX5		8	7			11		8		9
No. Of students attained	A/B		A/B		A/B		A/B		A/B	
Percentage	%		%		%		%		%	
Attainment Level	1or 2or3		1or 2or3		1or 2or3		1or 2or3		1or 2or3	

Where A → No. Of students attained that particular CO

B → Total No. of students multiplied by 3 (High level of attainment)

Example of attainment calculation:

	CO Number	CO1	CO2	CO3	CO4	CO5
AVERAGE	Attained	83	99	80	92	104
	Total Students	124	124	124	124	124
	External Exam	66.93	79.83	64.51	74.19	83.87
	CO Attainment level	1	2	1	2	3
	60% OF INTERNAL MARKS					
	60% OF EXTERNAL MARKS					

PSOs	
PSO-1	Skilful to analyze, design, and implementation of control techniques to conventional and non-conventional energy systems.
PSO-2	To prepare students well to have successful careers in multi- disciplinary global industry and to meet the technological challenges of the future.
PSO-3	Demonstrate the ability to effectively work in a team, communicate correctly and develop an ethical attitude and concern for society and environment.

➢ Based on the PSO's mark the level of attainment

Step 7

After calculating the COs of the course, substitute these values in Step 2 table

Course Name	CO's	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
	CO1		1		1									1	2	1	
	CO2		2		2							2		2	2	2	2
	CO3		1	1		1		1						1	1		2
	CO4		2		2		2					2		2	1	2	
	CO5			3	3	3	3							3	3	3	1
	Average of COs		1.5	2	2	2	2.5		1			2		1.8	1.8	2	1

Over all PO Calculation=[(0.6xSemester End Exam)+(0.3xInternal Exam) +(0.1xQuiz)]

Finally put the average value of course PO outcome table shown below

Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
Cours	1.	2	2	2	2.		1			2		1.	1.	2	1

	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G
e1	5				5							8	8		
Course2															
Course3															
Course4															
Course5															
→	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G	AV/G

The same procedure repeats for all the courses and finds the PO attainment levels. Now calculate average value of each PO attainment.

PO Attainment - Indirect Assessment
End-of-Course Student Survey form

Please take time to complete this survey in class. Your thoughts and objective responses to each question are a highly valued part of the CO attaining, teaching and learning improvement process. End-of-Course surveys are completed anonymously and are collected by someone other than the course teacher. Survey reports are made available in the department.

Course Code	Course Name	Course Outcomes
13EE3107	Electrical Measurements	At the end of the course, Students will able to; CO1: Analyze the characteristics of the instrument and understand the working and construction of various types of measuring instruments. CO2: Gain knowledge on construction and working of the measurement of power and energy CO3: Understand working and construction of instrument transformers and gain the knowledge on measurement of frequency, power factor. CO4: Analyze the standardization, working and construction of D.C. Crompton's, polar and coordinate type Potentiometers. CO5: Get basic knowledge of bridge balance condition and can find unknown values of Resistances, Inductance, capacitance and frequency.

Step 8

Using the scale at right, where (1) = Disagree and (3) = Strongly Agree, indicate your level of agreement with the following statements:

Disagree (1)	Agree (2)	Strongly Agree (3)

1. The course teacher exhibits enthusiasm for the subject matter. [   ]
2. Course outcomes were clearly specified and attained. [   ]
3. The course teacher seemed knowledgeable about the subject matter. [   ]
4. The course teacher conveyed a positive attitude toward students. [   ]

5. Tests, assignments, and seminars were fair. [   ]

6. The faculty member has developed and presents this course in a manner that helps me relate basic concepts to other situations. [   ]
7. The instructional approach (es) used was (were) appropriate to the course. [   ]

8. The course teacher motivated me to do my best work. [   ]

9. The course teacher is fair in evaluating student learning. [   ]

10. The class presentations and learning materials are organized. [   ]

Please provide written comments directly on this page in response to the following question.
1. What are your suggestions, if any, for changes that would improve this course?

Reg. No.:
Name:
Signature:

After collecting the course end survey, final PO attainment will be calculated using below formula.

Final PO Attainment
Course End Survey=_____% (Level __)
(Over all Attainment= 90% of Direct Assessment+10% Indirect Assessment)

Final PO Attainment														
PO→ Assessment↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
Direct Assessment															
Indirect Assessment (Course End Survey)															
Over all Attainment															