National Education Society (R.)
J N N College of Engineering, Shivamogga
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INTERNAL QUALITY ASSURANCE CELL (IQAC)

CO & PO Attainment Computation Process:

1. For each course 4 to 6 COs are defined

CO1	xxxxxxx
CO2	xxxxxxx
CO3	xxxxxxx
CO4	xxxxxxx
CO5	xxxxxxx

2. Once COs are defined for the course, CO-PO and PSO matrix for the course is constructed.

For Example: 18CSXX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2		2											2	
CO3		2	3											
CO4		2		1										3
CO5	1				2									

3. CO attainment for the course is computed based on both direct and indirect attainment. For direct attainment 50 % of Contentious Internal Assessment (CIE) and 50 % of Semester End Examination (SEE) are considered. For indirect attainment course end survey is carried out. Final CO attainment is 90% of the direct attainment and 10% of indirect attainment.

CO Attainment Computation through SEE :

1. Consider 10 Students in a class and the marks obtained by them in the course 18CSXX

TABLE 1 : SEE marks for the course 18CSXX

USN	SEE
4JN15CS001	70
4JN15CS002	45
4JN15CS003	38
4JN15CS004	78
4JN15CS005	34
4JN15CS006	12
4JN15CS007	79
4JN15CS008	85
4JN15CS009	65
4JN15CS010	52
Average	55.8 ≈ 56

2. Set the target in three ranges for the course

TARGET	
60% Students score more than the class average percentage	3
40% Students score more than the class average percentage	2
20% Students score more than the class average percentage	1

TABLE 2 : Students who got more than the class average18CSXX

Sl.No.	USN	SEE
1	4JN15CS001	70
2	4JN15CS002	45
3	4JN15CS003	38
4	4JN15CS004	78
5	4JN15CS005	34
6	4JN15CS006	12
7	4JN15CS007	79
8	4JN15CS008	85
9	4JN15CS009	65
10	4JN15CS010	52
		55.8 ≈ 56

3. In TABLE 2, Five students scored more than class average (5 among 10). Hence 5/10 = 50% students scored more than class average. Hence, the target is between 40% and 60%, SEE attained is 2.

CO Attainment Computation through CIE :

1. For the course 18CSXX, the performance of the 10 students in three tests and assignment is tabulated in Table 3.

TABLE 3 : Students marks for the course 18CSXX

USN	TEST 1		TEST 2		TEST3		Assignment
	CO1	CO2	CO2	CO3	CO4	CO5	CO3
	15	**15**	**15**	**15**	**15**	**15**	**10**
4JN15CS001	12	12	15	15	12	12	10
4JN15CS002	10		10	10	12	12	10
4JN15CS003	13	14	12	12	10	10	10
4JN15CS004	15	15	13	14	10	10	10
4JN15CS005	8	8	10	8	10	10	9
4JN15CS006			15	15	12	12	9
4JN15CS007	10	15	5	2	15	15	9
4JN15CS008	15	10	3	12	15	15	8
4JN15CS009	5	5	10	12	10	8	8
4JN15CS010	12	11	11		8	8	8

2. Course instructor should fix the target for each CO, target may be same or different for each CO.

TARGET for CO1-CO5	
60% Students score more than the class average percentage	3
40% Students score more than the class average percentage	2
20% Students score more than the class average percentage	1

3. Similar to SEE, the class average of each CO is computed. Percentage of students scored above class average should be computed as in Table 4. For example, for CO1, 5 students scored above class average. Hence, 50% students scored above class average. The target set for CO1 is 40% Students score more than the class average percentage the attainment obtained is 2. Similarly, attainment is computed for other COs.

TABLE 4 : Attainment computation for each CO

USN	TEST 1		TEST 2		TEST3		Assignment
	CO1	CO2	CO2	CO3	CO4	CO5	CO3
	15	15	15	15	15	15	10
4JN15CS001	12	12	15	15	12	12	10
4JN15CS002	10		10	10	12	12	10
4JN15CS003	13	14	12	12	12	15	10
4JN15CS004	15	15	13	14	12	15	10
4JN15CS005	8	8	10	8	12	15	9
4JN15CS006			15	15	12	12	9
4JN15CS007	10	15	5	2	15	15	9
4JN15CS008	15	10	3	12	15	15	8
4JN15CS009	5	5	10	12	10	8	8
4JN15CS010	12	11	11		8	8	8

CO1 = 1/9 (12/15 + 10/15 + 13/15 15/15 + 8/15 + 10/15 + 15/15 + 5/15 +12/15)

= 1/9(0.8 +0.66+0.86+1+0.53+0.66+1+0.33+0.8) = 0.737

5 students have got above class average among 9, Hence 5/9 =55 %

CO2 =
1/18(12/15+14/15+15/15+8/15+15/15+10/15+5/15+11/15+15/15+10/15+12/15+13/15+10/15+15/15+5/15 +3/15+10/15+11/15)

= 1/18(0.8+0.93+1+0.53+1+0.66+0.33+0.73+1+0.66+0.8+0.86+0.66+1+0.33+0.20+0.66+0.73) = 0.715

10 students have got above class average among 18, hence 10/18 = 55 %

CO3 =

1/19(15/15+10/15+12/15+14/15+8/15+15/15+2/15+12/15+12/15+10/10+10/10+10/10+10/10+9/10+9/10+9/10+8/10+8/10+8/10)

=1/19(1+0.66+0.8+0.93+0.53+1+0.13+0.8+0.8+1+1+1+1+0.9+0.9+0.9+0.8+0.8+0.8) = 0.82

10 students have got above class average among 19, hence 10/19 = 53%

CO4 = 1/10(12/15+12/15+12/15+12/15+12/15+12/15+15/15+15/15+10/15 + 8/15)

= 1/10(0.8+0.8+0.8+0.8+0.8+0.8+1+1+0.66+0.53) = 0.80

8 students have got above class average among 10, hence 8/10 = 80%

CO5 = 1/10 (12/15+12/15+15/15+15/15+15/15+12/15+15/15+15/15+8/15+8/15)

=1/10(0.8+0.8+1+1+1+0.8+1+1+0.53+0.53) = 0.846

5 students have got above class average among 10, hence 5/10 = 50%

Final CO Attainment:

	CO1	CO2	CO3	CO4	CO5
	55%	55%	53%	80%	50%
Attainment	2	2	2	3	2

	DIRECT Attainment			INDIRECT Attainment	Final Attainment
	CIE	SEE	50% CIE + 50% SEE		90% direct + 10% indirect
CO1	2	2	(2 X 0.5 + 2 X 0.5) = 2	3	(2 X 0.9 + 3 X 0.1) = 2.1
CO2	2	2	(2 X 0.5 + 2 X 0.5) = 2	3	(2 X 0.9 + 3 X 0.1) = 2.1
CO3	2	2	(2 X 0.5 + 2 X 0.5) = 2	3	(2 X 0.9 + 3 X 0.1) = 2.1
CO4	3	2	(3 X 0.5 + 2 X 0.5) = 2.5	2	(2.5 X 0.9 + 2 X 0.1) = 2.45
CO5	2	2	(2 X 0.5 + 2 X 0.5) = 2	3	(2 X 0.9 + 3 X 0.1) = 2.1

PO Attainment Computation:

1. Consider the CO-PO & PSO matrix for the course 18CSXX for PO computation.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2		2											2	
CO3		2	3											
CO4		2		1										3
CO5	1				2									

CO Attainment	
CO1	2.1
CO2	2.1
CO3	2.1
CO4	2.45
CO5	2.1

PO1 =1/3((3 X 2.1 + 1 X 2.1)/2)= 1.40

PO2 =1/3((2 X 2.1 + 2 X 2.1+ 2 X 2.45)/3)= 1.47

PO3 = 1/3(3 X 2.1) =2.10

PO4 = 1/3(1 X 2.45) =0.81

PO5 = 1/3 (2 X2.1)= 1.40

PSO1 =1/3 (2 X 2.1) = 1.40

PSO2 = 1/3 (3 X 2.1) = 2.1

Direct PO & PSO Attainment

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
18CSXX	1.40	1.47	2.1	0.81	1.4	-	-	-	-	-	-	-	1.40	2.1

CO –PO matrix obtained for the course 18CSXX

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2.1													
CO2		1.4											1.40	
CO3		1.4	2.1											
CO4		1.63		0.81										2.1
CO5	0.70				1.4									

Dr. Jalesh Kumar
B.E.,M.TECH,PH.D.
IQAC Coordinator
J.N.N. College of Engineering
Shivamogga-577 204.

Principal
Jawaharlal Nehru New
College of Engineering (JNNCE)
Shivamogga