

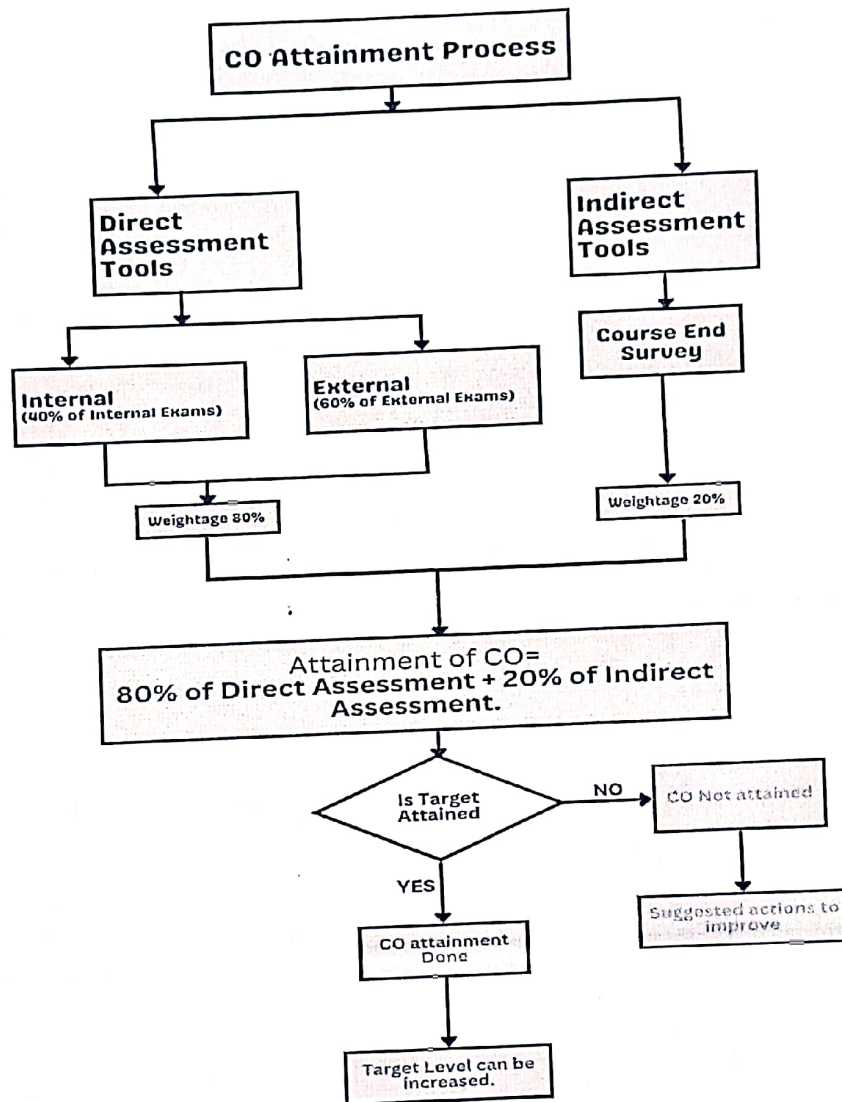


SRI VENKATESWARA COLLEGE OF ENGINEERING
(Autonomous)

Karakambadi Road, Opposite LIC Training Centre, Tirupati - 517 507.
Accredited by NBA (B Tech - CSE, ECE, EEE, Mech., Civil and IT) & NAAC with 'A' Grade
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Department of Electrical and Electronics Engineering

**FLOW CHART FOR
CO ATTAINMENT**



[Signature]
INCHARGE

[Signature]
HOD-EEE
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Describe the assessment processes used to gather the data upon which the evaluation of course outcome is based

CO ATTAINMENT TOOLS:

Assessment Tools for CO attainment:

- A. Direct assessment tools : 40% Internal Examinations and Assignments
60% End Examinations.
- B. Indirect assessment tools: Course End Surveys

CO ATTAINMENT=80% of Direct Assessment Tools + 20% Indirect Assessment Tools

CO Attainment Process:

Direct Assessment Tools: The description of evaluation process for CO attainment through Direct Assessment Tool is explained below:

- **Mid Semester Examination Evaluation:** For theory subjects, during the semester, there shall be two mid semester examinations. The Internal marks shall be evaluated for 40 marks of which 30 marks for mid semester examinations and 10 marks for assignment. The syllabus of the first mid examination covers 40 % of the total course content. The second mid examination is conducted before the end semester examination with the remaining 60% syllabus.

- **End Examination:** End examination of theory subjects shall have the following pattern

- There shall be 6 questions and all questions are compulsory.
- Question 1 shall contain 5 compulsory short answer questions for a total of 10 marks, each question carries 2 marks. There shall be 1 short answer question from each unit.
- In each of the questions from 2 to 11, there shall be either or type questions of 10 mark each. Student shall answer any one of them.
- The questions from 2 to 11 shall be set by covering one unit of the syllabus for each question.

Complete syllabus is covered in this examination. Major Weightage of marks is given to this component.

- **Practical Subjects:** For practical courses, there shall be a continuous evaluation during the semester for 40 marks (Internal) and End examination shall be for 60 marks. Day-to-day work in the laboratory shall be evaluated for 30 marks by the concerned laboratory faculty based on the regularity, viva, observation & record and 10 marks for internal exam.



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- **Summer Internship / Mini Project:** There shall be one mini project at the end of VI semester. This is to be registered during VI Semester taken up during the summer vacation, for a period of four weeks duration. A report/dissertation certified in the prescribed format by the concerned Supervisor and HOD shall be submitted to the Department. The viva voce shall be conducted by a committee consisting of Head of the Department, project supervisor and a senior faculty member of the department constituted by the Principal/Controller of Examinations and it should be evaluated for 100 marks. There shall be no internal marks for mini project. The mini project shall be evaluated at the end of the VII Semester.

- **Project Work:**

- **Procedure and Evaluation of Project Stage – I:** It shall be evaluated for 50 marks. A student shall acquire 2 credits, when he/she secures 40% or more marks for the total of 50 marks. It will be evaluated at the end of VII semester by PEC.

- **Procedure and Evaluation of Project Stage – II:** Project work shall start in VII Semester and continue in the VIII Semester. The evaluation of project is as follows.

Out of 200 marks for the Project stage-II, 60 marks for Internal Evaluation and 140 marks for the end semester examination (viva-voce) shall be awarded.

- **Technical Seminars:** The technical Seminar evaluated for 40 marks, is based on the report and presentation shall be evaluated by the departmental committee consisting of Head of the Department, technical seminar supervisor and a senior faculty member.

Indirect Assessment Tool: Course End Survey.

- **Process:** At the end of semester feedback is collected through offline and calculate the weighted average as mentioned below:

$$CES = \frac{G*3 + A*2 + S*1}{T}$$

G: Total Number of Students gave **GOOD**.

A: Total Number of Students gave **Moderate**.

S: Total Number of Students gave **Satisfactory**.

T: Total Number of Students.

Step1: Direct Assessment:

- **Measurement of Course attainment levels for Internal Examinations (Mid Semester Examination and Assignments):**



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$$\text{Assignment Level} = \left(\frac{\text{No. of Students secured more than 60\%}}{\text{No. of students attempted}} * 0.03 \right)$$

$$\% \text{ Assignment} = \left(\frac{\text{No. of Students secured more than 60\%}}{\text{No. of students attempted}} * 100 \right)$$

$$\text{Course Level} = \left(\frac{\text{No. of Students secured more than 60\%}}{\text{No. of students attempted}} * 0.03 \right)$$

$$\% \text{ Course} = \left(\frac{\text{No. of Students secured more than 60\%}}{\text{No. of students attempted}} * 100 \right)$$

- Measurement of Course attainment levels for End Examinations:

$$\text{Course Level} = \left(\frac{\text{No. of Students secured more than 60\%}}{\text{No. of students attempted}} * 0.03 \right)$$

$$\% \text{ Course} = \left(\frac{\text{No. of Students secured more than 60\%}}{\text{No. of students attempted}} * 100 \right)$$

Overall Direct Assessment includes both Mid Semester and End Examinations

Direct Assessment = 40% of Internal Semester Examination + 60% End Examinations.

Step2: Indirect Assessment:

Tools: Course End Survey

Process: Collect the feedback and calculate the weighted average as mentioned below

$$CES = \frac{G*3 + A*2 + S*1}{T}$$

G: Total Number of Students gave GOOD.

A: Total Number of Students gave Moderate.

S: Total Number of Students gave Satisfactory.

T: Total Number of Students.

Step3: Overall Course Outcome Attainment including Direct and Indirect Survey:

CO ATTAINMENT Tools = 80% of Direct Assessment Tools + 20% Indirect Assessment

H.O.D. E.E.E.

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3.2.2. Record the attainment of course outcomes of all courses with respect to set attainment levels

A. Verify the Records as per the Benchmark set for the courses:

Sample Attainment

Table 3.2.2.1 Sample CO Attainment levels of Power Electronics

Course Name:	Power Electronics	
Course Code:	EE20APC501	C312
Session of Course:	September 2022- February 2023	
L:T:P	3-0-0	
Year/Semester	III-I B.Tech	
Credits:	3	
Batch:	2020-2024	

Table 3.2.2.2 CO mapping with mid question paper:

COURSE OUTCOMES		Mid 1	Mid 2	Assign ment	External Examina tion
CO1	Evaluate the operation, characteristics, and usage of basic Power Semiconductor Devices.	Q1,Q2, Q3		1	Q1a,Q2, Q3
CO2	Analyze different types of Rectifier circuits with different operating conditions.	Q4,Q5, Q6		2	Q1b,Q4, Q5
CO3	Illustrate DC-DC converters operation and analysis of their characteristics.		Q1,Q2	3	Q1c,Q6, Q7
CO4	Analyze the construction and operation of voltage source inverters, Voltage Controllers, and Cyclo Converters.		Q3,Q4	4	Q1d,Q8, Q9
CO5	Apply all the above concepts to solve various numerical problem-solving.		Q5,Q6	5	Q1e,Q10, Q11



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Table 3.2.2.3(a) Student's Marks of Internal:

Table 3.2.2.3(a) Student's Marks of																			
S.N o.		Reg. No.	Test 1						Test 2						Assignments				
			Q. 1	Q. 2	Q. 3	Q. 4	Q. 5	Q. 6	Q.1	Q. 2	Q. 3	Q. 4	Q. 5	Q. 6	A1	A2	A3	A4	A5
Max. Marks			10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
60% Marks			6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
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2	20BF1 A0202		10		10		5	10		10			9	10	10	10	10	10	10
3	20BF1 A0203		10		10	9		9			8		8	10	10	10	10	10	10
4	20BF1 A0204		10		8	10	6		10		10	2	2	10	10	10	10	10	10
5	20BF1 A0205		10		10	8	4	10		10		4	9	10	10	10	10	10	10
6	20BF1 A0206		9		10	5		10		10			7	10	10	10	10	10	10
7	20BF1 A0207		5		5		0							10	10	10	10	10	10
8	20BF1 A0208	10			9		7		10				10	10	10	10	10	10	10
9	20BF1 A0209		9		7		1	6			6			10	10	10	10	10	10
10	20BF1 A0210		9	0		8	5	4		6				10	10	10	10	10	10
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12	20BF1 A0212	10			10	9	7	4		10			9	10	10	10	10	10	10
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19	20BF1 A0219		10		10		5	10			1 0		8	10	10	10	10	10
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30	20BF1 A0230	8			2		2	10			9			10	10	10	10	10
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62	20BF1 A0262		7			10	7		9		9		8		10	10	10	10



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63	20BF1 A0263	10			10		10	10			1 0		10	10	10	10	10
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85	20BF1 A0285		10		10	7		9		9		6	10	10	10	10	10
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87	20BF1 A0287		10		10	7	10	9			9	8	10	10	10	10	10
88	20BF1 A0288		10		8	8		10		8		8	10	10	10	10	10
89	20BF1 A0289	10			9		7	9			9		10	10	10	10	10
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104	20BF1 A02A4		10	10		9		10			9	7	10	10	10	10	10
105	20BF1 A02A5							10				4	10	10	10	10	10
106	20BF1 A02A6		9		7	5	1	10			7	7	10	10	10	10	10



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107	20BF1 A02A7	10			5	9		9		10		6		10	10	10	10	10
108	20BF1 A02A8	10			5	6		9		3			7	10	10	10	10	10
109	20BF1 A02A9		10		9		8	9			7		8	10	10	10	10	10
110	20BF1 A02B0		10		10	7	8	9			9	7		10	10	10	10	10
111	20BF1 A02B1		8	10	10		10		1				7	10	10	10	10	10
112	20BF1 A02B2		10	10		10		10		9			9	10	10	10	10	10
113	20BF1 A02B3		10		10	8		10			9	8		10	10	10	10	10
114	20BF1 A02B4		10	9		8				9			9	10	10	10	10	10
115	20BF1 A02B5		9		6	9		9		8			4	10	10	10	10	10
116	20BF1 A02B6		10		10		8	9			1		8	10	10	10	10	10
117	20BF1 A02B8	2	9		9	3	8			10			9	10	10	10	10	10
118	20BF1 A02B9		10		9	10		9			1		8	10	10	10	10	10
119	20BF1 A02C0								7				9	10	10	10	10	10
120	20BF1 A02C1		10		9	8			7		9		8	10	10	10	10	10
121	20BF1 A02C2	7			9	7				1			6	10	10	10	10	10
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124	20BF1 A02C5		10		10	6		7		7			9	10	10	10	10	10
125	21BF5 A0201	10			10		10	9		9			9	10	10	10	10	10
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129	21BF5 A0205		10		10	7		10			1	0	0	10	10	10	10	10
130	21BF5 A0206		10		7		10		8	0			10	10	10	10	10	10
131	21BF5 A0207		10	0			2	8			7		8	10	10	10	10	10
132	21BF5 A0208	9		7		9	2	8		10			7	10	10	10	10	10
133	21BF5 A0209	10			10		9	9		0		0		10	10	10	10	10
134	21BF5 A0210		9		9		4	8	4		9		7	10	10	10	10	10
135	21BF5 A0211		10		9	4		8		9			7	10	10	10	10	10
136	21BF5 A0212	7		6			8	9		7			7	10	10	10	10	10
137	21BF5 A0213		10	10			9		1	0		1	0	10	10	10	10	10
138	21BF5 A0214		7		9	7			4		0		7	10	10	10	10	10
139	21BF5 A0215		10		10	8		9			0		0	10	10	10	10	10
Number of students attempted question		42	95	30	105	83	77	104	37	72	58	1	0	11	139	139	139	139
Number of students scoring more than 60%		38	90	20	98	63	44	97	23	69	55	1	5	95	139	139	139	139
% CO Assessment		90.5	94.7	66.7	93.3	75.9	57.1	93.3	62.2	95.8	94.8	7	8	86.4	100	100	100	100
CO Assessment level		2.7	2.84	2.00	2.8	2.28	1.71	2.80	1.86	2.8	2.84	2.37	2.59	3	3	3	3	3

Table 3.2.2.3(b) Student's Marks of External:

Table 3.2.2.3(b) Student's Marks																
S. No.	Reg. No.	Short Answers					Essay Answers									
		1a	1b	1c	1d	1e	Q. 2	Q. 3	Q. 4	Q. 5	Q. 6	Q. 7	Q. 8	Q. 9	Q. 10	Q. 11
Max. Marks		2	2	2	2	2	10	10	10	10	10	10	10	10	10	10
60% Marks		1	1	1	1	1	6	6	6	6	6	6	6	6	6	6



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1	312	1	1	2	1	1		7	3		2		3		3	
2	03-1	0	1	2	2	0		8	4		10			2	10	
3	2		0	2	2			8	5	5	9	3	7		10	
4	3	0	0	2	1	0		8		5	9	1	7		8	
5	4		1		1	1		7	7		8		9		8	
6	5	1	1	1				7	5		6				8	
7	6							9	5				0		8	
8	7	1	2	2	2	2		10		9	9		9		9	
9	8	0	1	0	0	0	4		5		8		2		4	
10	9	1	1	0	0	0		9	5	2	10		2	2		
11	10	2	2	2	2	2		10	8		10		9		10	
12	11	0	1	2	1	1		7	7		7		6		9	
13	12	1	2	2	1	1		10	6	5	10		9		10	
14	13							3	5	2	6	2	9		10	
15	14	1	2	0	0	1	4		6		10		6		9	
16	15		0	2	1	1		6	9	2	9		9		9	
17	16	1	2	2	2	2		9	10		10		9		10	
18	17		1	0	0	1		9	6		9		5		8	
19	18	0	1	1		1		7	5		10		8		8	
20	19	0	2	2	1	1		8	5		10		8		8	
21	20	0	1	0	1	0		8		2	8		6		8	
22	21	2	1	2	2	1		9	6		7		10		9	
23	22		0	2	2	1		6			6		3		5	
24	23	2	2	2	2	2		8	10		10		8		9	
25	24	0	2	1	1	1		8	8		9		7		8	
26	25	0	1	2	0	0		8	6		9		5		8	
27	26	0	1	0	2	2		9	6		10		8		9	
28	27	1	0	0		0		7	6		10		5		8	
29	28	0	1	0	0			2	3		6	0	7		4	
30	29	0	1	2	1	1		3	9	8	10		2	8		
31	30	1	1	2	2	2		9	10		10		9		10	
32	31	0	2	2	2	1		10	5	5	10		4		8	
33	32	0	2	2	2	2		10	10		9		9		10	
34	33	0	2	1	0	2		9	10		9		10		10	
35	34	2	2	2	2	2		8	10		10		10		10	
36	35	0	2	0	0	2		7	5	3	6		0		9	
37	36	0	1	0	2	1	2		4		7		3		3	
38	37	0	2	0	0	1		8	9		9		3		7	



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39	39	2	2	2	2	1		9		3	10		10		9	
40	40	0	0	0	1	1		2	2		5		0		4	
41	312 04- 1	1	2	2	1	1		7	7	5	5	4	3		8	6
42	2	1	2	2	1	1		5	3		6		6			7
43	3	1	0	2	1	0		8	4		7		9		8	
44	4	1	1	2	1	0		4	6		6		6			2
45	5	1	1	2	2	1		8	6	4	7		9		3	
46	6	2	2	1	1	1		7	5		7		3		6	
47	7	2	1	0		1		6	7		8		7		6	
48	8	1	0	1	1	1		7	6	5	7		4		6	
49	9	2	1	2	1	1		5	8	4	6		3		7	
50	10	2	2	2	2	1		7	8		9		6		8	
51	11	2	1	2	1	1		6	5	5	9		4	4	8	
52	12	1	2	1		2					5	2	3	2		4
53	13	1	1	2	1	1		5	8		8		6		7	
54	14	1	1	1	1	1		7	6		8		2		7	
55	15						3		2	0	4	0	3			0
56	16	1	0	1	0	1	4		2			0	1		2	
57	17	1	1	2	2	1		6	4	3	6		7		8	
58	18	0	1				3	4		0	2		2	0		3
59	19	1	1	2	2	1		6	7		8		7		7	
60	20	1	1	1	1	1		6	2		7	0	4		0	
61	21	0	1	1	0			5	5		5		4		7	
62	22	0	1	1	1	0		5	6		5		4		8	
63	23	1	1	1	1	1	5			2	5		5		2	
64	24	1	1	1	0	0		3	6	4	9	9		0	8	
65	25	0	0	1	0	1		4	4		6		3		4	
66	26	1	1	0	1	0	3	5	3	1	6	4	5		4	
67	27	2	1	2	1	1		4		3	8	3	4	3		
68	28	1	0	1	1	0	5	6	6	3	5		5		5	0
69	29	0	0	1	1	0		6		5	6		5		6	
70	30	1	1	0	1	0		6	3	4	8			4	7	
71	31	1	0	0	0	0	3	4		1	7		4		7	
72	32	2	1		2	1	3		3		7		7		8	
73	33	1	1	0	1	0		7	7		6		7			7
74	34	1	0	0	0	0		6	5		7		7		7	
75	35	1	1	1		0		2	6	0	4	0	5	0	3	



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76	36	1	0	1	2	0		8		5	4		4		5	
77	37	1	1	1	0	0		6	6	0	6	2	5	1	6	
78	38	2	0	0	1	0		6	6		7		7		6	
79	39	1	0	1	0	0		6	4	5	8		3		5	
80	40	2	0	1	1	0	8			3	5		7		5	
81	312 05- 1	0	1	1	1	0		7		8	6		7		6	
82	2	0	0	1	1	1		5	7		7		1		8	
83	3	1	1	2	1	2		5	6		9			4	4	
84	4											0				
85	5	1	1	2	2	1		7	7		8		9		7	
86	6	2	2	1	1	1		8	6	4	9		9		7	
87	7	1	1	2	2	1		7	7		8		2	4	6	
88	8	0	1	0	0	1		7	6	0	6	1		1	6	
89	9			0	2	1	2				7		7		5	
90	10	1	0	1	1	1		4	4	4	7		8		5	
91	11			1	1	0	4	7	7	0	7		7			
92	12	1	1	2	2	1		8	5	4		6	8		8	
93	13	1	0	1	1	1		7	8		8		8		6	
94	14	1	1	2	1	1		10	5		8		8		5	
95	15	1	0		1	1		5	2		6		5		4	
96	16	1	0	2	1	1		4					2			
97	17	0	0	1	2	0		6	9		6		8		5	
98	18	0	2	1	1	1		6	9		8		7		6	
99	19	1	1	2	1	0		7	3		8		5		4	
100	20	1	1	2	2	1		9	7		8		7		8	
101	21	2	0	0	1	1		6	4		5		7		5	
102	22	0	0	1	0	0		5	2	3	5	8	3	0		4
103	23		1	1	1	1		8	6		9		7			9
104	24	2	1	1	1	1		7	7			6	8		7	
105	25	0		1	1	0		6	5	4	6		5		6	
106	26	1	1	2		1		6	4		8				6	
107	27	2	1	0	2	1		3	6		8		9		8	
108	28		1	1	1	1		6	0	4	8		5		6	
109	29	1	0	1	2			6		6	9		6		7	
110	30	1	1								9				9	
111	31	2	1	1	1	1		8		4	7		4		8	
112	32	1	0	1	2	1		8	7	5	8		9		8	



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113	33		1	1				7	5	4	5	4	3		3	
114	34	1	0	2	0	1	4		5		7		8		6	
115	35	0	1	1	1	1		6	6	6	8		4	5	4	
116	36	1	1	1	1	1		6	5		8		8		6	
117	37	2	1	2	2	1		7	7		9		8		8	
118	38	1	0	1	0	0		7		6	7		4		6	
119	39		1	1	1	1	3		6		4				8	
120	40		2	2	2	1		7	5	6	8		9		7	
121	312 06-1	0	2	2	2	2		8	6		8		10		10	
122	2	0	2	0			3		8			0	3		8	
123	3		1	1	1			3	6		10		9		8	
124	4	1	2	2	2	1		8	8	5	8		8		8	8
125	5	1	2	2	2	1		9	10	5	10		10		10	
126	6		2	1	2	2		6		5	7		10		10	6
127	7	1	2	2	2	1		8		5	9		8		9	
128	8	2	2	1	2	2		8	8		9		7		8	
129	9	1	2	2	1	1		9	8		10		5		8	
130	10	1	2	2	2	1		7	8		9		10		10	
131	11	1	2	2	1	1	2	6	5	0	10	0	6		2	8
132	12	1		1	2	1		9	7	5	10		9		10	
133	13	1	1	2	2	1		8	6		9		9		8	
134	14	1	2	2		0		9	9		8		5		5	
135	15	1	1	2	1	0		8	9		8		8		9	
136	16	0	2	2	2	2		9	10		10		10		10	
137	17	0	2	2	1	1		9	2		4		9		6	
138	18	1	2	2	2	1		8	9		9		9		9	
Number of students attempted question		120	130	129	122	124	18	123	115	55	131	22	127	16	123	15
Number of students scoring more than 60%		84	100	105	101	91	1	98	69	7	113	4	75	0	96	7
% CO Assesmen		70	77	81	83	73	6	80	60	13	86	18	59	0	78	47



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1																
CO Assessment level	2.10	2.31	2.44	2.48	2.20	0.17	2.39	1.80	0.38	2.59	0.55	1.77	0.00	2.34	1.40	

Indirect Assessment:

Tools: Course End Survey

Process: Collect the feedback and calculate the weighted average as mentioned below

$$CES = \frac{G*3 + A*2 + S*1}{T}$$

G: Total Number of Students gave GOOD.

A: Total Number of Students gave Moderate.

S: Total Number of Students gave Satisfactory.

T: Total Number of Students.

Table 3.2.2.4 Indirect Survey:

Course Name	COs	COURSE OUTCOMES	3	2	1	SUM	TOTAL NO	INDIRECT LEVEL	% INDIRECT LEVEL
Power Electronics (EE20A PC501)	C312.1	Evaluate the operation, characteristics, and usage of basic Power Semiconductor Devices.	95	9	4	307	108	2.84	94.75
	C312.2	Analyze different types of Rectifier circuits with different operating conditions.	96	8	4	308	108	2.85	95.06
	C312.3	Illustrate DC-DC converters operation and analysis of their characteristics.	97	6	5	308	108	2.85	95.06
	C312.4	Analyze the construction and operation of voltage source inverters, Voltage Controllers, and Cyclo Converters.	99	5	4	311	108	2.88	95.99
	C312.5	Apply all the above concepts to solve various numerical problem-solving.	95	8	5	306	108	2.83	94.44



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CO ATTAINMENT: Target Level: 1.8 (60% of the students scoring more than 60% of marks)

Table 3.2.2.5 CO Attainment of Selected Course: Power Electronics

Table 3.2.2.5 CO Attainment of Selected Courses													
Mapping of COs				Assign- ment	Inter- nal Eval- uation	Mapping of COs			Exte- rnal Eval- uation	Direct Attain- ment levels	Indire- ct Attain- ment Level (CES)	CO Atta- ined	% CO Attain- ed
CO	Mapping of Mid I & Mid II Term Examination					Mapping of End Term Examination							
CO1	2.71	2.84	2.00	3.00	2.64	2.10	0.17	2.39	1.55	1.99	2.84	2.16	71.94
CO2	2.80	2.28	1.71	3.00	2.45	2.31	1.80	0.38	1.50	1.88	2.85	2.07	69.07
CO3	2.80	1.86		3.00	2.55	2.44	2.59	0.55	1.86	2.14	2.85	2.28	75.99
CO4	2.88	2.84		3.00	2.91	2.48	1.77	0.00	1.42	2.01	2.88	2.19	72.90
CO5	2.37	2.59		3.00	2.65	2.20	2.34	1.40	1.98	2.25	2.83	2.37	78.89

CO Attainment Analysis: Based on the above CO attainment it was found that CO₁ has reached the target level of 65%. Therefore all COs are attained

ACTION SUGGESTED:

For the fourth coming batch target level can be increased.

[Signature]
INCHARGE

[Signature]
H.O.D. EEE
S.V. COLLEGE OF ENGINEERING
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