

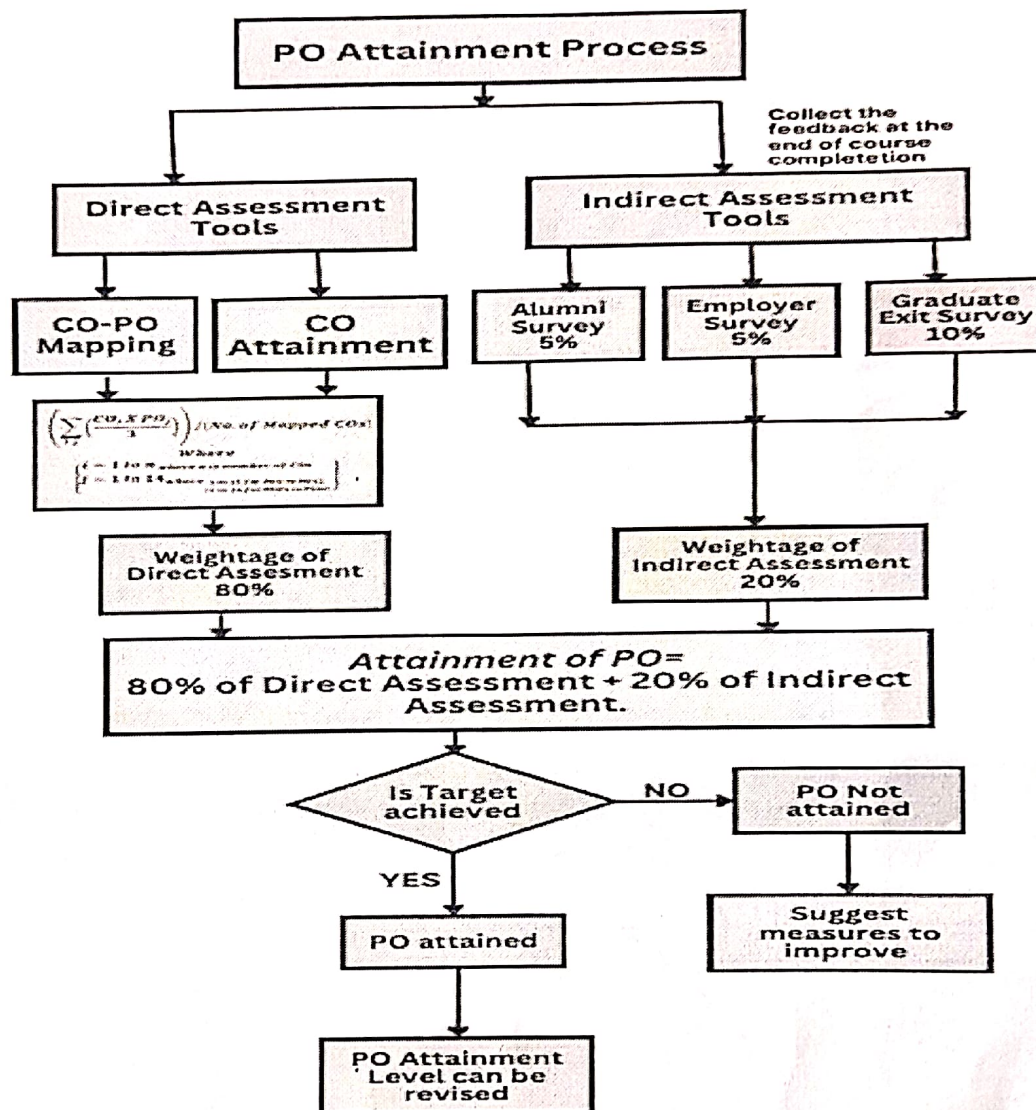


# SRI VENKATESWARA COLLEGE OF ENGINEERING (Autonomous)

Karakambadi Road, Opposite LIC Training Centre, Tirupati – 517 507.  
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## Department of Electrical and Electronics Engineering

### Flow Chart for PO Attainment Department of EEE



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### Department of Electrical and Electronics Engineering

**Describe assessment tools and processes used for measuring the attainment of each of the Program Outcomes and Program Specific Outcomes**

**Assessment Tools for measuring PO/PSO attainment:**

Attainment of POs and PSOs is based on **direct assessment tools** as well as **indirect assessment tools**.

**1. Direct Assessment Tools:**

- Direct assessment of POs and PSOs is based on the students' performance in both internal and End examinations for all courses.
- Based on the mapping of COs with POs and PSOs, the performance of every student in various assessments, such as internal exams, assignments, practical courses, technical seminars, project work, internships, community service projects, and end exams, contributes to the achievement of COs, which in turn leads in the attainment of POs and PSOs.

**2. Indirect Assessment Tools:**

The indirect assessment tools that are used for attainment of POs and PSOs are

- Graduate Exit Survey (10% weightage)
- Alumni Survey (5% weightage)
- Employer Survey (5% weightage)

**The quality and Relevance of the Process used for measuring Attainment of POs and PSOs:**

PO\PSO Attainment= 80% of Direct Assessment+20% Indirect Assessment.

**Step1: Direct Assessment**

- POs and PSOs attainment at course level are calculated by taking the average of arithmetic multiplication of course outcomes attainment levels and CO-PO matrix.

$$PO \text{ Assessment} = \left( \sum_{i,j} \left( \frac{CO_i * PO_j}{3} \right) \right) / (\text{No. of mapped CO's})$$

$$\text{Where } \begin{cases} i = 1 \text{ to } n \text{ where } n \text{ is no. of CO'S} \\ j = 1 \text{ to } 14 \text{ where } 1 \text{ to } 12 \text{ for PO1 to PO12} \\ \quad \quad \quad 13 \text{ to } 14 \text{ for PSO1 to PSO2} \end{cases}$$

**Step2: Indirect Assessment:**

**Tools:** Graduate Exit Survey, Alumni Survey and Employer Survey





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**Department of Electrical and Electronics Engineering**

Process: Evaluated weighted average of the above-mentioned surveys using the expression mentioned below.

$$\text{Indirect Survey} = \frac{G*3 + A*2 + S*1}{T}$$

**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 Attainment of POs and PSOs including Direct and Indirect Survey:**

Attainment of POs and PSOs = 80% of Direct Assessment + 20% of Indirect assessment.

$$(0.8 * \text{Direct PO attainment} + 0.10 * \text{GES} + 0.05 * \text{AS} + 0.05 * \text{ES})$$

  
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## Department of Electrical and Electronics Engineering

### Sample PO Attainment Process:

In continuation with sample CO attainment Process for a Course **Power Electronics**, we have the CO attainment values as below:

**Table 3.3.1: CO attainment values for Power Electronics**

Mapping of COs					Assi gnme nt	Internal Evaluati on	Mapping of COs					External Evaluati on	Direct Attainm ent levels	Indirect Attainment Level (CES)	CO Attai ned	% CO Attai ned
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	

**Table 3.3.2: PO Assessment for the course Power Electronics**

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	CO Attained Levels
C312.1	3	2	2									1	3	3	2.16
C312.2	3	3	2									2	3	3	2.07
C312.3	3	3	3									2	3	3	2.28
C312.4	3	3	3									2	3	3	2.19
C312.5	3	3	3									1	3	3	2.37
TOTAL	5	5	5	0	0	0	0	0	0	0	0	5	5	5	

**Table 3.3.3: PO Assessment**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PO Assessment Level	2.21	2.07	1.93									1.17	2.21	2.21
% PO Assessment Level	73.8	69.0	64.4									39.1	73.8	73.8

### Procedure for establishing the correlation between the courses and POs& PSOs:

A course is related to POs and PSOs, by establishing a relation between the Course Outcomes of the course and the POs/PSOs.











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II-II	26	C215	BA20AHS301	Managerial Economics & Financial Analysis	1.64	1.61						2.12		1.64	1.80	
	27	C216	EE20APC303	DC Machines & Transformers Lab	2.84	2.60	2.36	2.60	1.89						1.65	1.89
	28	C217	EC20APC308	Semiconductor Devices and Circuits Lab	2.49	2.16	1.66	1.82	1.82							
	29	C218	EE20APC304	Control Systems & Simulation Lab	2.82	2.51	2.82	2.35	2.51	2.51			2.82		2.35	1.88
	30	C219	IT20ASC301	Application Development using Python	2.33	2.14	1.95		1.56							
	31	C2110	CH20AMC202	Biology For Engineers	1.91											
	32	C2111	MA20AMC301	Logical Skills for Professionals-II	2.48	2.66										
	33	C221	CS20AES401	Data Structures Using C	2.83	2.64	2.64									
	34	C222	MA20ABS401	Numerical Methods, Probability & Statistics	2.61	2.61										
	35	C223	EE20APC401	Rotating AC Machines	2.17	1.91	1.44									1.87
III-I	36	C224	EC20APC406	Digital Electronics & Microprocessors	2.37	2.23	2.08									
	37	C225	EE20APC402	Electromagnetic Field Theory	2.21	1.91	1.91	1.76								1.76
	38	C226	CS20AES402	Data Structures Lab	2.73	2.51	2.28									
	39	C227	EC20APC407	Digital Electronics & Microprocessors Lab	2.37	2.37	1.58	1.58	1.58				1.58			
	40	C228	EE20APC403	AC Machines Lab	2.79	2.79	1.86	1.86	1.86				1.86			2.79
	41	C229	EG20ASC401	Soft Skills									1.97	1.97		
	42	C2210	BA20AMC201	Universal Human Values	2.69	2.49				1.95	2.85	2.21	0.98			
	43	C311	EC20APC403	Linear & Digital IC Applications	2.17	1.84	1.57									
III-I	44	C312	EE20APC501	Power Electronics	2.21	2.07	1.93									1.17
	45	C313	EE20APC502	Power System Architecture	2.09	1.80	1.42									
	46	C314	EE20APE504	Smart Grid & Electric Vehicles	2.75	2.57	2.57									
	47	C315	AM20AOE503	Soft Computing Techniques	2.38	2.38	1.59									1.43
	48	C316	EC20APC405	Linear & Digital IC Applications Lab	2.28	1.83	1.83	0.91	1.82							
	49	C317	EE20APC503	Power Electronics & Simulation Lab	2.64	2.64	2.42	2.64	2.64							
	50	C318	EE20ASC501	Software tools for Electrical Applications development	2.75	2.57	2.76	1.84	2.57							



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	51	C319	BA20AMC501	Constitution of India						2.48	2.31	2.67	2.49	2.49		
	52	C3110	EE20ATS501	Technical Seminar Presentation-I	2.97	2.97	1.98	1.98	1.97	1.98	1.98	1.98	1.98	2.97	1.98	
	53	C3111	EE20ACS501	Community Service Project (Completed after the end of IV Semester with 4 Weeks duration)	2.58	2.58	2.38	2.48	2.64	2.38	2.38	2.23	2.38	2.18	2.31	
III-II	54	C321	EE20APC601	Electrical Measurements & Sensors	2.42	1.76										1.93
	55	C322	EE20APC602	Power System Analysis	2.19	1.90	1.89									1.47
	56	C323	EE20APC603	Power System Protection	1.84	1.86	1.87									1.45
	57	C324	EE20APE603	Energy Auditing & Energy Conservation	1.91	1.74	1.91		1.50							1.50
	58	C325	ME20AOE502	Solar & Wind Energy Systems	2.16	1.82	2.16									
	59	C326	EE20APC604	Electrical Measurements & Sensors Lab	2.79	1.86	2.79	2.79	2.79							
	60	C327	EE20APC605	Power Systems & Protection Lab	2.78	1.85	2.78	1.85	2.78							1.85
	61	C328	EE20APC606	Power Systems Simulation Lab	2.93	2.15	2.74	1.95	2.93							1.96
	62	C329	EC20ASC601	Graphical System Design Using LabVIEW	2.45	2.45	2.69		2.94							1.96
	63	C3210	BA20AMC502	Intellectual Property Rights & Patents	2.57	2.20				1.67	2.40	2.58				
	64	C3211	EE20ATS601	Technical Seminar Presentation-II	2.97	2.97	1.98	1.98	1.98	1.98	1.98	1.98	1.98	2.97	1.98	
IV-I	65	C411	EE20APE701	Power Quality	2.59	2.25										
	66	C412	EE20APE706	Utilization of Electrical Energy	2.49	2.16	2.00									
	67	C413	EE20APE707	Electrical & Electronics Instrumentation	2.45	1.47	1.64									
	68	C414	CE20AOE701	Air Pollution and Quality Control	2.64	2.64	2.32	2.18		2.83	2.64					
	69	C415	AM20AOE701	Cyber Security & Techniques	1.24	1.24	1.90	1.90	1.05			2.54				
	70	C416	BA20AHS705	Management science	2.58	2.58										
	71	C417	EE20ASC701	Energy Conservation and Audit	2.71	2.47										
	72	C418	EE20ATS701	Technical Seminar Presentation-III	2.97	2.97	1.98	2.97	1.98	1.99	1.99	1.98	1.99	2.97	1.98	
	73	C419	EE20APW701	Project Work Stage-I	2.81	2.48	2.97	2.64	2.31				2.64	2.97		
	74	C4110	EE20AIP701	Industrial/ Research Internship	2.38	2.38	2.38	2.97	2.97	0.99	0.99	1.49	2.97	1.98	1.98	
IV-II	75	C421	EE20APW801	Project Work Stage-II/ Full Internship in Industry	2.95	2.95	2.95	2.95	2.95				2.95	2.95		
PO Assessment Level					2.43	2.23	2.09	2.09	2.18	2.06	2.18	2.12	2.30	2.50	2.00	1.67





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## PSO Assessment:

YEAR-SEM	S.NO	Course Code	Subject Code	Course	PSO1	PSO2
I-I	1	C111	MA20ABS101	Linear Algebra and Calculus		
	2	C112	PH20ABS103	Applied Physics		
	3	C113	EG20AHS101	Communicative English		
	4	C114	EE20AES103	Fundamentals of Electrical Circuits	0.99	1.57
	5	C115	ME20AES102	Engineering Drawing		
	6	C116	ME20AES103	Engineering Graphics Lab		
	7	C117	PH20ABS104	Applied Physics Lab		
	8	C118	EG20AHS102	Communicative English Lab		
	9	C119	EE20AES104	Fundamentals of Electrical Circuits Lab	1.97	1.97
	10	C1110	MA20AMC102	Logical Skills for Professionals		
I-II	11	C121	MA20ABS201	Differential Equations and Vector Calculus		
	12	C122	CH20ABS103	Chemistry		
	13	C123	CS20AES101	Problem Solving using C		
	14	C124	EE20AES201	Electrical Circuit Analysis	1.38	1.62
	15	C125	ME20AES101	Engineering Workshop		
	16	C126	CS20AES103	IT Workshop		
	17	C127	CS20AES102	Problem Solving using C Lab		
	18	C128	CH20ABS104	Chemistry Lab		
	19	C129	EE20AES202	Electrical Circuit & Simulation Lab	2.71	2.63
	20	C1210	CH20AMC201	Environmental Science		
	21	C1211	EG20AMC103	Speech & Oral Communication		
II-I	22	C211	MA20ABS302	Complex Variables & Transforms		
	23	C212	EE20APC301	Control Systems	1.88	1.88
	24	C213	EE20APC302	DC Machines & Transformers	2.46	1.64
	25	C214	EC20APC307	Semiconductor Devices and Circuits		



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	26	C215	BA20AHS301	Managerial Economics & Financial Analysis		
	27	C216	EE20APC303	DC Machines & Transformers Lab	2.36	1.42
	28	C217	EC20APC308	Semiconductor Devices and Circuits Lab		
	29	C218	EE20APC304	Control Systems & Simulation Lab	2.82	2.51
	30	C219	IT20ASC301	Application Development using Python		
	31	C2110	CH20AMC202	Biology For Engineers		
	32	C2111	MA20AMC301	Logical Skills for Professionals-II		
II-II	33	C221	CS20AES401	Data Structures Using C		
	34	C222	MA20ABS401	Numerical Methods, Probability & Statistics		
	35	C223	EE20APC401	Rotating AC Machines	2.17	1.87
	36	C224	EC20APC406	Digital Electronics & Microprocessors		
	37	C225	EE20APC402	Electromagnetic Field Theory	2.21	1.76
	38	C226	CS20AES402	Data Structures Lab		
	39	C227	EC20APC407	Digital Electronics & Microprocessors Lab		
	40	C228	EE20APC403	AC Machines Lab	2.79	2.79
	41	C229	EG20ASC401	Soft Skills		
	42	C2210	BA20AMC201	Universal Human Values		
III-I	43	C311	EC20APC403	Linear & Digital IC Applications		
	44	C312	EE20APC501	Power Electronics	2.21	2.21
	45	C313	EE20APC502	Power System Architecture	2.09	1.64
	46	C314	EE20APE504	Smart Grid & Electric Vehicles	2.75	2.20
	47	C315	AM20AOE503	Soft Computing Techniques	2.38	2.22
	48	C316	EC20APC405	Linear & Digital IC Applications Lab		
	49	C317	EE20APC503	Power Electronics & Simulation Lab	2.64	2.42
	50	C318	EE20ASC501	Software tools for Electrical Applications development	2.75	2.39
	51	C319	BA20AMC501	Constitution of India		





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	52	C3110	EE20ATS501	Technical Seminar Presentation-I		
	53	C3111	EE20ACS501	Community Service Project (Completed after the end of IV Semester with 4 Weeks duration)		
III-II	54	C321	EE20APC601	Electrical Measurements & Sensors	2.42	2.42
	55	C322	EE20APC602	Power System Analysis	2.19	2.04
	56	C323	EE20APC603	Power System Protection	2.13	1.84
	57	C324	EE20APE603	Energy Auditing & Energy Conservation	2.04	1.89
	58	C325	ME20AOE502	Solar & Wind Energy Systems	2.34	2.32
	59	C326	EE20APC604	Electrical Measurements & Sensors Lab	2.79	2.78
	60	C327	EE20APC605	Power Systems & Protection Lab	2.78	2.59
	61	C328	EE20APC606	Power Systems Simulation Lab	2.74	2.54
	62	C329	EC20ASC601	Graphical System Design Using LabVIEW	2.69	2.45
	63	C3210	BA20AMC502	Intellectual Property Rights & Patents		
	64	C3211	EE20ATS601	Technical Seminar Presentation-II		
IV-I	65	C411	EE20APE701	Power Quality	2.42	1.72
	66	C412	EE20APE706	Utilization of Electrical Energy	2.49	2.32
	67	C413	EE20APE707	Electrical & Electronics Instrumentation	2.29	1.96
	68	C414	CE20AOE701	Air Pollution and Quality Control		
	69	C415	AM20AOE701	Cyber Security & Techniques		
	70	C416	BA20AHS705	Management science		
	71	C417	EE20ASC701	Energy Conservation and Audit	2.47	1.97
	72	C418	EE20ATS701	Technical Seminar Presentation-III		
	73	C419	EE20APW701	Project Work Stage-I	2.97	1.98
	74	C4110	EE20AIP701	Industrial/ Research Internship		
IV-II	75	C421	EE20APW801	Project Work Stage-II/ Full Internship in Industry	2.95	2.95
PSO Assessment Level					2.38	2.14

*[Signature]*  
In-charge

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