



2.6.2 - Attainment of Programme outcomes and course outcomes are evaluated by the institution

COURSE OUTCOMES AND PROGRAM OUTCOMES

Establish the correlation between the courses and the Program Outcomes (POs) and Program Specific Outcomes (PSOs)

(Program Outcomes as mentioned in Annexure I and Program Specific Outcomes as defined by the Program)

PO.1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO.2. Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO.3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO.4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO.5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO.6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO.7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO.8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO.9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO.10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO.11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO.12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PSO 1: Ability to design, simulate & analysis of electrical systems using different software tools.

PSO 2: Will be able to design & build renewable energy system.


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Course Name: EM-I**Year of Study: II-I**

Upon Completion of the course student will be able to:

EM-I.CO1	Explain the concepts of electromagnetic energy conversion.
EM-I.CO2	Describe the operation of dc generator, armature reaction and commutation.
EM-I.CO3	Analyze the characteristics and performance of dc generators.
EM-I.CO4	Evaluate the torque developed and performance of dc motors.
EM-I.CO5	Analyze the speed control /testing methods of dc motors

Course Name: PS-I**Year of Study: II-II**

PS I.CO1	Understand the operation of conventional and renewable electrical power generating stations
PS I.CO2	Evaluate the power tariff methods and Economics associated with power generation
PS I.CO3	Analyse the operations of AIS & GIS, Insulators and Distribution systems

Course Name: POWER ELECTRONICS**Year of Study: III-I**

PE.CO1	Explain the fundamental concepts and techniques used in power electronics
PE.CO2	Discuss the Various single phase and three phase power converter circuits and understand their applications
PE.CO3	Able to Identify basic requirements for power electronics based design application
PE.CO4	Develop skills to build, and troubleshoot power electronics circuits
PE.CO5	Able to use of power converters in commercial and industrial applications.

Course Name: Power System Protection**Year of Study: III-II**

PSP.CO1	Compare and contrast electromagnetic, static and microprocessor-based relays
PSP.CO2	Apply technology to protect power system components
PSP.CO3	Select relay settings of over current and distance relays.
PSP.CO4	Analyze quenching mechanisms used in air, oil and vacuum circuit breakers


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 Gunthapalli: IV, Abdulapurmet (M.d.), R.R. Dist.

CourseName: POWER SEMI CONDUCTOR DRIVES**Year of Study: IV-I**

PSD.CO1	Explain speed control techniques of electrical machines and estimation of speed torque characteristics.
PSD.CO2	Explain speed control of DC and AC motor drives in an energy efficient manner using power electronics
PSD.CO3	To write the basic principles of power electronics in drives using phase controlled converter, choppers, AC voltage controllers, cycloconverters, VSI and CSI to synthesize the voltages in DC and AC motor drives
PSD.CO4	Analyse Four quadrant operations of DC and AC motor drives using various types power electronic converters
PSD.CO5	Able to design closed loop operation of DC and AC motor in order to operate drive in different quadrant
PSD.CO6	Describe the operation of DC and AC motor drives to satisfy speed torque characteristics to meet mechanical load requirements

CourseName: ELECTRICAL AND HYBRID VEHICLES**Year of Study: IV-I**

EHV.CO1	Understand the models to describe hybrid vehicles and their performance
EHV.CO2	Understand the different possible ways of energy storage
EHV.CO3	Understand the different strategies related to energy storage systems

Course Name: HVDC Transmission**Year of Study: IV-II**

HVDC.CO1	Compare EHV AC and HVDC system and to describe various types of DC links
HVDC.CO2	Analyze Graetz circuit for rectifier and inverter mode of operation
HVDC.CO3	Describe various methods for the control of HVDC systems and to perform power flow analysis in AC/DC systems
HVDC.CO4	Describe various protection methods for HVDC systems and classify Harmonics and design different types of filters


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Course name : Power quality and facts

Year of study:IV -II

PQ&FACTS.CO1	Know the severity of power quality problems in distribution system
PQ&FACTS. CO2	Understand the concept of voltage sag transformation from up-stream (higher voltages) to down-stream (lower voltage)
PQ&FACT CO3	Concept of improving the power quality to sensitive load by various mitigating custom power devices
PQ&FACTS. CO4	Choose proper controller for the specific application based on system requirements
PQ&FACTS CO5	Understand various systems thoroughly and their requirements
PQ&FACTS. CO6	Understand the control circuits of Shunt Controllers SVC & STATCOM for various functions viz. Transient stability Enhancement, voltage instability prevention and power oscillation damping

CO-PO MAPPING

Course Name: Electrical Machines-I; Year of Study: II-I; Academic Year:2021-22

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
EM-I.CO1	3	1	--	2--	--	--	--	--	--	--	--	1
EM-I.CO2	2	2	1		--	--	--	--	--	--	--	--
EM-I.CO3	1	2	--	1	--	--	--	--	--	--	--	--
EM-I.CO4	3	3	--		--	--	--	--	--	--	--	1
EM-I.CO5	2	1	--	2	--	--	--	--	--	--	--	--
EM-I(AVG)	3	2	2	2								1

Course Name: Power systems -I; Year of Study: II-II; Academic Year: 2021-22

CO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PS I.CO1	3	3	2	1	1	3	2	2	2	1	2	1
PS I.CO2	3	3	2	1	1	3	2	3	2	1	2	1
PS I.CO3	3	3	3	3	1	2	2	2	1	1	1	1
PS-I(AVG)												

CourseName: Power Electronics; Year ofStudy: III-I; Academic Year: 2021-22

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Pe.co1	2	2	2	3	-	-	-	-	-	-	-	-
Pe.co2	1	-	3	-	2	-	-	-	-	-	-	-
Pe.co3	2	3	-	2	-	-	-	-	-	-	-	-
Pe.co4	-	3	1	-	2	-	-	-	-	-	-	1
Pe.co5	-	-	3	2	2	-	-	-	-	-	-	-
PE(AVG)	2	3	3	3	2	2						


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CourseName: Power system protection; Year of Study: III-II; Academic Year: 2021-22

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PSP.CO1	2	2	1	--	1	--	--	--	--	--	--	--
PSP.CO2	1	2	--	1	--	--	--	--	--	--	--	--
PSP.CO3	2	2	2	1	1	--	--	--	--	--	--	--
PSP.CO4	2	2	1	1	1	--	--	--	--	--	--	--
PSP.CO5	1	2	1	--	--	--	--	--	--	--	--	--
PSP.CO6	2	2	1	--	--	--	--	--	--	--	--	--
PSP (AVG)	2	2	1	1	1							

Course Name: Power system operation & control ; Year of Study: IV-I Academic Year: 2021-22

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PSOC.CO1	3	3	2	-	-	-	-	-	-	-	-	-
PSOC.CO2	3	-	2	2	-	-	-	-	-	-	-	-
PSOC.CO3	3	2	2	-	-	-	-	-	-	-	-	-
PSOC.CO4	3	3	1	-	-	-	-	-	-	-	-	-
PSOC.CO5	2	1	3	-	-	-	-	-	-	-	-	-
PSOC.CO6	2	1	2	-	-	-	-	-	-	-	-	-
PSOC (AVG)	3	2	2	2								

CourseName: Linear system analysis ; Year ofStudy: IV-II; Academic Year: 2021-22

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
EDS.CO1	3	2	2	-	1	-	-	-	-	-	-	1
EDS.CO2	2	2	3	-	-	1	-	-	-	-	-	-
EDS.CO3	2	3	-	2	-	-	-	-	-	-	-	-
EDS.CO4	2	3	-	3	-	1	-	-	-	-	-	1
EDS(Avg)	3	3	3	2	1	1	-	-	-	-	-	-

1: Slight(Low)

2: Moderate(Medium)

3: Substantial(High)


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2. Similar table for PSOs

CO	PSO1	PSO2
EM-I.CO1	1	--
EM-I.CO2	1	--
EM-I.CO3	1	--
EM-I.CO4	1	--
EM-I.CO5	--	--

CO	PSO1	PSO2
PS-I.CO1	1	--
PS -I.CO2	1	1
PS -I.CO3	--	--
PS -I.CO4	--	--
PS-I.CO5	1	1
PS-I.CO6	--	--

CO	PSO1	PSO2
PE-I.CO1	1	--
PE-I.CO2	1	1
PE-I.CO3	--	--
PE-I.CO4	1	--
PE-I.CO5	1	1

CO	PSO1	PSO2
PSD.CO1	1	--
PSD.CO2	1	--
PSD.CO3	1	1
PSD.CO4	1	1
PSD.CO5	1	--
PSD.CO6	1	--

CO	PSO1	PSO2
PSOC.CO1	1	--
PSOC.CO2	1	--
PSOC.CO3	1	2
PSOC.CO4	1	--
PSOC.CO5	1	--
PSOC.CO6	1	--

CO	PSO1	PSO2
EDS.CO1	1	--
EDS.CO2	1	2
EDS.CO3	1	--


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Program level Course-PO matrix of all courses INCLUDING first year courses

COURSE	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
AE	2	1		2		2		2		2	2	2
ECA	3	3	3		2	3	3	1	2	1	1	
EM-I	3	2	2	2			2	2	1		2	1
EMF	3	2	3	2	3	2	2	3	1	1	2	0
EM	2	1	2	2			2		2			1
AE LAB	3		2	2	2	2	2	1	2	2	1	
EM-I LAB	3	3	3	3	3	2	3	3	1	3	3	2
ECA LAB	2	1	2	2	2	2	2	1	2	1	2	3
CS	3	3	3		2		2	2	2	2	2	2
DE	3	2	2	2	2			2	1	2	2	
EM-II	2	1	1	1	3	3	3	1	2	1	2	3
LTNM	3	2	2	1		1	2	1		2	2	2
PS-I	2	3	3	3	2	2	3	2	3		1	1
CS LAB	3	3	3		2		2	2	2	2	1	1
DE LAB	1	1	2	1	1	3	3	1	3	3	2	3
EM-II LAB	3	3	3	1	2	2	2	1	1	1	1	3
BEFA	3	2	2	1			2		1		1	
HVE	2	2	1	2		2			1	1		2
M&I	2	1	2	2	2	2	2	1	1	1	2	3
PE	2	3	3	3	2	2		2		2		
PS-II	3	3	3	1	1	2	2	3	3	1	2	2
MI LAB	3	3	3	3	3	3	3	1	2	1	1	2
PE LAB	3	3	3		2	2		2		2	1	1
PS LAB	3	2	3	1	2		2	2	2	1		2
MPMC	1	1	1	1		2	2		2	1	1	1
NCES	2	2	2		2		2	2	2			1
PSD	3	2	2	3	2	2			2	3	3	3
PSOC	3	2	2	2	2		3			2	1	2
PSP	3	2	2	2		2		2		2	2	2
SS	2	3	1	2		2	2		2		2	2
MPMC LAB	1	1	1	1			3		2	1		2
SS LAB	2	2	2	3	2		3		2		2	2
EHV	3	2	2	2	1	3		2	2	2		2
FOM	2	3	2	2	2		2		1			2
HVDC	2	3	2		1	2	3	2			2	
POE	3	2		2	2	2			1	2	2	2
MINI	1		1	1	1						1	
PROJECT-I	1	2	1	2	2	1	3	3	3	2	2	2

SEMINAR	3		2		2		3	1	1	3	1	3
EED LAB	3	2	2	1		2		2		2	2	2
EDS	3	2	2		2	1		1	2			1
NCSE	2	2	2	2	2	2	2		2			2
PQ&FACTS	2	2	2	1	3	2		2		2		1
PROJECT-II	1	2	2	2	2	1	1	3	3	2	2	1
CO (AVG)	2.4	2	2.1	1.8	2.0	2.0	2.4	1.8	1.8	1.8	1.7	1.9

1: Slight(Low)

2: Moderate(Medium)

3: Substantial(High)

Similar table for PSOs

COURSE	PSO1	PSO2
ENGLISH-I	1	---
MATHEMATICS-I	1	--
MATHEMATICAL METHODS	2	--
ENGINEERING PHYSICS	2	--
ENGINEERING CHEMISTRY	1	---
ENGINEERING DRAWING	1	--
ECS LAB-I	2	----
EP LAB	2	1
EP-VIRTUAL LABS-ASSIGN	1	--
EW&IT WORKSHOP	2	---
AE	---	2
ECA	1	--
EM-I	2	--
EMF	1	--
AE	2	1
ECA	2	--
EM-I	1	--
EMF	2	2
EM	2	--
AE LAB	--	--
EM-I LAB	2	--
ECA LAB	2	1
CS	2	--
DE	1	--
EM-II	3	--
LTNM	1	2

PS-I	2	--
CS LAB	1	--
DE LAB	1	1
EM-II LAB	1	--
BEFA	2	--
HVE	2	--
M&I	2	--
PE	1	--
PS-II	3	1
MI LAB	2	1
PE LAB	2	2
PS LAB	2	--
MPMC	1	--
NCES	3	3
PSD	1	--
PSOC	1	--
PSP	1	--
SS	2	2
MPMC LAB	2	--
SS LAB	2	1
EHV	1	--
FOM	1	1
HVDC	1	--
POE	2	1
MINI	2	1
PROJECT-I	2	1
SEMINAR	2	--
EED LAB	1	---
EDS	1	1
NCSE	1	1
PQ&FACTS	1	1
CO (AVG)	1.6	1.35


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Attainment of Course Outcomes

Describe the assessment processes used to gather the data upon which the evaluation of Course Outcome is based.

((Examples of data collection processes may include, but are not limited to, specific exam/tutorial questions, assignments, laboratory tests, project evaluation, student portfolios (A portfolio is a collection of artifacts that demonstrate skills, personal characteristics and accomplishments created by the student during study period), internally developed assessment exams, project presentations, oral exams etc.)

The assessment of course outcome is done based on examinations conducted:

- Mid exam
- Laboratory exam
- Projects
- University examinations

The course outcome for all theory courses is assessed based on target criterion set

Step1: AIET collected the exam marks from Exam branch.

Internal – sample form and University Exam – Sample form are shown after the procedure.

Step 2: One Sample excel sheet was developed internally for assessments.

Step 3: Copied the exam results to the developed excel sheet & calculated assessment from 1st internal exam; 2nd internal exam and university. From assessment – average Mark, % average mark and CO attainments.

The assessment of course outcome is done based on examinations conducted

- Mid Exam
- Laboratory Exam
- Projects
- University Examinations

The Course outcome for all theory courses is assessed based on target criterion set. The Weightages are given for Internal Examinations & University Examinations. The overall attainment of the course outcome is calculated by obtaining weighted average.

Projects Work & Laboratory courses of assessed through Rubrics. Performance indicators are described in Rubrics to assess the course outcome.

Sample CO Attainment calculations of **Internal Examinations** (III year 1st Semester) (2021-22)


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Regd No	BEFA	HVE	M&I	PE	PS-II	MI LAB	PE LAB	PS LAB
19Q61A0201	15	24	15	11	17	20	18	16
19Q61A0202	20	23	17	19	20	22	22	22
19Q61A0203	16	18	15	15	16	20	18	18
19Q61A0204	20	21	23	18	22	25	21	20
19Q61A0205	12	23	12	18	17	21	20	15
19Q61A0206	21	20	22	17	22	20	20	22
19Q61A0207	21	25	20	21	23	25	22	23
19Q61A0208	20	22	18	20	16	20	20	18
19Q61A0209	22	24	20	23	23	20	22	20
19Q61A0210	20	17	16	11	17	21	18	18
19Q61A0211	20	24	23	22	24	20	20	23
19Q61A0212	22	24	17	18	22	20	19	20
19Q61A0213	20	24	21	19	23	22	18	22
19Q61A0214	22	24	23	21	21	20	22	22
19Q61A0215	20	24	18	18	19	20	22	20
19Q61A0216	22	23	24	20	23	22	23	21
19Q61A0217	21	24	20	17	20	13	21	22
19Q61A0219	17	24	20	14	18	20	20	16
19Q61A0220	21	23	22	18	20	20	22	20
20Q65A0201	24	24	25	23	24	22	23	23
20Q65A0202	24	25	25	23	24	25	23	23
20Q65A0203	19	24	22	23	19	20	20	18
20Q65A0204	20	23	22	20	18	20	14	20
20Q65A0205	18	24	20	21	20	21	19	23
20Q65A0206	11	15	11	14	11	20	18	18
20Q65A0207	21	23	20	22	22	22	19	21
20Q65A0209	17	20	15	12	18	20	20	20
20Q65A0211	19	24	19	19	21	20	20	22
20Q65A0213	21	24	23	23	24	20	18	23
20Q65A0214	19	24	20	21	24	20	21	23
20Q65A0215	19	24	19	20	21	20	20	20
20Q65A0216	17	19	21	19	20	20	19	20
20Q65A0217	19	23	19	20	22	20	23	22
20Q65A0218	16	19	21	17	16	20	18	15
20Q65A0219	18	23	24	21	22	20	20	23
20Q65A0220	20	24	21	19	20	20	19	21
20Q65A0221	23	24	24	22	24	22	22	23
20Q65A0222	13	15	11	12	13	20	20	20
20Q65A0223	11	15	11	14	11	20	20	15
20Q65A0224	21	24	24	22	22	20	20	22
20Q65A0225	16	24	22	13	17	20	18	15
20Q65A0226	20	23	20	19	21	20	19	22
20Q65A0227	19	23	21	13	19	20	18	15

20Q65A0229	21	24	22	19	22	20	20	21
20Q65A0230	22	24	21	23	21	25	23	22
20Q65A0231	20	25	18	21	22	20	20	21
20Q65A0232	22	23	20	19	22	20	20	22
20Q65A0233	20	24	22	18	21	20	18	22
20Q65A0234	22	23	20	20	20	20	20	20
20Q65A0235	19	24	23	20	21	20	20	20
20Q65A0236	18	24	21	20	17	21	20	15
20Q65A0237	19	22	19	21	21	20	20	20
20Q65A0238	18	21	18	13	18	20	18	15
20Q65A0239	22	23	22	23	23	20	21	23
20Q65A0240	23	24	24	22	22	21	23	23
20Q65A0241	11	15	11	14	11	20	20	15
AVERAGE	19.2	22.4	19.8	18.7	19.9	20.5	20.0	20.1
AVERAGE %	76.7%	89.8%	79.1%	74.6%	79.8%	82.1%	80.1%	80.3%
CO (internal)	3	3	3	3	3	3	3	3

Sample CO Attainment calculations of **University Examinations** (III year 1Semester) (2021-22)

Regd No	BEFA	HVE	M&I	PE	PS-II	MI LAB	PE LAB	PS LAB
19Q61A0201	30	42	41	9	41	65	50	58
19Q61A0202	32	27	35	16	26	72	73	65
19Q61A0203	32	32	38	2	2	65	53	60
19Q61A0204	27	32	3	4	38	73	65	65
19Q61A0205	30	26	39	14	32	70	65	60
19Q61A0206	29	29	14	14	30	70	65	68
19Q61A0207	26	33	37	27	34	73	68	67
19Q61A0208	31	13	1	26	38	69	56	58
19Q61A0209	26	26	31	15	32	70	68	67
19Q61A0210	32	7	5	3	41	62	59	60
19Q61A0211	31	30	35	14	29	69	68	67
19Q61A0212	26	41	1	26	2	69	61	65
19Q61A0213	33	28	36	7	30	74	65	68
19Q61A0214	26	26	26	26	29	70	68	68
19Q61A0215	32	35	3	6	31	69	69	65
19Q61A0216	31	32	31	17	35	74	70	69
19Q61A0217	26	14	38	1	1	69	70	67
19Q61A0219	33	44	11	8	26	60	68	60
19Q61A0220	32	12	41	12	29	65	69	65
20Q65A0201	41	42	29	26	43	74	71	71
20Q65A0202	26	26	41	26	30	74	72	71
20Q65A0203	29	39	37	32	35	60	60	58
20Q65A0204	26	35	41	26	27	60	-1	60
20Q65A0205	39	18	39	26	29	70	65	66

20Q65A0206	-1	40	8	32	14	60	50	58
20Q65A0207	26	32	32	16	31	74	70	70
20Q65A0209	26	42	41	8	38	65	62	60
20Q65A0211	26	17	40	27	38	67	65	67
20Q65A0213	38	41	31	30	32	74	68	68
20Q65A0214	30	33	28	26	31	65	69	70
20Q65A0215	32	38	31	44	35	62	68	60
20Q65A0216	28	39	35	26	26	65	65	64
20Q65A0217	34	26	41	18	32	71	70	65
20Q65A0218	26	26	38	8	35	60	55	50
20Q65A0219	26	32	35	31	32	72	68	67
20Q65A0220	352	29	15	26	35	67	64	65
20Q65A0221	31	36	33	28	35	70	72	71
20Q65A0222	27	40	41	28	17	60	60	60
20Q65A0223	32	26	42	31	18	60	52	60
20Q65A0224	40	31	38	14	38	72	70	68
20Q65A0225	26	1	-1	7	38	60	52	60
20Q65A0226	30	45	32	40	34	69	68	67
20Q65A0227	26	32	35	12	34	60	55	58
20Q65A0229	26	32	31	43	29	67	69	65
20Q65A0230	26	42	43	28	45	73	70	69
20Q65A0231	26	29	26	8	41	62	65	67
20Q65A0232	29	42	41	26	26	62	63	67
20Q65A0233	28	18	17	12	9	62	68	67
20Q65A0234	26	13	42	27	42	62	64	60
20Q65A0235	31	41	42	27	28	67	62	60
20Q65A0236	41	30	34	13	45	60	54	58
20Q65A0237	42	32	40	8	26	67	68	63
20Q65A0238	40	31	36	27	35	60	60	58
20Q65A0239	26	13	42	31	26	65	66	66
20Q65A0240	33	35	41	37	31	72	70	67
20Q65A0241	29	30	7	16	41	60	50	58
AVERAGE	35.4	30.1	30.2	20.3	30.5	66.8	63.0	63.9
AVERAGE %	47.2%	40.1%	40.2%	27.1%	40.6%	89.0%	84.0%	85.3%
co attainment	2	2	2	1	2	3	3	3


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The course outcomes are assessed through internal and external examinations (direct assessment tool). Each examination is given due weightage for assessment as given below.

A. Theory Courses:

- 1. Internal Examination (25%)**-This type of performance assessment is carried out during the examination sessions which will be held twice in a semester. Each and every Mid-term examination is focused in achieving the course outcomes.
- 2. University Examination (75%)**- Semester End examination comprising entire syllabus of the course is a measure for assessing whether the entire COs are attained or not.

Mid Examination Evaluation Procedure:

Step No	Activity	Responsibility	Frequency	Time Line
2	Midterm Question paper mapped with Course Outcomes	Respective Faculty	Twice per Semester	Along the Question paper setting
3	Internal Examination Conduction	Department Exam Section	Twice per Semester	As per academic Calendar
4	Evaluate the answer scripts	Respective Faculty	Twice per Semester	two days from examination completion
5	Standard format for Course Outcome Assessment for Mid and Assignment	Assessment Committee	Once per Year	Beginning of the ACY
6	Evaluate question wise and calculate the course Attainment	Respective Faculty	Twice per Semester	two days from examination completion
7	Submit the course attainment to Assessment Committee	Respective Faculty	Twice per Semester	two days from examination completion
8	Consolidation of attainments for all courses and report submission to HOD	Assessment Committee	Twice per Semester	3 days from examination completion
9	Analysis of attainments and corrective measures for all courses	HOD	Twice per Semester	One week from report availability


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B. Lab Courses: Presentation and Conduction The laboratory test assessment is based on the following three components:

1. **Day to day work (20%):** The students are expected to conduct the laboratory experiment by applying the concepts learned in relevant theory courses. In order to test the experimental skills and knowledge attained by the student viva-voce will be conducted on the day of performing experiment. While evaluating the students in laboratory the COs are taken into consideration
2. **Record (10%):** In laboratory courses the students are expected to prepare the documentation of experimental procedure, design calculations, results and conclusions for every experiment conducted in the laboratory. The record is submitted to faculty for assessment of the student skills in various aspects.
3. **Internal exam (20%):** The overall performance of the student in laboratory is evaluated by conducting examination at the end of the semester.
4. **(University Examinations (50%) :** The overall performance of the student in Laboratory is evaluated by conducting examination at the end of the semester

However, the assessment of laboratory courses are done through rubrics comprising of above mentioned performance indicators.

3. **Project Work:** To evaluate the project of the student, minimum of two reviews are conducted during the project period. The evaluation shall be carried out based on the rubric developed for project work. The performance indicators shall be identified to assess various skills of the students in order to attain the COs.

Project Work:

The internal evaluation for 50 marks allocated for the project work shall be on the basis of two seminars & Viva - Voce examination by each student on the topic of his/her project and evaluated by Project Review committee. The Project Review committee consists of Head of Department, respective internal guide and three senior faculty members of the department. The distribution of marks is as given in below Table.


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Table: Distribution of Internal Marks

S.No.	Criteria	Marks
1	Two Seminars & Viva-Voce	20+20
2	Day to Day Assessment	10

Rubric showing internal evaluation of Project - Seminar

- Literature survey(5M)
- Problem identification(5M)
- Professional behavior (5M)
- Communication skills(5M)

- Similar evaluation for 2nd Seminar of Project

S.No.	Criteria	Marks
1	Report	100
2	Presentation & Viva	50

Table: Distribution of External Marks

These marks awarded by the examiner appointed by the University.

Based on the above procedure, Attainment levels will be calculated for both internal and university examinations and the same is consolidated into the following format:

S.NO	COURSE OUT COMES	INTERNAL EXAMS	EXTERNAL EXAMS	Overall Course attainment (0.25*Internal + 0.75*External)
1	Course 1			
2			
3	Course n			

Record the attainment of Course Outcomes of all courses with respect to set attainment levels:

Program shall have set Course Outcome attainment levels for all courses. (The attainment levels shall be set considering average performance levels in the university examination or any higher value set as target for the assessment years. Attainment level is to be measured in terms of student performance in internal assessments with respect to the Course Outcomes of a course in addition to the performance in the University examination)


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CO ATTAINMENT**OVER ALL CO ATTAINMENT (2021-22)****II-I**

Course Outcomes	int exams	university exams	Overall Course attainment (0.75*Univ + 0.25*Internal)
AE	3	1	1.5
ECA	3	1	1.5
EM-I	3	2	2.25
EMF	2	1	1.25
EM	3	1	1.5
AE LAB	3	3	3
ECA LAB	3	3	3
EM-I LAB	3	3	3

II-II

Course Outcomes	int exams	university exams	Overall Course attainment (0.75*Univ + 0.25*Internal)
CS	3	1	1.5
DE	3	2	2.25
EM-II	3	2	2.25
LTNM	3	2	2.25
PS-II	3	1	1.5
CS LAB	3	3	2
DE LAB	3	3	3
EM-II LAB	3	3	3

III-I

Course Outcomes	int exams	university exams	Overall Course attainment (0.75*Univ + 0.25*Internal)
BEFA	3	2	2.25
HVE	3	2	2.25
M&I	3	2	2.25
PE	3	1	1.5
PS-II	3	2	2.25
MI LAB	3	2	2
PE LAB	3	3	3
PS LAB	3	3	3

III-II

Course Outcomes	int exams	university exams	Overall Course attainment (0.75*Univ + 0.25*Internal)
MPMC	2	1	1.25
NCES	2	2	2
PSD	3	1	2
PSOC	2	2	2
PSP	2	1	1.25
SS	3	1	1.5
MPMCLAB	2	3	2.75
PS LAB	2	3	3
SS LAB	3	3	3

IV-I

Course Outcomes	int exams	university exams	Overall Course attainment (0.75*Univ + 0.25*Internal)
EHV	3	2	2.25
FOM	3	2	2.25
HVDC	3	2	2.25
POE	2	1	1.25
PROJECT-I	3	3	3
EED LAB	3	3	3
SEMINAR	3	*	3
MINI	*	3	3

IV-II

Course Outcomes	int exams	university exams	Overall Course attainment (0.75*Univ + 0.25*Internal)
EDS	3	2	2.25
NCSE	3	2	2.25
PQ&FACTS	3	3	3
PROJECT-II	3	3	3


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*The attainment of seminar is not calculated externally , so internal attainment is awarded as overall attainment.

Sample Internal assessment of PSD course is shown below:

Regd No	MPMC	NCES	PSD	PSOC	PSP	SS	MPMC LAB	PS LAB	SS LAB
19Q61A0201	16	10	13	11	12	23	15	14	20
19Q61A0202	21	19	22	18	21	23	20	20	21
19Q61A0203	16	15	19	15	16	21	16	14	20
19Q61A0204	18	23	19	23	19	24	21	22	24
19Q61A0205	18	17	21	20	18	23	15	14	21
19Q61A0206	18	21	19	20	19	23	16	18	20
19Q61A0207	22	22	22	21	23	24	21	22	21
19Q61A0208	18	18	21	14	20	25	15	20	20
19Q61A0209	19	18	22	18	21	24	22	22	24
19Q61A0210	16	17	20	21	17	24	17	14	21
19Q61A0211	23	18	22	22	22	25	22	22	24
19Q61A0212	12	11	12	10	10	12	15	15	20
19Q61A0213	21	18	20	21	21	23	21	21	21
19Q61A0214	20	19	23	18	22	25	22	22	24
19Q61A0215	18	17	22	17	20	22	14	18	20
19Q61A0216	20	21	23	20	22	25	21	21	24
19Q61A0217	17	16	22	17	19	24	17	22	21
19Q61A0219	20	16	11	5	13	22	14	15	21
19Q61A0220	20	19	21	22	19	24	16	18	20
20Q65A0201	24	23	23	24	24	24	23	23	24
20Q65A0202	24	23	21	14	24	23	22	23	24
20Q65A0203	20	11	20	12	20	23	14	21	21
20Q65A0204	19	18	12	5	11	24	14	15	17
20Q65A0205	19	19	23	17	24	23	16	20	21
20Q65A0206	11	17	12	5	13	13	14	15	18
20Q65A0207	18	19	21	18	22	22	16	18	21
20Q65A0209	11	18	19	19	16	15	14	15	20
20Q65A0211	21	19	19	20	23	23	20	21	24
20Q65A0213	23	21	22	24	24	24	14	21	24
20Q65A0214	22	23	23	24	24	24	14	23	24
20Q65A0215	20	19	21	18	22	23	19	22	21
20Q65A0216	17	19	20	17	18	22	20	21	21
20Q65A0217	20	19	19	23	22	25	23	21	24
20Q65A0218	5	16	5	19	5	5	14	14	14
20Q65A0219	18	20	22	21	21	24	18	20	21
20Q65A0220	19	20	23	18	21	24	21	21	24
20Q65A0221	22	20	23	24	24	25	22	23	24
20Q65A0222	18	16	20	17	18	23	18	15	20
20Q65A0223	21	19	20	21	22	24	21	21	21
20Q65A0224	21	21	21	21	23	24	20	21	20

20Q65A0225	5	5	5	5	5	5	14	14	14
20Q65A0226	19	21	20	19	23	22	21	22	20
20Q65A0227	19	18	22	18	19	23	14	20	21
20Q65A0229	21	20	22	22	23	25	18	21	21
20Q65A0230	21	21	22	19	23	24	24	22	24
20Q65A0231	20	21	23	17	21	25	17	18	20
20Q65A0232	20	19	21	21	22	25	18	20	21
20Q65A0233	17	19	20	17	18	25	16	19	20
20Q65A0234	18	19	20	17	21	24	18	19	21
20Q65A0235	18	19	22	17	21	23	17	18	20
20Q65A0236	19	19	22	21	19	23	14	15	21
20Q65A0237	21	19	22	18	21	25	21	20	20
20Q65A0238	19	18	23	17	21	23	14	15	21
20Q65A0239	20	20	22	18	20	24	15	14	20
20Q65A0240	23	22	23	19	23	25	25	22	24
20Q65A0241	17	16	12	5	11	22	15	14	19
AVERAGE	18.6	18.4	19.7	17.6	19.4	22.4	17.8	18.9	21.1
AVERAGE %	74.5%	73.6%	78.9%	70.3%	77.6%	89.7%	71.3%	75.8%	84.4%
co att	2	2	3	2	2	3	2	2	3

Sample University Examination assessment of PSD course is shown below:

Regd No	MPMC	NCES	PSD	PSOC	PSP	SS	MPMC LAB	PS LAB	SS LAB
19Q61A0201	6	13	8	5	-1	9	60	40	65
19Q61A0202	39	30	31	27	26	15	68	60	64
19Q61A0203	1	42	2	35	0	0	55	50	63
19Q61A0204	17	43	0	28	26	7	70	66	72
19Q61A0205	40	42	42	26	8	19	55	43	64
19Q61A0206	35	40	0	40	3	0	56	60	65
19Q61A0207	41	35	19	41	26	50	70	65	63
19Q61A0208	50	29	26	45	19	26	54	60	64
19Q61A0209	29	33	27	36	32	26	71	63	72
19Q61A0210	5	12	2	42	5	0	59	50	65
19Q61A0211	50	32	26	31	26	19	69	65	72
19Q61A0212	-1	-1	-1	-1	-1	-1	56	40	63
19Q61A0213	40	29	37	33	26	7	68	65	64
19Q61A0214	33	38	27	43	26	29	70	68	72
19Q61A0215	1	45	1	42	1	0	55	60	65
19Q61A0216	31	42	10	30	26	26	68	68	71
19Q61A0217	8	35	11	45	0	5	67	65	63
19Q61A0219	7	26	14	21	19	0	66	42	64
19Q61A0220	7	39	12	44	13	0	60	60	65
20Q65A0201	44	52	50	49	43	26	73	72	72
20Q65A0202	35	29	38	36	29	29	71	72	72
20Q65A0203	47	50	36	40	49	29	59	60	65

20Q65A0204	30	43	48	30	29	7	50	42	48
20Q65A0205	26	35	40	46	30	17	62	70	64
20Q65A0206	15	45	53	38	27	6	50	40	48
20Q65A0207	0	32	2	33	27	4	60	60	63
20Q65A0209	7	28	29	28	28	10	59	43	65
20Q65A0211	12	45	26	41	27	5	67	67	72
20Q65A0213	36	38	58	48	32	29	74	71	72
20Q65A0214	19	38	54	34	28	17	70	72	72
20Q65A0215	8	34	38	37	27	5	55	57	63
20Q65A0216	26	33	29	34	30	8	56	68	64
20Q65A0217	32	39	46	46	37	18	71	68	72
20Q65A0218	14	35	20	26	19	4	-1	-1	-1
20Q65A0219	16	31	36	38	30	15	61	66	65
20Q65A0220	11	34	33	30	26	11	66	66	72
20Q65A0221	38	42	35	47	44	30	70	72	72
20Q65A0222	17	45	13	27	29	9	50	58	64
20Q65A0223	19	39	26	41	30	10	67	66	63
20Q65A0224	33	43	32	50	32	29	65	68	65
20Q65A0225	-1	-1	-1	-1	-1	-1	-1	-1	-1
20Q65A0226	27	45	29	32	35	12	68	70	64
20Q65A0227	26	45	13	36	27	13	51	45	63
20Q65A0229	18	41	31	45	32	11	55	68	65
20Q65A0230	26	41	32	30	30	13	73	72	72
20Q65A0231	28	40	32	35	15	15	56	55	65
20Q65A0232	32	29	38	35	38	10	57	66	66
20Q65A0233	2	32	5	26	26	5	50	60	64
20Q65A0234	26	35	16	36	27	18	54	60	63
20Q65A0235	26	38	31	39	30	9	57	60	65
20Q65A0236	31	49	50	34	45	15	50	48	64
20Q65A0237	28	32	26	39	26	15	61	65	63
20Q65A0238	31	42	50	43	33	4	45	45	64
20Q65A0239	4	36	6	30	26	8	46	40	65
20Q65A0240	28	33	29	40	27	30	74	72	72
20Q65A0241	-1	31	34	-1	36	-1	49	40	48
AVERAGE	22.4	35.5	26.2	34.7	24.7	13.1	58.9	57.4	63.0
AVERAGE %	29.9%	47.3%	34.9%	46.3%	33.0%	17.4%	58.9%	57.4%	63.0%
co attainment	1	2	1	2	1	1	3	3	3


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Overall Attainment

Course Outcomes	int exams	university exams	Overall Course attainment (0.75*Univ + 0.25*Internal)
MPMC	2	1	1.25
NCES	2	2	2
PSD	3	1	2
PSOC	2	2	2
PSP	2	1	1.25
SS	3	1	1.5
MPMCLAB	2	3	2.75
PS LAB	2	3	3
SS LAB	3	3	3

Course Outcome Attainment:

For example:

Attainment through University Examination: Substantial i.e. 1

Attainment through Internal Assessment: Moderate i.e. 3

Assuming 75% weightage to University examination and 25% weightage to Internal assessment, the attainment calculations will be (75% of University level) + (25% of Internal level) i.e. 75% of 1 + 25% of 3 = 0.75 + 0.75 = 1.5

Indirect Attainment (20%)

Indirect Method Calculation This method is purely survey oriented, So the calculations are based on data and surveys collected from the following

- Current Passing out students
- Stakeholders
- Alumni
- Survey from placement officers.

Programme – Exit survey: This survey taken from the final year students at the completion of their B.Tech programme, stands as the comprehensive feedback for the PO/PSO assessment.

Alumni Survey : This survey is conducted annually through Google link or mail with the Alumni to obtain the inputs and suggestion.

Student feedback

The feedback is collected from all the students of concerned department for the respective subjects at the start and end of every semester. Weightage is given as 25% of Indirect Attainment.


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LEVEL	PO attainment range
1 (Poor)	$0.5 \leq \text{PO attainment value}$
2 (Average)	$1 \leq \text{PO attainment value}$
3 (Good)	$1.5 \leq \text{PO attainment value}$
4 (Very Good)	$2 \leq \text{PO attainment value}$
5 (Excellent)	$2.5 \leq \text{PO attainment value} \leq 3$

These levels of attainment are then listed out according to their category in the below format for calculating the indirect PO attainment

SURVEY	INDIRECT PO ATTAINMENT												PSO1	PSO2
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		
PASSED OUT STUDENT	3	2	1	1	2	3	1	3	1	2	2	2	2	2
Alumni	3	2	2	1	2	2	2	1	2	2	3	2	3	1
Placement Officers	3	2	3	2	2	2	1	1	3	2	2	3	1	2
Indirect Program attainment	3	2	2	1.3	2	2.33	1.3	1.66	2	2	2.33	2.33	2	1.66

Number of samples are considered. 2021-22
Employer Survey: 7

Alumni Survey: 14
Program Exit Survey: 60


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Indirect Assessment Of PO-1

Survey type	Question type	Number of Responses	Satisfaction Number	Attainment Level
Graduate survey	Have you learned the fundamental principles of the major areas of mathematics and sciences in your courses?	60	52	3
	Have you applied knowledge of mathematics, science and engineering / computing, fundamentals in solving Engineering problems in your program?	60	52	3
Alumni survey	Are you able to develop a broad appreciation for mathematics and science both as a discipline and as a tool for solving real world problems?	20	17	3

Indirect Assessment methods

Assessment tool	% target level attainment	Attainment Level
Graduate survey	85	3
Alumni survey	75	3
Employer	70	3
Average Indirect Attainment		3

Indirect assessment methods to assess Program outcome

Average Attainment of PO-1

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PO

PO	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
PO 1	Direct Assessment (80%)	$2.4 * 0.8 = 1.92$	$1.92 + 0.6 = 2.52$	84
	Indirect Assessment (20%)	$3 * 0.2 = 0.6$		

% Attainment calculation = max. attainment level reached / max attainment level
 $2.52/3=84$


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Indirect Assessment of PO-2,

Indirect PO assessment is done using assessment tools like graduate survey, alumni survey, projects etc .as described in following table

Survey type	Question type	Number of Responses	Satisfaction Number	Attainment Level
Graduate survey	PO2: : Are you able to identify, design, analyze and solve Electrical engineering problems.	60	52	3

Assessment tool	% target level attainment	Attainment Level
Graduate survey	85	3
Alumni survey	75	2
Employer	70	2
Average Indirect Attainment		2

Indirect assessment methods to assess Program outcome 2

Average Attainment of PO-2

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PO

PO	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
PO 2	Direct Assessment (80%)	$2 * 0.8 = 1.6$	$1.6 + 0.4 = 2$	66.6
	Indirect Assessment (20%)	$2 * 0.2 = 0.4$		

Indirect Assessment of PO-3,

Indirect PO assessment is done using assessment tools like graduate survey, alumni survey, projects etc .as described in following table

Survey type	Question type	Number of Responses	Satisfaction Number	Attainment Level
Graduate survey	PO3: How comfortable are you in identifying and designing an appropriate solution for an engineering problem?	60	52	3


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Assessment tool	% target level attainment	Attainment Level
Graduate survey	85	3
Alumni survey	75	2
Employer	70	2
Average Indirect Attainment		2

Average Attainment of PO-3

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PO

PO	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
PO 3	Direct Assessment (80%)	1.68	1.68+0.4=2.08	69.33
	Indirect Assessment (20%)	0.4		

Indirect Assessment of PO-4

Indirect PO assessment is done using assessment tools like graduate survey, alumni survey, projects etc .as described in following table

Survey type	Question type	Number of Responses	Satisfaction Number	Attainment Level
Alumni survey	PO4: Are you able to apply engineering knowledge to design experiments ,analyze and interpret data to obtain valid conclusions	20	17	3

Assessment tool	% target level attainment	Attainment Level
Graduate survey	62	3
Alumni survey	55	1
Employer	60	1
Average Indirect Attainment		1.3


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Average Attainment of PO-4

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PO

PO	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
PO 4	Direct Assessment (80%)	$2.08 * 0.8 = 1.96$	$1.44 + 0.26 = 1.7$	56.7
	Indirect Assessment (20%)	$1.3 * 0.2 = 0.26$		

Indirect Assessment of PO-5

Indirect PO assessment is done using assessment tools like graduate survey, alumni survey, projects etc .as described in following table:

Survey type	Question type	Number of Responses	Satisfaction Number	Attainment Level
Alumni survey	PO5: How satisfied are you in using new software/environment?	20	17	3
Graduate survey	PO5: Given a new tool or environment how comfortable are you to utilize and develop With it?	60	52	3

Assessment tool	% target level attainment	Attainment Level
Graduate survey	85	3
Alumni survey	73	2
Employer	70	2
Average Indirect Attainment		2

Average Attainment of PO-5

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PO

PO	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
PO 5	Direct Assessment (80%)	1.6	$1.6 + 0.4 = 2$	66.6
	Indirect Assessment (20%)	$2 * 0.2 = 0.4$		

Indirect Assessment of PO-6

Indirect PO assessment is done using assessment tools like graduate survey, alumni survey, projects etc .as described in following table:

Assessment tool	% target level attainment	Attainment Level
Graduate survey	85	3
Alumni survey	75	2.2
Employer	70	2.1
Average Indirect Attainment		2.33

Average Attainment of PO-6

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PO

PO	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
PO 6	Direct Assessment (80%)	1.6	1.6+0.46=2.06	68.6
	Indirect Assessment (20%)	2.3*0.2 =0.46		

Indirect Assessment of PO-7

Indirect PO assessment is done using assessment tools like graduate survey, alumni survey, projects etc .as described in following table:

Survey type	Question type	Number of Responses	Satisfaction Number	Attainment Level
Alumni survey	PO5:How satisfied are you in using new software/environment?	20	17	3
Graduate survey	PO5: Given a new tool or environment how comfortable are you to utilize and develop wi	60	52	3

Assessment tool	% target level attainment	Attainment Level
Graduate survey	85	3
Alumni survey	75	1
Employer	70	1
Average Indirect Attainment		1.3

Average Attainment of PO-7

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PO

PO	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
PO 5	Direct Assessment (80%)	1.92	1.92+0.26=2.18	72.6
	Indirect Assessment (20%)	0.26		

Indirect Assessment of PO-8

Indirect PO assessment is done using assessment tools like graduate survey, alumni survey, projects etc .as described in following table :

Survey type	Question type	Number of Responses	Satisfaction Number	Attainment Level
Alumni survey	PO8: How well you understand the pro responsibility and ethics ?	20	17	3
Graduate survey	PO8:Do you follow any non-technical constraints such as environmental , soc political, ethical, health and safety and sustainability?	60	52	3
	PO8:Have you ever participated in NGO activities or any external social welfare association during the college?it?	60	52	3

Assessment tool	% target level attainment	Attainment Level
Graduate survey	85	2
Alumni survey	75	1
Employer	70	1.5
Average Indirect Attainment		1.6

Average Attainment of PO-8

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PO

PO	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
PO 8	Direct Assessment (80%)	1.44	1.44+0.33=1.77	59
	Indirect Assessment (20%)	1.66*0.2=0.33		

Indirect Assessment of PO-9

Indirect PO assessment is done using assessment tools like graduate survey, alumni survey, projects etc .as described in following table :

Survey type	Question type	Number of Responses	Satisfaction Number	Attainment Level
Alumni survey	PO9: Are you able to work effectively in multidisciplinary teams?	20	17	3
Graduate survey	PO9:How frequently are you able to function effectively on tems to accomplish a common goal?	60	52	3

Assessment tool	% target level attainment	Attainment Level
Graduate survey	85	3
Alumni survey	75	2
Employer	70	2
Average Indirect Attainment		2

Average Attainment of PO-9

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PO

PO	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
PO 9	Direct Assessment (80%)	1.44	1.44+0.4=1.84	61.3
	Indirect Assessment (20%)	2*0.2= 0.4		


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Indirect Assessment of PO-10

Indirect PO assessment is done using assessment tools like graduate survey, alumni survey, projects etc .as described in following table:

Survey type	Question type	Number of Responses	Satisfaction Number	Attainment Level
Alumni survey	PO10: How far you have developed the ability to communicate effectively ,write precise reports and design documentatio applying the engineering knowledge?	20	17	3

Assessment tool	% target level attainment	Attainment Level
Graduate survey	85	3
Alumni survey	75	2
Employer	70	2
Average Indirect Attainment		2

Average Attainment of PO- 10

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PO

PO	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
P10	Direct Assessment (80%)	1.44	1.44+0.4=1.84	61.33
	Indirect Assessment (20%)	0.4		

Indirect Assessment of PO-11

Indirect PO assessment is done using assessment tools like graduate survey, alumni survey, projects etc .as described in following table:

Survey type	Question type	Number of Responses	Satisfaction Number	Attainment Level
Alumni survey	PO11: How well you prepare a specific time line and sequence of activities and use them manage the overall project to ensure its timely completion ?	20	17	3


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Assessment tool	% target level attainment	Attainment Level
Graduate survey	85	3
Alumni survey	75	2.2
Employer	70	2.1
Average Indirect Attainment		2.33

Average Attainment of PO- 11

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PO

PO	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
P11	Direct Assessment (80%)	1.36	1.36+0.46=1.82	60.6
	Indirect Assessment (20%)	0.46		

Indirect Assessment of PO-12

Indirect PO assessment is done using assessment tools like graduate survey, alumni survey, projects etc .as described in following table:

Assessment tool	% target level attainment	Attainment Level
Graduate survey	90	3
Alumni survey	85	2.2
Employer	75	2.1
Average Indirect Attainment		2.33

Average Attainment of PO- 12

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PO

PO	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
P12	Direct Assessment (80%)	1.52	1.52+0.46=1.98	66
	Indirect Assessment (20%)	0.46		


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**Program Specific Outcomes Assessment and Attainment
Direct Assessment of PSO**

PSO 1: Ability to design, simulate & analysis of electrical systems using different software tools.

PSO 2: Will be able to design & build renewable energy system.

COURSE	PSO1	PSO2
ENGLISH-I	1	---
MATHEMATICS-I	1	--
MATHEMATICAL METHODS	2	--
ENGINEERING PHYSICS	2	--
ENGINEERING CHEMISTRY	1	---
ENGINEERING DRAWING	1	--
ECS LAB-I	2	----
EP LAB	2	1
EP LAB	1	--
EW&IT WORKSHOP	2	---
AE	---	2
ECA	1	--
EM-I	2	--
EMF	1	--
AE	2	1
ECA	2	--
EM-I	1	--
EMF	2	2
EM	2	--
AE LAB	--	--
EM-I LAB	2	--
ECA LAB	2	1
CS	2	--
DE	1	--
EM-II	3	--
LTNM	1	2
PS-I	2	--
CS LAB	1	--
DE LAB	1	1
EM-II LAB	1	--
BEFA	2	--
HVE	2	--

M&I	2	--
PE	1	--
PS-II	3	1
MI LAB	2	1
PE LAB	2	2
PS LAB	2	--
MPMC	1	--
NCES	3	3
PSD	1	--
PSOC	1	--
PSP	1	--
SS	2	2
MPMC LAB	2	--
SS LAB	2	1
EHV	1	--
FOM	1	1
HVDC	1	--
POE	2	1
MINI	2	1
PROJECT-I	2	1
SEMINAR	2	--
EED LAB	1	---
EDS	1	1
NCSE	1	1
PQ&FACTS	1	1
Direct Assessment	1.68	1.35
Direct Attainment (80%)	1.34	1.08

Average Attainment of PSO1
Indirect Assessment of PSO-1

Survey type	Question type	Number of Responses	Satisfaction Number	Attainment Level
Alumni survey	PSO1:Ability to design, simulate & analysis of electrical systems using different software tools	20	17	2
	PSO2: Will be able to design & build renewable energy system.	20	15	2

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PSO

	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
PSO 1	Direct Assessment (80%)	1.34	1.34+0.4=1.74	58
	Indirect Attainment(20%)	2*20/100=0.4		

Average Attainment of PSO- 2

Survey type	Question type	Number of Responses	Satisfaction Number	Attainment Level
Exit survey	PSO1:Ability to design, simulate & analysis of electrical systems using different software tools	40	32	1.5
	PSO2: Will be able to design & build renewable energy system.	40	30	2

Finally, the average of direct and indirect assessment is calculated which is the attainment level for that PO

	Assessment Tool	Attainment Level	Overall Attainment	% Attainment
PSO 2	Direct Assessment (80%)	1.08	1.08+0.33=1.41	50
	Indirect Assessment (20%)	1.66*20/100=0.33		


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PO Attainment Summary (2021-22)

Course	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02
CO Direct Attainment	2.4	2	2.1	1.8	2.0	2.0	2.4	1.8	1.8	1.8	1.7	1.9	1.68	1.35
InDirect Attainment	3	2	2	1.3	2	2.33	1.3	1.66	2	2	2.33	2.33	2	1.66
Direct Attainment (80%)	1.92	1.6	1.68	1.44	1.6	1.6	1.92	1.44	1.44	1.44	1.36	1.52	1.34	1.08
In Direct Attainment (20%)	0.6	0.4	0.4	0.26	0.4	0.46	0.26	0.33	0.4	0.4	0.46	0.46	0.4	0.33
Overall PO/PSO attainment	2.52	2	2.08	1.7	2	2.06	2.18	1.77	1.84	1.84	1.82	1.98	1.74	1.41
Overall po/pso %	84	66.6	69.3	57	66.6	68.6	72.6	60	61.3	61.3	60.6	66	58	47

Overall attainment = Direct Attainment(80%) + In direct Attainment (20%)


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