SAMARTH EDUCATIONAL TRUST
ARVIND GAVALI COLLEGE OF ENGINEERING
ENGINEERING (B.Tech & M.Tech) BCA MCA B.VOC
NAAC & NBA Accredited AN AUTONOMOUS INSTITUTE ISO 9001:2015
Approved by AICTE, New Delhi, Recognised by Govt. Of Maha.,DTE Mumbai & Affiliated to Dr.Babasaheb Ambedkar Technological University (BATU), Lonere.

Address : At.Panmalewadi, Post.-Varye, Tal.& Dist.-Satara.-415 015 (Maharashtra)
Phone : 02162 - 261122 , 200100
e-mail : agcenggsatara@gmail.com
Website :-www.agce.edu.in
Institute Code : Engg. DTE EN-6545
BCA 6545, MCA 6545, B.Voc 6545

DEPARTMENT OF ELECTRICAL ENGINEERING

ABOUT THE DEPARTMENT

The Department of Electrical Engineering was established in 2010 with the intent to provide quality education to young aspirants for their successful careers in industry that meets the needs of Industry and society. The department has all UGC approved faculty members. Also, the department has well-equipped laboratories. With the growing demand for Electrical Engineers in the Government and private sectors, the Department is making the best efforts to produce highly trained and capable engineers who can take up the challenges of the real world. The quality of academic instructions, conduct guidelines, and college activities are designed to produce competent and successful engineers.

In the Department, the focus is on preparing professional engineers. Academic standards and practical work are the two key parameters. To execute this parameter the department has taken the Initiatives to provide industrial work exposure by sending the students for training to make them fit for future professional challenges. This orientation has led to successful projects and training. For extra curriculum activities, the Departmental Students Association in Electrical Engineering (SAEE) has been established by the students. This association conducts various technical and cultural events regularly.

"The best preparation for tomorrow is doing your best today…!!! "

DEPARTMENT VISION

To impart quality technical education in the field of electrical engineering to reduce the needs of industry and to improve efficiency.

DEPARTMENT MISSION

M1	To provide high quality education in electrical engineering that meets the needs of industry and societal progress.
M2	To create awareness of electrical trends to satisfy the requirement of industry.
M3	Cultivating ethical values and a strong sense of professionalism in students.

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

Graduates will be able to :

PEO 1	The graduates will be able to gain a good fundamental knowledge in science and engineering, to solve electrical engineering problems.
PEO 2	The graduates will be able to demonstrate the professional skills to succeed in a competitive environment.
PEO 3	The graduates will be able to build ethical values, sensitivity towards society and environment.

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PROGRAM OUTCOMES (PO)	
PO 1	**Engineering Knowledge:** Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development.(WK1-WK4)
PO 3	**Design/Development of Solutions**: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
PO 4	**Conduct Investigations of Complex Problems**: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8)
PO 5	**Engineering Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
PO 6	**The Engineer and The World:** Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
PO 7	**Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
PO 8	**Individual and Collaborative Team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO 9	**Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences
PO 10	**Project Management and Finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO 11	**Life-Long Learning:** Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

PROGRAM SPECIFIC OUTCOMES (PSO)	
Students will be able to :	
PSO 1	Demonstrate knowledge and hands-on experience with electrical machines, power/energy systems, power electronics, and automation problems.
PSO 2	To develop the professionals and entrepreneurs in Renewable Energy System, electrical contracting and consultancy using modern tools and techniques.

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MAPPING OF PEO'S TO PO'S											
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**
PEO 1	2	2	2	2	2	--	--	--	--	--	1
PEO 2	2	2	2	2	1	--	--	2	1	2	2
PEO 3	--	--	--	--	--	2	2	2	1	1	1

MAPPING OF PEO's TO PSO's		
	PSO 1	**PSO2**
PEO 1	2	1
PEO 2	1	2
PEO 3	1	2

A. Definition of Credit:

1 Hr. Lecture (L) per week 1	**1 credit**
1 Hr. Tutorial (T) per week	**1 credit**
1 Hr. Practical (P) per week	**0.5 credits**
2 Hours Practical (Lab)/week	**1 credit**

B. Range of Credits:

A range of credits from 160 to 176 for a student to be eligible to get undergraduate degree in engineering. Student will be eligible to get undergraduate degree with honors 18 credits and/or minors 14 credits, if one completes additional credits.

C. Structure & Definition:

SR.NO	DEFINATION	CODE
1.	Basic Science Course	BSC
2.	Engineering Science Course	ESC
3.	Program Core Courses	PCC
4.	Program Elective Course	PEC
5.	Multi Minor	MDM
6.	Open Elective	OE
7.	Vocational and Skill Enhancement Course	VSEC
8.	Ability Enhancement Course	AEC
9.	Entrepreneurship /Economics/ Management Courses (Mgt./Economics/Mkt./Finance)	EEM
10.	Indian Knowledge System	IKS
11.	Value Education Course	VEC
12.	Research Methodology (Project)	ECL
13.	Common Egg. Project/Field Project (PBL/Seminar/Mini Project)	
14.	Project	
15.	Internship/OJT (PBL/Seminar/Mini Project/Virtual Internship/Physical)	
16.	Co-curricular Courses	CC

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D. Credit Framework:

The minimum and maximum credit structure for different levels under the Four-year Bachelor's UG Programme with multiple entry and multiple exit options are as given below:

Credits offered per Semester will be a minimum 20 and a maximum 22. While minimum credits are mandatory as per National Credit Framework, the Universities and Autonomous Engineering Colleges can evolve the mechanism for providing Semester/ Level wise credit attainment flexibility within the broad framework.

Level	Qualification Title	Credit Requirements		Semester	Year
		Minimum	Maximum		
4.5	One Year UG Certificate in Engg./ Tech.	40	44	2	1
5.0	Two Years UG Diploma in Engg./ Tech.	80	84	4	2
5.5	Three Years Bachelor's Degree in Vocation (B.Voc.) or B. Sc. (Engg./ Tech.)	120	124	6	3
6.0	4-Years Bachelor's degree (B.E./ B.Tech. or Equivalent) in Engg./ Tech. with Multidisciplinary Minor	160	164	8	4

E. Structure Categories of UG Program:

SR. NO.	YEAR	FY		SY		TY		B. TECH			
	SEMESTER	I	II	III	IV	V	VI	VII	VIII	ACTUAL	NEP GUIDELINES
1	Basic Science Course	8	8							16	14-18
2	Engineering Science Course	7	5							12	12-16
3	Program Core Courses		2	13	11	11	10	7		54	44-56
4	Program Elective Course					4	7	7		18	20
5	Multi Minor			3	3	3	2	3		14	14
6	Open Elective			2	3	3				08	08
7	Vocational and Skill Enhancement Course	1	4	1		1	1			08	08
8	Ability Enhancement Course	3		-	1					04	04
9	Entrepreneurship /Economics/ Management Courses (Mgt./Economics/Mkt./Finance)								3	03	03
10	Indian Knowledge System		2							02	02
11	Value Education Course			1	1					02	04
12	Research Methodology (Project)								4	04	04
13	Common Egg. Project/Field Project (PBL/Seminar/Mini Project)				1		1			02	02
14	Project							4		04	04
15	Internship/OJT (PBL/Seminar/Mini Project/Virtual Internship/Physical)								12	12	12
16	Co-curricular Courses	1	1							02	04
	Total Credits	**20**	**22**	**20**	**20**	**22**	**21**	**21**	**19**	**165**	
	Examination Total	**900**	**900**	**950**	**950**	**950**	**950**	**900**	**100**	**6600**	
	Total Working Hours/Week	**26**	**27**	**25**	**25**	**28**	**24**	**25**	**20**	**200**	
	NEP Guidelines	**20-22**	**20-22**	**20-22**	**20-22**	**20-22**	**20-22**	**20-22**	**20-22**		**160-176**

F. Semester wise credit distribution:

First Year B. Tech-2025-26(Common for all Branches) **SEMESTER I**

SR. NO	CATEGORY	COURSE CODE	COURSE NAME	TEACHING SCHEME					EVALUATION SCHEME			
				L	T	P	HRS./WEEK	CR	COMPONENTS	MAX	MIN FOR PASSING	
1	BSC	25BSE1101	Engineering Mathematics Calculus and Algebraic Techniques	3	1	--	4	4	CA1 MSE CA2 ESE	15 20 15 50	 20	40
2	BSC	25BSE1001/ 25BSE1002	Engineering Physics/ Modern Chemistry	3	--	--	3	3	CA1 MSE CA2 ESE	15 20 15 50	 20	40
3	ESC	25BSE1102	Basic Electrical & Electronics Engineering	3	--	--	3	3	CA1 MSE CA2 ESE	15 20 15 50	 20	40
4	ESC	25BSE1103	C Programming for Problem Solving	2	--	--	2	2	CA1 MSE CA2 ESE	15 20 15 50	 20	40
5	AEC	25BSE1104	Communication Skills	2	--	--	2	2	CA1 MSE CA2 ESE	15 20 15 50	 20	40
6	BSC	25BSE1001L / 25BSE1002L	Engineering Physics Laboratory/ Modern Chemistry Laboratory	--	--	2	2	1	CA1 CA2 OE	25 25 --	 --	20
7	ESC	25BSE1102L	Basic Electrical & Electronics Engineering Laboratory	--	--	2	2	1	CA1 CA2 OE	25 25 50	 20	40
8	ESC	25BSE1103L	C Programming for Problem Solving Laboratory	--	--	2	2	1	CA1 CA2 POE	25 25 50	 20	40
9	AEC	25BSE1104L	Communication Skills Laboratory	--	--	2	2	1	CA1 CA2 OE	25 25 --	 --	20
10	VSEC	25BSE1105L	Engineering Practice Laboratory	--	--	2	2	1	CA1 CA2 OE	25 25 --	 --	20
11	CC	25BSE1106L	Yoga	--	--	2	2	1	CA1 CA2 OE	25 25 --	 --	20
			Total	**13**	**1**	**12**	**26**	**20**		**900**		

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First Year B. Tech-2025-26(Common for all Branches)

SEMESTER II

SR. NO.	CATEGORY	COURSE CODE	COURSE NAME	TEACHING SCHEME					EVALUATION SCHEME			
				L	T	P	HR/ WEEK	CR	COMPONENTS	MAX	MIN FOR PASSING	
1	BSC	25BSE1201	Engineering Mathematics: Calculus and Transform Methods	3	1	--	4	4	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
2	BSC	25BSE1001/ 25BSE1002	Engineering Physics/ Modern Chemistry	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
3	ESC	25BSE1202	Engineering Mechanics	2	--	--	2	2	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
4	ESC	25BSE1203	Python Programming	2	--	--	2	2	CA1	15		20
									MSE	20		
									CA2	15		
									ESE	50	20	
5	VSEC	25BSE1204	Computer Aided Engineering Drawing	2	--	--	2	2	CA1	25		20
									MSE	--		
									CA2	25		
									ESE	--	--	
6	PCC	25PCC1201	Introduction to Industry 4.0	2	--	--	2	2	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
7	IKS	25BSE1205	Energy, Ecology & Environment	2	--	--	2	2	CA1	25		20
									MSE	--		
									CA2	25		
									ESE	--	--	
8	BSC	25BSE1001L/ 25BSE1002L	Engineering Physics / Modern Chemistry Laboratory	--	--	2	2	1	CA1	25		20
									CA2	25		
									OE	--	--	
9	ESC	25BSE1203L	Python Programming Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
10	VSEC	25BSE1204L	Computer Aided Engineering Drawing Laboratory	--	--	2	2	1	CA1	25		20
									CA2	25		
									OE	--	--	
11	VSEC	25BSE1205L	Design Thinking	--	--	2	2	1	CA1	25		20
									CA2	25		
									OE	--	--	
12	CC	25BSE1206L	Community Services	--	--	2	2	1	CA1	25		20
									CA2	25		
									OE	--	--	
			Total	**16**	**1**	**10**	**27**	**22**		**900**		

Note: Students should complete an internship of 2 weeks after the completion of semester. Evaluation of this will be done in the next semester

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Second Year B. Tech-2025-26 **SEMESTER III**

SR. NO.	CATEGORY	COURSE CODE	COURSE NAME	TEACHING SCHEME					EVALUATION SCHEME			
				L	T	P	Hrs./Week	CR	COMPONANTS	MAX	MIN FOR PASSING	
1	PCC	25EEE2301	Differential Equations and Transform Techniques	2	--	--	2	2	CA1 MSE CA2 ESE	15 20 15 50	 20	40
2.	PCC	25EEE2302	DC Machines and Transformers	3	--	--	3	3	CA1 MSE CA2 ESE	15 20 15 50	 20	40
3.	PCC	25EEE2303	Network Theory	3	--	--	3	3	CA1 MSE CA2 ESE	15 20 15 50	 20	40
4.	PCC	25EEE2304	Electrical Measuring Instruments	3	--	--	3	3	CA1 MSE CA2 ESE	15 20 15 50	 20	40
5.	#MDM	25MMXXX2301	Multidisciplinary Minor-I	3	--	--	3	3	CA1 MSE CA2 ESE	15 20 15 50	 20	40
6.	*OE	25OE23XX	Open Elective-I	2	--	--	2	2	CA1 MSE CA2 ESE	15 20 15 50	 20	40
7.	VEC	25VEC2002	Universal Human Values	1	--	--	1	1	CA1 MSE CA2 ESE	25 -- 25 --	 --	20
8.	PCCL	25EEE2302L	DC Machine and Transformer Laboratory	--	--	2	2	1	CA1 CA2 POE	25 25 50	 20	40
9.	PCCL	25EEE2303L	Network Theory Laboratory	--	--	2	2	1	CA1 CA2 POE	25 25 50	 20	40
10.	VSEC	25EEE2305L	Seminar-I	--	--	2	2	1	CA1 CA2 OE	25 25 --	 --	20
11.	ELC	25EEE2306	FT/Internship/ Industrial Tr.	--	--	--	--	AU	--	--	--	
Total				**17**		**06**	**23**	**20**		**900**		

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Open Elective (OE-I) Bucket:

Sr. No.	Course Code	Course Name
1.	25OE2301	Enhancing Soft Skill and Personality
2.	25OE2302	Ethics in Engineering Practices
3.	25OE2303	Introduction to project Management

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Second Year B. Tech-2025-26 **SEMESTER IV**

SR. NO.	CATEGORY	COURSE CODE	COURSE NAME	TEACHING SCHEME					EVALUATION SCHEME			
				L	T	P	Hrs./Week	CR	COMPONANTS	MAX	MIN FOR PASSING	
1	PCC	25EEE2401	Electrical Power System	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
2	PCC	25EEE2402	AC Machines	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
3	PCC	25EEE2403	Analog and Digital Electronics	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
4	#MDM	25MMXXX2401	MDM-II	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
5	*OE	25OE24XX	OE-II	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
6.	VEC	25VEC2001	Constitution of India	1	--	--	1	1	CA1	25		20
									CA2	25		
									ESE	--	--	
7.	AEC	25AEC2001	Modern Language	1	--	--	1	1	CA1	25		20
									CA2	25		
									ESE	--	20	
8.	PCCL	25EEE2403L	Analog and Digital Electronics Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
9.	PCCL	25EEE2402L	AC Machines Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
10.	ECL/CEP/ FP	25EEE2405L	Mini Project I	--	--	2	2	1	CA1	25		20
									CA2	25		
									OE	--	20	
TOTAL				**17**	**--**	**6**	**23**	**20**		**850**		

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Open Elective (OE-II) Bucket:

Sr. No.	Course Code	Course Name
1.	25OE2401	Business Communication
2.	25OE2402	E-Business
3.	25OE2403	Intellectual Property Rights

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Third Year B. Tech-2025-26 **SEMESTER V**

SR. NO.	CATEGORY	COURSE CODE	COURSE NAME	TEACHING SCHEME					EVALUATION SCHEME			
				L	T	P	Hrs./Week	CR	COMPONANTS	MAX	MIN FOR PASSING	
1	PCC	25EEE3501	Power System Analysis	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
2	PCC	25EEE3502	Power Electronics	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
3	PCC	25EEE3503	Switchgear and Protection	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
4	PEC	25PEEEE35XX	Program Elective -1	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
5	#MDM	25MMXXX3501	MDM-III	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
6.	*OE	25OE35XX	OE-III	3	--	--	3	3	CA1	25		40
									CA2	25		
									ESE	50	20	
7.	PCCL	25EEE3502L	Power Electronics Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
8.	PCCL	25EEE3503L	Switch Gear and Protection Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
9.	PECL	25PEC35XXL	Program Elective -1 Laboratory	--	--	2	2	1	CA1	25		20
									CA2	25		
									POE	--	20	
10.	VSEC	25EEE3504L	Power System Analysis Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
11.	ELC	25EEE3504	FT/Internship/Industr Tr.	--	--	--	--	AU	--	--	--	
TOTAL				**17**	**--**	**10**	**27**	**22**		**950**		

Program Elective Courses Bucket (PEC-I):

Sr. No.	Course Code	Course Name
1.	25PEEEE3501	Microprocessor and Microcontroller
2.	25PEEEC3502	Electric Utilization and Traction
3.	25PEEEE3503	EHVAC

Open Elective (OE-III) Bucket:

Sr. No.	Course Code	Course Name
1.	25OE3501	Employability and Skill Development
2.	25OE3502	Business Fundamentals for Entrepreneurs
3.	25OE3503	Patent law for engineers and scientists

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• ENGINEERING (B.Tech & M.Tech) • BCA • MCA • B.VOC
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Third Year B. Tech-2025-26 **SEMESTER VI**

SR. NO.	CATEGORY	COURSE CODE	COURSE NAME	TEACHING SCHEME					EVALUATION SCHEME			
				L	T	P	Hrs./Week	CR	COMPONANTS	MAX	MIN FOR PASSING	
1	PCC	25EEE3601	Electrical Machine Design	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
2	PCC	25EEE3602	Control System Engineering	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
3	PCC	25EEE3603	HVDC Transmission	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
4	PEC	25PEEEE236XX	Program Elective - II	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
5	PEC	25PEEEE236XX	Program Elective - III	3	-	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
6	MDM	25MMXXX3601	MDM - IV	2	--	--	2	2	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
7.	PECL	25PEEEE336XXL	Program Elective – III Laboratory	--	--	2	2	1	CA1	25		20
									CA2	25		
									POE	--	20	
8.	PCCL	25EEE3601L	Control System Engineering Laboratory	--	--	2	2	1	CA1	25		20
									CA2	25		
									POE	--	20	
9.	VSEC	25EEE3607L	MATLAB for Electrical Engineering	--	--	2	2	1	CA1	25		20
									CA2	25		
									POE	--	--	
10.	ELC/CEP / FP	25EEE3608L	Mini Project II	--	--	2	2	1	CA1	25		40
									CA2	25		
									OE	50	20	
TOTAL				**17**	**--**	**08**	**25**	**21**		**850**		

Note: Students should complete an internship of 2 weeks after the completion of semester. Evaluation of this will be done in next the semester

Program Elective Course (PEC-II) Bucket:

Sr. No.	Course Code	Course Name
1.	25PEEEE3601	Electrical Power Generation Technologies
2.	25PEEEE3602	Sensor Technology
3.	25PEEEE23603	Embedded System

Program Elective Course (PEC-III) Bucket:

Sr. No.	Course Code	Course Name
1.	25PEEEE3601	High Voltage Engineering
2.	25PEEEE3602	Industrial Automation using PLC & SCADA
3.	25PEEEE3603	Advanced Control system

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B. Tech-2025-26 **SEMESTER VII**

SR. NO.	CATEGORY	COURSE CODE	COURSE NAME	TEACHING SCHEME					EVALUATION SCHEME			
				L	T	P	Hrs./Week	CR	COMPONANTS	MAX	MIN FOR PASSING	
1	PCC	25EEE4701	Hybrid Electric Vehicle	3	-	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
2	PCC	25EEE4702	Industrial Electrical Drives	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
3	PEC	25PEC447XX	PEC-IV	3	-	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
4	PEC	25PEEEE47XX	PEC- V	3	-	--	3	3	CA1	v		40
									MSE	30		
									CA2	10		
									ESE	50	20	
5	MDM	25MMXXX4701	MDM - V	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15		
									ESE	50	20	
6	PECL	25PEEEE47XXL	PEC- IV	--	--	2	2	1	CA1	25		20
									CA2	25		
									POE	--	20	
7	PCCL	25EEE4702L	Industrial Electrical Drives Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
8	Project	25EEE4704L	Project Phase-I	--	--	8	8	4	CA1	25		40
									CA2	25		
									OE	50	20	
TOTAL				**15**	**00**	**10**	**25**	**21**		**750**		

Program Elective Course – IV (PEC-IV):

Sr. No	Course code	Course Name
1.	25PEEEE4701	Solar and Wind Power System
2.	25PEEEE4702	Special Purpose Machine
3.	25PEEEE4703	Smart Grid Technology

Program Elective Course – V (PEC-V):

Sr. No	Course code	Course Name
1.	25PEEEE4701	Digital Protection
2.	25PEEEE4702	Battery Management System
3.	25PEEEE4703	Power System Operation and Control

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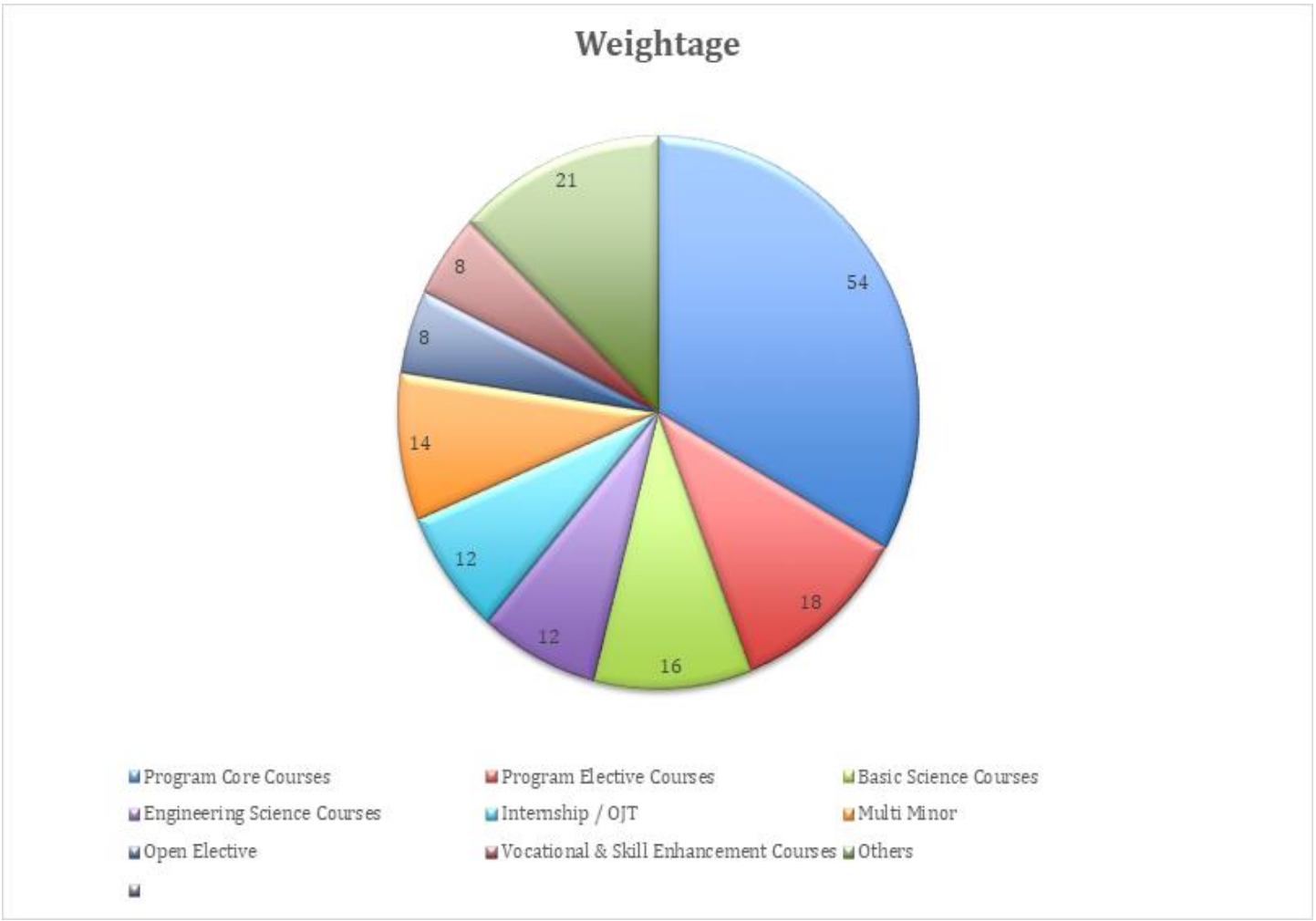
B. Tech-2025-26 **SEMESTER VIII**

SR. NO.	CATEGORY	COURSE CODE	COURSE NAME	TEACHING SCHEME					EVALUATION SCHEME			
				L	T	P	Hrs./Week	CR	COMPONANTS	MAX	MIN FOR PASSING	
1	HSSM	25HSM4801	Finance Management	3	--	--	3	3	CA1	15		40
									MSE	20		
									CA2	15	20	
									ESE	50		
2	ELC	25ELC4801	Research Methodology	4	--	--	4	4	CA1	15		40
									MSE	20		
									CA2	15	20	
									ESE	50		
3	ELC	25EEE4801	Industrial Internship/ Research Internship/ Major Project	--	--	--	30	12	CA	50		40
									OE	50	20	
Total				**7**	**--**	**-**	**37**	**19**		**300**		

G. Category wise Credit Distribution



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PCC: PROGRAM CORE COURSES

Sr. No.	Course Code	Course Name	L	T	P	Hrs. / Week	Credits
1.	25PCC1201	Fundamentals of Industry Evolution	2	--	--	2	2
2.	25EEE2301	Differential Equations and Transform Techniques	3	--	--	3	3
3.	25EEE2302	DC Machine and Transformer	3	--	--	3	3
4..	25EEE2303	Network Theory	3	--	--	3	3
5.	25EEE2304	Measurement and Instrumentation	3	--	--	3	3
6.	25EEE2302L	DC Machine and Transformer Lab	--	--	2	2	1
7.	25EEE2303L	Network Theory Lab	--	--	2	2	1
8.	25EEE2401	Electrical Power System	3	--	--	3	3
9.	25EEE2402	AC Machine	3	--	--	3	3
10.	25EEE2403	Analog and Digital Electronics	3	--	--	3	3
11.	25EEE2404	Analog and Digital Electronics Lab	3	--	--	3	3
12.	25EEE2402L	AC Machine Lab	--	--	2	2	1
13.	25EEE3501	Power System Analysis	3	--	--	3	3
14.	25EEE3502	Power Electronics	3	--	--	3	3
15.	25EEE3503	Switchgear and Protection	3	--	--	3	3
16.	25EEE3501L	Power System Analysis Lab	--	--	2	2	1
17.	25EEE3502L	Power Electronics Lab	--	--	2	2	1
18.	25EEE3503L	Switchgear and Protection Lab	--	--	2	2	1
19.	25EEE3601	Electrical Machine Design	3	--	--	3	3
20.	25EEE3602	Control System Engineering	3	--	--	3	3
21	25EEE3603	HVDC Transmission	3	--	--	3	3
22	25EEE3602L	Control System Engineering Lab	--	--	2	2	1
23	25EEE4701	Hybrid Electric Vehicle	3	1	--	4	4
24	25EEE4702	Industrial Electrical Drives	4	--	--	4	4
25	25EEE4702L	Industrial Electrical Drives Lab	--	--	2	2	1
Total			**51**	**1**	**16**	**68**	**60**

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PEC: PROGRAM ELECTIVE COURSES

Sr. No.	Course Code	Course Name	L	T	P	Hrs. / Week	Credits
1.	25PEC13501	Microprocessor and Microcontroller	3	--	--	3	3
2.	25PEC13502	Electric Utilization and Traction					
3.	25PEC13503	EHVAC					
4.	25PEC135XXL	Program Elective – I Lab	--	--	2	2	2
5.	25PEC23601	Electrical Power Generation Technologies	3	--	--	3	3
6.	25PEC23602	Sensor Technology					
7.	25PEC23603	Embedded System					
8.	25PEC33601	High Voltage Engineering	3	--	--	3	3
9.	25PEC33602	Industrial Automation using PLC & SCADA					
10	25PEC33603	Advanced Control system					
11	25PEC44701	Solar and Wind Power System	3	--	--	3	3
12	25PEC44702	Special Purpose Machine					
13	25PEC44703	Smart Grid Technology					
14	25PEC54701	Power System Protection	3	--	--	3	3
15	25PEC54702	Battery Management System					
16	25PEC54703	Power System Operation and Control					
Total			**15**	**--**	**--**	**15**	**15**

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OEC: OPEN ELECTIVE COURSES

Sr. No.	Course Code	Course Name	L	T	P	Hrs. / Week	Credits
1.	25OE23XX	Enhancing Soft Skill and Personality	3	--	--	3	3
2.		Ethics in Engineering Practices					
		Introduction to Project Management					
4.	25OE24XX	Business Communication	2	--	--	2	2
5.		E-Business					
		Intellectual Property					
7.	25OE25XX	Employability Skill Development	3	--	--	3	3
8.		Business fundamentals for entrepreneurs/ Entrepreneurship essentials					
		Patent law for engineers and scientists					
Total			**8**	**--**	**--**	**8**	**8**

VESC:VOCATIONAL AND SKILL ENHANCEMENT COURSES

Sr. No.	Course Code	Course Name	L	T	P	Hrs. / Week	Credits
1	25BSE1105	Engineering Practice Laboratory	--	--	2	2	1
2	25BSE1204	Computer Aided Engineering Drawing	2	--	2	2	2
3	25EEE2305L	Seminar-I	--	--	2	2	1
4	25EEE3504L	Power System Analysis Lab	--	--	2	2	1
5	25EEE3607L	Python for Electrical Engineering	--	--	2	2	1
Total			**2**	**--**	**10**	**12**	**6**

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HUMANITIES SOCIAL SCIENCE AND MANAGEMENT COURSES

Sr. No.	Course Code	Course Name	L	T	P	Hrs. / Week	Credits
1.	25BSE1104	Communication Skills	1	--	2	3	3
2.	25BSE1205	Ecology, Energy & Environment	2	--	--	2	2
3	25AEC2001	Modern Indian Language	1	--	--	1	1
4.	25VEC2001	Constitution of India	1	--	--	1	1
5	25VEC2002	Universal Human Values	1	--	--	1	1
6	25HS4801	Financial Management	1	--	--	1	1
Total			**7**	**--**	**2**	**9**	**8**

EXPERIENTIAL LEARNING

Sr. No.	Course Code	Course Name	L	T	P	Hrs. / Week	Credits
1.	25EEE2305	Seminar-I	--	--	2	2	1
2.	25EEE2405	Mini Project-I	--	--	2	2	1
4.	25EEE3608	Mini Project-II	--	--	4	4	2
5	25EEE4708	Project-I	--	--	4	4	2
6	25EEE4803	Project-II	--	--	24	24	12
Total			**--**	**--**	**36**	**36**	**18**

H. Multi-Disciplinary Minor Courses(MDM)

A.

Multi-Disciplinary Minor : MDM Courses to be offered by Electrical Engineering Department (Electric Vehicle Technology)							
Sr. No.	**Course Code**	**Course Name**	**L**	**T**	**P**	**H./ W**	**Credits**
1.	25MMEEE2301	Fundamental of Electric Vehicles	3	--	--	3	3
2.	25MMEEE2401	Embedded System for EV	3	--	--	3	3
3.	25MMEEE2501	AI & IOT in Electric Vehicles	3	--	--	3	3
4.	25MMEEE2601	Autonomous & EV Technology	2	--	--	2	2
5.	25MMEEE2701	Emerging Trends in EV	3	--	--	3	3
Total			**14**	**--**	**--**	**14**	**14**

Multi-Displinary Minor For Electrical Engineering Department Students (Data Science, AI and ML)							
Sr. No.	**Course Code**	**Course Name**	**L**	**T**	**P**	**H./ W**	**Credits**
1.	25MMADS2301	Statistics for Engineers	3	--	--	3	3
2.	25MMADS2401	Data Analytics & Visualization	2	--	--	2	2
3.	25MMADS3501	Fundamentals of Artificial Intelligence	3	--	--	3	3
4.	25MMADS3601	Machine Learning & Algorithms	3	--	--	3	3
5.	25MMADS4701	Prompt Engineering	3	--	--	3	3
Total			**14**	**--**	**--**	**14**	**14**

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Multi-Disciplinary Minor For Electrical Engineering Department Students

(Minor in Full Stack Development)

Sr. No.	Course Code	Course Name	L	T	P	H./ W	Credits
1.	25MMECE2301	Introduction to web Development	3	--	--	3	3
2.	25MMECE2401	Front End development React JS	2	--	--	2	2
3.	25MMECE2501	Backend Development with Node Js & express JS	3	--	--	3	3
4.	25MMECE2601	Database Management with Mongo DB	3	--	--	3	3
5.	25MMECE2701	Cloud Deployment for MERN Application	3	--	--	3	3
Total			**14**	**--**	**--**	**14**	**14**

Multi-Disciplinary Minor For Electrical Engineering Department Students(Minor in Mechatronics)

Sr. No.	Course Code	Course Name	L	T	P	H./ W	Credits
1.	25MMMEC2301	Introduction of Mechatronics	3	--	--	3	3
2.	25MMMEC2401	Design of Mechatronics	2	--	--	2	2
3.	25MMMEC2501	Sensor technology	3	--	--	3	3
4.	25MMMEC2601	Mechatronics in Automotive System	3	--	--	3	3
5.	25MMMEC2701	Industrial Automation	3	--	--	3	3
Total			**14**	**--**	**--**	**14**	**14**

Multi-Disciplinary Minor For Electrical Engineering Department Students (Machine Learning and Data Science)							
Sr. No.	**Course Code**	**Course Name**	**L**	**T**	**P**	**H./ W**	**Credits**
1.	25MMCSE2301	Data structure and Algorithm	2	--	--	2	2
2.	25MMCSE2401	Master in Object Oriented Programming	2	--	2	4	3
3.	25MMCSE2501	Database Engineering and Distributed System	2	1	--	3	3
4.	25MMCSE2601	Machine Learning and its Applications	2	--	1	3	3
5.	25MMCSE2701	Deep Learning and Generative AI	2	1	--	3	3
Total			**14**	**--**	**--**	**14**	**14**

I. Exit Courses:

EXIT COURSE AFTER FIRST YEAR: ONE YEAR UG CERTIFICATION IN ELECTRICAL ENGINEERING												
Sr. No.	**Category**	**Course Code**	**Course Name**	**Teaching Scheme**					**Evaluation Scheme**			
				L	**T**	**P**	**Hr./W**	**Cr**	**Components**	**Max**	**Min for Passing**	
1	VSEC	25EEEEX101	Electrical Wiring	--	--	4	4	2	CA1	25		20
									MSE	--		
									CA2	25		
									ESE	--	--	
2	VSEC	25EEEEX102	Installation of Household and Industrial wiring	--	--	4	4	2	CA1	25		20
									MSE	--		
									CA2	25		
									ESE	--	--	
3	ELC	25EEEEX103	Electrical Panel Design	--	--	8	8	4	CA1	25		20
									CA2	25		
									POE	--	--	
Total				**--**	**--**	**16**	**16**	**8**		**150**		

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EXIT COURSE AFTER SECOND YEAR: TWO YEAR UG DIPLOMA IN ELECTRICAL ENGINEERING

Sr. No.	Category	Course Code	Course Name	Teaching Scheme					Evaluation Scheme		
				L	T	P	Hrs./W	Cr	Components	Max	Min for Passing
1	VSEC	25EEEEX201	PCB Design and soldering	--	--	4	4	2	CA1	25	20
									MSE	--	
									CA2	25	
									ESE	--	--
2	VSEC	25EEEEX202	Auto CAD for Electrical	--	--	4	4	2	CA1	25	20
									MSE	--	
									CA2	25	
									ESE	--	--
3	ELC	25EEEEX203	Solar Technician	--	--	8	8	4	CA1	25	20
									CA2	25	
									MSE	--	--
Total				--	--	**16**	**16**	**8**		**150**	

EXIT COURSE AFTER THIRD YEAR: THIRD YEAR BACHELOR'S DEGREE IN VOCATION (B.VOC) IN ELECTRICAL ENGINEERING

Sr. No.	Category	Course Code	Course Name	Teaching Scheme					Evaluation Scheme		
				L	T	P	Hrs./W	Cr	Components	Max	Min for Passing
1	VSEC	25EEEEX301	Installation of Transformer	--	--	4	4	2	CA1	25	20
									MSE	--	
									CA2	25	
									ESE	--	--
2	VSEC	25EEEEX302	Electric Vehicle Maintenance	--	--	4	4	2	CA1	25	20
									MSE	--	
									CA2	25	
									ESE	--	--
3	ELC	25EEEEX303	Industrial Electrical Systems	--	--	8	8	4	CA1	25	20
									MSE	--	
									CA2	25	--
Total				--	**Total**	**16**	**16**	**8**		**150**	

J. Emerging/Minor Courses: Smart Energy System

Sr. No.	Course Code	Course Name	L	T	P	Hrs. / Week	Credits
1.	25EEEEM001	Fundamentals of Smart Energy Systems	3	--	--	3	3
2.	25EEEEM002	Renewable Energy Technologies	3	--	--	3	3
3	25EEEEM003	Smart Grid and Automation	3	--	--	3	3
4.	25EEEEM004	Energy Storage and Battery Systems	3	--	--	3	3
5	25EEEEM005	Intelligent Energy Management Systems	3	--	--	3	3
Total			**15**	**--**	**6**	**21**	**18**

K . Honors Courses: Industrial IoT & Automation

Sr. No.	Course Code	Course Name	L	T	P	Hrs. / Week	Credits
1.	25EEEHS001	Fundamentals of Industrial Automation	3	--	--	3	3
2.	25EEEHS002	Industrial Sensors and Instrumentation	3	--	--	3	3
3.	25EEEHS003	PLC and SCADA Systems	3	--	--	3	3
4.	25EEEHS004	Industrial IoT Systems	3	--	--	3	3
5.	25EEEHS005	Intelligent Industrial Systems and Applications	3	--	--	3	3
Total			**18**	**--**	**--**	**18**	**18**

Title of the Course: Differential Equations and Transform Techniques Course Code: 25EEE2301	L	T	P	Credit
	2	--	--	2

Course Pre-Requisite:

Basic terminologies of differential equations, vector algebra, Basic results of derivative and integration.

Course Description:

The course begins with a review of differential and integral calculus, including functions of one and multiple variables. Further, the course introduces complex numbers and their applications in AC circuit analysis, along with transforms such as Laplace and Fourier transforms for analyzing signals and systems. By the end of the course, students will be able to apply mathematical tools effectively to analyze, design, and optimize electrical engineering systems.

Course Objectives:

1. To develop understanding of methods for solving linear differential equations with constant coefficients.
2. To apply Laplace and inverse Laplace transforms in solving differential equations.
3. To understand Fourier series, fourier Transform and inverse Fourier Transform of standard signals and represent periodic functions mathematically
4. To analyse discrete-time systems using Z-transform and its properties

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Solve linear differential equations using complementary function, particular integral, and variation of parameters.
CO2	Apply inverse Laplace transform techniques to solve differential equations.
CO3	Apply Fourier series techniques to represent and compute periodic functions and fourier transform techniques for frequency spectrum analysis in engineering and communication systems.
CO4	Analyze discrete-time signals and electrical systems using Z-transform and ROC.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PSO1	PSO2
CO1	3	2	2	1	--	--	--	--	--	--	--	3	2
CO2	3	3	2	2	1	--	--	--	--	--	--	3	2
CO3	3	2	3	2	1	--	--	--	--	--	--	3	3
CO4	3	3	2	2	2	1	--	--	--	--	--	3	3

Assessment Scheme:

Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 30%, 20% and 50% weightage respectively.

Assessment Component	Marks
CA1	15
MSE	20
CA2	15
ESE	50

CA1 and **CA2** are based on Assignment/ Surprise Test/ Quiz/Seminar/Group Discussions Presentation, etc.

MSE is based on 50% of course content.

ESE is based on 100% course content with 60-70% weightage for course content covered after MSE

Course Contents

Unit No.	Unit Title and Contents	Hours
1.	**Linear Differential Equations and Its Applications**: Introduction and definition - complementary function, particular integral; Rules for finding complementary functions and particular integrals; Method of variation of parameters; Cauchy's homogeneous and Legendre's linear equations.	**07**
2.	**Inverse Laplace Transforms:** Inverse Laplace transforms, Inverse Laplace transforms by using partial fractions, transforms of periodic functions and Heaviside unit step function, Solution of linear differential equations with constant coefficients by Laplace transform method, Applications of Laplace Transform to solve Ordinary Differential Equations.	**07**
3.	**Fourier Series and Advanced Fourier Transform:** Definition, Euler's formulae, Fourier series with period 2π. Expansion of odd and even periodic functions, Introduction to Fourier Transform, Basic conditions for existence, Fourier Transform of standard signals, Properties, Inverse Fourier Transform, Convolution theorem.	**07**
4	**Z —Transform:** Definition, Z-transform of standard functions, properties of Z-transform, inverse Z- transform. Use of Z- Transform in Electrical Engineering problems	**07**

Text Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Higher Engineering Mathematics	Dr. B. S. Grewal	Khanna Publishers, Delhi
2	A Text Book of Applied Mathematics (Vol. I, II, III)	P. N. Wartikar & J. N. Wartikar	Pune Vidyarthi Griha Prakashan, Pune

Reference Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	A Text Book of Engineering Mathematics	N. P. Bali & Manish Goyal (Iyengar)	Laxmi Publications (P) Ltd., New Delhi
2	Advanced Engineering Mathematics	H. K. Dass	S. Chand, New Delhi.
3	Advanced Engineering Mathematics	Erwin Kreyszig	Wiley India Pvt. Ltd.

Title of the Course: DC Machines & Transformers Course Code: 25EEE2302	L	T	P	Credit
	3	--	--	3

Course Pre-Requisite:

Basic knowledge of Electrical Circuit Analysis, Electromagnetic Theory, and fundamental principles of AC & DC circuits. Familiarity with Faraday's laws of electromagnetic induction is desirable.

Course Description:

This course provides a thorough understanding of DC machines and transformers the fundamental building blocks of electrical power systems. It begins with the study of DC generators covering construction, EMF equations and characteristics, followed by DC motors including starters, speed control and testing methods. The course then transitions to single phase and three-phase transformers, exploring equivalent circuits, performance parameters and special connections. Finally, it covers special-purpose DC machines such as stepper motors, BLDC motors, DC servo motors, PMDC motors and universal motors. The course equips students with both theoretical understanding and practical knowledge.

Course Objectives:

1) To impart knowledge about the constructional features, EMF equation, characteristics and efficiency of DC generators.
2) To familiarize students with the working principle, starting methods, speed control and testing of DC motors.
3) To study the construction, equivalent circuit, voltage regulation and efficiency of single-phase transformers to study the principles of nuclear power generation, reactor types and safety considerations.
4) To understand three-phase transformer connections, vector groups, special connections and harmonic effects.
5) To explore the construction, working principles and applications of special purpose DC machines.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Explain the constructional features, working principle, EMF equation, characteristics and efficiency of DC generators including armature reaction and commutation.
CO2	Analyse the working principle, torque equation, characteristics, starting methods, speed control techniques, braking and testing of DC motors.
CO3	Understand the construction, equivalent circuit, Phasor diagrams, voltage regulation, efficiency and special tests of single-phase transformers.
CO4	Describe three-phase transformer connections, vector groups, special connections, harmonic effects and cooling methods with relevant IS specifications.
CO5	Explain the working principles, constructional features, control characteristics and applications of special purpose DC machines.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PSO1	PSO2
CO1	3	3	2	1	1	1	--	--	--	1	1	2	1
CO2	3	3	2	2	1	1	--	--	--	1	1	2	1
CO3	3	2	2	1	1	--	--	--	--	1	1	3	2
CO4	3	2	2	2	1	--	--	--	--	--	1	2	2
CO5	3	2	2	1	2	1	--	--	1	1	1	1	1

Assessment Scheme:

Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 30%, 20% and 50% weightage respectively.

Assessment Component	Marks
CA1	15
MSE	20
CA2	15
ESE	50

CA1 and **CA2** are based on Assignment/ Surprise Test/ Quiz/Seminar/Group Discussions Presentation, etc.
MSE is based on 50% of course content.
ESE is based on 100% course content with 60-70% weightage for course content covered after MSE

Course Contents

Unit No.	Unit Title and Contents	Hours
1	**DC Generators:** Constructional Features. Working Principle: Faraday's law, EMF equation derivation, classification of DC generators. Characteristics: Efficiency, Losses, power flow diagram, condition for maximum efficiency, parallel operation.	**06**

2	**DC Motors & Testing of DC Motors:** Working Principle: Back EMF concept, torque equation, types shunt, series, compound. Characteristics, Speed-torque and speed-current characteristics, Applications. Starters & Speed Control Braking Methods. Testing Brake load test, Swinburne's test, Hopkinson's test	**08**
3	**Single Phase Transformers:** Construction & Working Principle, ideal vs practical transformer, EMF equation. Phasor Diagrams: Transformer at no-load; transformer on load, Equivalent Circuit Parameters, OC test and SC test.Special Transformers.	**08**
4	**Three Phase Transformers:** Construction & Connections Vector Groups, parallel operation conditions. Special Connections: Scott connection for 3-phase to 2phase; Open delta (V-V) connection and its capacity. Switching inrush current, effect with different connections. Practical Applications: Choice of connections, cooling methods, relevant Indian Standard specifications	**08**
5	**Special Purpose DC Machines:** Stepper Motor & Its Types step angle, applications. Brushless DC Motor (BLDC), DC Servo motor. PMDC Motor, Universal Motor	**06**

Text Books

Sr. No.	Title	Author	Publisher
1	Electrical Machines	A.K Sawhney	DhanpatRai & Co
2	Electrical Technology Vol. II	B.L. Theraja & A.K. Theraja	S. Chand Publications
3	The Performance and Design of DC Machines	A.E. Fitzgerald, C. Kingsley & S. Umans	McGraw-Hil

Reference Books

Sr No.	Title	Author	Publisher
1	Electric Machinery Fundamentals	Stephen J. Chapman	McGraw-Hill Education
2	Electrical Machines	I.J. Nagrath & D.P. Kothari	Tata McGraw-Hill

3	Theory of Alternating Current Machinery	Alexander Langsdorf	McGraw-Hill
4	Transformers	A. Winders	Newnes (Elsevier)
5	DC Motors, Speed Controls, Servo Systems	Electro-Craft Corporation	Pergamon Press

Online References—

SWAYAM Course on ELECTRIC MACHINE- I

https://onlinecourses.nptel.ac.in/e-learning/preview/noc25_ee124 NPTEL

Course on ELECTRIC MACHINE- I

https://nptel.ac.in/courses/108105017?utm_source

Title of the Course: Network Theory Course Code: 25EEE2303	L	T	P	Credit
	3	--	--	3

Course Prerequisite:
Basic knowledge of Electrical Engineering like KCL, KVL, Laplace Transform.

Course Description:
This course deals with circuit theory. It introduces fundamental concepts such as circuit elements, network laws, and analysis techniques used to solve both DC and AC circuits. The course covers systematic methods including mesh and nodal analysis, network theorems, transient and steady-state analysis, and frequency response of electrical networks. Course form a strong analytical base for advanced subjects like control systems, power systems, and communication engineering.

Course Objectives:

1. Understand and network topology concepts using graph theory
2. Make use of electrical circuits with network theorems and transient responses to various inputs in time and frequency domains.
3. Analyse three-phase systems, resonance behaviour, and power calculations in balanced and unbalanced circuits.
4. Design and Analyse basic filters, exploring low-pass, high-pass, band-pass, and band-stop filters with elementary synthesis techniques.
5. Analyse Frequency response and parameters of two port network

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Understand the concepts of basic circuit laws, mesh and Nodal analysis of circuits and circuit theorems.
CO2	Apply the knowledge of basic circuit law to simplify the networks using network theorems.
CO3	Solve circuit problems using Laplace transform
CO4	Analyse the transient, steady state and resonating behavior of circuits
CO5	Calculate frequency response of filter, and various parameters of two port networks

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PSO1	PSO2
CO1	3	2	2	1	--	--	--	--	--	--	--	3	2
CO2	3	3	2	2	1	--	--	--	--	--	--	3	2
CO3	3	2	2	2	1	--	--	--	--	--	--	2	1
CO4	3	2	3	3	2	1	--	--	--	--	--	3	1
CO5	3	3	2	2	2	1	--	--	--	--	--	2	1

Assessment Scheme:
Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 30%, 20% and 50% weightage respectively.

Assessment Component	Marks
CA1	15
MSE	20
CA2	15
ESE	50

CA1 and **CA2** are based on Surprise test/ Assignment/ Quiz/Seminar/Group discussions presentation, etc.
MSE is based on 50% of course content.
ESE is based on 100% course content with 60-70% weightage for course content covered after MSE.

Course Contents

Unit No.	Unit Title and Contents	Hours
1	**Network Fundamentals**: Representation of voltage & current sources (Independent& Dependent), source transformation, Star- Delta transformation, reduction of networks: Mesh analysis, Node analysis. Super mesh and super node analysis.	**07**
2	**Network Theorems:** Solution of D.C and A.C. networks using Superposition Theorem, Millman ‘s Theorem, Norton‘s Theorem, Thevenin‘s Theorem, Maximum Power Transfer Theorem, Reciprocity Theorem, Duality Theorem, Compensation and Tellegen's Theorem	**07**
3	**Transient Response:** Analysis of RC, RL, and RLC networks with DC excitation with and without initial conditions using Laplace transforms. Steady state & transient response (Voltage & Current)	**07**
4	**Resonance**: Introduction to AC circuit, steady state analysis of RL, RC and RLC circuits, Series resonance: Properties, Bandwidth, Q factor. Parallel resonance: Properties, Bandwidth, Q factor.	**07**
5	**Two port Network**: Relationship of Two-port variables, short-circuit admittance parameters, the open circuit impedance parameters, transmission parameters, the hybrid parameters, relationships between parameters sets, parallel and series connections of two-port network.	**06**

Text Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Circuit & Network – Analysis & Synthesis	A. Sudhakar, Shyammohan S	Tata McGraw Hill
2	Circuit Theory (Analysis & Synthesis)	A. Chakrabarti	Dhanpat Rai & Co.
3	Networks & Systems	D. Roy Choudhury	New Age International Publisher
4	Electrical Circuit Analysis	Soni Gupta	Dhanpat Rai & Co.

Reference Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Engineering Circuit Analysis,	William H. Hayt, Jack E. Kimmerly, Steven M. Durbin	Tata McGraw Hill
2	Network Analysis	M. E. Van Valkenburg	Pearson Education / PHI
3	Theory & Problems of Electronic Circuits (Schaum's Series)	Joseph Edminister	Tata McGraw Hill
4	Network Fundamentals and Analysis	R. G. Kaduskar, S. O. Rajankar, T. S. Khatavkar	Wiley India

Online Reference—

1) NPTEL Network Analysis Course—

https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ee48

2) NPTEL Basic Electrical Circuit Course--

https://nptel.ac.in/courses/108104139?utm_source

Title of the Course: Electrical Measuring Instruments Course Code: 25EEE2304	L	T	P	Credit
	3	--	--	3

Course Prerequisite:

Measurement and Instrumentation course include basic knowledge of electrical and electronic circuits, sensors, and transducers. Students should also understand fundamental mathematics, AC/DC concepts, and basic measuring instruments like voltmeters and oscilloscopes.

Course Description:

This course provides a comprehensive understanding of electrical and electronic measurement principles, instruments and techniques. It begins with the fundamentals of measuring instruments covering PMMC, PMMI meters, measurement characteristics and error types. The course progresses through power measurement using dynamometer wattmeters, energy measurement using inductiontype and digital energy meters, and bridge methods for measurement of resistance, inductance and capacitance. The final unit covers transducers including LVDT and RVDT for displacement measurement and the working of CRO and DSO. The course develops both theoretical understanding and practical skills essential for instrumentation in electrical engineering applications.

Course Objectives:

1. To understand the working principles, construction and characteristics of various electrical measuring instruments and appreciate the role of calibration.
2. To study the dynamometer wattmeter and apply single-phase and three-phase power measurement methods for balanced and unbalanced loads.
3. To explain the working and error analysis of energy meters and perform energy meter calibration by direct loading method.
4. To apply appropriate bridge circuits for accurate measurement of resistance, inductance and capacitance and perform earth resistance measurement.
5. To classify and select transducers for displacement measurement and describe the working of CRO and DSO with their comparative features**.**

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Explain the working principles, construction and characteristics of absolute and secondary measuring instruments.
CO2	Describe construction and working of dynamometer wattmeter in single-phase and three-phase circuits.
CO3	Explain the construction, working principle, torque equation and error adjustments of single-phase and three-phase energy meters.
CO4	Select and apply appropriate bridge circuits for measurement of low, medium and high resistance, inductance and capacitance.
CO5	Classify transducers, CRO and DSO with their comparative advantages.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PSO1	PSO2
CO1	3	2	1	1	--	--	--	1	--	1	--	2	1
CO2	3	3	2	2	1	1	--	--	1	1	--	2	1
CO3	3	2	1	3	2	2	1	1	1	1	--	2	1
CO4	3	3	2	3	2	1	--	1	1	1	--	3	2
CO5	3	2	2	1	3	--	--	--	1	1	--	3	2

Assessment Scheme:

Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 30%, 20% and 50% weightage respectively.

Assessment Component	Marks
CA1	15
MSE	20
CA2	15
ESE	50

CA1 and **CA2** are based on Surprise test/ Assignment/ Quiz/Seminar/Group discussions presentation, etc.

MSE is based on 50% of course content.

ESE is based on 100% course content with 60-70% weightage for course content covered after MSE.

Course Contents

Unit No.	Unit Title and Contents	Hours
1	**Principle of Measuring Instruments:** Absolute and secondary instruments; types of secondary instruments Indicating and Integrating instruments; multi-range ammeter and voltmeter; Analog meters Permanent Magnet Moving Coil (PMMC) and Permanent Magnet Moving Iron (PMMI) construction, working and salient features; static and dynamic characteristics of measurement; types of errors in measurement; calibration need and procedure	**07**
2	**Measurement of Electric Power:** Dynamometer type wattmeter construction and working, errors and their compensation, advantages and disadvantages; power and its types active, reactive and apparent power; measurement of active and reactive power in single-phase and three-phase circuits with balanced and unbalanced loads using three wattmeter method, two wattmeter method and one wattmeter method.	**08**

3	**Measurement of Energy:** Energy meter construction, working principle, torque equation, errors and adjustments of single-phase conventional (induction type) energy meter, digital energy meter, block diagram and operation of electronic energy meter; three-phase energy meter; calibration of single-phase energy meter using direct loading.	**07**
4	**Electrical Bridges:** Measurement of resistance — low, medium and high resistance; Wheatstone bridge; Kelvin's bridge; Megger; earth tester for earth resistance measurement; loss of charge method for measurement of high resistance. Maxwell's Inductance bridge, Maxwell's Capacitance bridge, Hay's bridge. Phase sequence and phase sequence indicator.	**07**
5	**Transducers, Displacement Measurement and CRO/DSO:** Transducer's introduction, classification, basic requirements and selection criteria. Displacement measurement LVDT and RVDT: construction, working, applications, advantages and disadvantages. Construction and working principle of CRO and DSO; advantages and disadvantages of DSO over CRO.	**07**

Text Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	A Course in Electrical and Electronic Measurements and Instrumentation	A.K. Sawhney	Dhanpat Rai & Co.
2	Electrical Measurements and Instrumentation	E.W. Golding & F.C. Widdis	Reem Publications
3	Electronic Instrumentation and Measurements	David A. Bell	Oxford University Press

Reference Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Electrical Measurements and Measuring Instruments	R.K. Rajput	S. Chand Publications
2	Modern Electronic Instrumentation and Measurement Techniques	A.D. Helfrick & W.D. Cooper	Prentice Hall India
3	Instrumentation Devices and Systems	C.S. Rangan, G.R. Sarma & V.S.V. Mani	Tata McGraw-Hill

Title of the Course: MDM – I Fundamental of Electric Vehicles Course Code: 25MMEEE2301	L	T	P	Credit
	3	--	--	3

Course Prerequisite:

Basic knowledge of Engineering Physics, Fundamental concepts of Electrical Engineering Basic understanding of Automobile and Energy Systems, Awareness of environmental issues and sustainable transportation

Course Description:

This course provides an introductory understanding of Electric Vehicles (EVs) and their role in sustainable transportation. The course covers the evolution and need for electric mobility, types of electric vehicles, major components and their functions, battery technologies, charging methods, and charging infrastructure. It also introduces students to the environmental benefits, challenges, and emerging trends in electric vehicle technology. The course is designed for students from all engineering disciplines and aims to develop awareness of modern transportation systems and future opportunities in the field of electric mobility.

Course Objectives:

1. To introduce students to the evolution, need, and significance of Electric Vehicles in sustainable transportation, along with the global and Indian EV market scenario and government policies.
2. To familiarize students with the classification of Electric Vehicles (BEV, HEV, PHEV, FCEV) and their applications across different vehicle segments.
3. To impart knowledge of the architecture, major components, and working principles of an Electric Vehicle, including motors, controllers, and power electronics.
4. To develop an understanding of battery technologies, battery management systems, and various charging methods and infrastructure used in EVs.
5. To create awareness of the environmental impact, challenges, and emerging trends shaping the future of electric mobility

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Explain the evolution, need, and importance of Electric Vehicles, and describe the government policies promoting EV adoption in India.
CO2	Classify different types of Electric Vehicles (BEV, HEV, PHEV, FCEV) and compare their features, advantages, and applications.
CO3	Describe the architecture, major components, and working principle of an Electric Vehicle under acceleration, cruising, and braking conditions.
CO4	Explain battery technologies, battery parameters, battery management systems, and various charging methods used in EVs.
CO5	Analyze the environmental impact, challenges in EV adoption, and emerging trends shaping the future of electric mobility.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PSO1	PSO2
CO1	3	1	--	--	--	3	2	--	--	1	1	3	2
CO2	3	2	1	1	--	1	1	--	--	1	--	3	2
CO3	3	2	2	1	1	1	1	--	--	1	--	2	3
CO4	3	2	2	2	1	1	2	--	--	1	1	2	2
CO5	2	3	1	1	1	2	3	1	--	2	1	--	--

Assessment Scheme:

Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 30%, 20% and 50% weightage respectively.

Assessment Component	Marks
CA1	15
MSE	20
CA2	15
ESE	50

CA1 and **CA2** are based on Surprise test/ Assignment/ Quiz/Seminar/Group discussions presentation, etc.

MSE is based on 50% of course content.

ESE is based on 100% course content with 60-70% weightage for course content covered after MSE.

Course Contents

Unit No.	Unit Title and Contents	Hours
1	**Introduction Of Electric Vehicles:** Evolution and history of Electric Vehicles, present global and Indian EV market scenario, need for Electric Vehicles, factors responsible for transition from conventional vehicles to EVs, advantages and disadvantages of Electric Vehicles, environmental and economic benefits of EVs, government initiatives and schemes for EV adoption in India, overview of FAME policy and state EV policies.	**06**
2	**Types of Electric Vehicles and Their Applications:** Classification of Electric Vehicles, Battery Electric Vehicles (BEV), Hybrid Electric Vehicles (HEV), Plug-in Hybrid Electric Vehicles (PHEV), Fuel Cell Electric Vehicles (FCEV), comparison among different types of EVs, applications of EVs in two-wheelers, threewheelers, passenger cars, buses and commercial vehicles, examples of EVs available in Indian market.	**06**

3	**Components and Working of Electric Vehicles:** Basic architecture and layout of an Electric Vehicle, electric traction motor, battery pack, battery management system (BMS), controller, inverter, DC-DC converter, on-board charger, transmission system, regenerative braking system, auxiliary systems used in EVs, working principle of an Electric Vehicle during acceleration, cruising and braking conditions.	**08**
4	**Batteries and Charging Infrastructure:** Introduction to energy storage systems, types of batteries used in Electric Vehicles, Lithium-ion batteries and their characteristics, battery parameters such as capacity, State of Charge (SOC) and State of Health (SOH), charging methods including slow charging, fast charging and battery swapping, charging standards, public charging stations, home charging systems and charging infrastructure requirements.	**08**
5	**Environmental Impact, Challenges and Future Trends:** Comparison between Electric Vehicles and Internal Combustion Engine (ICE) vehicles with respect to efficiency, emissions, maintenance and operating cost, environmental impact of EVs, battery recycling and disposal methods, challenges in widespread adoption of EVs including cost, driving range and charging facilities, solid-state batteries	**08**

Text Books

Sr. No.	Title	Author	Publisher
1	Electric Vehicle Technology Explained	James Larminie & John Lowry	John Wiley & Sons
2	Modern Electric, Hybrid Electric, and Fuel Cell Vehicles	B.L. Theraja & A.K. Theraja Mehrdad Ehsani, Yimin Gao, Stefano Longo & Kambiz Ebrahimi	CRC Press
3	The Performance and Design of DC Machines Electric and Hybrid Vehicles: Design Fundamentals	Iqbal Husain	CRC Press

Reference Books

Sr. No.	Title	Author	Publisher
1	Electric Vehicle Battery Systems	Sandeep Dhameja	Newnes (Elsevier)
2	Hybrid Electric Vehicles: Principles and Applications with Practical Perspectives	Chris Mi, M. Abul Masrur & David Wenzhong Gao	John Wiley & Sons
3	Battery Management Systems for Large Lithium-Ion Battery Packs	Davide Andrea	Artech House
4	Electric Vehicle Technology	K.T. Chau	Wiley-IEEE Press
5	Plug-in Electric Vehicle Engineering	Tony Sousa	CRC Press

Title of the Course: Open Elective- I Enhancing Soft Skills and Personality Course Code: 25OE2301	L	T	P	Credit
	2	-	--	2

Course Prerequisite:

Basic communication skills in English. Willingness to participate in individual and group activities. Interest in personal and professional development. Basic awareness of workplace and social interactions. Positive attitude toward self-improvement and lifelong learning.

Course Description:

Enhancing Soft Skills and Personality is designed to develop the personal, interpersonal, and professional competencies required for academic success and career growth. The course focuses on self-awareness, personality development, communication skills, emotional intelligence, leadership, teamwork, professional etiquette, employability skills, and lifelong learning. Students learn to improve their communication abilities, strengthen interpersonal relationships, build confidence, and develop professional behavior required in modern organizations.

Course Objectives:

1. Develop self-awareness and personality development skills.
2. Enhance verbal, non-verbal, written, and interpersonal communication skills.
3. Strengthen leadership, teamwork, and conflict management abilities.
4. Build emotional intelligence and professional workplace behavior.
5. Prepare students for career opportunities and lifelong learning.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Analyze personal strengths, weaknesses, emotions, and personality traits for selfdevelopment.
CO2	Demonstrate effective verbal, non-verbal, written, and interpersonal communication skills
CO3	Apply leadership, teamwork, negotiation, and conflict resolution skills in professional settings.
CO4	Exhibit professional etiquette, emotional intelligence, and workplace behavior.
CO5	Develop career planning, employability, interview, and lifelong learning skills

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1	--	--	--	--	--	--	1	2	3	--	1
CO2	--	--	--	--	--	--			3	--	1
CO3	--	--	--	--	--	--	2	2	3	--	1

CO4	--	--	--	--	--	--	2	2	3	--	1
CO5	--	--	--	--	--	--		2	3	--	2

Assessment Scheme:
Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 30%, 20% and 50% weightage respectively.

Assessment Component	Marks
CA1	15
MSE	20
CA2	15
ESE	50

CA1 and **CA2** are based on Surprise test/ Assignment/ Quiz/Seminar/Group discussions presentation, etc.
MSE is based on 50% of course content.
ESE is based on 100% course content with 60-70% weightage for course content covered after MSE.
Course Contents

Unit No.	Unit Title and Contents	Hours
1	**Self-Awareness and Personality Development** – Self-concept, Selfesteem, SWOT Analysis, Personality Traits, Goal Setting, Positive Attitude, Confidence Building, Time Management, Personal Effectiveness	**07**
2	**Emotional Intelligence and Communication Skills** – SelfAwareness, Verbal Communication, Non-Verbal Communication, Listening Skills, Speaking Skills, Reading Skills, Writing Skills, Interpersonal Communication, Workplace Communication, SelfRegulation, Motivation, Empathy, Social Skills, Relationship Management, Conflict Resolution, Negotiation Skills	**08**
3	**Leadership and Team Building** – Leadership Styles, Team Dynamics, Team Building, Collaboration, Decision Making, Problem Solving, Workplace Ethics, Professional Etiquette	**07**
4	**Career Development and Employability Skills** – Resume Writing, Cover Letter Preparation, Group Discussions, Interview Skills, Personal Branding, Professional Networking, Career Planning, Lifelong Learning	**07**

Text Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Personality Development and Soft Skills	Barun K. Mitra	Oxford University Press
2	Soft Skills: Know Yourself and Know the World	Dr. Alex K.World	S. Chand Publications

Reference Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Developing Communication Skills	Krishna Mohan & Meera Banerji	Macmillan
2	Communication Skills for Engineers and Scientists	Sangeeta Sharma & Binod Mishra	PHI Learning
3	Seven Habits of Highly Effective People	Stephen R. Covey	Simon & Schuster

Title of the Course: Open Elective-I Ethics in Engineering Practices Course Code: 25OE2302	L	T	P	Credit
	2	--	--	2

Course Prerequisite:

Basic communication and comprehension skills. Awareness of social and professional responsibilities. Fundamental understanding of engineering disciplines. Interest in ethical, environmental, and societal issues. Ability to analyze situations and make reasoned judgments.

Course Description:

Ethics in Engineering Practices is designed to develop ethical awareness, professional responsibility, and decision-making skills among engineering students. The course examines moral values, professional ethics, accountability, integrity, sustainability, environmental responsibility, and the societal impact of engineering decisions. Students learn to identify ethical dilemmas, evaluate professional responsibilities, apply ethical principles, and contribute to sustainable and socially responsible engineering solutions. The course emphasizes ethical leadership, workplace professionalism, and responsible use of emerging technologies.

Course Objectives:

1. To develop ethical awareness and professional responsibility among engineering students.
2. To understand the impact of engineering decisions on society and the environment.
3. To cultivate ethical decision-making skills in professional practice.
4. To promote sustainable and socially responsible engineering solutions.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Explain ethical principles, moral values, and professional responsibilities
CO2	Analyze ethical dilemmas and make responsible engineering decisions.
CO3	Evaluate societal, environmental, and sustainability concerns in engineering practices.
CO4	Deliver effective presentations and negotiate professionally
CO5	Apply professional ethics, integrity, accountability, and legal responsibilities.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1	--	--	--	--	--	--	3	3	3	--	1
CO2	--	3	--	--	--	--	3	--	--	--	--
CO3	--	--	--	--	--	3	3	--	--	--	--

CO4	--	--	3	--	--	--	--	3	3	--	2
CO5	--	--	--	--	--	--	3	3	3	--	--

Assessment Scheme:
Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 30%, 20% and 50% weightage respectively.

Assessment Component	Marks
CA1	15
MSE	20
CA2	15
ESE	50

CA1 and **CA2** are based on Surprise test/ Assignment/ Quiz/Seminar/Group discussions presentation, etc.
MSE is based on 50% of course content.
ESE is based on 100% course content with 60-70% weightage for course content covered after MSE.
Course Contents

Unit No.	Unit Title and Contents	Hours
1	**Foundations of Engineering Ethics-** Meaning and Importance of Ethics, Engineering as a Profession, Moral Values and Ethical Principles, Rights Duties and Responsibilities, Ethical Dilemmas in Engineering, Engineering Case Studies	**07**
2	**Professional Responsibility-** Professional Codes of Ethics, Accountability and Integrity, Confidentiality and Intellectual Property Rights, Whistleblowing, Ethical Leadership, Workplace Professionalism	**07**
3	**Technology, Society and Sustainability-** Engineers and Society, Sustainable Development Goals (SDGs), Environmental Ethics, Green Engineering, Corporate Social Responsibility (CSR), Ethical Use of Emerging Technologies	**07**
4	**Ethical Decision Making and Leadership -** Ethical Decision Models, Value-Based Leadership, Organizational Ethics, Governance and Compliance, Stakeholder Management, Ethical Risk Assessment	**07**

Text Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Ethics in Engineering	Ethics in Engineering	Ethics in Engineering
2	Engineering Ethics	Charles E. Harris Jr., Michael Pritchard & Michael Rabins	Cengage Learning

Reference Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Engineering Ethics: Concepts and Cases	Charles E. Harris Jr.	Cengage Learning
2	Ethics, Technology and Engineering	Ibo van de Poel & Lambèr Royakkers	Wiley-Blackwell
3	Practical Ethics for Engineers	John R. Boatright	CRC Press
4	Professional Ethics and Human Values	R. S. Naagarazan	New Age International

Title of the Course: Open Elective –I Introduction to Project Management Course Code: 25OE2303	L	T	P	Credit
	2	--	--	2

Course Prerequisite:

Basic understanding of engineering and technology concepts. Fundamental communication and teamwork skills. Logical thinking and problem-solving ability. Awareness of organizational and business environments.

Course Description:

This course introduces students to the fundamentals of project management, including project planning, scheduling, execution, monitoring, and closure. It covers the project life cycle, stakeholder management, risk management, quality management, and the use of common project management tools and techniques. The course aims to develop the ability to plan and manage projects effectively in engineering and business environments **Course Objectives:**

1. To understand the fundamental concepts and importance of project management.
2. To explain the phases of the project life cycle and project planning techniques.
3.To introduce scheduling, budgeting, risk, and quality management practices.
4. To develop skills in project execution, monitoring, and successful project closure.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Explain the principles, objectives, and life cycle of project management.
CO2	Prepare project plans, schedules, and resource allocation strategies
CO3	Identify and manage project risks, costs, quality, and stakeholder expectations.
CO4	Apply monitoring, control, and project closure techniques to improve project success

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1	3	2	1	1	1	--	--	--	1	2	2
CO2	3	3	2	2	2	--	--	--	2	2	2
CO3	2	3	3	2	2	1	1	--	2	2	2
CO4	2	2	3	3	2	1	--	1	3	3	2

Assessment Scheme:
Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 30%, 20% and 50% weightage respectively.

Assessment Component	Marks
CA1	15
MSE	20
CA2	15
ESE	50

CA1 and **CA2** are based on Surprise test/ Assignment/ Quiz/Seminar/Group discussions presentation, etc.
MSE is based on 50% of course content.
ESE is based on 100% course content with 60-70% weightage for course content covered after MSE.
Course Contents

Unit No.	Unit Title and Contents	Hours
1	**Introduction** Concept and characteristics of projects, Project management fundamentals, Importance and objectives of project management, Project life cycle, Roles and responsibilities of project manager, Stakeholders and organizational structures, Project selection and feasibility analysis	**07**
2	**Project Planning and Scheduling** Project scope definition, Work Breakdown Structure (WBS), Project planning process, Resource planning and allocation, Scheduling techniques, Gantt Charts, Critical Path Method (CPM), Introduction to PERT	**07**
3	**Project Cost, Risk, and Quality Management** Cost estimation and budgeting, Project financing basics, Risk identification and risk assessment, Risk mitigation strategies, Quality planning and quality assurance, Performance measurement and documentation, Communication management	**08**
4	**Project Execution, Monitoring, and Closure** Project execution and coordination, Team management and leadership, Project monitoring and control, change management, Performance evaluation, Project documentation and reporting, Project closure and lessons learned, Introduction to project management software tools	**08**

Text Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Project Management: The Managerial Process	Clifford F. Gray, Erik W. Larson	McGraw-Hill Education

Reference Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Project Management: A Systems Approach to Planning, Scheduling, and Controlling	Harold Kerzner	John Wiley & Sons
2	Information Technology Project Management	Kathy Schwalbe	Cengage Learning
3	A Guide to the Project Management Body of Knowledge (PMBOK® Guide)	Project Management Institute (PMI	Project Management Institute (PMI)

NPTEL: -

Sr.No.	**Course**	**Provider /Platform**	**Level**	**Mode**	**Certification Authority**
1.	Project Management	nptel.ac.in/courses/110104073 ?utm_source=chatgpt.com	UG	Online	NPTEL
2.	Project Management For Managers	Projectmanagement for managers - Course	UG	Online	NPTEL

Title of the Course: Universal Human Values Course Code: 25VEC2301	L	T	P	Credit
	1	--	--	1

Course Prerequisite: Students are not required to have prior academic background in this subject, but must possess a willingness to actively engage in self-reflection and experience-based learning.

Course Description:

The Universal Human Values course is designed to foster holistic personal development and interpersonal skills through active, experience-based learning. The curriculum guides students in mastering self-management techniques, including time management, stress reduction, and SWOT analysis, equipping them to handle real-world challenges like peer pressure and anger effectively. Furthermore, by emphasizing priority management and dedication, the course empowers students to formulate clear academic and career goals while thoughtfully balancing the expectations of their family, peers, society, and the nation.

Course Objectives:

- To introduce students to fundamental self-management skills, including SWOT analysis and time management, equipping them to effectively cope with stress, anger, and peer pressure.
- To foster an understanding of healthy interpersonal dynamics by teaching students how to navigate competition, express gratitude, and constructively resolve conflicts in their relationships.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Describe self-management techniques, including time management and SWOT analysis, to foster personality development and effectively handle stress, anger, and peer pressure.
CO2	Demonstrate effective interpersonal skills by navigating competition and cooperation, expressing gratitude, and resolving various types of conflicts in personal and academic relationships
CO3	Formulate clear academic and career goals by effectively managing priorities and aligning personal dedication with the expectations of family, peers, society, and the nation.
CO4	Assess personal well-being through continuous feedback and self-evaluation techniques to maintain a healthy lifestyle, implement a balanced diet, and cultivate a caring attitude towards nature.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PSO1	PSO2
CO1	--	--	--	--	--	1	--	2	1	1	--	--	--
CO2	--	--	--	--	--	2	--	3	3	0	--	--	--
CO3	--	--	--	--	--	3	--	2	1	2	--	--	--
CO4	--	--	--	--	--	2	3	2	0	0	--	--	--

Assessment Scheme:

Two components of Continuous Assessment (CA-1, CA-2) having 50% and 50% weightage respectively.

Assessment Component	Marks
CA1	25
MSE	--
CA2	25
ESE	--

CA1 and CA2 are based on Assignment / Declared test / Quiz / Seminar / Group discussions presentation, etc..

Course Contents

Unit No.	Unit Title and Contents	Hours
1	**Self-Management** Self-confidence, peer pressure, time management, anger, Stress, Personality Development, Self-improvement, SWOT analysis	**05**
2	**Relationships** Home sickness, gratitude towards parents, teachers and others Ragging and interaction Competition and cooperation, Types of conflicts and conflict resolution.	**05**
3	**Individual academic, career** Expectations of family, peers, society, nation, fixing the goals. Time management, priority management, Dedication, devotion	**05**
4	**Self-evaluation and Healthy life** Sharing and feedback Health issues, healthy diet, healthy lifestyle. Caring the nature, Self-evaluation techniques.	**05**

(* Focus should be activity based learning or experience based learning)

Text Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	A Foundation Course in Human Values and Professional Ethics	R R Gaur, R Asthana, G P Bagaria	Excel Books, New Delhi
2	Professional Ethics and Human Values	Premvir Kapoor	Khanna Book Publishing, New Delhi,

Reference Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Fundamentals of Ethics for Scientists &Engineers	Mohandas Karamchand Gandhi	New Age International Publishers.
2	Human Values	A N Tripathy	Jeevan Vidya Prakashan
3	Foundations of Ethics and Management	B P Banerjee	Excel Books

Title of the Course: Dc Machines & Transformers Laboratory Course Code: 25EEE2302L	L	T	P	Credit
	--	--	2	1

Course Prerequisite:

Basic knowledge of DC and AC circuit analysis, electromagnetic principles, and the theoretical concepts of DC machines and transformers as covered in the co-requisite theory course DC Machines & Transformers (25EEE2302). Knowledge of electrical safety practices in laboratory environments is essential.

Course Description:

This laboratory course provides hands-on practical experience complementing the theory of DC machines and transformers. Students will study the constructional features of DC machines and transformers, perform standard tests to determine equivalent circuit parameters, efficiency and voltage regulation, and carry out speed control experiments on DC motors. The course includes performance evaluation of single-phase and three-phase transformers under various loading and connection conditions. It also covers experimental determination of characteristics of three-phase alternators and induction motors. The course develops practical skills in equipment handling, data recording, result analysis and technical report writing.

Course Objectives:

1. To familiarize students with the constructional features and operating characteristics of DC machines through hands-on study.
2. To develop skills in performing standard tests — OC test, SC test and load test — on singlephase and three-phase transformers.
3. To verify speed control techniques of DC motors through field resistance and armature resistance control experiments.
4. To analyse the performance of transformers under load, parallel operation and Sumpner's test conditions.
5. To determine the characteristics of three-phase alternators and induction motors through standard experimental procedures.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Study the constructional features of DC machine and plot its characteristics to understand its operating behavior under different conditions.
CO2	Perform speed control of DC motor using field resistance control and armature resistance control methods and analyze their speed-torque characteristics.
CO3	Conduct open circuit and short circuit tests on single-phase transformers to determine core loss, copper loss and equivalent circuit parameters.
CO4	Evaluate the performance of single-phase and three-phase transformers through direct load test, parallel operation and Sumpner's test for efficiency and voltage regulation.
CO5	Perform blocked rotor test on three-phase induction motor and open circuit, short circuit and load tests on three-phase alternator to determine their performance characteristics.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PSO1	PSO2
CO1	3	2	--	3	1	--	--	1	2	2	--	2	1
CO2	3	3	2	3	2	--	--	1	2	2	--	2	1
CO3	3	3	1	3	1	--	--	1	2	2	--	3	1
CO4	3	3	2	3	2	--	--	1	2	2	1	2	2
CO5	3	2	1	3	2	--	--	1	2	2	--	2	2

Assessment Scheme:
Two components of Continuous Assessment (CA-1, CA-2), and End Semester Examination (ESE) having 50% and 50% weightage respectively.

Assessment Component	Marks
CA1	25
CA2	25
POE	50

CA1 and CA2 have 50% weightage and are based on practical performance and oral examination. POE is having 50% weightage is based on 100% course content.

Course Contents

Practical No.	List of Experiments	Hours
1	Study Construction of Dc Machine & Its Characteristics	02
2	Study Construction of Single Phase & Three Phase Transformer.	02
3	To perform open circuit (OC) and short circuit (SC) test on single phase transformer to estimate its core loss, copper loss and equivalent circuit parameters	02
4	To perform direct load test on single phase and three phase transformers to obtain its % efficiency and % voltage regulation at various loading conditions	02
5	Parallel operation of two single-phase transformers to study their load sharing under various operating condition.	02
6	Speed Control of DC motor by field resistance control.	02
7	Speed Control of DC motor by Armature Resistance Control.	02

8	Brake test on dc shunt motor.	02
9	Performance characteristics of Dc series motor by Break Load test Method	02
10	Scott Connection for Converting 3 Phase to 2 Phase Supply.	02
11	Sumpner's test on transformer (single phase and three phase) to determine its losses & Efficiency.	02
12	Load Test on DC Generator	02

***Any 10 practical's /experiments to be conducted.**

Text Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Electrical Machines	A.K. Sawhney	Dhanpat Rai & Co.
2	Electrical Technology Vol. II	B.L. Theraja & A.K. Theraja	S. Chand Publications
3	The Performance and Design of DC Machines	A.E. Fitzgerald, C. Kingsley & S. Umans	McGraw-Hill

Reference Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Electric Machinery Fundamentals	Stephen J. Chapman	McGraw-Hill Education
2	Electrical Machines	I.J. Nagrath & D.P. Kothari	Tata McGraw-Hill
3	Transformers	A. Winders	Newnes (Elsevier)
4	Laboratory Manual for Electrical Machines	B.R. Gupta	S. Chand Publications

Title of the Course: Network Theory Laboratory Course Code: 25EEE2303L	L	T	P	Credit
	--	--	2	1

Course Prerequisite:
Basic knowledge of electrical circuits including Ohm's Law, Kirchhoff's Laws (KCL & KVL), basic network theorems, and use of electrical measuring instruments.

Course Description:
This laboratory course is designed to provide practical understanding of fundamental concepts in electrical network theory. It enables students to experimentally verify basic circuit laws such as KCL and KVL, and validate important network theorems including Thevenin's, Norton's, Superposition, and Maximum Power Transfer theorem. The course emphasizes analysis of transient response in RL, RC, and RLC circuits under step inputs, as well as the study of steady-state and frequency response characteristics under sinusoidal excitation. Students also investigate resonance phenomena, behavior of passive filters, and parameters of two-port networks. The lab strengthens hands-on skills, measurement techniques, and the ability to compare theoretical and experimental results.

Course Objectives:

1. To verify fundamental electrical laws such as KCL and KVL through practical experiments.
2. To validate various network theorems using experimental setups.
3. To analyse transient and steady-state behaviour of RL, RC, and RLC circuits.
4. To study resonance and frequency response characteristics of electrical circuits.
5. To evaluate the performance of passive filters and two-port networks.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Verify fundamental electrical laws such as Kirchhoff's Current Law (KCL) and Kirchhoff's Voltage Law (KVL) through practical experiments.
CO2	Validate network theorems including Thevenin's, Norton's, Superposition, and Maximum Power Transfer theorem using laboratory setups.
CO3	Analyze the transient response of RL, RC, and RLC circuits for step input conditions.
CO4	Determine the frequency response and resonance characteristics of RLC circuits under sinusoidal excitation.
CO5	Evaluate the performance of two port networks and determine the driving point and transfer function of two-port networks.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PSO1	PSO2
CO1	3	2	1	2	3	--	--	--	--	--	1	2	2
CO2	3	3	2	2	3	--	--	--	--	--	1	2	2
CO3	3	2	2	3	3	--	--	--	--	1	1	1	--
CO4	3	2	3	3	3	1	--	--	1	--	1	1	--
CO5	3	3	2	3	3	1	--	--	1	--	1	--	--

Assessment Scheme:

Two components of Continuous Assessment (CA-1, CA-2), and End Semester Examination (ESE) having 50% and 50% weightage respectively.

Assessment Component	Marks
CA1	25
CA2	25
POE	50

CA1 and CA2 have 50% weightage each, and are based on practical performance and oral examination. POE is based on 100% course content.

Course Contents

Practical No.	List of Experiments	Hours
1	Verification of Kirchhoff's Current & Voltage Law	02
2	Verification of Thevenin's Theorem	02
3	Verification of Superposition Theorem	02
4	Verification of Norton's Theorem	02
5	Verification of Maximum power Transfer Theorem.	02
6	Determination of Transient Response of current in RL, RC, and RLC circuit with step input	02
7	Determination of frequency Response of current RLC circuit sinusoidal input	02
8	Determination of Driving point and Transfer Function of two port ladder network and verify with theoretical values	02
9	Analyze A.C/D.C. circuits using Mesh and Node analysis	02

***Any 8 practical's /experiments to be conducted.**

Text Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Circuit & Network – Analysis & Synthesis	A. Sudhakar, Shyammohan S. Palli	Tata McGraw Hill
2	Circuit & Network – Analysis & Synthesis	A. Chakrabarti	Dhanpat Rai & Co.
3	Networks & Systems	D. Roy Choudhury	New Age International Publisher
4	Electrical Circuit Analysis	Soni Gupta	Dhanpat Rai & Co.

Reference Books			
Sr. No.	**Title**	**Author**	**Publisher**
1	Engineering Circuit Analysis,	William H. Hayt, Jack E. Kimmerly, Steven M. Durbin	Tata McGraw Hill
2	Network Analysis	M. E. Van Valkenburg	Pearson Education / PHI
3	Theory & Problems of Electronic Circuits (Schaum's Series)	Joseph Edminister	Tata McGraw Hill
4	Network Fundamentals and Analysis	R. G. Kaduskar, S. O.	Network Fundamentals and Analysis

Title of the Course: Seminar -I Course Code: 25EEE2305L	L	T	P	Credit
	--	--	2	1

Course Prerequisite:

Students must possess a basic understanding of core concepts within their academic program to effectively identify and explore emerging trends or interdisciplinary topics in engineering and technology

Course Description:

This Seminar course is designed to empower students to explore and present on emerging trends or interdisciplinary topics in engineering and technology that directly align with expected industry outcomes. Tailoring the experience to their unique aptitudes, students will independently select a theme and finalize it with a faculty mentor to investigate the logic development behind the practical industry applications of various technologies. The course emphasizes effective technical communication by requiring students to utilize appropriate software tools to prepare detailed write-ups and deliver formal presentations. Additionally, it serves as a critical foundation for real-world application through a project initiation phase, where students form small batches to adopt an inquiry-driven approach, identify specific program-related problem statements, propose solutions, and assess both their practical feasibility

Course Objectives:

1. To encourage students to explore emerging trends or interdisciplinary themes in engineering and technology, and effectively present their findings using relevant software tools
2. To foster an inquiry-driven approach that allows students to understand the logic behind practical industry applications, identify specific problem statements, and evaluate the practical feasibility.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	list emerging trends and interdisciplinary approaches to select a seminar theme that aligns with expected industry outcomes.
CO2	Analyze the logic development behind the practical industry applications of various technologies and processes.
CO3	Develop detailed write-ups and deliver formal presentations utilizing appropriate software tools.
CO4	Identify problem statements and to decide the solution by assessing its practical feasibility.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011	PSO1	PSO2
CO1	3	2	1	3	1	1	--	1	3	1	--	2	1
CO2	3	3	2	2	1	2	--	--	1	2	--	2	1
CO3	1	0	0	0	3	0	--	1	2	3	--	3	2
CO4	2	3	3	2	1	2	1	1	3	2	3	2	2
CO5	3	2	1	3	1	1	--	1	3	1	--	2	1

Assessment Scheme:
Two components of in semester evaluation (CA1 and CA2) having 50% weightage each.

Assessment Component	Marks
CA1	25
CA2	25
OE	--

ASSESSMENT DETAILS:

CA1 and CA2 are based on Assignment/Surprise test/Quiz/Seminar/Group discussions/presentation, etc

GUIDELINES FOR SEMINAR:

1. Align with Emerging Trends & Industry Needs The seminar topic must focus on emerging trends in engineering and technology, or adopt an interdisciplinary/multidisciplinary approach. The chosen theme must directly align with the expected industry outcomes of your academic program.
2. Select a Theme Based on Individual Strengths because every student has unique aptitudes, you are required to independently choose a seminar Title (Theme) that best matches your personal strengths, skills, and interests.
3. Finalize the Title with a Faculty Mentor You cannot finalize your seminar topic in isolation. Your selected title must be discussed, reviewed, and officially approved in consultation with your assigned faculty mentor.
4. Focus on Logic and Industry Application The core content of your seminar must go beyond theory; it must actively involve the logic development behind how various technologies and processes are practically applied within the industry.
5. Work Individually, Present Collaboratively the seminar is strictly an individual assignment. However, while you are solely responsible for the research and content, you are permitted to seek logistical or operational support from other students during the actual presentation.
6. Utilize Relevant Tools and Prepare Write-ups You must prepare your presentation using appropriate software tools relevant to your topic. Additionally, you are required to draft detailed write-ups to accompany and support your presentation.
7. Submit Both Hard and Soft Copies Upon completion of your seminar preparation, you must submit exactly one physical (hard) copy and one digital (soft) copy of your final presentation materials.
8. Record Your Presentation While not strictly mandatory, it is highly encouraged that you keep a recorded video or audio copy of the presentation you make during the live seminar for future reference.