ELECTRICAL AND ELECTRONICS ENGINEERING

R2024

CURRICULUM & SYLLABI

GRT INSTITUTE OF ENGINEERING AND TECHNOLOGY, Tiruttani

(An Autonomous Institution)

Accredited by NBA (ECE), NAAC with "A++" Grade & An ISO 9001:2015 Certified Institution

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai.

B.E – ELECTRICAL AND ELECTRONICS ENGINEERING

CURRICULUM REGULATIONS - 2024

CHOICE BASED CREDIT SYSTEM

CURRICULUM AND SYLLABI (SEMESTER I TO VIII)

(FOR THE STUDENTS ADMITTED DURING 2024)

SEMESTER - I									
S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
1	IP24101	Induction Programme	-	-	-	-	-	0	-
THEORY COURSES									
2	HS24101	Professional English	HS	3	-	-	3	3	60/40
3	MA24101	Algebra and Calculus	BS	3	1	-	4	4	60/40
4	PH24101	Engineering Physics	BS	3	-	-	3	3	60/40
5	CY24101	Engineering Chemistry	BS	3	-	-	3	3	60/40
6	GE24101	Problem Solving and Python Programming	ES	3	-	-	3	3	60/40
7	TA24101	Heritage of Tamils	HS	1	-	-	1	1	60/40
PRACTICAL COURSES									
8	GE24102	Problem Solving and Python Programming Laboratory	ES	-	-	4	4	2	40/60
9	PC24101	Physics and Chemistry Laboratory	BS	-	-	4	4	2	40/60
10	HS24102	English Laboratory	HS	-	-	2	2	1	0/100
TOTAL				**16**	**1**	**10**	**27**	**22**	

SEMESTER - II									
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
THEORY COURSES									
1	MA24201	Statistics and Numerical Techniques	BS	3	1	0	4	4	60/40
2	PH24202	Physics for Electrical Engineering	BS	3	0	0	3	3	60/40
3	GE24201	Engineering Graphics	ES	2	0	3	5	4	60/40
4	EE24201	Electrical Measurements and Electromagnetic Fields	PC	3	0	0	3	3	60/40
5	ME24203	Fundamentals of Mechanical Engineering	ES	3	0	0	3	3	60/40
6	TA24201	Tamils and Technology	HS	1	0	0	1	1	60/40
THEORY CUM PRACTICAL COURSES									
7	EE24202	Electric Circuit Analysis	PC	3	0	2	5	4	50/50
PRACTICAL COURSES									
8	GE24202	Engineering Practices Laboratory	ES	-	-	4	4	2	40/60
9	HS24201	English Communication Laboratory	HS	-	-	4	4	2	40/60
TOTAL				**18**	**1**	**13**	**32**	**26**	

SEMESTER - III									
S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
THEORY COURSES									
1	MA24304	Fourier Analysis and Partial Differential Equation	BS	3	1	0	4	4	60/40
2	EE24301	Digital Logic Circuits	PC	3	1	0	4	3	60/40
3	EE24302	Electron Devices and Circuits	PC	3	0	0	3	3	60/40
4	EE24303	Soft Computing for Electrical Engineers	PC	3	0	0	3	3	60/40
THEORY CUM PRACTICAL COURSES									
5	EE24304	Electrical Machines – I	PC	3	0	2	5	4	50/50
6	CS24309	Programming in C	ES	3	0	2	5	4	50/50
PRACTICAL COURSES									
7	EE24305	Electronic Devices and Circuits Laboratory	PC	0	0	3	3	2	40/60
TOTAL				**18**	**2**	**7**	**27**	**23**	

SEMESTER - IV									
S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
THEORY COURSES									
1	GE24402	Environmental Science and Sustainability	BS	2	0	0	2	2	60/40
2	EE24401	Analog Circuit and Systems Using IC's	PC	3	0	0	3	3	60/40
3		Management Elective	HS	3	0	0	3	3	60/40
THEORY CUM PRACTICAL COURSES									
4	EE24402	Transmission and Distribution	PC	3	0	2	5	4	50/50
5	EE24403	Electrical Machines - II	PC	3	0	2	5	4	50/50
6	CS24406	Data Structures and Algorithms Using C	ES	3	0	2	5	4	50/50
PRACTICAL COURSES									
7	EE24404	Linear and Digital Circuits Laboratory	PC	0	0	3	3	2	40/60
8	GE24S02	Soft Skills	EEC	0	0	2	2	1	0/100
TOTAL				**17**	**-**	**11**	**28**	**23**	

SEMESTER - V									
S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
THEORY COURSES									
1	EE24501	Protection and Switchgear	PC	3	0	0	3	3	60/40
2		Professional Elective I	PE	3	0	0	3	3	-
3		Professional Elective II	PE	3	0	0	3	3	-
4		Professional Elective III	PE	3	0	0	3	3	-
5		Non-Credit Mandatory course I	MC	3	0	0	3	NC	0/100
THEORY CUM PRACTICAL COURSES									
6	EE24502	Power System Analysis	PC	3	0	2	5	4	50/50
7	EE24503	Power Electronics	PC	3	0	2	5	4	50/50
8	CS24506	Java Programming	ES	3	0	2	5	4	50/50
TOTAL				**24**	**-**	**6**	**30**	**24**	

SEMESTER - VI									
S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
THEORY COURSES									
1	EE24601	Industry 5.0	PC	3	0	0	3	3	60/40
2		Open Elective – I	OE	3	0	0	3	3	-
3		Professional Elective IV	PE	3	0	0	3	3	-
4		Professional Elective V	PE	3	0	0	3	3	-
5		Non-Credit Mandatory course II	MC	3	0	0	3	NC	0/100
THEORY CUM PRACTICAL COURSES									
6	EE24602	Control Systems	PC	3	0	2	5	4	50/50
7	EE24603	Microprocessor and Micro controller	PC	3	0	2	5	4	50/50
PRACTICAL COURSES									
8	EE24S01	Advance Aptitude and Coding Skills	EEC	0	0	2	2	1	0/100
TOTAL				**21**	**-**	**6**	**27**	**21**	

SEMESTER - VII									
S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
THEORY COURSES									
1	GE24701	Human Values and Ethics	HS	2	0	0	2	2	60/40
2	EE24701	Electric Vehicle Technologies	PC	3	0	0	3	3	60/40
3		Professional Elective VI	PE	3	0	0	3	3	-
4		Open Elective – II	OE	3	0	0	3	3	-
5		Open Elective – III	OE	3	0	0	3	3	-
6		Open Elective – IV	OE	3	0	0	3	3	-
PRACTICAL COURSES									
7	EE24703	Summer Internship	EEC	0	0	4	4	2	0/100
TOTAL				**17**	**-**	**4**	**21**	**19**	

SEMESTER - VIII									
S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
PRACTICAL COURSES									
1	EE24801	Project Work/ Internship	EEC	-	-	20	20	10	40/60
TOTAL				**-**	**-**	**-**	**20**	**10**	

TOTAL CREDITS	**168**

SUMMARY

Name of the Programme: Electrical and Electronics Engineering										
S.No	Subject Area	Credits per Semester								Total Credits
		1	2	3	4	5	6	7	8	
1	HS	5	3	-	3	-	-	2	-	13
2	BS	12	7	4	2	-	-	-	-	25
3	ES	5	9	4	4	4	-	-	-	26
4	PC	-	7	15	13	11	11	3	-	60
5	PE	-	-	-	-	9	6	3	-	18
6	OE	-	-	-	-	-	3	9	-	12
7	EEC	-	-	-	1	-	1	2	10	14
8	Non-Credit Mandatory					✓	✓			
TOTAL		20	26	23	23	24	21	19	10	168

MANDATORY COURSE

NON-CREDIT MANDATORY COURSE I								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	MX24C71	Introduction to Women and Gender Studies	MC	3	-	-	3	-
2	MX24C72	Elements of Literature	MC	3	-	-	3	-
3	MX24C73	Disaster Risk Reduction and Management	MC	3	-	-	3	-
4	MX24C74	Film Appreciation	MC	3	-	-	3	-

NON-CREDIT MANDATORY COURSE II								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	MX24C75	Well Being with Traditional Practices - Yoga, Ayurveda and Siddha	MC	3	-	-	3	-
2	MX24C76	History of Science and Technology in India	MC	3	-	-	3	-
3	MX24C77	Industrial Safety	MC	3	-	-	3	-
4	MX24C78	Political and Economic Thought for a Human Society	MC	3	-	-	3	-
5	MX24C79	State, Nation Building and Politics in India	MC	3	-	-	3	-

MANAGEMENT ELECTIVE

MANAGEMENT ELECTIVE								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	GE24M01	Principles of Management	HS	3	-	-	3	3
2	GE24M02	Total Quality Management	HS	3	-	-	3	3
3	GE24M03	Engineering Economics and Financial Accounting	HS	3	-	-	3	3
4	GE24M04	Human Resource Management	HS	3	-	-	3	3
5	GE24M05	Knowledge Management	HS	3	-	-	3	3
6	GE24M06	Industrial Management	HS	3	-	-	3	3

PROFESSIONAL ELECTIVE COURSES: VERTICALS

VERTICAL1 Power Engineering	VERTICAL2 Converters and Drives	VERTICAL3 Embedded Systems	VERTICAL4 Electric Vehicle Technology	VERTICAL5 Advanced Control	VERTICAL6 Diversified Courses
Utilization and Conservation of Electrical Energy	Special Electrical Machines	Embedded System Design	Electric Vehicle Architecture	Process Modeling and Simulation	Energy Storage Systems
Under Ground Cable Engineering	Analysis of Electrical Machines	Embedded C-programming	Design of Motor and Power Converters for Electric Vehicles	Computer Control of Processes	Hybrid Energy Technology
Substation Engineering and Automation	Multilevel Power Converters	Embedded Processors	Electric Vehicle Design, Mechanics and Control	System Identification	Design and Modeling of Renewable Energy Systems
HVDC and FACTS	Electrical Drives	Embedded Control for Electric Drives	Design of Electric Vehicle Charging System	Model Based Control	Grid integrating Techniques and Challenges
Energy Management and Auditing	SMPS and UPS	Smart System Automation	Testing of Electric Vehicles	Non LinearControl	Sustainable and Environmental Friendly HV Insulation System
Power Quality	Power Electronics for Renewable Energy Systems	Embedded System for Automotive Applications	Grid Integration of Electric Vehicles	Optimal Control	Power System Transients
Smart Grid	Control of Power Electronics Circuits	VLSI Design	Intelligent Control of Electric Vehicles	Adaptive Control	PLC Programming
Power system operation & control	-	MEMS and NEMS	-	Machine Monitoring System	Big Data Analytics
High Voltage Engineering	-	Digital Signal Processing System Design	-	-	-

PROFESSIONAL ELECTIVE COURSES: VERTICALS

VERTICAL 1: POWER ENGINEERING								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EE24P01	Utilization and Conservation of Electrical Energy	PE	3	0	0	3	3
2	EE24P02	Under Ground Cable Engineering	PE	3	0	0	3	3
3	EE24P03	Substation Engineering and Automation	PE	3	0	0	3	3
4	EE24P04	HVDC and FACTS	PE	3	0	0	3	3
5	EE24P05	Energy Management and Auditing	PE	3	0	0	4	3
6	EE24P06	Power Quality	PE	3	0	0	3	3
7	EE24P07	Smart Grid	PE	3	0	0	3	3
8	EE24P09	Power system operation & control	PE	3	0	0	3	3
9	EE24P10	High Voltage Engineering	PE	3	0	0	3	3

VERTICAL 2: CONVERTERS AND DRIVES								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EE24P11	Special Electrical Machines	PE	2	0	2	4	3
2	EE24P12	Analysis of Electrical Machines	PE	2	0	2	4	3
3	EE24P13	Multilevel Power Converters	PE	2	0	2	4	3
4	EE24P14	Electrical Drives	PE	2	0	2	4	3
5	EE24P15	SMPS and UPS	PE	2	0	2	4	3
6	EE24P16	Power Electronics for Renewable Energy Systems	PE	2	0	2	4	3
7	EE24P17	Control of Power Electronics Circuits	PE	2	0	2	4	3

VERTICAL 3: EMBEDDED SYSTEMS								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EE24P18	Embedded System Design	PE	2	0	2	4	3
2	EE24P19	Embedded C- programming	PE	2	0	2	4	3
3	EE24P20	Embedded Processors	PE	2	0	2	4	3
4	EE24P21	Embedded Control for Electric Drives	PE	2	0	2	4	3
5	EE24P22	Smart System Automation	PE	2	0	2	4	3
6	EE24P23	Embedded System for Automotive Applications	PE	2	0	2	4	3
7	EE24P24	VLSI Design	PE	2	0	2	4	3
8	EE24P25	MEMS and NEMS	PE	2	0	2	4	3
9	EE24P26	Digital Signal Processing System Design	PE	2	0	2	4	3

VERTICAL 4: ELECTRIC VEHICLE TECHNOLOGY								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EE24P27	Electric Vehicle Architecture	PE	3	0	0	3	3
2	EE24P28	Design of Motor and Power Converters for Electric Vehicles	PE	2	0	2	4	3
3	EE24P29	Electric Vehicle Design, Mechanics and Control	PE	2	0	2	4	3
4	EE24P30	Design of Electric Vehicle Charging System	PE	2	0	2	4	3
5	EE24P31	Testing of Electric Vehicles	PE	2	0	2	4	3
6	EE24P32	Grid Integration of Electric Vehicles	PE	3	0	0	3	3
7	EE24P33	Intelligent Control of Electric Vehicles	PE	2	0	2	4	3

VERTICAL 5: ADVANCED CONTROL								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EE24P34	Process Modeling and Simulation	PE	3	0	0	3	3
2	EE24P35	Computer Control of Processes	PE	3	0	0	3	3
3	EE24P36	System Identification	PE	3	0	0	3	3
4	EE24P37	Model Based Control	PE	3	0	0	3	3
5	EE24P38	Non-Linear Control	PE	3	0	0	3	3
6	EE24P39	Optimal Control	PE	3	0	0	3	3
7	EE24P40	Adaptive Control	PE	3	0	0	3	3
8	EE24P41	Machine Monitoring System	PE	3	0	0	3	3

VERTICAL 6: DIVERSIFIED COURSES								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EE24P42	Energy Storage Systems	PE	3	0	0	3	3
2	EE24P43	Hybrid Energy Technology	PE	3	0	0	3	3
3	EE24P44	Design and Modeling of Renewable Energy Systems	PE	3	0	0	3	3
4	EE24P45	Grid integrating Techniques and Challenges	PE	2	0	2	4	3
5	EE24P46	Sustainable and Environmental Friendly HV Insulation System	PE	3	0	0	3	3
6	EE24P47	Power System Transients	PE	3	0	0	3	3
7	EE24P48	PLC Programming	PE	3	0	0	3	3
8	EE24P49	Big Data Analytics	PE	2	0	2	4	3

OPEN ELECTIVES

OPEN ELECTIVE I AND II								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	AD24901	Artificial Intelligence and Machine Learning Fundamentals	OE	2	0	2	4	3
2	CS24902	IoT Concepts and Applications	OE	2	0	2	4	3
3	AD24905	Data Science Fundamentals	OE	2	0	2	4	3
4	CS24906	Reinforcement Learning	OE	2	0	2	4	3
5	CS24908	Augmented Reality/Virtual Reality	OE	2	0	2	4	3

OPEN ELECTIVE III								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	ME24901	Applied Design Thinking	OE	3	0	0	3	3
2	AS24901	Space Engineering	OE	3	0	0	3	3
3	IE24908	Quality Engineering	OE	3	0	0	3	3
4	RA24903	Foundation of Robotics	OE	3	0	0	3	3
5	HS24901	English for Competitive Examinations	OE	3	0	0	3	3
6	PE24902	Energy Conservation and Management	OE	3	0	0	3	3
7	MA24902	Linear Algebra	OE	3	0	0	3	3
8	AI24901	Urban Agriculture	OE	3	0	0	3	3
9	RA24902	Remote Sensing Concepts	OE	3	0	0	3	3
10	CH24901	Nano Technology	OE	3	0	0	3	3

OPEN ELECTIVE IV								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	RA24904	Drone Technologies	OE	3	0	0	3	3
2	ME24904	New Product Development	OE	3	0	0	3	3
3	AU24901	Batteries and Management System	OE	3	0	0	3	3
4	EE24904	Sensors and Actuators	OE	3	0	0	3	3
5	CH24901	Energy Technology	OE	3	0	0	3	3
6	PE24901	Industrial Safety	OE	3	0	0	3	3
7	BM24903	Wearable Devices	OE	3	0	0	3	3
8	CS24917	Learning Analytic Tools	OE	3	0	0	3	3
9	CS24905	Cloud computing	OE	3	0	0	3	3
10	AI24903	IT in Agricultural System	OE	3	0	0	3	3

SEMESTER-I
Common To All Branches
(B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH)

HS24101	PROFESSIONAL ENGLISH	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- Improve the communicative competence of learners.
- Help learners use language effectively in academic /work contexts.
- Build on students' English language skills by engaging them in listening, speaking and grammar learning activities that are relevant to authentic contexts.
- Develop learners' ability to read and write complex texts, summaries, articles, blogs, definitions, essays and user manuals.
- Use language efficiently in expressing their opinions via various media

UNIT I INTRODUCTION OF EFFECTIVE COMMUNIATION 1

What is effective communication? (Explain using activities) Why is communication critical for excellence during study, research and work? What are the seven C's of effective communication? What are key language skills? What is effective listening? What does it involve? What is effective speaking? What does it mean to be an excellent reader? What should you be able to do? What is effective writing? How does one develop language and communication skills? What does the course focus on? How are communication and language skills going to be enhanced during this course? What do you as a learner need to do to enhance your English language and communication skills to get the best out of this course?

INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION 8

Reading - Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails. Writing - Writing emails / letters introducing oneself. Grammar - Present Tense (simple and progressive); Question types: Why/ Yes or No/ and Tags. Vocabulary - Synonyms; One word substitution; Abbreviations & Acronyms (as used in technical contexts).

UNIT II NARRATION AND SUMMATION 9

Reading-Reading biographies, travelogues, newspaper reports, Excerpts from literature, and travel & technical blogs. Writing - Guided writing-- Paragraph writing Short Report on an event (field trip etc.) Grammar–Past tense(simple); Subject Verb Agreement; and Prepositions. Vocabulary-Word forms (prefixes& suffixes); Synonyms and Antonyms. Phrasal verbs

UNIT III DESCRIPTION OF PROCESS AND PRODUCT 9

Reading – Reading advertisements, gadget reviews; user manuals. Writing - Writing definitions; instructions; and Product /Process description. Grammar - Imperatives; Adjectives; Degrees of comparison; Present & Past Perfect Tenses. Vocabulary - Compound Nouns, Homonyms; and Homophones, discourse markers (connectives & sequence words).

UNIT IV CLASSIFICATION 9

Reading–Newspaper articles; Journal reports–and Non-Verbal Communication (tables, pie charts etc.,). Writing–Note-making/Note-taking (*Study skills to be taught, not tested); Writing recommendations; Transferring information from nonverbal (chart , graph etc., to verbal mode) Grammar–Forms of Verbs, Articles; Pronouns- Possessive & Relative pronouns. Vocabulary-Collocations; Fixed/Semi fixed expressions.

UNIT V EXPRESSION OF VIEWS 9

Reading–Reading editorials; and Opinion Blogs; Writing–Minutes of Meeting, Essay Writing (Descriptive or narrative). Grammar – Future Tenses, Punctuation; Negation (Statements & Questions); and Simple, Compound & Complex Sentences. Vocabulary-Cause & Effect Expressions–Content vs Function words.

Total: 45 Periods

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1: Use appropriate words in a professional context**.**

CO2: Gain understanding of basic grammatical structures and use them in right context.

CO3: Read and interpret and also infer information presented in tables, charts, denotative and connotative meanings of technical texts and other graphic forms.

CO4: Write definitions, descriptions, narrations and essays on various topics.

TEXTBOOKS:

1. English for Engineers & Technologists Orient Black Swan Private Ltd. Department of English, Anna University, (2020 edition)
2. English for Science & Technology CambridgeUniversityPress,2021. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. K N. Shoba, and Dr. Lourdes Joevani Department of English, Anna University.

REFERENCEBOOKS:

1. Technical Communication– Principles and Practices By Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.
2. A Course Book on Technical English By Lakshminarayanan, Scitech Publications (India) Pvt. Ltd.
3. English for Technical Communication (With CD) By Aysha Viswa Mohan, McGraw Hill Education, ISBN: 0070264244.
4. Effective Communication Skill, Kulbhusan Kumar, RS Salaria, Khanna Publishing House.
5. Learning to Communicate–Dr. V. Chellammal, Allied Publishing House, New Delhi,2003.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2		2		2	2		3	3	2	2	1		
CO2		2		2		2	2		3	3	2	2	1		
CO3		2		2		2	2		3	3	2	3	1		
CO4		1		2		3	2		3	3	2	3	1		
Avg		**1.75**		**2**		**2.25**	**2**		**3**	**3**	**2**	**2.5**	**1**		

1 - Low, 2 - Medium, 3 - High

SEMESTER-I
Common To All Branches
B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH

MA24101	ALGEBRA AND CALCULUS	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To familiarize the students with differential calculus.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.
- To introduce integral ideas in solving areas, volumes and other practical problems in vector.

UNIT I MATRICES 9+3

Eigen values and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigen values and Eigenvectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms – Applications: Stretching of an elastic membrane.

UNIT II DIFFERENTIAL CALCULUS 9+3

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation - Applications: Maxima and Minima of functions of one variable.

UNIT III FUNCTIONS OF SEVERAL VARIABLES 9+3

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Applications: Maxima and minima of functions of two variables and Lagrange's method of undetermined multipliers.

UNIT IV MULTIPLE INTEGRALS 9+3

Double integrals in Cartesian and polar coordinates - Change of order of integration in Cartesian coordinates - Area enclosed by plane curves - Change of variables in double integrals -Triple integrals - Volume of Solids. Applications: Moments and centres of mass, moment of inertia.

UNIT V VECTOR CALCULUS 9+3

Gradient, divergence and curl (excluding vector identities) – Directional derivative –Irrotational and Solenoidal vector fields – Vector integration – Green's theorem in a plane and Gauss divergence theorem and Stoke's theorem (without proof) – Simple applications involving cubes and rectangular parallelopipeds.

Total: 60 Periods

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1: Demonstrate the matrix techniques in solving the related problems in engineering and technology.

CO2: Apply differential calculus tool to solve engineering applications.

CO3: Use differential calculus ideas on functions several variables.

CO4: Evaluate the area and volume by applying the concept of multiple integration.

CO5: Utilize the concept of vector calculus in evaluating integrals.

TEXTBOOKS:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition,
2. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.

REFERENCEBOOKS:

1. M. K. Venkataraman, "Engineering Mathematics", Volume I, 4th Edition, The National Publication Company, Chennai, 2003.
2. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, 5th Edition, New Delhi, 2017.
3. H. K. Dass and Er. Rajnish Verma, "Higher Engineering Mathematics", S. Chand Private Limited, 3rd Edition 2014.
4. B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, 6th Edition, New Delhi, 2008.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2					2		2	3		1	1
CO2	3	3	1	2					2		2	3		1	1
CO3	3	3	2	2					2		2	3		1	1
CO4	3	3	1	1					2		2	3		1	1
CO5	3	3	2	2					2		2	3		1	1
Avg	**3**	**3**	**1.6**	**1.6**					**2**		**2**	**3**		**1**	**1**

1 - Low, 2 - Medium, 3 - High

SEMESTER-I
Common To All Branches
B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH

PH24101	ENGINEERING PHYSICS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To make the students achieve an understanding of mechanics.
- To enable the students to gain knowledge of electromagnetic waves and its applications.
- To introduce the basics of oscillations, optics and lasers.
- Equipping the students to successfully understand the importance of quantum physics.
- To motivate the students towards the applications of quantum mechanics.

UNIT I MECHANICS 9

Multi-particle dynamics: Center of mass (CM) – CM of continuous bodies – motion of the CM – kinetic energy of the system of particles. Rotation of rigid bodies: Rotational kinematics – rotational kinetic energy and moment of inertia - theorems of M. I – moment of inertia continuous bodies – M.I of a diatomic molecule-rotational energy state of a rigid diatomic molecule - torque – rotational dynamics of rigid bodies – conservation of angular momentum - gyroscope - torsional pendulum.

UNIT II ELECTROMAGNETIC WAVES 9

The Maxwell's equations - wave equation; Plane electromagnetic waves in vacuum, - properties of electromagnetic waves: speed, amplitude, phase, orientation and waves in matter - Source of electromagnetic waves. EM waves: Energy, momentum, intensity and radiation pressure - Cell-phone reception. Reflection and transmission of electromagnetic waves from a non-conducting medium vacuum interface for normal incidence.

UNIT III OSCILLATIONS, OPTICS AND LASERS 9

Simple harmonic motion – resonance –analogy between electrical and mechanical oscillating systems – waves on a string – standing waves – traveling waves – Energy transfer of a wave – sound waves – Doppler effect. Reflection and refraction of light waves – total internal reflection – interference –Michelson interferometer – Theory of air wedge and experiment. Theory of laser – characteristics – Spontaneous and stimulated emission – Einstein's coefficients – population inversion – Nd-YAG laser, CO2 laser, semiconductor laser –Basic applications of lasers in industry.

UNIT IV BASIC QUANTUM MECHANICS 9

Photons and light waves – Electrons and matter waves –Compton effect – Schrodinger equation (Time dependent and time independent forms) – Physical meaning of wave function – particle in a infinite one dimensional (1D) potential well - Normalization, probabilities and the correspondence principle.

UNIT V APPLIED QUANTUM MECHANICS 9

The harmonic oscillator (qualitative)- Barrier penetration and quantum tunneling(qualitative)- Tunneling microscope – Resonant diode – Finite potential wells (qualitative)- Bloch's theorem for particles in a periodic potential –Basics of Kronig-Penney model and origin of energy bands.

Total: 45 Periods

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1: Recognized the importance of mechanics.

CO2: Express their knowledge in electromagnetic waves.

CO3: Demonstrate a strong foundational knowledge in oscillations, optics and lasers.

CO4: Illustrate the importance of quantum physics.

CO5: Comprehend and apply quantum mechanical principles towards the formation of energy bands.

TEXTBOOKS:

1. D. Kleppner and R. Kolenkow. An Introduction to Mechanics. McGraw Hill Education (Indian Edition), 2017.
2. E.M. Purcell and D.J. Morin, Electricity and Magnetism, Cambridge Univ.Press, 2013.
3. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, Concepts of Modern Physics, McGraw-Hill (Indian Edition), 2017.

REFERENCEBOOKS:

1. R. Wolfson. Essential University Physics. Volume 1 & 2. Pearson Education (Indian Edition), 2009.
2. Paul A. Tipler, Physic – Volume 1 & 2, CBS, (Indian Edition), 2004.
3. K. Thyagarajan and A. Ghatak. Lasers: Fundamentals and Applications, Laxmi Publications, (Indian Edition), 2019.
4. Halliday, R. Resnick and J. Walker. Principles of Physics, Wiley (Indian Edition), 2015.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	1	-	-	1	-	1	-	-	-	-	-
CO2	3	2	2	1	2	1	2	2	-	1	-	2	-	1	
CO3	3	2	1	1	2	1	1	1	-	1	-	2	-	1	-
CO4	3	3	2	2	2	-	1	2	-	1	-	2	-	1	1
CO5	2	3	2	1	1	1	-	2	-	1	-	2	-	-	-
Avg	**2.8**	**2.6**	**1.75**	**1.25**	**1.6**	**1**	**1.3**	**1.6**	**-**	**1**	**-**	**2**	-	1	1

1 - Low, 2 - Medium, 3 - High

SEMESTER-I
Common To All Branches
B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH

CY24101	ENGINEERING CHEMISTRY	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To inculcate sound understanding of water quality parameters and water treatment techniques.
- To impart knowledge on the basic principles and preparatory methods of nanomaterials.
- To introduce the basic concepts and applications of phase rule and composites.
- To facilitate the understanding of different types of fuels, their preparation, properties and combustion characteristics.
- To familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices.

UNIT I WATER AND ITS TREATMENT 9

Water: Sources and impurities, Water quality parameters: Definition and significance of-color, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD, fluoride and arsenic. Municipal water treatment: primary treatment and disinfection (UV, Ozonation, break-point chlorination). Desalination of brackish water: Reverse Osmosis. Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming & foaming. Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and Calgon conditioning) and External treatment – Ion exchange demineralization and zeolite process.

UNIT II NANOCHEMISTRY 9

Basics: Distinction between molecules, non-materials and bulk materials; Size-dependent properties (optical, electrical, mechanical and magnetic); Types of non-material's: Definition, properties and uses of – nanoparticle, nanocluster, nanorod, nanowire and nanotube. Preparation of nanomaterials: sol-gel, solvothermal, laser ablation, chemical vapor deposition, electrochemical deposition and electro spinning. Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.

UNIT III PHASE RULE AND COMPOSITES 9

Phase rule: Introduction, definition of terms with examples. One component system - water system; Reduced phase rule; Construction of a simple eutectic phase diagram - Thermal analysis; Two component system: lead-silver system - Pattinson process. Composites: Introduction: Definition & Need for composites; Constitution: Matrix materials (Polymer matrix, metal matrix and ceramic matrix) and Reinforcement (fiber, particulates, flakes and whiskers). Properties and applications of: Metal matrix composites (MMC), Ceramic matrix composites and Polymer matrix composites. Hybrid composites - definition and examples.

UNIT IV FUELS AND COMBUSTION 9

Fuels: Introduction: Classification of fuels; Coal and coke: Analysis of coal (proximate and ultimate), Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method). Petroleum and Diesel: Manufacture of synthetic petrol (Bergius process), Knocking - octane number, diesel oil – cetane number; Power alcohol and biodiesel. - natural gas- compressed natural gas (CNG)- liquefied petroleum gases(LPG).

Combustion of fuels: Introduction: Calorific value - higher and lower calorific values, Theoretical calculation of calorific value; Ignition temperature: spontaneous ignition temperature, Explosive range; Flue gas analysis - ORSAT Method. CO2 emission and carbon footprint.

UNIT V ENERGY SOURCES AND STORAGE DEVICES 9

Stability of nucleus: mass defect (problems), binding energy; Nuclear energy: light water nuclear power plant, breeder reactor- environmental consequences of fossil fuel- Importance of renewable energy sources -Solar energy conversion: Principle, working and applications of solar cells; Recent developments in solar cell materials. Batteries: Types of batteries- lead acid battery- Solid Battery – Lithium Battery, Lithium-ion; Battery Electric vehicles-working principles; Fuel cells: H2-O2 fuel cell, microbial fuel cell.

Total: 45 Periods

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1: Infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.

CO2: Identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nonmaterial for engineering and technology applications.

CO3: Apply the knowledge of phase rule and composites for material selection.

CO4: Analyze the quality of fuel and its various uses.

CO5: Recognize different forms of energy resources and apply them for suitable applications in energy sectors.

TEXTBOOKS:

1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
3. S.S. Dara, "A text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.

REFERENCEBOOKS:

1. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
2. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2				1	1	2							
CO2	2		1	1	2	2	2	1				3		1	1
CO3	3	1				-	-	2				3			
CO4	3	1	1			1	3	2				2			
CO5	3	2	2	2		3	3	1				3			1
Avg	**2.8**	**1.5**	**1.33**	**1.5**	**2**	**1.75**	**2.25**	**1.6**				**2.75**		**1**	**1**

1 - Low, 2 - Medium, 3 - High

SEMESTER-I
Common To All Branches
B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH

GE24101	PROBLEM SOLVING AND PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the basics of algorithmic problem solving.
- To learn to solve problems using Python conditionals and loops.
- To define Python functions and use function calls to solve problems.
- To use Python data structures - lists, tuples, dictionaries to represent complex data.
- To do input/output with files in Python.

UNIT I COMPUTATIONAL THINKING AND PROBLEM SOLVING 9

Fundamentals of Computing – Identification of Computational Problems -Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

UNIT II DATA TYPES, EXPRESSIONS, STATEMENTS 9

Python interpreter and interactive mode, debugging; values and types: int, float, Boolean, string, and list; variables, expressions, statements, tuple assignment, operators, precedence of operators, comments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

UNIT III CONTROL FLOW, FUNCTIONS, STRINGS 9

Conditionals: Boolean values and conditional (if), alternative (if-else), chained conditional (if-elif-else);Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, GCD, exponentiation, sum an array of numbers, linear search, binary search.

UNIT IV LISTS, TUPLES, DICTIONARIES 9

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: simple sorting, histogram, Students marks statement, Retail bill preparation.

UNIT V FILES, MODULES, PACKAGES 9

Files and exceptions: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, Predefined modules (Numpy Pandas, Matplotlib, Scipy, Django) packages; Illustrative programs: word count, copy file, Voter's age validation, Marks range validation (0-100).

Total: 45 Periods

COURSE OUTCOMES:

Upon completion of the course, students will be able to

CO1: Develop algorithmic solutions to simple computational problems.

CO2: Develop and execute simple Python programs.

CO3: Write simple Python programs using conditionals and loops for solving problems.

CO4: Represent compound data using Python lists, tuples, dictionaries etc.

CO5: Read and write data from/to files in Python programs.

TEXT BOOKS:

1. Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly Publishers, 2016.
2. Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition, BCS Learning & Development Limited, 2017.
3. Python Data Science Handbook: Essential Tools for Working with Data, Second Edition (Grayscale Indian Edition) by Jake VanderPlas.

REFERENCES:

1. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.
2. G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
3. John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data", Third Edition, MIT Press, 2021
4. Eric Matthes, "Python Crash Course, A Hands - on Project Based Introduction to Programming", 2nd Edition, No Starch Press, 2019.
5. https://www.python.org/
6. Martin C. Brown, "Python: The Complete Reference", 4th Edition, Mc-Graw Hill, 2018.Comparison of Existing and Revised Syllabus

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3		2							1	1		
CO2	3	3	3		2							1	1		
CO3	3	3	3		2							1	1	1	
CO4	3	3	3		2						1	1	1	1	
CO5	3	2	1		1						1	1	1	1	
Avg	**3**	**2.8**	**2.6**		**1.8**						**0.5**	**1**	**1**	**1**	

1 - Low, 2 - Medium, 3 - High

SEMESTER-I
Common To All Branches
B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH

TA24101	HERITAGE OF TAMILS	L	T	P	C
		1	0	0	1

UNIT I LANGUAGE AND LITERATURE 3

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE 3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT III FOLK AND MARTIAL ARTS 3

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV THINAI CONCEPT OF TAMILS 3

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE 3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

Total: 15 Periods

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு மக்களும் பண்பாடு மற்றும் கல்வியியல் பணிகள் கழகம்.
2. கணினித் தமிழ் முனைவர் இல.சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தோல்லியல் துறை வெளியீடு).
4. பொருநை - ஆற்றங்கரை நாகரிகம் (தோல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print).

6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

SEMESTER-I
Common To All Branches
B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH

GE24102	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To understand the problem-solving approaches.
- To learn the basic programming constructs in Python.
- To practice various computing strategies for Python-based solutions to real world problems.
- To use Python data structures - lists, tuples, dictionaries.
- To do input/output with files in Python.

LIST OF EXPERIMENTS

1. Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same. (Electricity Billing, Retail shop billing, Sin series, weight of a motorbike, Weight of a steel bar, compute Electrical Current in Three Phase AC Circuit, etc.)
2. Python programming using simple statements and expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).
3. Scientific problems using Conditionals and Iterative loops. (Number series, Number Patterns, pyramid pattern)
4. Implementing real-time/technical applications using Lists, Tuples. (Items present in a library/Components of a car/ Materials required for construction of a building –operations of list & tuples)
5. Implementing real-time/technical applications using Sets, Dictionaries. (Language, components of an automobile, Elements of a civil structure, etc.- operations of Sets & Dictionaries)
6. Implementing programs using Functions. (Factorial, largest number in a list, area of shape)
7. Implementing programs using Strings. (Reverse, palindrome, character count, replacing characters)
8. Implementing programs using written modules and Python Standard Libraries (pandas, numpy, Matplotlib, scipy)
9. Implementing real-time/technical applications using File handling. (Copy from one file to another, word count, longest word)
10. Implementing real-time/technical applications using Exception handling. (Divide by zero error, voter's age validity, student mark range validation)
11. Exploring Pygame tool.
12. Developing a game activity using Pygame like bouncing ball, car race etc.

Total: 60 Periods

COURSE OUTCOMES:

On completion of the course, students will be able to:

CO1 : Develop algorithmic solutions to simple computational problems

CO2 : Develop and execute simple Python programs.

CO3 : Implement programs in Python using conditionals and loops for solving problems.

CO4 : Process compound data using Python data structures.

CO5 : Utilize Python packages in developing software applications.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2						3	2	1		
CO2	3	3	3	3	2						3	2	1		
CO3	3	3	3	3	2						3		1	1	
CO4	1	2			1						1		1	1	
CO5	2	2			2						2		1	1	
Avg	**2.4**	**2.6**	**3**	**3**	**1.8**						**2.4**	**2**	**1**	**1**	

1 - Low, 2 - Medium, 3 - High

SEMESTER-I
Common To All Branches
B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH

PC24101	PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C
		0	0	4	2

PHYSICS LABORATORY

COURSE OBJECTIVES:

- To learn the proper use of various kinds of physics laboratory equipment
- To learn how data can be collected, presented and interpreted in a clear and concise manner.
- To learn problem solving skills related to physics principles and interpretation of experimental data.
- To determine error in experimental measurements and techniques used to minimize such error.
- To make the student as an active participant in each part of all lab exercises.

EXPERIMENT TOPICS: (Any seven experiments to be conducted)

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of regular and irregular objects.
2. Simple harmonic oscillations of cantilever.
3. Non-uniform bending - Determination of Young's modulus
4. Uniform bending – Determination of Young's modulus
5. Laser- Determination of the wave length of the laser using grating
6. Air wedge - Determination of thickness of a thin sheet/wire
7. a) Optical fibre -Determination of Numerical Aperture and acceptance angle
   b) Compact disc- Determination of width of the groove using laser.
8. Acoustic grating- Determination of velocity of ultrasonic waves in liquids.
9. Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids
10. Post office box -Determination of Band gap of a semiconductor.
11. Photoelectric effect
13. Michelson Interferometer.
14. Melde's string experiment
15. Experiment with lattice dynamics kit.

CHEMISTRY LABORATORY

COURSE OBJECTIVES:

- To inculcate experimental skills to test basic understanding of water quality parameters, such as, acidity, alkalinity, hardness, DO, chloride and copper.
- To induce the students to familiarize with electro analytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions.
- To demonstrate the analysis of metals and alloys.
- To demonstrate the synthesis of nanoparticles.

EXPERIMENT TOPICS: (Any seven experiments to be conducted)

1. Preparation of Na2CO3 as a primary standard and estimation of acidity of a water sample using the primary standard
2. Determination of types and amount of alkalinity in water sample.Split the first experiment into two
3. Determination of total, temporary & permanent hardness of water by EDTA method.
4. Determination of DO content of water sample by Winkler's method.
5. Determination of chloride content of water sample by Argentometric method.
6. Estimation of copper content of the given solution by Iodometry.
7. Estimation of TDS of a water sample by gravimetry.
8. Determination of strength of given hydrochloric acid using pH meter.
9. Determination of strength of acids in a mixture of acids using conductivity meter.
10. Conductometric titration of barium chloride against sodium sulphate (precipitation titration)
11. Estimation of iron content of the given solution using potentiometer.
12. Estimation of sodium /potassium present in water using flame photometer.
13. Preparation of nanoparticles (TiO2/ZnO/CuO) by Sol-Gel method.
14. Estimation of Nickel in steel
15. Proximate analysis of Coal

COURSE OUTCOMES:

Upon completion of the course, the students should be able to

CO1 : Analysis the Modulus of elasticity of materials.
CO2 : Illustrate the Laser and Optical fiber.
CO3 : Determine the wavelength of Ultrasonic wave in Liquid.
CO4 : Analyze the effect of chloride in water and DO present in sample water.
CO5 : Identify basicity acidity and pH of the materials

TEXT BOOKS:

1. J. Mendham, R. C. Denney, J.D. Barnes, M. Thomas and B. Sivasankar, Vogel's, Textbook of Quantitative Chemical Analysis (2009).

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3		1			2	2	1				2			
CO2	3	1	2			1	2	2				1		1	1
CO3	3	2	1	1			1	1						1	1
CO4	2	1	2			2	2	2							
CO5	2	1	2		1	2	2	2				1	1		1
Avg	**2.6**	**1.3**	**1.6**	**1**	**1**	**1.4**	**1.8**	**1.6**				**1.3**	**1**	**1**	**1**

1 - Low, 2 - Medium, 3 - High

SEMESTER-I
Common To All Branches
B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH

HS24102	ENGLISH LABORATORY	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- To improve the communicative competence of learners
- To help learners use language effectively in academic/work contexts
- To develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos etc.
- To build on students' English languages kills by engaging the listening, speaking and grammar learning activities that is relevant to authentic contexts.
- To use language efficiently in expressing their opinions via various media.

UNIT I INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION 6

Listening for general information-specific details- conversation: Introduction to classmates - Audio / video (formal & informal); Telephone conversation; Listening to voicemail & messages; Listening and filling a form. Speaking - making telephone calls-Self Introduction; Introducing a friend; - politeness strategies- making polite requests, making polite offers, replying to polite requests and offers- understanding basic instructions (filling out a bank application for example).

UNIT II NARRATION AND SUMMATION 6

Listening - Listening to podcasts, anecdotes / stories / event narration; documentaries and interviews with celebrities. Speaking - Narrating personal experiences / events-Talking about current and temporary situations & permanent and regular situations* - describing experiences and feelings- engaging in small talk- describing requirements and abilities.

UNIT III DESCRIPTION OF PROCESS/ PRODUCT 6

Listening - Listen to product and process descriptions; a classroom lecture; and advertisements about products. Speaking – Picture description- describing locations in workplaces- Giving instruction to use the product-explaining uses and purposes- Presenting a product- describing shapes and sizes and weights- talking about quantities (large & small)-talking about precautions.

UNIT IV CLASSIFICATOIN AND RECOMMENDATIONS 6

Listening – Listening to TED Talks; Listening to lectures - and educational videos. Speaking – Small Talk; discussing and making plans-talking about tasks-talking about progress- talking about positions and directions of movement-talking about travel preparations- talking about transportation-

UNIT V DISCUSSION 6

Listening –Listening to debates/discussions; different viewpoints on an issue; and panel discussions. Speaking –making predictions- talking about a given topic-giving opinions- understanding a website- describing processes

Total: 30 Periods

COURSE OUTCOMES:

At the end of the course, learners will be able

CO1 : To listen and comprehend complex academic texts

CO2 : To speak fluently and accurately in formal and informal communicative contexts

CO3 : To express their opinions effectively in both oral and written medium of communication

Assessment Pattern

- Conduction of Assessment to test speaking and writing skills

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		2		3		2	3		3	3	3	1	1		
CO2		2		3		2	3		3	3	3	1	1		
CO3		2		3		1	1		1	3	1	1	1		
Avg		**2**		**3**		**1.6**	**2.3**		**2.3**	**3**	**2.3**	**1**	**1**		

1 - Low, 2 - Medium, 3 - High

SEMESTER-II
Common To All Branches
(B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH)

MA24201	STATISTICS AND NUMERICAL TECHNIQUES	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

The student should be made to:

- This course aims at providing the necessary basic concepts of a few statistical and numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology.
- To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems.
- To introduce the basic concepts of solving algebraic and transcendental equations.
- To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines.
- To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.

UNIT I TESTING OF HYPOTHESIS 9+3

Sampling distributions - Tests for single mean, proportion and difference of means (Large and small samples) – Tests for single variance and equality of variances – Chi square test for goodness of fit – Independence of attributes.

UNIT II DESIGN OF EXPERIMENTS 9+3

One way and two - way classifications - Completely randomized design – Randomized block design – Latin square design - 2^2 factorial design.

UNIT III SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9+3

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method- Solution of linear system of equations - Gauss elimination method – Pivoting - Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel - Eigenvalues of a matrix by Power method and Jacobi's method for symmetric matrices.

UNIT IV INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION 9+3

Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Approximation of derivates using interpolation polynomials – Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules.

UNIT V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATION 9+3

Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first order differential equations - Multi step methods: Milne's and Adams - Bash forth predictor corrector methods for solving first order differential equations.

Total: 60 Periods

COURSE OUTCOMES

At the end of the course, the students should be able to

CO1 : Apply the concept of testing of hypothesis for small and large samples in real life problems.

CO2 : Apply the basic concepts of classifications of design of experiments in the field of agriculture.

CO3 : Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.

CO4 : Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

CO5 : Solve the partial and ordinary differential equations with initial and boundary condition by using certain techniques with engineering applications.

TEXT BOOKS:

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
2. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.

REFERENCES:

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
3. Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007.
4. Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12th Edition, 2020.
5. Spiegel. M.R., Schiller. J. and Srinivasan. R.A., "Schaum's Outlines on Probability and Statistics ", Tata McGraw Hill Edition, 4th Edition, 2012.
6. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", 9th Edition, Pearson Education, Asia, 2010.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1	1	1						2	2		1	
CO2	3	2	1	2	2						2	3		1	
CO3	2	2	1	1	1						2	2		1	
CO4	2	3	1	1	1						1	3		1	
CO5	2	3	1	1	1						2	2		1	
Avg	**2.2**	**2.6**	**1**	**1.2**	**1.2**						**1.8**	**2.4**		**1**	

1 - Low, 2 - Medium, 3 - High

SEMESTER-II
B.E. –ELECTRICAL AND ELECTRONICS ENGINEERNG

PH24202	PHYSICS FOR ELECTRICAL ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To make the students to understand the basics of dielectric materials and insulation.
- To understand the electrical properties of materials including free electron theory, applications of quantum mechanics.
- To instill knowledge on physics of semiconductors, determination of charge carriers and device applications
- To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications
- To inculcate an idea of significance of nano structures, quantum confinement and ensuing nano device applications.

UNIT I DIELECTRIC MATERIALS AND INSULATION 9

Matter polarization and relative permittivity: definition – dipole moment and polarization vector Polarization mechanisms: electronic, ionic, orientational, interfacial and total polarization – frequency dependence – local field and Causius-Mossetti equation – dielectric constant and dielectric loss – dielectric strength - dielectric breakdown mechanism – capacitor materials – typical capacitor constructions.

UNIT II ELECTRICAL AND MAGNETIC PROPERTIES OF MATERIALS 9

Classical free electron theory - Expression for electrical conductivity – Wiedmann Franz law-Thermal conductivity, expression - Quantum free electron theory : Fermi- Dirac statistics – Density of energy states – Electron in periodic potential – Energy bands in solids – tight binding approximation - Electron effective mass – concept of hole. Magnetic materials: Dia, para and ferromagnetic effects – paramagnetism in the conduction electrons in metals – exchange interaction and ferromagnetism – quantum interference devices – GMR devices.

UNIT III SEMICONDUCTING AND TRANSPORT PHYSICS 9

Intrinsic semiconductors – energy band diagram –direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – Extrinsic semiconductors - Carrier concentration in n-type & p-type semiconductors – variation of carrier concentration with temperature – variation of Fermi level with temperature and impurity concentration – carrier transport in semiconductor – drift and diffusion transport – Hall effect and devices – Ohmic contacts – Schottky diode and its applications.

UNIT IV OPTICAL PROPERTIES OF MATERIALS 9

Classification of optical materials – Optical processes in semiconductors: optical absorption and emission, charge injection and recombination, excitonic state - optical absorption, loss and gain. Optical processes in quantum wells – Optoelectronic devices: light detectors and solar cells – light emitting diode - optical processes in organic semiconductor devices.

UNIT V NANO DEVICES 9

Density of states for solids - Significance between Fermi energy and volume of the material – Quantum confinement – Quantum structures – Density of states for quantum wells, wires and dots – Band gap of nanomaterials –Tunneling – Single electron phenomena – Single electron Transistor. Conductivity of metallic nanowires –Quantum resistance and conductance –Spintronic devices and applications – Optics in quantum structures – quantum well laser.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

At the end of the course, the students should be able to

CO1 : Infer the basics of dielectric materials and its properties
CO2 : Apply the knowledge on the electrical and magnetic properties of materials and their applications
CO3 : Illustrate clearly of semiconductor physics and functioning of semiconductor devices
CO4 : Extend the optical properties of materials and working principles of various optical devices
CO5 : Illustrate the importance of nanotechnology and nano devices.

TEXT BOOKS:

1. V.Raghavan. Materials Science and Engineering: A First Course, Prentice Hall India Learning Private Limited, 2015.
2. S.O. Kasap, Principles of Electronic Materials and Devices, Mc-Graw Hill, 2018.
3. Jasprit Singh, Semiconductor Devices: Basic Principles, Wiley (India), 2007.
4. Jasprit Singh, Semiconductor Optoelectronics: Physics and Technology, Mc-Graw Hill India (2019)
5. G.W.Hanson. Fundamentals of Nanoelectronics. Pearson Education (Indian Edition), 2009.
6. Arumugam.M, Materials Science. Anuradha publishers, 2010.
7. PillaiS.O., Solid State Physics. New Age International (P) Ltd., publishers, 2009

REFERENCES:

1. R.Balasubramaniam, Callister's Materials Science and Engineering. Wiley (Indian Edition), 2014.
2. Wendelin Wright and Donald Askeland, Essentials of Materials Science and Engineering, CL Engineering, 2013.
3. Robert F.Pierret, Semiconductor Device Fundamentals, Pearson, 2006
4. Pallab Bhattacharya, Semiconductor Optoelectronic Devices, Pearson, 2017
5. Ben Rogers, Jesse Adams and Sumita Pennathur, Nanotechnology: Understanding Small Systems, CRC Press, 2017.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3			1			1		1			1		
CO2	3	2	2	1	2	1	2	2		1		2	2	2	
CO3	3	2	1	1	2	1	1	1		1		2	2	2	
CO4	3	3	2	2	2		1	2		1		2	1	1	
CO5	2	3	2	1	1	1		2		1		2	1		1
Avg	2.8	2.6	1.4	1	1.6	0.6	0.8	1.6		1		1.6	1.4	1.7	1

1 - Low, 2 - Medium, 3 - High

SEMESTER-II
Common To All Branches
B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH

GE24201	ENGINEERING GRAPHICS	L	T	P	C
		2	0	3	4

COURSE OBJECTIVES:

- To understand the importance of the drawing in engineering applications.
- To develop graphic skills for communication of concepts, ideas and design of engineering products.
- To expose them to existing national standards related to technical drawings.
- To improve their visualization skills so that they can apply this skill in developing new products.
- To improve their technical communication skill in the form of communicative drawings.

UNIT-I PLANE CURVES AND PROJECTION OF POINTS 5+9

Importance of graphics in engineering applications–Use of drafting instruments– BIS conventions and specifications–size, layout and folding of drawing sheets– lettering and dimensioning. (Not for examination)
Curves used in engineering practices: Conics–construction of ellipse, parabola and hyperbola by eccentricity method, cycloidal curves–construction of cycloid, construction of involutes of square and circle–drawing of tangents and normal to the above curves. Orthographic projection – principles – principal planes – first angle projection – projection of points.

UNIT-II PROJECTION OF LINES AND PLANE SURFACES 5+9

Projection of straight lines (only first angle projection) inclined to both the principal planes – determination of true lengths and true inclinations by rotating line method and traces.
Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT-III PROJECTION OF SOLIDS AND SECTION OF SOLIDS 5+9

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.
Sectioning of solids in simple position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section.

UNIT-IV DEVELOPMENT OF SURFACE AND ISOMETRIC PROJECTIONS 5+9

Development of lateral surfaces of simple and sectioned solids – prisms, pyramids cylinders and cones. Principles of isometric projection – isometric scale –isometric projections of simple solids and truncated solids –prisms, pyramids, cylinders, cones and combination of two solid objects in simple vertical positions.

UNIT-V FREE HAND SKETCHING AND PERSPECTIVE PROJECTIONS 5+9

Visualization concepts–representation of three dimensional objects – layout of views–freehand sketching of multiple views from pictorial views of objects.
Principle of perspective projection – terminology –perspective projection of simple solids-prisms, pyramids, cylinder and cone by visual ray method.

UNIT-VI COMPUTER AIDED DRAFTING (Not for examination) 5

Introduction to drafting packages: Initial Setup Commands, Coordinate system in AutoCAD, UCS, WCS, and MCS. Draw Commands, Modify Commands, View Commands, Annotation commands, 2D Drawings and 3D Models -Simple Exercises.

Total: 75 Periods

COURSE OUTCOMES

On successful completion of this course, the student will be able

CO1 : To construct different plane curves and to comprehend the theory of projection.

CO2 : To project orthographic projections of lines and plane surfaces.

CO3 : To draw the projection of simple solids and sectional solids.

CO4 : To draw the development of lateral surfaces of sectional solids and Isometric projections of solids.

CO5 : To perform freehand sketching of multiple views from pictorial viewand visualize perspective view of simple solids.

TEXT BOOKS:

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 51th Edition, 2012.
2. Natarajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 31th Edition, 2018.

REFERENCE BOOKS:

1. Varghese P I., "Engineering Graphics", McGraw Hill Education (I) Pvt. Ltd., First Edition, 2013.
2. Venugopal K. and PrabhuRaja V., "Engineering Graphics", New Age International (P) Limited, 12th Edition, 2014.
3. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores, Bangalore, 23th Edition, 2017.
4. Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill Publishing Company Limited, New Delhi, 2nd Edition, 2008.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2					2		3		2	1		1
CO2	3	2	2					2		3		2	1		1
CO3	3	2	2					2		3		2	1		1
CO4	3	2	2					2		3		2	1		1
CO5	3	2	2					2		3		2	1		1
Avg	**3**	**2**	**2**					**2**		**3**		**2**	**1**		**1**

1 - Low, 2 - Medium, 3 - High

SEMESTER-II
B.E. –ELECTRICAL AND ELECTRONICS ENGINEERNG

EE24201	ELECTRICAL MEASUREMENTS AND ELECTROMAGNETIC FIELDS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To illuminate the knowledge on the functional aspects of measuring instruments.
- To interpret the importance of various bridge circuits used with measuring instruments.
- To demonstrate the fundamental working of sensors and transducers and their applications.
- To enlighten the concepts of Electrostatic fields, electric potential, energy density and their applications.
- To enlighten the concepts of Magneto static fields, magnetic flux density, vector potential and its applications.

UNIT I MEASUREMENT OF PARAMETERS IN ELECTRICAL SYSTEMS 9

Classification of instruments – moving coil and moving iron meters – Induction type, dynamometer type watt meters – Energy meter – Megger – Instrument transformers (CT & PT).

UNIT II AC/DC BRIDGES AND INSTRUMENTATION AMPLIFIERS 9

Wheatstone bridge, Kelvin double bridge - Maxwell, Hay, Wien and Schering bridges – Errors and compensation in A.C. bridges - Instrumentation Amplifiers.

UNIT III TRANSDUCERS FOR MEASUREMENT OF NON- ELECTRICAL PARAMETERS 9

Classification of transducers – Measurement of pressure, temperature, displacement, flow, angular velocity – Digital transducers – Smart Sensors.

UNIT IV ELECTROSTATICS 9

Sources and effects of electromagnetic fields – Coordinate Systems – Vector fields –Gradient, Divergence, Curl – theorems and applications - Coulomb's Law - Gauss's law and applications.
Electric potential – Electric field in free space, conductors, dielectrics - Electric field in multiple dielectrics – Boundary conditions, Poisson's and Laplace's equations, Capacitance, Energy density, Applications.

UNIT V MAGNETOSTATICS AND ITS APPLICATION 9

Magentostatics: Biot-Savart's Law- Magnetic Field due Straight Conductors – Magnetic Flux – Magnetic Flux Density - Ampere's Circuital Law - H due to Circular Loop. Force and Inductance: Magnetic Force, Moving Charge in a Magnetic Field, Lorentz Force – Force Between Two Parallel Current Carrying Conductors - Self and Mutual Inductance – Inductance of Solenoid.

Total: 45 Periods

COURSE OUTCOME:

CO1 : Interpret the operating principles of measuring instruments and applications.
CO2 : Demonstrate the basic concepts of AC DC bridges and Instrumentation Amplifiers.
CO3 : Demonstrate the working principle, characteristics and applications of transducers and Smart Sensors.
CO4 : Interpret electromagnetic vector fields, electrostatic fields, electric potential, energy density along with their applications.

CO5 : Interpret magneto static fields, vector potential along with their applications, and Maxwell's equations.

TEXT BOOKS:

1. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015.
2. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010.
3. Mathew N. O. Sadiku, S.V. Kulkarni 'Principles of Electromagnetics', 6th Edition, Oxford University Press Inc. Asian edition, 2015.
4. William H. Hayt and John A. Buck, 'Engineering Electromagnetics', McGraw Hill Special Indian edition, 2014.
5. Kraus and Fleish, 'Electromagnetics with Applications', McGraw Hill International Editions, Fifth Edition, 2010.

REFERENCES:

1. J.J. Carr, 'Elements of Electronic Instrumentation and Measurement', Pearson Education India, New Delhi, 2011.
2. M.M.S. Anand, 'Electronics Instruments and Instrumentation Technology', Prentice Hall India, New Delhi, 2009.
3. R. K. Rajput, "Electrical and Electronics Measurements and Instrumentation", Chand Pub, 2016.
4. V.V.Sarwate, 'Electromagnetic fields and waves', Second Edition, Newage Publishers, 2018.
5. Joseph. A.Edminister, 'Schaum's Outline of Electromagnetics, Fifth Edition (Schaum's Outline Series), McGraw Hill, 2018.
6. S.P.Ghosh, Lipika Datta, 'Electromagnetic Field Theory', First Edition, McGraw Hill Education(India) Private Limited, 2017.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2		3	3	1	1		2		2	3	3	1
CO2	3	3	2		3	3	1	1		2		2	3	3	1
CO3	3	2	2		3	3	2	1		2		2	3	3	1
CO4	3	1			1	1	1			1		2	3	3	1
CO5	3	1			1	1	1			1		2	3	3	1
Avg	**3**	**1.8**	**2**		**2.2**	**2.2**	**1.2**	**1**		**1.6**		**2**	**3**	**3**	**1**

1 - Low, 2 - Medium, 3 - High

SEMESTER-II
B.E. –ELECTRICAL AND ELECTRONICS ENGINEERNG

ME24203	FUNDAMENTALS OF MECHANICAL ENGINEERING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To impart basic knowledge on thermodynamics processes.
- To familiarize on air, vapour and gas turbine power cycles.
- To provide the exposure on the fundamental of Heat transfer.
- To explain the components of power plant units and detailed explanation to IC engines their working principles.
- To understand the Pumps, Refrigeration and Air Conditioning system.

UNIT I INTRODRUCTION OF THERMODYNAMICS 9

Review of Basics – Thermodynamic systems, Properties and processes. Thermodynamic Equilibrium. Zeroth law – Concept of temperature and Temperature Scales. First law – application to closed and open systems. Second law – Kelvin's and Clausius statements. Heat Reservoir, source and sink. Heat Engine, Refrigerator, Heat pump., Carnot theorem, Carnot cycle, Reversed Carnot cycle, Efficiency, COP.

UNIT II AIR, VAPOUR AND GAS TURBINE CYCLES 9

Air Standard Cycles – Otto, Diesel, Dual, Comparison of Otto, Diesel and Dual cycles. Vapour Power Cycles - Rankine Cycle, losses, reheat cycle, regenerative cycle. Gas turbine cycles – open, closed. Brayton cycle-Performance and its improvement - Regenerative, Intercooled, Reheated cycles and their combination.

UNIT III HEAT TRANSFER 9

Modes of heat transfer – Conduction - Fourier's Law of Heat Conduction, Thermal Conductivity of Materials, Thermal Resistance. Convection- Newton's law of cooling, Boundary Layer Concept – Forced Convection and Free convection. Heat exchangers-Types of Heat Exchangers and its applications. Radiation – Stefan-Boltzmann law, Wien's law, Kirchhoff's law, and Planck's law. Surface emission properties, Absorption-Black Body and Gray body Radiation -Radiation Shields.

UNIT IV INTERNAL COMBUSTION ENGINES AND POWER PLANTS 9

Classification of Power Plants - Internal combustion engines as automobile power plant –Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Working principle of steam, Gas, Diesel, Hydro - electric and Nuclear Power plants – working principle of Boilers and Turbines.

UNIT V PUMPS, REFRIGERATION AND AIR CONDITIONING SYSTEM 9

Reciprocating Pumps (single acting and double acting) and Centrifugal Pumps. Terminology of Refrigeration and Air Conditioning. Principle of vapour compression and absorption system – layout of typical domestic refrigerator–Window, Split and Inverter type room Air conditioner.

Total: 45 Periods

OUTCOMES:

On successful completion of this course, the student will be able to

CO1 : Understand the basic concept of zeroth, first and second law of thermodynamics.

CO2 : Apply thermodynamic concepts to different air, vapour and gas turbine power cycles.

CO3 : Apply the knowledge gained in modes of heat transfer.

CO4 : Demonstrate working principles of petrol and diesel engine

CO5 : Elaborate the components of refrigeration and Air conditioning system.

TEXT BOOKS:

1. Nag.P.K., "Engineering Thermodynamics", 6th Edition, Tata McGraw Hill (2017), New Delhi.
2. R.C. Sachdeva, "Fundamentals of Engineering Heat & Mass transfer", New Age International Publishers, 2009
3. Ganesan.V, " Internal Combustion Engines" 4th Edition, Tata McGraw Hill, 2012.

REFERENCES:

1. G Shanmugam, M S Palanichamy, Basic Civil and Mechanical Engineering, McGraw Hill Education; First edition, 2018
2. Palanikumar, K. Basic Mechanical Engineering, ARS Publications, 2018.
3. Shantha Kumar SRJ., "Basic Mechanical Engineering", Hi-tech Publications, Mayiladuthurai,2000.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3			2					1			2	1	2	
CO2	3			2					1			2	2	2	
CO3	3			2					1			2	2	2	
CO4	3			2					1			2	2	3	
CO5	3			2					1			2	2	2	
Avg	**3**			**2**					**1**			**2**	**2**	**2**	

1 - Low, 2 - Medium, 3 - High

SEMESTER-II
Common To All Branches
(B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH)

TA24201	TAMILS AND TECHNOLOGY	L	T	P	C
		1	0	0	1

UNIT I WEAVING AND CERAMIC TECHNOLOGY 3

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY 3

Designing and Structural construction House & Designs in household materials during Sangam Age -Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III MANUFACTURING TECHNOLOGY 3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold-Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads -Terracotta beads - Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY 3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry -Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries –Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING 3

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries –Sorkuvai Project.

Total: 15 Periods

SEMESTER-II
Common To All Branches
(B.Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH)

TA242001	தமிழரும் மற்றும் தொழில்நுட்பம்	L	T	P	C
		1	-	-	1

அலகு I நெசவு மற்றும் பானை தொழில்நுட்பம் 3

சங்க காலத்தில் நெசவுத் தொழில் - பானை தொழில்நுட்பம் - கருப்பு மற்றும் சிவப்பு பாண்டங்கள் பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு II வடிவமைப்பு மற்றும் கட்டுமான தொழில்நுட்பம் 3

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு- சங்க காலத்தில் கட்டுமானப் பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெரியகோவில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோவில்கள் - மாதிரி கட்டமைப்புகள் பற்றிய அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாடு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ- சாரோசெனிக் கட்டிடக் கலை.

அலகு III உற்பத்தி தொழில்நுட்பம் 3

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற் சாலை- இரும்பு உருகுதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் – நாணயங்கள் அச்சாடித்தல் - மணிகள் உருவக்கும் தொழிற் சாலைகள் – கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத் துண்டுங்கள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு IV வேளாண்மை மற்றும் நீர்ப்பாசன தொழில்நுட்பம் 3

அணை, ஏரி, குளங்கள், மதகு, - சோழர்காலக் குமிழித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக் குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.

அலகு V அறிவியல் தமிழ் மற்றும் கணிதத்தமிழ் 3

அறிவியல் தமிழின் வளர்ச்சி – கணிதத்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் -சொற்குவைத் திட்டம்.

Total: 15 Periods

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு மக்களும் பண்பாடு மற்றும் கல்வியியல் பணிகள் கழகம்.
2. கணினித் தமிழ் முனைவர் இல.சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தோல்லியல் துறை வெளியீடு).
4. பொருநை - ஆற்றங்கரை நாகரிகம் (தோல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print).
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

SEMESTER-II
B.E. –ELECTRICAL AND ELECTRONICS ENGINEERNG

EE24202	ELCTRIC CIRCUIT ANALYSIS	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To recognize the nature of different circuit elements and fundamental laws of electric circuits.
- To solve circuits equation using network theorems.
- To compute the knowledge on obtaining the transient response of circuits.
- To initiate the phenomenon of resonance in coupled circuits and resonance in various electrical circuits.
- To plot the phasor diagrams and analysis of three phase circuits.

UNIT I BASIC CIRCUITS ANALYSIS 9

Fundamentals concepts of R, L and C elements - Energy Sources - Ohm's Law- Kirchhoff's Laws –DC Circuits - Resistors, Inductors and Capacitors in series and parallel circuits – AC Circuits - Average and RMS Value — Complex Impedance — Phasor diagram - Real and Reactive Power, Power Factor, Energy -Mesh current and node voltage methods of analysis D.C and A.C Circuits.

UNIT II NETWORK REDUCTION AND THEOREMS FOR DC AND AC CIRCUIT 9

Network reduction: voltage and current division, source transformation – star delta conversion. Theorems – Superposition, Thevenin's and Norton's Theorem – Maximum power transfer theorem –Reciprocity Theorem –Statement, application to DC and AC Circuits.

UNIT III TRANSIENT RESPONSE ANALYSIS 9

Average and RMS Value - Complex Impedance - Phasor diagram - Real and Reactive Power, Power Factor, Energy - Steady state analysis of R, L and C with sinusoidal excitation - Concept of Reactance, Impedance, Susceptance and Admittance, Power triangle, Power factor.

UNIT IV RESONANCE AND COUPLED CIRCUITS 9

Faraday's Law of electromagnetic induction - Concept of self and mutual inductance - Dot convention - Coefficient of coupling - Analysis of coupled circuits - Single tuned circuits.

UNIT V THREE PHASE CIRCUITS 9

Series resonance – Frequency response – Quality factor and Bandwidth, Parallel resonance - Frequency response of RLC, RL parallel RC, RL parallel C and RC parallel L circuits – Quality factor and Bandwidth – Magnification in resonance.

Total : 45 Periods

PRACTICAL EXERCISES:

1. Experimental verification of electrical circuit using Kirchhoff's current law.
2. Experimental verification of electrical circuit using Kirchhoff's voltage law.
3. Experimental verification of electrical circuit problems using Thevenin's Theorem.
4. Experimental verification of electrical circuit problems using Norton's Theorem.
5. Experimental verification of electrical circuit problems using Super position theorem.
6. Simulation verification of electrical circuit problems using Millman's and Tellegen's theorem.
7. Simulation of R-C, R-L and RLC electric circuit transient.
8. Simulation of frequency response of RLC electric circuit.

Total : 30 Periods

COURSE OUTCOMES:

At the end of the course the student will be able to:

CO1 : Illustrate circuit's behavior using circuit laws.

CO2 : Utilize network theorems to determine behavior of the given DC and AC circuit.

CO3 : Compute the transient response of first order and second order systems and

CO4 : Illustrate the frequency response of series and parallel RLC circuits and understand the behavior of magnetically coupled circuits.

CO5 : Interpret the behavior of magnetically coupled circuits.

Total : 75 Periods

TEXTBOOKS

1. William H. HaytJr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", McGraw Hill publishers, 9th Edition, New Delhi, 2020.
2. Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", Seventh Edition, McGraw Hill, 2022.
3. A.Sudhakar and Shaym mohan S Palli, "Circuits and Network" McGraw Hill publishers.

REFERENCES

1. Chakrabarti A, "Circuits Theory (Analysis and synthesis), Dhanpat Rai& Sons, New Delhi,2020.
2. Joseph A. Edminister, Mahmood Nahvi, "Electric circuits", Schaum's series, McGraw-Hill, 5th Edition, 2019.
3. M E Van Valkenburg, "Network Analysis",Prentice-Hall of India Pvt Ltd, New Delhi, 2015.
4. Joseph A. Edminister, Mahmood Nahvi, "Electric circuits", Schaum's series, McGraw-Hill, 5th Edition, 2019.
5. Richard C. Dorf and James A. Svoboda, "Introduction to Electric Circuits", 7th Edition, JohnWiley Sons, Inc. 2018.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2		2	2	2			3	3	3	3
CO2	3	3	3	3	2		2	2	2			3	3	3	3
CO3	3	3	3	3	2		2	2	2			3	3	3	3
CO4	3	3	3	3	2		2	2	2			3	3	3	3
CO5	3	3	3	3	2		2	2	2			3	3	3	3
Avg	**3**	**3**	**3**	**2.8**	**2**		**2**	**2**	**2**			**3**	**3**	**3**	**3**

1 - Low, 2 - Medium, 3 - High

SEMESTER-II
Common To All Branches
B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH

GE24201	ENGINEERING PRACTICES LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

The main learning objective of this course is to provide hands on training to the students in:

- Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planning; making joints in wood materials used in common household wood work.
- Welding various joints in steel plates using arc welding; machining various simple processes like turning, drilling, and tapping in parts.
- Wiring various electrical joints in common household electrical wire work.
- Soldering and testing simple electronic circuits; assembling and testing simple electronic components on PCB.

GROUP – A (CIVIL & MECHANICAL ENGINEERING)

PART I CIVIL ENGINEERING PRACTICES 15

PLUMBING WORK:

a. Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, and elbows in household fittings.
b. Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
c. Preparation of plumbing line sketches for water supply.
d. Laying pipe connection to the suction and delivery side of a pump
e. Mixed pipe material connection – Pipe connections with different joining components.

WOOD WORK:

a. Study of the joints in roofs, doors, windows and furniture.
b. Making joints like Mortise and Tenon joint, T-Joint and Dovetail joint by sawing, planning and cutting.

PART II MECHANICAL ENGINEERING PRACTICES 15

WELDING WORK:

a. Welding of Butt joints, Lap joints and Tee joints using arc welding.
b. Gas welding practice

BASIC MACHINING WORK:

a. Simple step turning, taper turning
b. Simple drilling.

ASSEMBLY WORK:

a. Study of centrifugal pump
b. Study of air conditioner
c. Study of household mixer.

SHEET METAL WORK:

a. Making models of a square/Rectangular tray and funnels.

FOUNDRY WORK:

a. Demonstrating basic foundry operations.

GROUP B (ELECTRICAL & ELECTRONICS ENGINEERING)

PART III ELECTRICAL ENGINEERING PRACTICES 15

a. Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket.
b. Staircase Wiring.
c. Fluorescent Lamp wiring with introduction to CFL and LED types.
d. Energy meter wiring and related calculations/ calibration.
e. Study of Iron Box wiring and assembly.
f. Study of Fan Regulator (Resistor type and Electronic type using Diac/Triac/quadrac).
g. Study of emergency lamp wiring/Water heater.

PART IV ELECTRONIC ENGINEERING PRACTICES 15

STUDY OF ELECTRONIC COMPONENTS

a. Measurement of Resistance of a resistor using Color Coding.
b. Measurement of AC signal parameters (Peak-Peak, RMS period, Frequency) using CRO.

SOLDERING WORK:

a. Soldering simple electronic circuits and checking continuity.

ELECTRONIC ASSEMBLY AND TESTING WORK:

a. Assembling and testing electronic components on a small PCB.

STUDY OF LOGIC GATES:

a. Verification of logic gates - AND, OR, NOT, NAND, NOR, EXOR, EX-NOR.

ELECTRONIC EQUIPMENT STUDY:

a. Study on elements of smart phone.
b. Assembly and dismantle of LED TV.
c. Assembly and dismantle of computer/ laptop.

Total = 60 Periods

***At end of the semester students should submit the prototypes of their stem projects.**

COURSE OUTCOMES

On successful completion of this course, the student will be able to:

CO1: draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.

CO2: weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, and tapping in parts.

CO3: assemble simple mechanical assembly of common household equipment's; Make a simple model using sheet metal work.

CO4: wiring of various electrical joints in common household electrical wire work.

CO5: solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

CO6: understand the concept and verification of logic gates.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2			1	1	1					2			
CO2	3	2			1	1	1					2			
CO3	3	2			1	1	1					2			
CO4	3	2			1	1	1					2	2	1	1
CO5	3	2			1	1	1					2	2	1	1
CO6	3	2			1	1	1					2	2	1	1
Avg	**3**	**2**			**1**	**1**	**1**					**2**	**2**	**1**	**1**

1 - Low, 2 - Medium, 3 - High

SEMESTER-II
Common To All Branches
B. Tech – AI&DS, IT, B.E – BME, CSE, ECE, EEE & MECH

HS24202	ENGLISH COMMUNICATION LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To identify varied group discussion skills and apply them to take part in effective discussions in a professional context.
- To be able to communicate effectively through writing.

UNIT I SELF INTRODUCTION AND EMAIL DRAFTING 12

Speaking: Role Play Exercises Based on Workplace Contexts, - talking about competition- discussing progress toward goals-talking about experiences-talking about events in life-discussing past events.
Writing: Writing emails (formal & semi-formal).

UNIT II INDIVIDUAL DISCUSSION ON SOCIAL ISSUES 12

Speaking: discussing news stories-talking about frequency-talking about travel problems- discussing travel procedures- talking about travel problems- making arrangements-describing arrangements-discussing plans and decisions- discussing purposes and reasons- understanding common technology terms.
Writing: Writing different types of emails.

UNIT III PRESENTATION ON TECHNICAL AND NON-TECHNICAL TOPICS 12

Speaking: discussing predictions-describing the climate-discussing forecasts and scenarios-talking about purchasing-discussing advantages and disadvantages-making comparisons-discussing likes and dislikes-discussing feelings about experiences-discussing imaginary scenarios.
Writing: Short essays and reports-formal/semi-formal letters.

UNIT IV IMPORTANCE OF DESCRIPTIVE WRITING & INSTRUCTIONS 12

Speaking: discussing the natural environment-describing systems-describing position and movement-explaining rules-(example- discussing rental arrangements)- understanding technical instructions.
Writing: Writing instructions. Writing a short article.

UNIT V GROUP DISCUSSION AND IMPORTANCE OF RESUME WRITING 12

Speaking: describing things relatively-describing clothing-discussing safety issues (making recommendations) talking about electrical devices-describing controlling actions.
Writing: Job application (Cover letter+ Curriculum vitae)- product presentation)

Total: 60 Periods

COURSE OUTCOMES

After completion of this course, the students should be able to

CO1 : Speak effectively in group discussions held in a formal/semi-formal contexts.
CO2 : Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions

CO3 : Write emails, letters and effective job applications.
CO4 : Write critical reports to convey data and information with clarity and precision.
CO5 : Give appropriate instructions and recommendations for safe execution of tasks.

Assessment Pattern

- Conduction of Assessment to test speaking and writing skills

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3		3		3	3		3	3	3	3			1
CO2		3		3		3	3		3	3	3	3			1
CO3		2		3		3	3		3	3	3	3			1
CO4		3		3		3	3		3	3	3	3			1
CO5		3		3		3	3		3	3	3	3			1
Avg		**2.8**		**3**		**3**	**3**		**3**	**3**	**3**	**3**			**1**

1 - Low, 2 - Medium, 3 - High

SEMESTER - III
(B.E - EEE)

MA24304	FOURIER ANALYSIS AND PARTIAL DIFFERENTIAL EQUATION	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems.
- To acquaint the student with fourier transform techniques used in wide variety of situations.
- To introduce the basic concepts of PDE for solving standard partial differential equations.
- To acquaint the student with Fourier series techniques in solving wave and heat flow problems used in various situations.
- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems.

UNIT I FOURIER SERIES 9 + 3

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range sine series and cosine series – Root mean square value – Parseval's identity – Harmonic analysis.

UNIT II FOURIER TRANSFORMS 9 + 3

Statement of Fourier integral theorem– Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

UNIT III PARTIAL DIFFERENTIAL EQUATIONS 9 + 3

Formation of partial differential equations –Solutions of standard types of first order partial differential equations - First order partial differential equations reducible to standard types Lagrange's linear equation - Linear partial differential equations of second and higher order with constant coefficients of both homogeneous and non-homogeneous types.

UNIT IV ONE DIMENSTIONAL WAVE AND HEAT EQUATIONS 9 + 3

Classification of PDE – Fourier series solutions of one dimensional wave equation – One dimensional heat flow equation– Method of separation of variables. Fourier series solutions.

UNIT V SOLUTIONS OF LAPLACE EQUATIONS 9 + 3

Method of separation of variables -Two dimensional heat flow equation in steady state. Laplace equation in Cartesian and polar co-ordinates - Fourier series solutions.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Analyze the periodicity of a function and formulate the same as a combination of sine and cosine using Fourier series.

CO2 : Apply Fourier transform to convert the function in time domain into a sum of sine waves of different frequencies, each of which represents a frequency component.

CO3 : Exemplify the concepts of partial differential equations and able to apply them to solve real scenarios.

CO4 : Appreciate the physical significance of Fourier series techniques in solving One-dimensional wave and heat equations.

CO5 : Understand the techniques in solving two-dimensional heat equations and Laplace equations.

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", 44thEdition, Khanna Publishers, New Delhi, 2018.
2. Kreyszig E, "Advanced Engineering Mathematics ", 10th Edition, John Wiley, New Delhi, India,2016.

REFERENCES:

1. Kandasamy P, Thilagavathy K., Gunavathy K., Engineering Mathematics, Volume III, Chand & Company.
2. Bali. N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 10th Edition, Laxmi Publications Pvt. Ltd, 2015.
3. James. G., "Advanced Modern Engineering Mathematics", 4thEdition, Pearson Education, New Delhi, 2016.
4. Erwin Kreyszig, Advanced Engineering Mathematics, Tenth Edition, Wiley India Private Limited, New Delhi, 2016.
5. Peter V O Neil., Advanced Engineering Mathematics, 7th Edition, TBH Publishers, 2013.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1									2			
CO2	2	3	1									1			
CO3	3	2	1									2			
CO4	2	3	2									1			
CO5	3	2	1									1			
Avg	**2.6**	**2.4**	**1.2**									**1.4**			

1 - Low, 2 - Medium, 3 - High

SEMESTER - III
(B.E - EEE)

EE24301	DIGITAL LOGIC CIRCUITS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the fundamentals of combinational and sequential digital circuits.
- To study various number systems and to simplify the mathematical expressions using boolean functions word problems.
- To explore implementation of combinational circuits using Gates and MSI Devices.
- To study the design of various synchronous and asynchronous circuits.
- To understand the concept of VHDL program of application of digital circuits.

UNIT I NUMBER SYSTEMS AND DIGITAL LOGIC FAMILIES 9

Number system - Error detection, correction and code conversions - Boolean algebra: De Morgan's theorem, minimization using K-map and Quine McCluskey method - Digital Logic Families -Comparison of RTL, DTL, TTL, ECL.

UNIT II COMBINATIONAL CIRCUITS 9

Combinational logic - representation of logic functions-SOP and POS forms, K-map representations - minimization using K maps - simplification and implementation of combinational logic – adders, subtractors, Encoders and Decoders, multiplexers and de multiplexers - code converters.

UNIT III SYNCHRONOUS SEQUENTIAL CIRCUITS 9

Sequential logic - SR, JK, D and T flip flops - level triggering and edge triggering - counters - asynchronous and synchronous type - Modulo counters - Shift registers - design of synchronous sequential circuits - state diagram; state reduction; state assignment.

UNIT IV ASYNCHRONOUS SEQUENTIAL CIRCUITS AND PROGRAMMABILITY LOGIC DEVICES 9

Asynchronous sequential logic Circuits - Transition stability, flow stability - race conditions, hazards & errors in digital circuits; analysis of asynchronous sequential logic circuits - introduction to Programmability Logic Devices: PROM – PLA – PAL.

UNIT V VERY HIGH SPEED INTEGRATED CIRCUIT HARDWARE DESCRIPTION LANGUAGE (VHDL) 9

Introduction to VHDL – RTL design- combinational logic: adder, subtractor, multiplexers, demultiplexers - Sequential circuit: flip flop, counters and register – Operators – Case studies illustrating the design and implementation of digital systems – adder, subtractor, flipflops.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Identify various number systems and characteristics of digital logic families.

CO2 : Construct various combinational circuits like multiplexer, de-multiplexer, encoder and decoder.

CO3 : Design various synchronous and asynchronous circuits using flip-flops.

CO4 : Analyze asynchronous sequential circuits and programming logic devices.

CO5 : Design and implement VHDL programs of application of digital circuits.

TEXT BOOKS:

1. Morris Mano.M, "Digital Logic and Computer Design", Prentice Hall of India, 3rd Edition, 2005.
2. Donald D.Givone, "Digital Principles and Design", Tata McGraw Hill, 1st Edition, 2003.
3. Thomas L Floyd, "Digital fundamentals", Pearson Education Limited, 11th Edition, 2018.

REFERENCES:

1. Tocci R.J., Neal S. Widmer, "Digital Systems: Principles and Applications", Pearson Education Asia, 12th Edition, 2017.
2. Donald P Leach, Albert Paul Malvino, Goutam Sha, "Digital Principles and Applications", Tata McGraw Hill, 7th Edition, 2010.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	1	3			1				2	3		2
CO2	3	2	3	1	2			1				1	3		1
CO3	3	3	3	1	3			2				1	2		1
CO4	2	3	3	1	2			1				1	3		1
CO5	3	2	3	1	3			1				2	2		2
Avg	**2.8**	**2.6**	**3**	**1**	**2.6**			**1.2**				**1.4**	**2.6**		**1.4**

1 - Low, 2 - Medium, 3 - High

SEMESTER - III
(B.E - EEE)

EE24302	ELECTRON DEVICES AND CIRCUITS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the structure of basic electronic devices.
- To study the active and passive circuit elements.
- To familiarize the operation and applications of transistor like BJT and FET.
- To explore the characteristics of amplifier gain and frequency response.
- To learn the required functionality of positive and negative feedback systems.

UNIT I PN JUNCTION DEVICES 9

PN junction diode –structure, operation and V-I characteristics, Rectifiers – Half Wave and Full Wave Rectifier, Zener diode characteristics– Zener diode Reverse Characteristics- Zener diode as regulator, Clipping & Clamping circuits, Schottky diode, Display devices- LED, Laser diodes.

UNIT II TRANSISTORS AND THYRISTORS 9

BJT, UJT, JFET, MOSFET- structure, operation, characteristics and Biasing, Thyristors and IGBT - Structure and characteristics.

UNIT III AMPLIFIERS 9

BJT small signal model – Analysis of CE, CB, CC amplifiers- Gain and frequency response –MOSFET small signal model– Analysis of CS and Source follower – Gain and frequency response- High frequency analysis.

UNIT IV MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER 9

BIMOS cascade amplifier, Differential amplifier – Common mode and Difference mode analysis – FET input stages – Single tuned amplifiers – Gain and frequency response – Neutralization methods, power amplifiers –Types (Qualitative analysis).

UNIT V FEEDBACK AMPLIFIERS AND OSCILLATORS 9

Advantages of negative feedback – voltage / current, series, Shunt feedback –positive feedback – Condition for oscillations, Operation and analysis of RC phase shift – Wien bridge, Hartley, Colpitts and Crystal oscillators. Opto-electronic Devices: Photo-diode, Photo-transistor.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

- **CO1 :** Illustrate the structure and working operation of basic electronic devices.
- **CO2 :** Explain construction and working of various active and passive devices.
- **CO3 :** Analyze BJT in various modes of operation in gain and frequency response and small signal amplifier circuits.
- **CO4 :** Design amplifier circuits with its frequency response characteristics.
- **CO5 :** Analyze feedback amplifiers and different types of oscillator circuits.

TEXT BOOKS:

1. Electronic devices and circuits- David A. Bell, Oxford University higher education, 5th Edition 2008.
2. Microelectronic circuits, Sedra and smith 7th edition, Oxford University Press.
3. S.Salivahanan, N. Suresh Kumar, "Electronic Devices and Circuits", Mc Graw Hill Education, New Delhi, 4th Edition, 2016.

REFERENCES:

1. Mohammad Rashid, "Electronic Devices and Circuits", Cengage Learning, 2013.
2. Thomas L.Floyd, "Electronic devices", Conventional current version, Pearson prentice hall 10th Edition, 2017.
3. B.P. Singh, Rekha Singh, "Electronic Devices and Circuits", Pearson, 2nd Edition, 2013.
4. Robert L. Boylestad, "Electronic devices and circuit theory", 2002.
5. J. Millman, C.C.Halkias and Satyabratajit, "Electronic Devices and Circuits", 2nd Edition, 1998.
6. Electronics for analog signal processing - I by Prof. K. Radhakrishna Rao, IIT Madras. https://archive.nptel.ac.in/courses/117/106/117106087/#.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		1					1		1		1	2	2	
CO2	2	1	1					1		1		1	2	2	
CO3	2	1	1					1		1		1	2	1	
CO4	2	1	1					1		1		1	2	1	
CO5	2	1	1					1		1		1	2	1	
Avg	**2**	**1**	**1**					**1**		**1**		**1**	**2**	**1.4**	

1 - Low, 2 - Medium, 3 - High

SEMESTER - III
(B.E - EEE)

EE24303	SOFT COMPUTING FOR ELECTRICAL ENGINEERS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the fundamental concepts of AI agents, their environments, and basic uninformed search strategies for problem-solving.
- To apply heuristic search techniques and local search algorithms to solve complex problems, including those in uncertain or partially observable environments.
- To comprehend the principles of fuzzy sets, membership functions, and defuzzification methods for handling imprecise information.
- To understand the core components and operations of genetic algorithms, including reproduction, crossover, and mutation, for optimization problems.
- To identify and explain various real-world applications of AI techniques, particularly in the domain of electrical power systems.

UNIT I INTELLIGENT AGENTS 9

Introduction to AI – Agents and Environments – concept of rationality – nature of environments –structure of agents. Problem solving agents – search algorithms – uninformed search strategies.

UNIT II PROBLEM SOLVING 9

Heuristic search strategies – heuristic functions. Local search and optimization problems – search with non-deterministic actions – search in partially observable environments.

UNIT III FUZZY LOGIC 9

Basics of fuzzy sets and membership functions - Fuzzy rules and inference systems - Defuzzification methods - Fuzzy control systems in electrical applications (e.g., motor speed control, load balancing)

UNIT IV GENETIC ALGORITHMS 9

Evolutionary computing basics - Genetic operators: selection, crossover, mutation - Encoding, fitness function and convergence - Applications in electrical optimization: capacitor placement, load flow, economic dispatch

UNIT V APPLICATIONS OF AI TECHNIQUES 9

Power system stability using fuzzy rules - Renewable energy forecasting using rule-based AI - Smart grid monitoring using intelligent systems - Electrical drive control using fuzzy logic - Optimization of energy management using GA.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Understand the fundamentals of intelligent agents and evaluate their behavior based on rationality and environment characteristics.

CO2 : Apply various heuristic and local search algorithms to solve deterministic and non-deterministic problems in AI.

CO3 : Analyze and implement fuzzy logic principles including fuzzy set operations, membership functions, and defuzzification techniques.

CO4 : Demonstrate the working of genetic algorithms and design optimization problems using various crossover and mutation strategies.

CO5 : Apply AI techniques to solve real-time electrical engineering problems such as network optimization, motor control, fault detection, and renewable energy forecasting.

TEXT BOOKS:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence – A Modern Approach", Fourth Edition, Pearson Education, 2021.
2. Deepak Khemani, "A First Course in Artificial Intelligence," McGraw Hill Education (India), 2013.
3. David E. Goldberg, "Genetic Algorithms in Search, Optimization, and Machine Learning," Addison-Wesley, January 1989.

REFERENCES:

1. Stefan Edelkamp and Stefan Schroedl, "Heuristic Search: Theory and Applications," Morgan Kaufmann, 2011.
2. S. Rajasekaran and G. A. Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications," PHI Learning Private Limited.
3. Lance D. Chambers (Editor), "The Practical Handbook of Genetic Algorithms, Applications," Chapman & Hall/CRC.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1									1			
CO2	3	3	3	2	3							2			
CO3	3	2	2	1	1							2			
CO4	3	3	3	2								2			
CO5	3	3	3	3	3	1	2				1	3			
Avg	**3**	**2.6**	**2.4**	**1.6**	**1.4**	**0.2**	**0.4**				**0.2**	**2**			

1 - Low, 2 - Medium, 3 - High

SEMESTER - III
(B.E - EEE)

EE24304	ELECTRICAL MACHINES - I	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To understand the concept of electromechanical energy conversion system.
- To identify the appropriate machine for a given application based on its characteristics.
- To identify the appropriate test to determine the performance parameters of a given machine.
- To familiarize with the procedure for parallel operation of generators and transformers.
- To deliberate the working of auto transformer and three phase transformers.

UNIT I ELECTROMECHANICAL ENERGY CONVERSION 9

Fundamentals of Magnetic circuits - Statically and dynamically induced EMF - energy balance in magnetic circuits - magnetic force - co-energy in singly excited and multi excited magnetic field system - mmf of distributed windings, magnetic fields in rotating machines.

UNIT II DC GENERATORS 9

Principle of operation, constructional details, EMF equation, armature reaction, demagnetizing and cross magnetizing Ampere turns, compensating winding, commutation, methods of improving commutation, interpoles, OCC and load characteristics of different types of DC Generators. Parallel operation of DC Generators.

UNIT III DC MOTORS 9

Principle of operation, significance of back emf, torque equations and power developed by armature, speed control of DC motors, starting methods of DC motors, load characteristics of DC motors, losses and efficiency in DC machine, condition for maximum efficiency. Testing of DC Machines: Swinburne's test, Hopkinson's test, -applications of DC motors.

UNIT IV SINGLE PHASE TRANSFORMER 9

Construction and principle of operation, equivalent circuit, phasor diagrams, testing - polarity test, open circuit and short circuit tests, voltage regulation, losses and efficiency, all day efficiency, back-to- back test, parallel operation of single-phase transformers, applications of single-phase transformer.

UNIT V AUTO TRANSFORMER AND THREE PHASE TRANSFORMER 9

Construction and working of auto transformer, comparison with two winding transformers, applications of autotransformer. Three Phase Transformer- Construction, types of connections and their comparative features, Scott connection, applications of Scott connection.

TOTAL: 45 PERIODS

LIST OF EXPERIMENTS:

1. Open circuit and load characteristics of DC shunt generator- calculation of critical resistance and critical speed.
2. Load test on DC shunt motor.
3. Load test on DC compound motor.
4. Load test on DC series motor.
5. Swinburne's test and speed control of DC shunt motor.
6. Open circuit and short circuit tests on single phase transformer.
7. Load test on single-phase transformer.

TOTAL: 30 PERIODS
TOTAL: 75 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Apply the laws governing the electromechanical energy conversion for singly and multiple excited systems.
CO2 : Explain the construction and working principle of DC machines.
CO3 : Illustrate various characteristics of DC motor.
CO4 : Interpret the equivalent circuit of transformer and predetermine the efficiency and regulation.
CO5 : Explain the working principle of autotransformer, three phase transformer with different types of connections.

TEXT BOOKS:

1. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 5th Edition, 2017.
2. P. S. Bimbhra, "Electric Machinery", Khanna Publishers, 2nd Edition, 2021.
3. B.L. Theraja, A.K Theraja. "Electrical Technology". Volume II. S.Chand & Co., 2022.
4. V. K. Metha, "Principles of Electrical Machines", S Chand, 1st Edition, 2002.

REFERENCES:

1. J.B Gupta. "Theory and performance of Electrical Machines". S.K.Kataria & Sons, 15th Edition, Reprint 2022.
2. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 6th Edition 2017.
3. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2018.
4. M. G. Say, "Performance and design of AC machines", CBS Publishers, 1st Edition 2008.
5. Sahdev S. K., "Electrical Machines", Cambridge University Press, 2018.
6. https://www.vlab.co.in/.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	1	1			1				1	3	2	2
CO2	3	3	1	1	1			1				1	3	1	1
CO3	3	3	1	1	1			1				1	3	1	1
CO4	3	3	1	1	1			1				1	3	3	2
CO5	3	3	1	1	1			1				1	3	3	2
Avg	**3**	**3**	**1**	**1**	**1**			**1**				**1**	**3**	**2**	**2**

1 - Low, 2 - Medium, 3 - High

SEMESTER - III
(B.E - EEE)

CS24309	PROGRAMMING IN C	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To understand basics of Unix/Linux and the constructs of C Language.
- To develop C Programs using basic programming constructs.
- To develop C programs using arrays and strings.
- To develop modular applications in C using functions.
- To develop applications in C using pointers and structures.
- To do input/output and file handling in C and Implementation of simple projects using C.

UNIT I BASICS OF C PROGRAMMING 9

Introduction to UNIX/LINUX - basic Commands with shell scripting- Introduction to programming paradigms – Applications of C Language - Structure of C program - C programming: Data Types - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity - Expressions - Input/output statements, Assignment statements – Decision making statements - Switch statement - Looping statements – Preprocessor directives -Compilation process.

UNIT II ARRAYS AND STRINGS 9

Introduction to Arrays: Declaration, Initialization – One dimensional array –Two dimensional arrays- String operations: length, compare, concatenate, copy–Selection sort, linear and binary search.

UNIT III FUNCTIONS AND POINTERS 9

Modular programming- Function prototype, function definition, function call, Built-in functions (string functions, math functions) – Recursion, Binary Search using recursive functions – Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – Array of pointers – Parameter passing: Pass by value, Pass by reference.

UNIT IV STRUCTURES AND UNION 9

Structure - Nested structures – Pointer and Structures – Array of structures – Self referential structures – Dynamic memory allocation –Singly link edlist – typedef –Union-Storage classes and Visibility.

UNIT V FILE PROCESSING AND IMPLEMENTATION 9

Files – Types of file processing: Sequential access, Random access – Sequential access file - Random access file - Command line arguments – Implementation of simple projects using C (Program Design, Program Coding, Program Testing and Debugging).

TOTAL: 45 PERIODS

LIST OF EXPERIMENTS:

1. UNIX/LINUX basic Commands, I/O statements, operators, expressions
2. Decision-making constructs: if-else, go to, switch-case, break-continue.
3. Loops: for, while, do-while.
4. Arrays: D and 2D, Multi-dimensional arrays, traversal.
5. Strings: operations.
6. Functions: call, return, passing parameters by (value, reference), passing arrays to function.
7. Recursion.
8. Pointers: Pointers to functions, Arrays, Strings, Pointers to Pointers, Array of Pointers.
9. Structures: Nested Structures, Pointers to Structures, Arrays of Structures and Unions..
10. Files: reading and writing, File pointers, file operations, random access, processor directives.

TOTAL: 30 PERIODS
TOTAL: 75 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Demonstrate basic knowledge on Unix/Linux and C Programming constructs.
CO2 : Design and implement applications using arrays and strings.
CO3 : Develop and implement modular applications in C using functions.
CO4 : Develop applications in C using structures and pointers.
CO5 : Design applications using sequential and random-access file processing and Implementation of simple projects using C.

TEXT BOOKS:

1. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.
2. Programming in ANSIC 9thEdition by Balagurusamy || McGrawHill·11July2024| Standard Edition- 4.
3. Kernighan B. WandRitchie D.M, "The C Programming language" Second Edition, Pearson Education, 2015.
4. Linux Essential Commands, Fourth Edition (Grayscale Indian Edition) • Daniel J. Barrett | 11 April 2024 | Fourth Edition - 4.

REFERENCES:

1. UNIX: The Complete reference by Kenneth Rosen, Second Edition.2021.
2. Yashwant Kanetkar, Let us C,17th Edition, BPB Publications, 2020.
3. ByronS. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.
4. PradipDey, ManasGhosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.
5. Anita Goel and Ajay Mittal "Computer Fundamentals and Programming in C",1stEdition, Pearson Education, 2013.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	2	1	2	1	1	1	2		3	2	1	2	
CO2	2	3	2	1	2	1	1	1	2		3	2	2	2	
CO3	3	2	2	1	3	1	1	1	2		3	3	2	2	
CO4	2	3	3	1	2	1	2	1	2		3	2	2	2	
CO5	2	2	3	2	1	2			2	1	2	2	2	3	
Avg	**2**	**2.4**	**2.4**	**1.2**	**2**	**1.2**	**1**	**1**	**2**	**1**	**2.8**	**2.2**	**1.8**	**2.2**	

1 - Low, 2 - Medium, 3 - High

SEMESTER - III

(B.E - EEE)

EE24305	ELECTRONIC DEVICES AND CIRCUITS LABORATORY	L	T	P	C
		0	0	3	2

COURSE OBJECTIVES:

- To understand the behavior of semiconductor device based on experimentation.
- To explore active and passive circuit elements.
- To study the operation and characteristics of transistor like BJT and FET.
- To explore the characteristics of amplifier gain and frequency response.
- To familiarize the required functionality of positive and negative feedback systems.

LIST OF EXPERIMENTS:

1. Characteristics of Semiconductor diode and Zener diode, Photo diode and Photo transistor.
2. Characteristics of NPN Transistor under common emitter, common collector and common base configurations.
3. Characteristics of JFET and draw the equivalent circuit.
4. Characteristics of UJT and generation of saw tooth waveforms.
5. Design and Frequency response characteristics of a Common Emitter Amplifier.
6. Characteristics of light activated relay circuit.
7. Design and testing of RC phase shift and LC oscillators.
8. Characteristics of Single Phase half-wave and full wave rectifiers with inductive and capacitive filters.
9. Design of Differential amplifiers using FET.
10. Measurement of frequency and phase angle using CRO.
11. Realization of passive filters.

*** Simulating suitable experiments using a virtual laboratory** (https://www.vlab.co.in/).

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Analyze and Interpret Semiconductor Device Characteristics.
CO2 : Evaluate Transistor Configurations and Amplifier Designs.
CO3 : Design and Analyze Field Effect Transistor Circuits.
CO4 : Implement Oscillator and Rectifier Circuits.
CO5 : Utilize Electronic Instruments for Measurement and Analysis.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1			1		1			1		1	2	1	
CO2	2	1			1		1			1		1	2	1	
CO3	2	2			1		1			1		1	2	1	
CO4	2	1			1		1			1		1	2	1	
CO5	2	1			1		1			1		1	2	1	
Avg	**2**	**1.4**			**1**		**1**			**1**		**1**	**2**	**1**	

1 - Low, 2 - Medium, 3 - High

SEMESTER - IV
(B.E - EEE)

GE24402	ENVIRONMENTAL SCIENCES AND SUSTAINABILITY	L	T	P	C
		2	0	0	2

COURSE OBJECTIVES:

- To introduce ecological concepts and biodiversity, emphasizing conservation and public awareness.
- To understand pollution types, impacts, and waste management practices, with industrial safety focus.
- To expose students to various renewable energy technologies and their practical applications.
- To study how people harm the environment and learn ways to prevent and manage disasters.
- To promote sustainability awareness and application of sustainable practices in industry and society.

UNIT I ENVIRONMENT AND BIODIVERSITY 6

Definition, scope, and importance of environment; need for public awareness. Ecosystem and energy flow with ecological succession. Types and values of biodiversity; India as a mega-diversity nation and biodiversity hotspots. Threats like habitat loss, poaching, man-wildlife conflict, impacts from industrial and infrastructure development. Endangered and endemic species of India and conservation methods (in-situ and ex-situ), Role of information technology in species monitoring.

UNIT II ENVIRONMENTAL POLLUTION 6

Causes, Effects and Preventive measures of water, air, soil, noise, and radioactive pollution. Waste management covers municipal solid waste, hazardous waste, and E-Waste - gold extraction. Carbon Credit and Footprint concepts related to industry. Environmental protection acts. Case studies on OHASMS (Occupational health and safety management systems) emphasizing industrial safety practices and engineering risk management

UNIT III RENEWABLE SOURCES OF ENERGY 6

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy. Case studies on biofuel production from agricultural waste.

UNIT IV HUMAN POPULATION AND ENVIRONMENT IMPACT 6

Human population -Importance of value education, human rights. Land degradation and deforestation- Man-Made Disasters: Industrial Accidents-Nuclear Accidents-Oil Spills - Prediction and management. Science and technology of Carbon Sequestration - Ozone depletion and environmental responsibility. Case Study: A low-cost water purification project implemented in a densely populated village.

UNIT V SUSTAINABILITY MANAGEMENT AND PRACTICES 6

Suitability Management - Development, GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability and protocols Sustainable Development Goals-targets. Suitability Practices - Zero waste and R concept, Circular economy, ISO 14000 Series, Environmental Impact Assessment. Sustainable habitat: green buildings, green materials, energy efficiency, sustainable transports. Sustainable energy. Case studies on sustainable building design in industrial facilities.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Explore ecosystem functions, biodiversity, and the importance of species protection.

CO2 : Identify types of pollution, their effects, and preventive measures including waste management.

CO3 : Describe renewable energy sources and their applications in sustainable energy production.

CO4 : Analyze human impact on the environment and propose disaster management strategies.

CO5 : Apply sustainability concepts and practices in environmental and industrial systems.

TEXT BOOKS:

1. Anubha Kaushik and C. P. Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers, 2018.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.
3. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.
4. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
5. Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
7. Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998.

REFERENCES:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media, Edition 2010.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice Hall of India PVT. LTD, New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, Third Edition, 2015.
5. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1	1			1	3	2		1		1		1	1
CO2	1	2	2		1	2	3	2		1		2	1	2	2
CO3	1	1	2		2	3	3	2		1		2	1	1	2
CO4	1					3	3	3		1		2	1		
CO5		1	2		1	3	3	3		1		2		1	2
Avg	**1.00**	**1.25**	**1.75**		**1.33**	**2.40**	**3.00**	**2.40**		**1.00**		**1.80**	**1.00**	**1.25**	**1.75**

1 - Low, 2 - Medium, 3 - High

SEMESTER - IV
(B.E - EEE)

EE24401	ANALOG CIRCUIT AND SYSTEMS USING IC'S	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the fundamental steps involved in Integrated Circuit fabrication.
- To acquire knowledge on the design of signal processing circuits using Op-Amps.
- To familiarize the diverse applications of Op-Amps.
- To understand the internal structure and functional applications of specialized integrated circuits.

UNIT I IC FABRICATION 9

IC classification, fundamental of monolithic IC technology, epitaxial growth, masking and etching, diffusion of impurities, Realization of monolithic ICs and packaging, Fabrication of diodes, capacitance, resistance and PV Cell.

UNIT II CHARACTERISTICS OF OPAMP 9

Op-amp symbol, terminals, packages and specifications - Block diagram Representation of op-amp - Ideal op-amp & practical op-amp - Open loop & closed loop configurations – DC & AC performance characteristics of op-amp – Frequency compensation - Noise – Differential amplifiers – General Description, Electrical Characteristics and internal schematic of 741 op-amps.

UNIT III APPLICATIONS OF OPAMP 9

Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier, Comparators, Schmitt trigger, peak detector, clipper and clamper, S/H circuit, D/A converter (R-2R ladder and weighted resistor types), A/D converters using OP-AMPs.

UNIT IV SPECIAL ICs 9

Functional block, characteristics of 555 Timer and its PWM application - Design of voltage controlled oscillator using op-amp and an analog multiplier - Design of phase locked loop using Op-amp and an analog multiplier, AD633 Analog multiplier ICs - Automatic Gain Controller.

UNIT V APPLICATION ICs 9

Basics of Voltage Regulator – Linear Voltage Regulators using Op-amp – IC Regulators (78xx, 79xx, LM 317, LM 337, 723) - Switching Regulators - SMPS – Low Drop Out regulator.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Illustrate the fabrication process of integrated circuits.

CO2 : Analyze the characteristics of operational amplifiers.

CO3 : Demonstrate Op-Amp-based circuits such as amplifiers, filters, converters, and signal conditioning circuits.

CO4 : Explain the working principles and applications of special ICs and analog multiplier.

CO5 : Analyze the voltage regulator circuits using linear and switching regulators and function generators.

TEXT BOOKS:

1. David A. Bell, "Op-amp & Linear ICs", Oxford, Third Edition, 2011.
2. D. Roy Choudhary, Sheil B. Jani, "Linear Integrated Circuits", New Age, 4th Edition, 2018.
3. Ramakant A.Gayakward, "Op-amps and Linear Integrated Circuits", 4th Edition, Pearson Education, PHI 2021.

REFERENCES:

1. Fiore, "Op-amps & Linear Integrated Circuits Concepts & applications", Cengage, 2010.
2. Floyd, Buchla, "Fundamentals of Analog Circuits", Pearson, 2013.
3. Jacob Millman, Christos C.Halkias, "Integrated Electronics - Analog and Digital circuits system", McGraw Hill, 2nd Edition, 2017.
4. Robert F.Coughlin, Fredrick F. Driscoll, "Op-amp and Linear ICs", Pearson, 6th Edition, 2012.
5. Sergio Franco, "Design with Operational Amplifiers and Analog Integrated Circuits", McGraw Hill, 4th Edition, 2016.
6. Muhammad H. Rashid, "Microelectronic Circuits Analysis and Design", Cengage Learning, 2nd Edition, 2012.
7. Electronics for Analog Signal Processing II, Prof. K. Radhakrishna Rao, IIT Madras. *https://www.youtube.com/playlist?list=PL80DBC78FA0498727.*

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	1								3	2	
CO2	3	3	2	2	2								3	2	
CO3	3	3	3	2	2								3	3	
CO4	3	3	3	2	2								3	3	
CO5	3	3	3	2	2								3	3	
Avg	**3**	**2.8**	**2.4**	**2**	**1.8**								**3**	**2.6**	

1 - Low, 2 - Medium, 3 - High

SEMESTER - IV
(B.E - EEE)

EE24402	TRANSMISSION AND DISTRIBUTION	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To understand the structure of electric power system and the mechanical design of transmission lines.
- To acquire knowledge on the analysis of the transmission line parameters for various types of transmission lines circuits.
- To familiarize with the equivalent circuit model for the transmission lines based on distance and determine its performance parameters.
- To acquire knowledge on the analysis of the voltage distribution in insulator strings to improve the efficiency and methods to improve the efficiency of cables.
- To understand the distribution system and substations layouts; and recent trends in transmission and distribution.

UNIT I INTRODUCTION TO POWER SYSTEM 9

Structure of electric power system - operating voltages of generation, transmission and distribution – advantage of higher operating voltage for AC transmission - Mechanical designs of transmission line: Sag and tension calculations- effect of ice and wind on sag.

UNIT II TRANSMISSION LINE PARAMETERS 9

Resistance, inductance and capacitance calculations: single and three phase transmission lines - double circuits - solid, stranded and bundled conductors - symmetrical and unsymmetrical spacing – transposition of lines - concepts of GMR and GMD - skin and proximity effects.

UNIT III MODELLING AND PERFORMANCE OF TRANSMISSION LINES 9

Transmission line classification - short line, medium line (T and π Model) and long line – equivalent circuits –Sending end voltage, current, voltage regulation and transmission efficiency- ABCD constants - real and reactive power flow in lines – surge impedance and surge-impedance loading - Ferranti effect - Corona discharge characteristics – critical voltage and corona loss.

UNIT IV INSULATORS AND UNDERGROUND CABLES 9

Insulators: Types - Characteristics and classification – voltage distribution in insulator string - Improvement of string efficiency, Underground cables: constructional features of LT and HT cables – insulation resistance, capacitance, and dielectric stress – grading of underground cables.

UNIT V DISTRIBUTION SYSTEMS 9

Substation layout - Feeders, distributors and service mains, DC 2-wire distributor – radial and ring main distribution, AC distribution – single phase (with concentrated loads) and three phase 3- wire and 4-wire distribution with balanced and unbalanced loads – Recent trends in Transmission and Distribution: EHVAC, HVDC and FACTS (Qualitative treatment only).

TOTAL: 45 PERIODS

LIST OF EXPERIMENTS:

1. Simulation of ABCD parameters of a transmission line.
2. Performance of short and medium transmission lines using MATLAB.
3. Analysis of transmission line under no load condition and at loaded condition at different power factors using Simulink model.
4. String efficiency of insulators using MATLAB.
5. Analysis of corona loss and proximity effect in power distribution system using Simulink model.
6. Study of the performance characteristics of typical DC distribution system in radial & ring main configuration.

TOTAL: 30 PERIODS

TOTAL: 75 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Analyze the structure of electric power system and the mechanical design of transmission lines.

CO2 : Analyze the transmission line parameters for various types of transmission lines circuits.

CO3 : Illustrate an equivalent circuit model for the transmission lines based on distance and determine its performance parameters.

CO4 : Analyze the voltage distribution in insulator strings to improve the efficiency and methods to improve the efficiency of cables.

CO5 : Interpret the distribution system and substations layouts; and recent trends in transmission and distribution.

TEXT BOOKS:

1. D.P.Kothari, I.J. Nagarath, "Power System Engineering", Mc Graw-Hill Publishing Company limited, New Delhi, 3rd Edition, 2019.
2. C.L.Wadhwa, "Electrical Power Systems", New Age International Ltd, 7th Edition 2022.
3. S.N. Singh, "Electric Power Generation, Transmission and Distribution", Prentice Hall of India Pvt. Ltd, New Delhi, 2nd Edition, 2008.

REFERENCES:

1. B.R.Gupta, "Power System Analysis and Design", S. Chand, New Delhi, 6th Edition, 2011.
2. Luces M.Fualken berry, Walter Coffer, "Electrical Power Distribution and Transmission", Pearson Education, 2007.
3. Arun Ingole, "Power transmission and distribution", Pearson Education, 1st Edition, 2018.
4. J.Brian Hardy and Colin R.Bayliss, "Transmission and Distribution in Electrical Engineering", Newness; 4th Edition, 2011.
5. G.Ramamurthy, "Handbook of Electrical power Distribution", Universities Press, 2013.
6. V.K.Mehta, Rohit Mehta, "Principles of power system", S. Chand & Company Ltd, New Delhi, 2013.
7. Hadi Saadat, "Power System Analysis", McGraw Hill Education Pvt. Ltd., New Delhi, 3rd Edition, 23rd Reprint, 2015.
8. R.K.Rajput, "A Text Book of Power System Engineering", 2nd Edition, Laxmi Publications (P) Ltd, New Delhi, 2016.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	1		1	1	1					3	2	2
CO2	3	3	2			1	1	1					3	2	2
CO3	3	3	2			1	1	1					3	2	2
CO4	3	3	2			1	1	1					3	2	2
CO5	3	3	3	1	3	1	1	1				3	3	2	2
Avg	**3**	**3**	**2.4**	**1**	**3**	**1**	**1**	**1**				**3**	**3**	**2**	**2**

1 - Low, 2 - Medium, 3 - High

SEMESTER - IV
(B.E - EEE)

EE24403	ELECTRICAL MACHINES II	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To understand the construction and performance of salient and non-salient type synchronous generators.
- To learn the principle of operation and performance of synchronous motor.
- To study the construction, principle of operation and performance of induction machines.
- To acquire knowledge on the classification of starters and speed control methods of three phase induction motor.
- To understand the construction and working principle of special Machines and Single phase Induction motor.

UNIT I SYNCHRONOUS GENERATOR 9

Constructional details-Types of rotors-Winding factors-EMF equation-Synchronous reactance-Armature reactance- Phasor diagram- Voltage regulation – EMF, MMF, ZPF and A.S.A method- Synchronizing and parallel operation- Synchronizing torque – Two reaction theory –slip test.

UNIT II SYNCHRONOUS MOTOR 9

Principle of operation – Torque equation – V and Inverted V curves – Power input and power developed equations – Starting methods – Current loci for constant power input, constant excitation and constant power Developed-Hunting – damper windings-synchronous condenser.

UNIT III THREE PHASE INDUCTION MOTOR 9

Constructional details – Types of rotors –- Principle of operation – Slip-Revolving magnetic field - Equivalent circuit – Torque-Slip characteristics - Condition for maximum torque – Losses and efficiency - Circle diagram – Double cage induction motors –Induction generators.

UNIT IV STARTING AND SPEED CONTROL OF THREE PHASE INDUCTION MOTOR 9

Need for starting – Types of starters – DOL, Rotor resistance, Autotransformer and Star delta starters – Speed control – Voltage control, Frequency control and pole changing – Cascaded Connection-V/f control – Slip power recovery Scheme.

UNIT V SINGLE PHASE INDUCTION MOTORS AND SPECIAL MACHINES 9

Constructional details of single phase induction motor – Double field revolving theory and operation – Equivalent circuit – Starting methods of single-phase induction motors – Capacitor-start capacitor run Induction motor- Shaded pole induction motor - Linear induction motor – Repulsion motor - Hysteresis motor.

TOTAL: 45 PERIODS

LIST OF EXPERIMENTS:

1. Regulation of three phase alternator by EMF and MMF method.
2. Regulation of three phase salient pole alternator by slip test.
3. V and Inverted V curves of Three Phase Synchronous Motor.
4. No load and blocked rotor tests on three-phase induction motor.
5. Load test on three-phase induction motor.
6. Separation of losses in three phase induction motor.
7. No load and block rotor test of single-phase induction motor.
8. Load test on single-phase induction motor.

TOTAL: 30 PERIODS
TOTAL: 75 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Illustrate the construction and working principle of Synchronous generator.
CO2 : Demonstrate the construction and working principle of Synchronous Motor.
CO3 : Explain construction and working principle of three phase induction motor.
CO4 : Examine the starting and speed control of induction motors.
CO5 : Inspect the construction and working principle of Single phase induction motor and Special Electrical Machines.

TEXT BOOKS:

1. A.E. Fitzgerald, Charles Kingsley, Stephen. D. Umans, "Electric Machinery", McGraw Hill publishing Education Pvt. Ltd., 6th Edition 2017.
2. Stephen J. Chapman, "Electric Machinery Fundamentals", 4th Edition, McGraw Hill Education Pvt. Ltd, 4th Edition 2017.
3. D.P. Kothari and I.J. Nagrath, "Electric Machines", McGraw Hill Publishing Company Ltd, 5th Edition 2017.
4. P.S. Bhimbhra, "Electrical Machinery", Khanna Publishers, 2nd Edition, 2021.
5. Murugesh Kumar, "Electric Machines", Vikas Publishing House Pvt. Ltd, 1st Edition 2010.

REFERENCES:

1. Vincent Del Toro, "Basic Electric Machines", Pearson India Education, 2016.
2. M.N. Bandyo padhyay, "Electrical Machines Theory and Practice", PHI Learning Pvt. Ltd., New Delhi, 2011.
3. B.R.Gupta, "Fundamental of Electric Machines", New age International Publishers, 3rd Edition, Reprint 2015.
4. Alexander S. Langsdorf, "Theory of Alternating-Current Machinery", McGraw Hill Publications, 2001.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1				1		1	1	1	3	2	1
CO2	2	1	1	1				1		1	1	1	3	2	1
CO3	2	1	1	1					1	1	1	1	3	2	1
CO4	2	1	1	1				1		1		1	3		1
CO5	2	1	1	1	1			1		1	1	1	3	2	1
Avg	**2**	**1**	**1**	**1**	**1**			**1**	**1**	**1**	**1**	**1**	**3**	**2**	**1**

1 - Low, 2 - Medium, 3 - High

SEMESTER - IV
(B.E - EEE)

CS24406	DATA STRUCTURES AND ALGOGITHMS USING C	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To understand abstract data types and Linear/Non-Linear data structures.
- To learn algorithm performance analysis notations.
- To explore stacks, queues, trees, hash tables, graphs, and their behaviors.
- To select suitable data structures for specific applications.
- To implement data structures in C for problem solving.

UNIT I ALGORITHMS, PERFORMANCE ANALYSIS 8

Algorithms, performance analysis - Asymptotic Notation - time complexity and space complexity, Searching: Linear and binary search methods. Sorting: Bubble sort, selection sort, Insertion sort, Quick sort, Merge sort, Heap sort. Time complexities.

UNIT II BASIC DATA STRUCTURES 10

Basic data structures - The list ADT, Stack ADT, Queue ADT, array and linked list.Trees - Basic terminology Binary Tree ADT, array and linked list Implementation, Binary tree traversals, threaded binary tree Dynamic Programming: General method, applications, All pairs shortest path problem, Travelling sales person problem.

UNIT III PRIORITY QUEUES 8

Priority Queues - Definition, ADT, Realizing a Priority Queue using Heaps, Definition, insertion, Deletion, External Sorting - Model for external sorting, Multiway merge, Polyphase merge.

UNIT IV DICTIONARIES 9

Dictionaries, linear list representation, skip list representation, operations insertion, deletion and searching, hash table representation, hash functions, collision resolution- separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing, comparison of hashing and skip lists.

UNIT V SEARCH TREES 10

Binary Search Trees, Definition, ADT, Implementation, Operations - Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations - Insertion, Deletion and Searching, B - Trees, B - Tree of order m, height of a B - Tree, insertion, deletion and searching. Graphs: Basic terminology, representation of graphs, graph search methods DFS, BFS.

TOTAL: 45 PERIODS

LIST OF EXPERIMENTS:

1. Write a C programs to implement recursive and non-recursive.
    a. Linear search.
    b. Binary search.
2. Write a C programs to implement.
    a. Bubble sort.
    b. Selection sort.
    c. Quick sort.
    d. Insertion sort.
3. Write a C programs to implement the following using an array.
    a. Stack ADT.
    b. Queue ADT.
4. Write a C programs to implement list ADT to perform following operations.
    a. Insert an element in to a list.
    b. Delete an element from list.
    c. Search for a key element in list.
    d. Count number of nodes in list.
5. Write a C programs to implement the following using a singly linked.
    a. List. Stack ADT.
    b. Queue ADT.
6. Write a C programs to implement the deque (double ended queue) ADT using a doubly linked list and an array.
7. Write a C program to perform the following operations:
    a. Insert an element in to a binary search tree.
    b. Delete an element from a binary search tree.
    c. Search for a key element in a binary search tree.
8. Write C programs for implementing the following sorting methods: Merge sort and Heap sort.
9. Write a C programs that use recursive functions to traverse the given binary tree in
    a. Preorder.
    b. In order and
    c. Post order.
10. Write a C program to perform the following operations.
    a. Insert ion into a B-tree.
    b. Deletion from a B-tree.
11. Write a C program to perform the following operations.
    a. Insertion into an AVL- tree.
    b. Deletion from an AVL-tree.
12. Write a C program to implement all the functions of a dictionary (ADT).

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS:

1. Intel based desktop PC of 166MHz or faster processor with at least 64MB RAM and 100 MB free disk space.
2. Turbo C compiler or GCC compilers.

TOTAL: 30 PERIODS

TOTAL: 75 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Demonstrate the ability to analyze algorithms for correctness and efficiency.

CO2 : Implement and utilize fundamental data structures like stacks, queues, linked lists, and trees.

CO3 : Apply appropriate sorting and searching techniques.

CO4 : Select the most suitable data structure for a given problem.

CO5 : Design and develop efficient solutions using data structures and algorithms.

TEXT BOOKS:

1. Data Structures using C, Special Edition-MRCET, Tata McGraw-Hill Publishers 2017.
2. Data Structures using C, 2E 2nd Edition, Kindle Edition, June 2016.

REFERENCES:

1. Data structures and Algorithms in C, Michael T.Goodrich, R.Tamassia and Mount, Wiley student edition, John Wiley and Sons.
2. Data structures and Algorithm Analysis in C, Mark Allen Weiss, Pearson Education. Ltd., Second Edition.
3. Data structures and algorithms in C, 3rd Edition, Adam Drozdek, Thomson
4. Data structures using C and C, Langsam, Augenstein and Tanenbaum, PHI.
5. Problem solving with C, The OOP, Fourth edition, W.Savitch, Pearson education.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2							2	3	3	
CO2	2	3	3	3	2							2	2	3	
CO3	3	3	2	3	1							1	3	3	
CO4	3	2	3	3	2							2	3	2	
CO5	3	3	2	2	1							2	3	3	
Avg	**2.8**	**2.8**	**2.6**	**2.6**	**1.6**							**1.8**	**2.8**	**2.8**	

1 - Low, 2 - Medium, 3 - High

SEMESTER - IV

(B.E - EEE)

EE24404	LINEAR AND DIGITAL CIRCUITS LABORATORY	L	T	P	C
		0	0	3	2

COURSE OBJECTIVES:

- To understand the circuits built with combinational logic gate ICs.
- To familiarize with the circuits of register/counter and sequential logic ICs.
- To acquire knowledge on the circuits built with Op-Amp ICs.
- To understand the circuits with analog ICs such as the 555 timer, VCO and regulators.
- To acquire knowledge on analysis of the circuits with digital ICs like decoders and multiplexers.

LIST OF EXPERIMENTS:

1. OP AMP Applications – Adder, Subtractor & Comparators.
2. Integrator and Differentiator Circuits using IC 741.
3. Active Filter Applications – LPF, HPF (first order).
4. IC 741 Waveform Generators – Sine, Square wave and Triangular waves.
5. IC 555 Timer – Monostable and Astable Multivibrator Circuits.
6. Schmitt Trigger Circuits using IC 741.
7. 3-8 decoder using 74138.
8. 4-bit comparator using 7485.
9. 8*1 Multiplexer using 74151 and 2*4 Demultiplexer using 74155.
10. D, JK Flip Flops using 7474, 7483.
11. Decade counter using 7490.
12. Universal shift registers using 74194/195.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Analyze the design of Op-Amp-based circuits.
CO2 : Examine active filters and waveform generators.
CO3 : Construct timer and Multivibrator circuits.
CO4 : Illustrate combinational and sequential logic circuits.
CO5 : Develop counter and shift register systems.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2								3	2	
CO2	3	2	3	2	2								3	2	
CO3	3	2	3	2	2								3	2	
CO4	3	3	3	2	2								3	2	
CO5	3	2	3	2	2								3	2	
Avg	**3**	**2.4**	**3**	**2**	**2**								**3**	**2**	

1 - Low, 2 - Medium, 3 - High

SEMESTER - IV
(B.E - EEE)

GE24S02	SOFT SKILLS	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

- To enhance students' interpersonal skills by focusing on the dynamics of leadership, teamwork, and networking, essential for academic and professional success.
- To develop leadership capabilities that include effective communication, managing change, and stepping out of comfort zones.
- To provide strategies for managing stress through emotional intelligence and self-awareness techniques.
- To equip students with conflict resolution skills by understanding the nature of conflicts and exploring practical approaches to resolve them.
- To improve decision-making abilities by teaching structured, rational, and practical evaluation techniques for real-life scenarios.

UNIT I INTERPERSONAL SKILLS 3

Understanding the relationship between Leadership, Networking, and Teamwork-Realizing one's skills in Leadership, Networking & Teamwork-Assessing interpersonal skills. Situation description of interpersonal skill - Teamwork: necessity of teamwork personally, socially, and educationally.

UNIT II LEADERSHIP 3

Skills for a good leader - Assessment of leadership skills - Change management - Exploring challenges-Risking comfort zone - Managing change.

UNIT III STRESS MANAGEMENT 3

Causes of stress and its impact - How to manage & de-stress-Understanding the circle of control - Stress busters-Emotional Intelligence: What is Emotional Intelligence, emotional quotient, Why Emotional Intelligence matters-Emotion scales - Managing emotions.

UNIT IV CONFLICT RESOLUTION 3

Conflicts in human relations Definition and types of conflicts (intrapersonal, interpersonal, group, organizational) - Positive and negative outcomes of conflict, reasons - Case studies-Approaches to conflict resolution - Active listening and empathy, assertive communication, emotional regulation and impulse control, problem - solving and consensus - building techniques.

UNIT V DECISION MAKING 3

Importance and necessity of decision making - Process of decision making - Practical ways of decision making - Weighing positives and negatives.

TOTAL: 15 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Demonstrate interpersonal skills including leadership, teamwork, and networking.
CO2 : Exhibit leadership qualities and manage change effectively.
CO3 : Apply stress management techniques and understand emotional intelligence.
CO4 : Resolve conflicts constructively using appropriate approaches.
CO5 : Make informed and practical decisions by evaluating situations logically.

TEXT BOOKS:

1. Covey Sean, Seven Habit of Highly Effective Teens, New York, Fire side Publishers,1998.
2. Carnegie Dale, How to Win Friends and Influence People, New York: Simon & Schuster, 1998.
3. ThomasA Harris, Iam ok, you are ok, New York-Harper and Row, 1972.
4. Daniel Coleman , Emotional Intelligence, Bantam Book,2006.

REFERENCES:

1. Covey, Sean (1998). The 7 Habits of Highly Effective Teens. New York: Fireside Publishers. A practical guide on personal development and interpersonal effectiveness tailored for young adults.
2. Goleman, Daniel (2006). Emotional Intelligence: Why It Can Matter More Than IQ. Bantam Books. A seminal work on the importance of emotional intelligence in personal and professional success.
3. Robbins, Stephen P. & Judge, Timothy A. (2019). Organizational Behavior (18th ed.). Pearson Education. Covers conflict resolution, stress management, leadership, and decision-making in organizational contexts.
4. McGraw, Hill (2020). Soft Skills Training: A Workbook to Develop Skills for Employment. A modern practical workbook for classroom and workshop-based soft skills development.
5. Soft skill: Enhancing Employability and Carrier Growth, Meenakshi Raman and Sangeetha sharma, Edition 2023, 3RD Edition, McGraw Hill Education.
6. Devdas M. (2004). Stop Sleep walking through life. Yogi Impressions Books Private, Limited.
7. Parthasarathy A (2008). The Fall of the Human Intellect. Kindle Edition.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		1				3	2	3	3					
CO2	2		2				3	2	3	3					
CO3			2			2	3	2		3		2			
CO4					2	2	3	3	2	3					
CO5	3	3	2				3	3		3		3			
Avg	**1.4**	**0.6**	**1.4**		**0.4**	**0.8**	**3**	**2.4**	**1.6**	**3**		**1**			

1 - Low, 2 - Medium, 3 - High

SEMESTER - IV
(B.E - EEE)

GE24M01	PRINCIPLES OF MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- Sketch the Evolution of Management.
- Extract the functions and principles of management.
- Learn the application of the principles in an organization.
- Study the various HR related activities.
- Analyze the position of self and company goals towards business.

UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS 9

Definition of Management – Science or Art – Manager Vs Entrepreneur- types of managers managerial roles and skills – Evolution of Management –Scientific, human relations, system and contingency approaches– Types of Business organization- Sole proprietorship, partnership, company-public and private sector enterprises- Organization culture and Environment – Current trends and issues in Management.

UNIT II PLANNING 9

Nature and purpose of planning – Planning process – Types of planning – Objectives – Setting objectives – Policies – Planning premises – Strategic Management – Planning Tools and Techniques – Decision making steps and process.

UNIT III ORGANISING 9

Nature and purpose – Formal and informal organization – Organization chart – Organization structure – Types – Line and staff authority – Departmentalization – delegation of authority – Centralization and decentralization – Job Design - Human Resource Management – HR Planning, Recruitment, selection, Training and Development, Performance Management, Career planning and management.

UNIT IV DIRECTING 9

Foundations of individual and group behaviour – Motivation – Motivation theories – Motivational techniques – Job satisfaction – Job enrichment – Leadership – types and theories of leadership – Communication – Process of communication – Barrier in communication – Effective communication – Communication and IT.

UNIT V CONTROLLING 9

System and process of controlling – Budgetary and non - Budgetary control techniques – Use of computers and IT in Management control – Productivity problems and management – Control and performance – Direct and preventive control – Reporting.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Understand the managerial functions like planning, organizing, staffing, leading & controlling.
CO2 : Explain basic knowledge on international aspect of management.
CO3 : Describe the management concept of organizing.
CO4 : Understand management concept of directing.
CO5 : Interpret management concept of controlling.

TEXT BOOKS:

1. Harold Koontz and Heinz Weihrich "Essentials of management" Tata McGraw Hill, 1998.
2. Stephen P. Robbins and Mary Coulter, "Management", Prentice Hall (India)Pvt. Ltd.,10th Edition, 2009.

REFERENCES:

1. Robert Kreitner and Mamata Mohapatra, "Management", Biztantra, 2008.
2. Stephen A. Robbins and David A. Decenzo and Mary Coulter, "Fundamentals of Management" Pearson Education, 7th Edition, 2011.
3. Tripathy PC and Reddy PN, "Principles of Management", Tata Mcgraw Hill, 1999.
4. JAF Stoner, Freeman R.E and Daniel R Gilbert "Management", 6th Edition, Pearson Education, 2004.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3					1							2	1	1
CO2		1	1										2	1	
CO3	1			2			1		2		1	1			2
CO4		1	1	1	2			1	2				1	1	1
CO5	1				1	1				3		1	1	1	1
Avg	**1.66**	**1**	**1**	**1.5**	**1.5**	**1**	**1**	**1**	**2**	**3**	**1**	**1**	**1.5**	**1.5**	**1.25**

1 - Low, 2 - Medium, 3 - High

SEMESTER - IV
(B.E - EEE)

GE24M02	TOTAL QUALITY MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To facilitate the understanding of basic quality management in engineering.
- To enhance the understanding of various principles of TQM.
- To be acquainted with management tools, six sigma and benchmarking.
- To acquire knowledge of quality functions, TPM concepts, and continuous improvement methodologies.
- To learn various quality systems and TQM implementation in manufacturing and service sectors.

UNIT I INTRODUCTION 9

Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of manufacturing and service quality - Basic concepts of TQM - Definition of TQM – TQM Framework - Contributions of Deming, Juran and Crosby – Barriers to TQM.

UNIT II TQM PRINCIPLES 9

Leadership – Strategic quality planning, Quality statements - Customer focus – Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal – Continuous process improvement – PDSA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS & TECHNIQUES I 9

The seven traditional tools of quality – New management tools – Six-sigma: Concepts, methodology, applications to manufacturing, service sector including IT – Bench marking – Reason to bench mark, Bench marking process – FMEA – Stages, Types.

UNIT IV TQM TOOLS & TECHNIQUES II 9

Quality circles – Quality Function Deployment (QFD) – Taguchi quality loss function – TPM – Concepts, improvement needs – Cost of Quality – Performance measures.

UNIT V QUALITY SYSTEMS 9

Need for ISO 9000- ISO 9000-2000 Quality System – Elements, Documentation, Quality auditing- QS9000 – ISO 14000 – Concepts, Requirements and Benefits – Case studies of TQM implementation in manufacturing and service sectors including IT.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Explain the importance of quality in engineering.

CO2 : Improve the quality of the organization through using the total quality process

CO3 : Explore the knowledge of implementing various TQM tools.

CO4 : Implement the tools and techniques for quality improvement.

CO5 : Outline the key benefits of ISO 9000 and ISO 14000 implementation for service sector businesses.

TEXT BOOKS:

1. Dale H.Besterfield, Carol B.Michna, Glen H. Besterfield, Mary B.Sacre, Hemant Urdhwareshe and Rashmi Urdhwareshe, Total Quality Management, Pearson Education Asia, Revised Third Edition, Indian Reprint, Sixth Impression, 2020.

REFERENCES:

1. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8th Edition, First Indian Edition, Cengage Learning, 2019.
2. Janakiraman. B and Gopal .R.K., "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. Ltd., 2018.
3. Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2020.
4. ISO 9001-2015 standards.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			2	1		2		2			2				2
CO2									2		3				
CO3									3		3				
CO4						3			3		3				
CO5							3								
Avg			**1**	**1**		**2**	**3**	**2**	**3**		**3**				**1**

1 - Low, 2 - Medium, 3 - High

SEMESTER - IV
(B.E - EEE)

GE24M03	ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the principles of and techniques of managerial economics.
- To learn various demand forecasting methods.
- To know the business organizations.
- To study the various costing methods.
- To understand the financial accounting and analysis.

UNIT I INTRODUCTION TO MANAGERIAL ECONOMICS 9

Introduction – Economics Theories And Scope –Demand And Supply Analysis –Determinants of Demand – Law Of Demand – Elasticity Of Demand – Demand Forecasting –Demand Sensitivity – Price ,Income ,Gross ,Advertisement – Law Of Supply – Elasticity Of Supply – Cost Concepts – Types – Cost Curves –Short Run And Long Run – Break Even Analysis – Pricing Concepts – Types ,Price – Determinations.

UNIT II DEMAND & SUPPLY ANALYSIS 9

Concepts – Firm, Industry, Market, Market power, Market Conduct, Market Performance, Market Structure – Types – Perfect Monopoly, Monopolistic and Oligopoly Competition, Manufacturing Practices – Diversification, Vertical and Horizontal Integration, Merger.

UNIT III PRODUCTION AND COST ANALYSIS 9

National Income: Concepts and Measurements – GNP, NNP- Methods of Measuring National Income-Inflation and Deflation, Unemployment, Money and Banking: Value of Money – Banking – Commercial Banks and Its Function, New Economic Environment: Economic Systems – Economic Liberalization, Privatization and Globalization.

UNIT IV PRICING 9

Introduction, Scope, Objectives, Basic Financial Concepts – Time Value Of Money And Method Of Appraising Project Profitability – Rate of Return –Pay Back Period – Percent Value, NPV Comparison – Cost – Benefit Analysis. Source of Finance – Internal and External – Long Term And Short Term – Securities, Debentures/ Bonds, Shares, Financial Institutions.

UNIT V FINANCIAL ACCOUNTING 9

Accounting System – Financial Statement – Types – Ledger, Cash Flow Statement Profit And Loss Account, Balance Sheet, Ratios/ Financial Analysis- Liquidity Leverage Activity, Profitability, Trends Analysis.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Analyse the demand in the present market.

CO2 : Illustrate the product demand by using the demand forecasting techniques.

CO3 : Apply the concept of cash flow.

CO4 : Introduce the analysis of economics of sampling and Replacement and Maintenance.

CO5 : Learn about depreciation and Evaluation of public alternatives.

TEXT BOOKS:

1. Management Economics and Financial Analysis, Aryasri, 4/e, TMH, 2009.
2. Managerial Economics, Varshney & Maheswari, Sultan Chand, 2009.

REFERENCES:

1. Maheshwari S N "Management Accounting and Financial Accounting", S.Chand and Company. 1993.
2. D. N. Drivedi, "Managerial Economics ", Vikas Publishing House.1980.
3. R. R. Barthwal, Industrial Economics ", Wiley Eastern Ltd1996.
4. G. S. Guptha, "Management Economics ", Tata McGraw Hill Ltd.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1						2	1	2							
CO2						2	2	2	1	1					**1**
CO3						2	2	3	1	1					**1**
CO4						2	1	3							**1**
CO5						2	2	2							
Avg						**2**	**1.6**	**2.4**	**0.4**	**0.4**					**0.6**

1 - Low, 2 - Medium, 3 - High

SEMESTER - IV
(B.E - EEE)

GE24M04	HUMAN RESOURCE MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- Understanding the fundamental concepts, scope, and evolution of Human Resource Management.
- Learning the human resource planning, job analysis, recruitment, and selection processes.
- Developing insights into training, employee development, and performance management systems.
- Analyzing the components of compensation management and employee welfare.
- Examining the performance evaluation methods and organizational control processes.

UNIT I INTRODUCTION TO HUMAN RESOURCE MANAGEMENT 9

Definition, nature and scope of HRM, The importance of human resources, Evolution of HRM, Objective of Human Resource Management, Human resource policies, Role of human resource manager, HRM in the Digital Era.

UNIT II HUMAN RESOURCE PLANNING AND RECRUITMENT 9

Internal and External sources of Human Resources, Importance of Human Resource Planning, Job analysis, Recruitment, Selection, Socialization.

UNIT III TRAINING, DEVELOPMENT, AND PERFORMANCE MANAGEMENT 9

Training vs. development, Need for Training, Evaluation of Training, Types of training and Executive development methods, Performance management systems, Performance appraisals.

UNIT IV COMPENSATION MANAGEMENT AND EMPLOYEE WELFARE 9

Compensation structure: Components and strategies, Compensation plan, Reward, Motivation, Career Development, Mentor, Protege relationships.

UNIT V PERFORMANCE EVALUATION AND CONTROL 9

Performance evaluation, Feedback, The control process, Importance, Methods, Grievances, Causes, Redressal methods.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Describe the definition, scope, and evolution of Human Resource Management.

CO2 : Analyze the human resource planning process, including recruitment, selection, and socialization.

CO3 : Evaluate various training and development methods and assess performance appraisal systems.

CO4 : Demonstrate an understanding of compensation structures, employee motivation strategies.

CO5 : Apply methods of performance evaluation and control and suggest appropriate redressal mechanisms

TEXT BOOKS:

1. Decenzo and Robbins, "Human Resource Management", 8th Edition, Wiley, 2007.
2. John Bernardin. H.,"Human Resource Management – An Experimental Approach", 5th Edition, Tata McGraw Hill, 2013, New Delhi.

REFERENCES:

1. Luis R,. Gomez-Mejia, DavidB. Balkin and Robert L. Cardy, “Managing Human Resources", 7th Edition, PHI, 2012.
2. Dessler, "Human Resource Management", Pearson Education Limited, 2007.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	2	2	1	1	1	1	1	1
CO2	3	3	2	3	2	3	2	2	2	1	1	1	1	1	1
CO3	3	3	2	3	2	3	2	2	2	1	1	1	1	1	1
CO4	3	3	2	3	2	3	2	2	2	1	1	1	1	1	1
CO5	3	3	2	3	2	3	2	2	2	1	1	1	1	1	1
Avg	**3**	**3**	**2**	**3**	**2**	**3**	**2**	**2**	**2**	**1**	**1**	**1**	**1**	**1**	**1**

1 - Low, 2 - Medium, 3 - High

SEMESTER - IV
(B.E - EEE)

GE24MO5	KNOWLEDGE MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- Learn the Evolution of Knowledge management.
- Be familiar with tools.
- Be exposed to Applications.
- Be familiar with some case studies

UNIT I INTRODUCTION 9

An Introduction to Knowledge Management - The foundations of knowledge management- including cultural issues- technology applications organizational concepts and processes- management aspects- and decision support systems. The Evolution of Knowledge management: From Information Management to Knowledge Management - Key Challenges Facing the Evolution of Knowledge Management - Ethics for Knowledge Management.

UNIT II CREATING THE CULTURE OF LEARNING AND KNOWLEDGE SHARING 9

Organization and Knowledge Management - Building the Learning Organization. Knowledge and role related issues-Basic types of knowledge management-Knowledge Management Life Cycle- Organizational Knowledge Sources Knowledge Markets: Cooperation among Distributed Technical Specialists – Tacit Knowledge and Quality Assurance.

UNIT III KNOWLEDGE MANAGEMENT-THE TOOLS 9

Telecommunications and Networks in Knowledge Management - Internet Search Engines and Knowledge Management - Information Technology in Support of Knowledge Management - Knowledge Management and Vocabulary Control - Information Mapping in Information Retrieval - Information Coding in the Internet Environment - Repackaging Information.

UNIT IV KNOWLEDGE MANAGEMENT APPLICATION 9

Components of a Knowledge Strategy - Case Studies (from Library to Knowledge Center, Knowledge Management in the Health Sciences-Knowledge Management in Developing Countries)

UNIT V FUTURE TRENDS AND CASE STUDIES 9

Advanced topics and case studies in knowledge management - Development of a knowledge management map/plan that is integrated with an organization's strategic and business plan - A case study on Corporate Memories for supporting various aspects in the process life - cycles of an organization

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Understand the process of acquire knowledge from experts.
CO2 : Understand the learning organization.
CO3 : Use the knowledge management tools.
CO4 : Develop knowledge management Applications.
CO5 : Design and develop enterprise applications.

TEXT BOOKS:

1. Srikantaiah, T.K., Koenig, M., Knowledge Management for the Information Professional Information Today, Inc., 2000.
2. "Effective Knowledge Management: A Best Practice Blueprint" by Sultan Kermally (CBI, 2002).
3. Knowledge Management" by Elias M. Awad (Pearson, 1st Edition).

REFERENCES:

1. Nonaka, I., Takeuchi, H., The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation, Oxford University Press, 1995.

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	1								3	2	
CO2	3	3	2	2	2								3	2	
CO3	3	3	3	2	2								3	3	
CO4	3	3	3	2	2								3	3	
CO5	3	3	3	2	2								3	3	
Avg	**3**	**2.8**	**2.4**	**2**	**1.8**								**3**	**2.6**	

1 - Low, 2 - Medium, 3 - High

SEMESTER - IV
(B.E - EEE)

GE24M06	INDUSTRIAL MANAGEMENT	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To study the basic concepts of management; approaches to management; contributors to management studies; various forms of business organization and trade unions function in professional organizations.
- To study the planning; organizing and staffing functions of management in professional organization.
- To study the leading; controlling and decision-making functions of management in professional organization.
- To learn the organizational theory in professional organization.
- To learn the principles of productivity and modern concepts in management in professional organization.

UNIT I INTRODUCTION TO MANAGEMENT 9

Management: Introduction; Definition and Functions – Approaches to the study of Management – Mintzberg's Ten Managerial Roles – Principles of Taylor; Fayol; Weber; Parker – Forms of Organization: Sole Proprietorship; Partnership; Company (Private and Public); Cooperative – Public Sector Vs. Private Sector Organization – Business Environment: Economic; Social; Political; Legal – Trade Union: Definition; Functions; Merits & Demerits.

UNIT II FUNCTIONS OF MANAGEMENT - I 9

Planning: Characteristics; Nature; Importance; Steps; Limitation; Planning Premises; Strategic Planning; Vision & Mission statement in Planning– Organizing: Organizing Theory; Principles; Types; Departmentalization; Centralization and Decentralization; Authority & Responsibility – Staffing: Systems Approach; Recruiting and Selection Process; Human Resource Development (HRD) Concept and Design.

UNIT III FUNCTIONS OF MANAGEMENT - II 9

Directing (Leading): Leadership Traits; Style; Morale; Managerial Grids (Blake - Mounton, Reddin) – Communication: Purpose; Model; Barriers – Controlling: Process; Types; Levels; Guidelines; Audit (External, Internal, Merits); Preventive Control – Decision Making: Elements; Characteristics; Nature; Process; Classifications.

UNIT IV ORGANIZATION THEORY 9

Organizational Conflict: Positive Aspects; Individual; Role; Interpersonal; Intra Group; Inter Group; Conflict Management – Maslow's hierarchy of needs theory; Herzberg's motivation-hygiene theory; McClelland's three needs motivation theory; Vroom's valence-expectancy theory – Change Management: Concept of Change; Lewin's Process of Change Model; Sources of Resistance; Overcoming Resistance; Guidelines to managing Conflict.

UNIT V PRODUCTIVITY AND MODERN TOPICS 9

Productivity: Concept; Measurements; Affecting Factors; Methods to Improve – Modern Topics (concept, feature/characteristics, procedure, merits and demerits): Business Process Reengineering (BPR); Benchmarking; SWOT/SWOC Analysis; Total Productive Maintenance; Enterprise Resource Planning (ERP); Management of Information Systems (MIS).

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After completion of this course, the students should be able to

CO1 : Explain basic concepts of management; approaches to management; contributors to management studies; various forms of business organization and trade unions function in professional organizations.

CO2 : Discuss the planning; organizing and staffing functions of management in professional organization.

CO3 : Apply the leading; controlling and decision-making functions of management in professional organization.

CO4 : Discuss the organizational theory in professional organization.

CO5 : Apply principles of productivity and modern concepts in management in professional organization

TEXT BOOKS:

1. M. Govindarajan and S. Natarajan, "Principles of Management", Prentice Hall of India, New Delhi, 2009.
2. Koontz. H. and Weihrich. H., "Essentials of Management: An International Perspective", 8th Edition, Tata McGraw-Hill, New Delhi, 2010.

REFERENCES:

1. Joseph J, Massie, "Essentials of Management", 4th Edition, Pearson Education, 1987.
2. Saxena, P. K., "Principles of Management: A Modern Approach", Global India Publications, 2009.
3. S. Chandran, "Organizational Behaviours", Vikas Publishing House Pvt. Ltd., 1994.
4. Richard L. Daft, "Organization Theory and Design", South Western College Publishing, 11th Edition, 2012.
5. S. Trevis Certo, "Modern Management Concepts and Skills", Pearson Education, 2018

CO - PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	1	1	1	3	2	3	2	3	1	3	1	1	1
CO2	1	1	1	1	1	3	2	3	2	3	1	3	1	1	1
CO3	1	1	1	1	1	3	2	3	2	3	1	3	1	1	1
CO4	1	1	1	1	1	3	2	3	2	3	1	3	1	1	1
CO5	1	1	1	1	1	3	2	3	2	3	1	3	1	1	1
Avg	**1**	**1**	**1**	**1**	**1**	**3**	**2**	**3**	**2**	**3**	**1**	**3**	**1**	**1**	**1**

1 - Low, 2 - Medium, 3 - High