ELECTRONICS AND COMMUNICATION 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 - ELECTRONICS AND COMMUNICATION 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	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
THEORY COURSES									
1	MA24201	Statistics and Numerical Techniques	BS	3	1	-	4	4	60/40
2	GE24201	Engineering Graphics	ES	2	-	3	5	4	60/40
3	EC24201	Electron Devices	PC	3	-	-	3	3	60/40
4	TA24201	Tamils and Technology	HS	1	-	-	1	1	60/40
THEORY CUM PRACTICAL COURSES									
5	EE24204	Electrical and Instrumentation Engineering	ES	3	-	2	5	4	50/50
6	EC24202	Circuit Theory	ES	3	-	2	5	4	50/50
PRACTICAL COURSES									
7	GE24202	Engineering Practices Laboratory	ES	-	-	4	4	2	40/60
8	HS24201	English Communication Laboratory	HS	-	-	4	4	2	40/60
TOTAL				**15**	**1**	**16**	**31**	**24**	

SEMESTER - III									
S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
THEORY COURSES									
1	MA24301	Random Processes	BS	3	1	-	4	4	60/40
2	EC24301	Signals and Systems	PC	3	-	-	3	3	60/40
3	EC24302	Electronic Circuits	PC	3	-	-	3	3	60/40
4	CS24307	Fundamentals of Data Structures	ES	3	-	-	3	3	60/40
THEORY CUM PRACTICAL COURSES									
5	EC24304	Digital System Design	PC	3	-	2	5	4	50/50
6	EC24305	Control Systems	PC	3	-	2	5	4	50/50
PRACTICAL COURSES									
7	EC24306	Electronic Circuits & Simulation Laboratory	PC	-	-	4	4	2	40/60
8	CS24308	Fundamentals of Data Structures Laboratory	ES	-	-	4	4	2	40/60
9	GE24S01	Professional Development	EEC	-	-	2	2	1	0/100
TOTAL				**18**	**1**	**14**	**33**	**26**	

SEMESTER - IV									
S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
THEORY COURSES									
1	EC24401	Electromagnetics	BS	3	-	-	3	3	60/40
2	EC24402	Linear Integrated Circuits	PC	3	-	-	3	3	60/40
3	EC24403	Analog Communication Systems	PC	3	-	-	3	3	60/40
4	AD24407	Artificial Intelligence and Machine Learning	ES	3	-	-	3	3	60/40
5	GE24402	Environmental Science and Sustainability	BS	2	-	-	2	2	60/40
THEORY CUM PRACTICAL COURSES									
6	EC24404	Discrete Time Signal Processing	PC	3	-	2	5	4	50/50
PRACTICAL COURSES									
7	EC24405	Linear Integrated Circuits Laboratory	PC	-	-	4	4	2	40/60
8	EC24406	Analog Communication Systems Laboratory	PC	-	-	4	4	2	40/60
TOTAL				**17**	**-**	**10**	**28**	**22**	

SEMESTER - V									
S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
THEORY COURSES									
1	EC24501	Microprocessors and Microcontrollers	PC	3	-	-	3	3	60/40
2	EC24502	Digital Communication Systems	PC	3	-	-	3	3	60/40
3	-	Professional Elective I	PE	-	-	-	-	3	-
4	-	Professional Elective II	PE	-	-	-	-	3	-
5	-	Professional Elective III	PE	-	-	-	-	3	-
6	-	Non-Credit Mandatory course-I	MC	-	-	2	2	-	0/0
THEORY CUM PRACTICAL COURSES									
7	EC24503	Transmission Lines and Waveguides	PC	3	-	2	5	4	50/50
PRACTICAL COURSES									
8	EC24504	Microprocessors and Microcontrollers Laboratory	PC	-	-	3	3	2	40/60
TOTAL				**-**	**-**	**-**	**-**	**21**	

SEMESTER - VI									
S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
THEORY COURSES									
1	-	Professional Elective IV	PE	-	-	-	-	3	-
2	-	Professional Elective V	PE	-	-	-	-	3	-
3	-	Professional Elective VI	PE	-	-	-	-	3	-
4	-	Open elective I	OE	-	-	-	-	3	-
5	-	Non-Credit Mandatory course -II	MC	-	-	-	2	-	0/0
THEORY CUM PRACTICAL COURSES									
6	EC24601	Wireless Communication	PC	3	-	2	5	4	50/50
7	EC24602	VLSI System Design	PC	3	-	2	5	4	50/50
PRACTICAL COURSES									
8	EC24603	Mini Project	EEC	-	-	4	4	2	40/60
TOTAL				**-**	**-**	**-**	**-**	**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	-	-	2	2	60/40
2	EC24701	Embedded system design	PC	3	-	-	3	3	60/40
3	-	Management -Elective	HS	3	-	-	3	3	60/40
4	-	Open Elective II	OE	-	-	-	-	3	-
5	-	Open Elective III	OE	3	-	-	3	3	60/40
6	-	Open Elective IV	OE	3	-	-	3	3	60/40
PRACTICAL COURSES									
7	EC24702	Embedded system design	PC	-	-	4	4	2	40/60
8	EC24703	Summer Internship	EEC	-	-	-	-	2	0/100
TOTAL				**-**	**-**	**-**	**-**	**21**	

SEMESTER - VIII									
S.NO	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS	EXT / INT
				L	T	P			
PRACTICAL COURSES									
1	EC24801	Project Work/ Internship	EEC	-	-	20	20	10	40/60
TOTAL				**-**	**-**	**-**	**-**	**10**	

TOTAL CREDITS	168

SUMMARY

Name of the Programme: Electronics and Communication Engineering										
S.No	Subject Area	Credits per Semester								Total Credits
		1	2	3	4	5	6	7	8	
1	HS	5	3					5		13
2	BS	12	4	4	5					25
3	ES	5	14	5	3					27
4	PC		3	16	14	12	8	5		58
5	PE					9	9			18
6	OE						3	9		12
7	EEC			1			2	2	10	15
8	Non-Credit Mandatory					✓	✓			
TOTAL		22	24	26	22	21	22	21	10	168

MANDATORY COURSE

NON-CREDIT MANDATORY COURSE I: SEMESTER V								
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: SEMESTER VI								
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 : SEMESTER VII								
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

Vertical I Sensor Technologies And IoT	Vertical II Signal Processing	Vertical III Advanced Communication Technology	Vertical IV Emerging Technologies	Vertical V Bio Medical Technologies	Verticals VI Semi-Conductor Chip Design & Testing	Verticals VII RF Technology
IoT Based System Design	Advanced Digital Signal processing	Optical Communication& Networks	Cryptography & Security Practices	Bio-Medical Instrumentations	System Verilog	Rf System Design
Industrial IoT and Industry 4.0	Bio Signal Processing	5G & Beyond Communication Networks	Deep Learning Algorithms	Wearable Devices	Low Power IC Design	Antenna Design
Wireless Network	Speech Processing	Software Defined Networks	Virtual Reality & Augmented Reality	Human Assist Devices	Validation & Testing Technology	Emi/Emcpre Compliance Testing
IoT Security	Under Water Imaging Systems And Image Processing	Machine Learning for Communication Technology	Human Computer Interaction	Body Area Networks	Analog IC Design	Smart Antenna
Data Analytics for IoT	DSP architecture and programming	Satellite Communication	Data Science and Analytics	Medical imaging Systems	Mixed Signal IC Design & Testing	Signal Integrity for High-Speed Design
IoT Architectures and Protocols	Computer Vision	Advanced Wireless Communication Techniques	Block Chain Technologies & Applications	Diagnostic & Therapeutic Equipments	VLSI Testing Design for Testability	Computational Electro Magnetics

PROFESSIONAL ELECTIVE COURSES: VERTICALS

VERTICAL I: SENSOR TECHNOLOGIES AND IOT								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC24P01	IOT based System design	PC	3	0	0	3	3
2	EC24P02	Industrial IOT and industry4.0	PC	2	0	2	4	3
3	EC24P03	Wireless Network	PC	2	0	2	4	3
4	EC24P04	IoT security	PC	3	0	0	3	3
5	EC24P05	Data Analytics for IOT	PC	3	0	0	3	3
6	EC24P06	IOT Architectures and protocols	PC	3	0	0	3	3

VERTICAL II: SIGNAL PROCESSING								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC24P07	Advanced Digital Signal Processing	PC	2	0	2	4	3
2	EC24P08	Bio Signal Processing	PC	3	0	0	3	3
3	EC24P09	Speech Processing	PC	2	0	2	4	3
4	EC24P10	Under Water Imaging Systems and Image Processing	PC	2	0	2	4	3
5	EC24P11	DSP Architecture and Programming	PC	2	0	2	4	3
6	EC24P12	Computer Vision	PC	2	0	2	4	3

VERTICAL III: ADVANCED COMMUNICATION TECHNOLOGY								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC24P13	Optical Communication & Networks	PC	3	0	0	3	3
2	EC24P14	5G & Beyond Communication Networks	PC	3	0	0	3	3
3	EC24P15	Software Defined Networks	PC	2	0	2	4	3
4	EC24P16	Machine learning for communication technology	PC	2	0	2	4	3
5	EC24P17	Satellite Communication	PC	3	0	0	3	3
6	EC24P18	Advanced Wireless Communication Techniques	PC	3	0	0	3	3

VERTICAL IV: EMERGING TECHNOLOGIES								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC24P19	Cryptography & Security Practices	PC	3	0	0	3	3
2	CS24P31	Deep Learning	PC	2	0	2	4	3
3	EC24P20	Virtual Reality & Augmented Reality	PC	3	0	0	3	3
4	EC24P21	Human Computer Interaction	PC	3	0	0	3	3
5	EC24P22	Data Science and Analytics	PC	2	0	2	4	3
6	EC24P23	Block Chain Technologies &Applications	PC	3	0	0	3	3

VERTICAL V: BIO MEDICAL TECHNOLOGIES								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	BM24P39	Bio-medical Instrumentations	PC	3	0	0	3	3
2	BM24P08	Wearable Devices	PC	3	0	0	3	3
3	BM24P32	Human Assist Devices	PC	3	0	0	3	3
4	EC24P38	Body Area Networks	PC	3	0	0	3	3
5	BM24P37	Medical Imaging Systems	PC	3	0	0	3	3
6	BM24P38	Diagnostic & Therapeutic Equipments	PC	3	0	0	3	3

VERTICAL VI: SEMICONDUCTOR CHIP DESIGN & TESTING								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC24P26	System Verilog	PC	2	0	2	4	3
2	EC24P27	Low power IC design	PC	2	0	2	4	3
3	EC24P28	Validation & Testing Technology	PC	2	0	2	4	3
4	EC24P29	Analog IC design	PC	2	0	2	4	3
5	EC24P30	Mixed signal IC design & Testing	PC	2	0	2	4	3
6	EC24P31	VLSI Testing design for testability	PC	3	0	0	3	3

VERTICAL VII: SEMICONDUCTOR CHIP DESIGN & TESTING								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC24P32	RF system design	PC	2	0	2	4	3
2	EC24P33	Antenna design	PC	2	0	2	4	3
3	EC24P34	EMI/EMC Pre Compliance Testing	PC	2	0	2	4	3
4	EC24P35	Smart Antenna	PC	3	0	0	3	3
5	EC24P36	Signal integrity for High-Speed design	PC	2	0	2	4	3
6	EC24P37	Computational electromagnetic	PC	3	0	0	3	3

OPEN ELECTIVES

OPEN ELECTIVE I								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	IE24901	Introduction to Industrial Engineering	OE	3	0	0	3	3
2	EE24901	Renewable Energy System	OE	3	0	0	3	3
3	AD24906	Neural Networks and Deep Learning	OE	2	0	2	4	3
4	CS24901	Digital Marketing	OE	3	0	2	5	3
5	CE24901	Climate Change and its Impact	OE	3	0	0	3	3
6	CS24914	Web Design and Management	OE	2	0	2	4	3
7	CS24903	Mobile Application Development	OE	2	0	2	4	3
8	AD24902	Business Intelligence	OE	3	0	0	3	3
9	AS24901	Space science	OE	3	0	0	3	3

OPEN ELECTIVE II								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	AI24902	IT in Agricultural System	OE	3	0	0	3	3
2	CS24904	DevOps	OE	2	0	2	4	3
3	RA24901	Robotic Process Automation	OE	2	0	2	4	3
4	MG24901	Fintech Regulation	OE	3	0	0	3	3
5	SF24901	Fire safety Engineering	OE	3	0	0	3	3
6	CS24905	Cloud Computing	OE	2	0	2	4	3
7	CS24915	Fundamentals of Database Management Systems	OE	3	0	0	3	3
8	IP24901	Intellectual Property Rights	OE	3	0	0	3	3
9	FD24901	Food, Nutrition and Health	OE	3	0	0	3	3

OPEN ELECTIVE III								
S.NO	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	MG24902	Democracy and Good Governance	OE	3	0	0	3	3
2	ME24901	Applied Design Thinking	OE	3	0	0	3	3
3	RA24902	Remote Sensing Concepts	OE	3	0	0	3	3
4	EE24902	Electric Vehicle Technology	OE	3	0	0	3	3
5	EE24903	Introduction to PLC Programming	OE	3	0	0	3	3
6	MA24904	Operations Research	OE	3	0	0	3	3
7	CS24906	Reinforcement Learning	OE	3	0	0	3	3
8	BM24901	Assistive Technology	OE	3	0	0	3	3
9	MA24901	Graph Theory	OE	3	0	0	3	3
10	HS24901	English for Competitive Examinations	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	AU24901	Batteries and Management system	OE	3	0	0	3	3
2	EE24904	Sensors and Actuators	OE	3	0	0	3	3
3	RA24903	Foundation of Robotics	OE	3	0	0	3	3
4	RA24904	Drone Technologies	OE	3	0	0	3	3
5	AI24904	Agriculture Entrepreneurship Development	OE	3	0	0	3	3
6	GI24901	Geographical Information System	OE	3	0	0	3	3
7	HS24902	Project Report Writing	OE	3	0	0	3	3
8	BM24902	Medical Informatics	OE	3	0	0	3	3
9	AD24903	Multivariate Data Analysis	OE	3	0	0	3	3
10	MF24901	Reverse Engineering	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
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.- ELECTRONICS AND COMMUNICATION ENGINEERING

EC24201	ELECTRON DEVICES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To gain knowledge on the construction, operation and biasing of the basic semiconductor devices such as PN junction diode, Bipolar and Field effect Transistors.
- To familiarize with special purpose semiconductor devices such as Metal-Semiconductor Junction transistors Power control devices, LED and Laser diodes.
- To understand about the fabrication process of PN Junction.

UNIT I SEMICONDUCTOR DIODES 9

PN Diodes-Construction-Biasing –V-I Characteristics – Break down Region-Temperature Effects-Resistance levels-Diode Equivalent circuit-Transition and Diffusion Capacitance-Recovery Time. Half Wave and Full wave rectifiers: Operation- Effect of the Barrier Potential on the Rectifier Output- Peak Inverse Voltage (PIV)-Transformer Coupling-Power supply filters, Clippers-Clampers.

UNIT II BIPOLAR JUNCTION TRANSISTORS 9

BJT construction, operation, symbol, transistor current components, input &output characteristics of a transistor in CB, CE and CC configurations. Need for biasing, operating point, DC and AC load lines, stability factor- Fixed-bias- Voltage-divider bias- Bias Stabilization.

UNIT III FIELD EFFECT TRANSISTORS 9

JFET: Basic Structure- Operation- Drain and Transfer characteristics,-Current equations-Pinch off voltage and its significance - MOSFET: Types-Basic Structure- Operation- Characteristics- Comparison of MOSFET with JFET- IGBT

UNIT IV SPECIAL PURPOSE SEMICONDUCTOR DEVICES 9

Zener Diode- Schottky Diode- Varactor diode -Tunnel diode- Light Emitting Diode-LASER diode,UJT, SCR, Power BJT- Power MOSFET- Photo transistor.

UNIT V FABRICATION OF P-N JUNCTIONS 9

Thermal Oxidation, Diffusion, Rapid Thermal Processing, Ion implantation, chemical vapour deposition, photolithography, Etching, metallization.

Total: 45 Periods

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1 : Describe about PN and Zener diode and its usage.
CO2 : Analysis on Characteristics of BJT configurations and Biasing methods.
CO3 : Discuss about JFET and MOSFET on their structures, operation and transfer characteristics.
CO4 : Demonstrate knowledge on special purpose semiconductor devices.
CO5 : Explain the process followed in fabrication of p-n junctions.

TEXT BOOKS:

1. Salivahanan. S, Suresh Kumar. N, Vallavaraj.A, "Electronic Devices and circuits", Third Edition, Tata McGraw- Hill, 2008.

REFERENCES:

1. Ben.G. Streetman, Sanjay Kumar Banergee, "Solid State Electronic Devices", 7thEdition, Pearson Education,2016
2. Donald A Neaman, "Semiconductor Physics and Devices", Fourth Edition, Tata Mc GrawHill Inc. 2012.
3. Millman and Halkias, "Electronic devices and circuits", 2nd Edition, McGraw Hill Publication, 2007
4. Plummer, J.D.,Griffin,P.B.(2023).Integrated Circuit Fabrication: Science and Technology,United Kingdom:Cambridge University Press.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2								2	3	1	
CO2	3	3	1	2								2	3	1	
CO3	3	2	2	2								2	2	1	
CO4	3											2	2	1	
CO5	3											2	1	1	
Avg	**3**	**2.3**	**1.3**	**2**								**2**	**2.6**	**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)

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.- ELECTRONICS AND COMMUNICATION ENGINEERING

EE24202	ELECTRICAL AND INSTRUMENTATION ENGINEERING	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To enlighten the knowledge in types, construction and working of transformers.
- To utilize the knowledge in types, construction and working of DC machines.
- To examine the types, construction and working of AC rotating machines.
- To compute the knowledge in functional elements and working of measuring instruments.
- To interpret the basics of power system and protection schemes.

UNIT I TRANSFORMER 9

Introduction - Ideal and Practical single phase Transformer – Phasor Diagram – Equivalent circuit – Efficiency and Voltage Regulation – Per Unit System – Three Phase Transformers – Applications – Auto Transformers.

UNIT II DC MACHINES 9

Introduction – Constructional Features – Motor and Generator mode – Types – EMF and Torque equation – Circuit Model – Methods of Excitation – Characteristics – Starting and Speed Control – Universal Motor.

UNIT III AC ROTATING MACHINES 9

Construction – Types – Starting methods, Principle of operation of three-phase induction motors – Working principle of Single phase induction motor– Alternator – working principle – Servo Motor.

UNIT IV MEASUREMENT AND INSTRUMENTATION 9

Functional elements of an instrument, Standards and calibration, Operating Principle, types – Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, Instrument Transformers – CT and PT, DSO – Block diagram – Data acquisition.

UNIT V BASICS OF POWER SYSTEMS 9

Power system structure - Generation, Transmission and Distribution, Various voltage levels, Earthing – methods of earthing, Protective devices - Switch fuse unit - Miniature circuit breaker - Earth leakage circuit breaker, safety precautions and First Aid.

Total: 45 Periods

PRACTICAL EXERCISES:

Open circuit and short circuit tests on single phase transformer.

1. Load test on three phase transformer.
2. Speed control on DC shunt motor.
3. Simulation Analysis on Stepper Motors and BLDC Motors.
4. Load test on single phase induction motor.
5. Measurement of Earth Resistance using Megger.
6. Simulation analysis on three phase power measurements.
7. Study of Fuses, MCB and ELCB.

8. Study on moulded case circuit breaker.

Total: 30 Periods

COURSE OUTCOMES:

After completing this course, the students will be able to

CO1 : Elaborate the working of transformer and to build its mathematical model.

CO2 : Demonstrate the principles of DC electrical machines.

CO3 : Demonstrate the operation of AC electrical machines.

CO4 : Plot the characteristics of the measuring instruments and its errors.

CO5 : Summarize the basic power system structure and protection schemes.

Total : 75 Periods

TEXT BOOKS:

1. V.K. Mehta and Rohit Mehta, "Electrical Technology", S. Chand Publishing, 2022.
2. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020.
3. S. K, Bhattacharya, "Basic Electrical and Electronics Engineering", Second Edition, Pearson Education, 2017.
4. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & amp; Instrumentation', Dhanpat Rai and Co, New Delhi,18 th edition, 2015.
5. C.L.Wadhwa, "Generation, Distribution and Utilisation of Electrical Energy", New Age International pvt.ltd., 2003.

REFERENCES:

1. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019.
2. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002.
3. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010.

CO-PO MAPPING

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

1 - Low, 2 - Medium, 3 - High

SEMESTER-II
B.E.- ELECTRONICS AND COMMUNICATION ENGINEERING

EC24202	CIRCUIT THEORY	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To learn the basic concepts and behavior of DC and AC circuits.
- To understand various methods of circuit/ network analysis using network theorems.
- To understand the transient and steady state response of the circuits subjected to DC excitations and AC with sinusoidal excitations.
- To learn the concept of coupling in circuits and topologies.

UNIT I CIRCUIT ANALYSIS 9

Basic Components of electric Circuits, Charge, current, Voltage and Power, Voltage and Current Sources, Ohms Law, Kirchoff 's Current Law, Kirchoff's voltage law, Resistors in Series and Parallel, voltage and current division, Nodal analysis, Mesh analysis.Network Reduction: Voltage and Current Division.

UNIT II NETWORK THEOREMS 9

Superposition Theorem, Thevenin and Norton Equivalent Circuits, Maximum Power Transfer Theorem, Reciprocity Theorem,Source Transformation.

UNIT III TRANSIENTS RESPONSE ANALYSIS AND RESONANCE IN RLC CIRCUITS 9

Transient Response of Source free RL and RC Circuits – Transient Response of RL and RC Circuits with Step, Impulse and Sinusoidal inputs. RLC circuits-Frequency Response, Parallel Resonance, Series Resonance, Quality Factor.

UNIT IV SINUSOIDAL STEADY STATE ANALYSIS 9

Sinusoidal Steady – State analysis, Characteristics of Sinusoids, Average and RMS Values of Sinusoidal Current and Voltage, impedance and Admittance, Nodal and Mesh Analysis, Phasor Diagrams, AC Circuit Power Analysis, Instantaneous Power, Average Power, apparent Power and Power Factor, Complex Power.

UNIT V NETWORK TOPOLOGY 9

An introduction to Network Topology- Trees, Links and Twigs, Incident Matrix, Reduced Incident Matrix Cutsets, Tie sets.

Total: 45 Periods

PRACTICAL EXERCISES:

LIST OF EXPERIMENTS:

1. Experimental Verifications of Electrical Circuit Problems using Kirchhoff's voltage and current laws.
2. Experimental Verifications of Electrical Circuit Problems using Thevenin Theorem.
3. Experimental Verifications of Electrical Circuit Problems using Norton theorem.
4. Experimental Verification of Electrical Circuit Problems using Superposition Theorem.
5. Experimental Verification of Electrical Circuit Problems using maximum power transfer Theorem
6. Experimental Verification of Electrical Circuit Problems using Reciprocity Theorem
7. Determination of Resonance Frequency of Series & Parallel RLC Circuits.
8. Transient analysis of RL and RC circuits.

9. Simulation of Mesh and Nodal Analysis for DC and AC Circuits
10. Circuit analysis using Network graphs.

Total: 30 Periods

Total: 75 Periods

COURSE OUTCOMES:

CO1 : Apply the basic concepts of circuit analysis such as Kirchoff's laws, mesh current and node voltage method for analysis of DC circuits.

CO2 : Identify suitable network theorems to analyze DC circuits.

CO3 : Examine the transient response of RC, RL and RLC circuits and frequency response of parallel and series resonance circuits.

CO4 : Analyze steady state response of Sinusoidal Sources for AC Circuits

CO5 : Apply Graph Theory for Circuit Analysis

TEXT BOOKS:

1. Charles K. Alexander & Mathew N.O.Sadiku, "Fundamentals of Electric Circuits", McGrawHill, 7th Edition, 2020.
2. Joseph Edminister and MahmoodNahvi, ―Electric Circuits, Schaum's Outline Series, Tata McGraw Hill Publishing Company, New Delhi, Fifth Edition Reprint 2016.

REFERENCES:

1. Robert.L. Boylestead, "Introductory Circuit Analysis", Pearson Education India, 12th Edition, 2014. David Bell, "Fundamentals of Electric Circuits", Oxford University press, 7thEdition, 2009.
2. W.H. Hayt Jack Kemmerly, Steven Durbin, "Engineering Circuit Analysis",McGraw Hill education, 9th Edition, 2019.
3. Allan H.Robbins, Wilhelm C.Miller, "Circuit Analysis Theory and Practice", Cengage Learning, Sixth Edition, 1st Indian Reprint 2016.
4. John O Mallay, Schaum's Outlines "Basic Circuit Analysis", The McGraw Hill companies, 2nd Edition, 2011 Delhi, 2010.

CO-PO MAPPING

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

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	1	
CO2		3		3		3	3		3	3	3	3	1	1	
CO3		2		3		3	3		3	3	3	3	1	1	
CO4		3		3		3	3		3	3	3	3	1	1	
CO5		3		3		3	3		3	3	3	3	1	1	
Avg		**2.8**		**3**		**3**	**3**		**3**	**3**	**3**	**3**	**1**	**1**	

1 Low, 2 Medium, 3 High

SEMESTER-III
(B.E – ECE)

MA24301	RANDOM PROCESSES	L	T	P	C
		3	1	0	4

COURSE OBJECTIVES:

- Understand the basic concepts of probability with characteristics and also two-dimensional random variables.
- To acquaint the student with the concept of Random Processes.
- To provide the basic knowledge to the student with correlation and spectral densities.

UNIT I PROBABILITY AND RANDOM VARIABLES 9 + 3

Axioms of probability - Conditional probability - Total probability - Bayes theorem - Random variables - Probability mass function - Probability density functions - Properties.

UNIT II STANDARD DISTRIBUTIONS 9 + 3

Discrete distributions: Binomial - Poisson - Negative Binomial - Continuous distributions: Uniform - Exponential - Normal distributions and their properties.

UNIT III TWO- DIMENSIONAL RANDOM VARIABLES 9 + 3

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT IV RANDOM PROCESSES 9 + 3

Definition and examples - first order, second order, strictly stationary, wide sense stationary and Ergodic processes - Markov process - Poisson and Normal processes.

UNIT V CORRELATION AND SPECTRAL DENSITIES 9 + 3

Auto correlation functions – Cross correlation functions – Properties – Power spectral density – Cross spectral density – Properties.

TOTAL PERIODS : 60

COURSE OUTCOMES:

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

CO1 : Demonstrate and apply the basic probability axioms and concepts in their core areas of random phenomena.

CO2 : Apply the concepts of probability distributions in an appropriate place of science and Engineering**.**

CO3 : Execute the knowledge of solving two-dimensional random variables using correlation Techniques**.**

CO4 : Apply the concept of random process.

CO5 : Evaluate the autocorrelation and spectral density of a random process and recognize the relation between them.

TEXT BOOKS:

1. Ibe.O.C., "Fundamentals of Applied Probability and Random Processes", Elsevier, 1st Indian Reprint, 2007.
2. Peebles. P.Z., "Probability, Random Variables and Random Signal Principles", Tata Mc Graw Hill, 4th Edition, New Delhi, 2002.

REFERENCES:

1. Stark. H and Woods. J.W "Probability and Random Processes with Applications to Signal Processing", 3rd Edition,Pearson Education, Asia, 2002.
2. Miller. S.L. and Childers. D.G., "Probability and Random Processes with Applications to Signal Processing and Communications", Academic Press, 2004.
3. Hwei Hsu, Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata Mc Graw Hill Edition, New Delhi, 2004.

CO-PO MAPPING

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

1 - Low, 2 - Medium, 3 - High

SEMESTER-III

(B.E –ECE)

EC24201	SIGNALS AND SYSTEMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

The main learning objective of this course is to prepare the students for:

- Understanding the various types and classifications of continuous-time and discrete-time signals.
- Exploring the representation and classification of continuous-time and discrete-time systems.
- Learning ability to analyze signals in the frequency domain using Fourier Series, Fourier Transform, Laplace Transform, DTFT, and Z-Transform.
- Understanding the frequency response and system behavior of continuous-time LTI systems using Laplace transforms and differential equations.
- Understanding the discrete-time LTI systems using difference equations, convolution, Z-transforms, and frequency domain techniques such as the DFT.

UNIT I CONTINUOUS AND DISCRETE TIME SIGNALS 9

Standard Elementary Signals of Continuous time signals (CT signals) & Discrete time signals (DT signals): Step, Ramp, Pulse, Impulse, Complex exponential and Sinusoidal signals. Classification of CT and DT signals: Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals, Even and Odd signals.

UNIT II CONTINUOUS AND DISCRETE TIME SYSTEMS 7

Classification of CT systems and DT systems: Static & Dynamic, Linear & Nonlinear, Time-variant & Time invariant, Causal & Non-causal, Stable & Unstable.

UNIT III ANALYSIS OF CONTINOUS AND DISCRETE TIME SIGNALS 11

Representation of Fourier series, Trigonometric Fourier Series, Fourier Transform and their properties, Laplace Transform and their properties. Discrete Time Fourier Transform (DTFT), Properties of DTFT, Z-Transforms, Region of convergence, Properties of Z transforms, Inverse Z Transform using Partial Fraction Method.

UNIT IV LINEAR TIME INVARIANT CONTINUOUS TIME SYSTEMS 9

Convolution Integrals, Frequency response of LTI systems, Analysis and characterization of LTI systems using Laplace transform, Computation of impulse response and transfer function using Laplace transform, Computation of impulse response from differential equation.

UNIT V LINEAR TIME INVARIANT DISCRETE TIME SYSTEMS 9

LTI-DT systems -Difference equation– Impulse response, Convolution Sum and Frequency response - Discrete Fourier Transform and Z Transform Analysis of Recursive & Non-Recursive systems.

TOTAL PERIODS: 45

COURSE OUTCOMES:

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

CO1: Identify and classify different types of continuous and discrete time signals.

CO2: Comprehend and categorize various CT and DT systems.

CO3: Apply various transforms (FS, FT, Laplace, DTFT, Z-transform) to analyze and characterize signals.

CO4: Determine the behavior of continuous-time LTI systems using Laplace Transform techniques.

CO5: Extract the behavior of discrete-time LTI systems using convolution, Z-transform, and DFT.

TEXT BOOKS:

1. Simon Haykin, Barry Van Veen, "Signals and Systems", 2nd Edition, Wiley, 2002
2. Oppenheim, Willsky and Hamid, "Signals and Systems", 2nd Edition, Pearson Education, New Delhi, 2015.
3. Allan V.Oppenheim, S.Wilsky and S.H.Nawab, "Signals and Systems", Pearson, 2nd edition, 2007.

REFERENCES:

1. B. P. Lathi, "Principles of Linear Systems and Signals", Second Edition, Oxford, 2009.
2. R.E.Zeimer, W.H.Tranter and R.D.Fannin, "Signals & Systems - Continuous and Discrete",Pearson, 2007.
3. John Alan Stuller, "An Introduction to Signals and Systems", Thomson, 2007.
4. M.J.Roberts, "Signals & Systems Analysis using Transform Methods & MATLAB", TataMcGrawHill, 2007.

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	2
CO2	3	3	3	2	-	-	-	-	-	-	2	2	2	2	2
CO3	3	3	3	2	-	-	-	-	-	-	2	2	2	2	2
CO4	3	3	3	2	-	-	-	-	-	-	2	2	2	2	2
CO5	3	3	3	2	-	-	-	-	-	-	2	2	2	2	2
Avg	**3**	**3**	**3**	**2**	-	-	-	-	-	-	**2**	**2**	**2**	**2**	**2**

1 - Low, 2 - Medium, 3 - High

SEMESTER-III
(B.E - ECE)

EC24302	ELECTRONIC CIRCUITS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

The Students should be made to:

- Understand the concept of BJT and MOSFET amplifiers.
- Learn the various multistage amplifiers and differential amplifier.
- Study about feedback amplifiers principles.
- Interpret the various types of oscillators.
- Elaborate the analysis of wave shaping and multivibrators.

UNIT-I AMPLIFIERS 11

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

UNIT II MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER 7

Cascade and Cascode amplifier, Darlington amplifier - Differential amplifier – Basic BJT differential pair — Small signal analysis and CMRR.

UNIT III FEEDBACK AMPLIFIERS 9

Feedback Concepts - Advantages of negative feedback – effect of feedback on gain stability, distortion, bandwidth, input and output impedances: topologies of feedback amplifiers – analysis of series-series, shunt-shunt, shunt-series feedback amplifiers.

UNIT IV OSCILLATORS 9

Barkhausen criterion for oscillation – Phase shift, Wein Bridge – Hartley and Colpitt's oscillators – Crystal oscillators.

UNIT V WAVE SHAPING AND MULTIVIBRATOR CIRCUITS 9

RC integrator and differentiator circuits – Multivibrators – Astable, Monostable and Bistable multivibrators – Schmitt Trigger.

TOTAL PERIODS: 45

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Analysis the frequency response of BJT and MOSFET amplifiers.

CO2: Illustrate the performance of various multistage and differential amplifiers.

CO3: Apply the concept of feedback amplifiers principles.

CO4: Demonstrate the various types of oscillators.

CO5: Interpret the principles of wave shaping and multivibrator circuits.

TEXT BOOKS:

1. Robert L. Boylestad and Louis Nasheresky, ―Electronic Devices and Circuit Theory, 10th Edition, Pearson Education / PHI, 2008

REFERENCES:

1. Salivahanan. S, Suresh Kumar. N, Vallavaraj.A, "Electronic Devices and circuits", Third Edition, Tata McGraw- Hill, 2008. (UNIT-I,II,III,IV,V)
2. David A. Bell, ―Electronic Devices and Circuits‖, Fifth Edition, Oxford University Press, 2008.
3. Millman J. and Taub H., ―Pulse Digital and Switching Waveforms, TMH, 2000.
4. Millman and Halkias. C., Integrated Electronics, TMH, 2007.
5. Sedra and smitch, - Micro Electronic Circuits; Sixth Edition, Oxford University Press, 2011.
6. Jacob Millman, ‗Microelectronics', McGraw Hill, 2nd Edition, Reprinted, 2009.

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	2	-
CO2	3	3	2	-	-	2	2	-	-	-	-	2	3	2	-
CO3	3	3	3	3	2	-	-	-	-	-	-	2	3	1	-
CO4	3	3	3	3	-	-	-	-	-	-	1	2	3	1	-
CO5	3	3	3	3	-	2	-	-	-	-	1	2	3	2	-
Avg	**3**	**3**	**2.6**	**2.8**	**2**	**2**	**2**	**-**	**-**	**-**	**1**	**2**	**2.8**	**1.6**	**-**

1 - Low, 2 - Medium, 3 - High

SEMESTER-III

(B.E - ECE)

CS24307	FUNDAMENTALS OF DATA STRUCTURES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

The main learning objective of this course is to prepare the students for:

- Introducing the basics of C programming language.
- Learning the concepts of advanced features of C.
- Understanding the concepts of ADTs and linear data structures.
- Learning the concepts of non-linear data structure and hashing.
- Familarizing the concepts of sorting and searching techniques.

UNIT I C PROGRAMMING FUNDAMENTALS 9

Data Types – Variables – Operations – Expressions and Statements – Conditional Statements – Basic Debugging and Error Handling– Functions – Recursive Functions – Arrays – Single and Multi-Dimensional Arrays.

UNIT II C PROGRAMMING - ADVANCED FEATURES 9

Structures – Union – Enumerated Data Types – Pointers: Pointers to Variables, Arrays and Functions – File Handling – Preprocessor Directives.

UNIT III LINEAR DATA STRUCTURES 9

Abstract Data Types (ADTs) – List ADT – Array-Based Implementation – Linked List – Doubly- Linked Lists – Time Complexity Basics– Stack ADT – Implementation of Stack – Applications – Queue ADT – Priority Queues – Queue Implementation – Applications.

UNIT IV NON-LINEAR DATA STRUCTURES 9

Trees – Binary Trees – Tree Traversals – Binary Search Tree – Hashing - Hash Functions – Separate Chaining – Open Addressing – Linear Probing– Quadratic Probing – Double Hashing – Rehashing.

UNIT V SORTING AND SEARCHING TECHNIQUES 9

Insertion Sort – Quick Sort – Heap Sort – Merge Sort –Linear Search – Binary Search.

TOTAL PERIODS: 45

COURSE OUTCOMES:

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

CO1: Develop C programs for any real world/technical application.

CO2: Apply advanced features of C in solving problems.

CO3: Write functions to implement linear and non–linear data structure operations.

CO4: Suggest and use appropriate linear/non–linear data structure operations for solving a given problem.

CO5: Appropriately use sort and search algorithms for a given application.

TEXT BOOKS:

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 1997.
2. Reema Thareja, "Programming in C", Second Edition, Oxford University Press, 2016.

REFERENCES:

1. Brian W. Kernighan, Rob Pike, "The Practice of Programming", Pearson Education, 1999.
2. Paul J. Deitel, Harvey Deitel, "C How to Program", Seventh Edition, Pearson Education, 2013.
3. Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education,1983.
4. Ellis Horowitz, Sartaj Sahni and Susan Anderson, "Fundamentals of Data Structures", Galgotia, 2008.

List of Open-Source Software/ Learning website:

https://www.coursera.org/specializations/data-structures- algorithms.

https://nptel.ac.in/courses/112107243.

https://nptel.ac.in/courses/112105598.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1	2	2	1	1	-	1	2	1	3	1	2	-
CO2	1	2	1	2	2	-	-	-	1	1	1	2	1	2	-
CO3	2	3	1	2	3	-	-	-	1	1	1	2	1	2	-
CO4	2	1	1	1	1	-	-	-	2	1	1	2	1	2	-
CO5	1	2	1	2	2	1	1	-	1	2	1	3	1	2	-
Avg	**1.6**	**2.2**	**1**	**1.8**	**2**	**1**	**1**	-	**1.2**	**1.4**	**1**	**2.4**	**1**	**2**	-

1 - Low, 2 - Medium, 3 - High

SEMESTER-III

(B.E - ECE)

EC24304	DIGITAL SYSTEM DESIGN	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

The Students should be made:

- To present the fundamentals of digital circuits and simplification methods.
- To practice the design of various combinational digital circuits using logic gates.
- To bring out the design procedures for synchronous and asynchronous Sequential circuits.
- To learn integrated circuit families.

UNIT I BASIC CONCEPTS **9**

Review of number systems- conversions, Review of Boolean algebra- theorems, sum of product and product of sum simplification, canonical forms min term and max term, Karnaugh map, Universal gates, Tabulation methods.

UNIT II COMBINATIONAL LOGIC CIRCUITS **9**

Introduction of combinational circuits – Design of Code-Converters, Half and Full Adders and subtractor, Carry look ahead Adder, BCD Adder, Decoder, Encoder, Mux/Demux.

UNIT III SYNCHRONOUS SEQUENTIAL CIRCUITS **9**

Flip flops – SR, JK, T, D, Master/Slave FF, Triggering of FF, Design of clocked sequential circuits – Design - Moore/Mealy models, state minimization, state assignment, Counters, Ripple Counters, Shift registers, Universal Shift Register.

UNIT IV ASYNCHRONOUS SEQUENTIAL CIRCUITS **9**

Stable and Unstable states, output specifications, cycles and races, state reduction, race free assignments, Hazards, Essential Hazards, Design of Hazard free circuits.

UNIT V LOGIC FAMILIES AND PROGRAMMABLE LOGIC DEVICES **9**

Logic families- Propagation Delay, Fan - In and Fan - Out - Noise Margin - RTL ,TTL,ECL, Comparison of Logic families – PLD's - PROM, PLA and PAL.

TOTALPERIODS: 45

LIST OF EXPERIMENTS:

1. Design of adders and subtractors & code converters.
2. Design of Multiplexers & Demultiplexers.
3. Design of Encoders and Decoders.
4. Design of Magnitude Comparators.
5. Design and implementation of counters using flip-flops.
6. Design and implementation of shift registers.

TOTAL PERIODS: 30

TOTAL PERIODS: 75

COURSE OUTCOMES:

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

CO1: Use Boolean algebra and simplification procedures relevant to digital logic.

CO2: Design various combinational digital circuits using logic gates.

CO3: Design synchronous sequential circuits.

CO4: Analyze and design asynchronous sequential circuits.

CO5: Build logic gates and use programmable Logic devices.

TEXT BOOKS:

1. M. Morris Mano and Michael D. Ciletti, 'Digital Design', Pearson, 5th Edition, 2013.

REFERENCES:

1. Charles H. Roth, Jr, 'Fundamentals of Logic Design', Jaico Books, 4th Edition, 2002.
2. William I. Fletcher, "An Engineering Approach to Digital Design", Prentice- Hall of India, 1980.
3. Floyd T.L., "Digital Fundamentals", Charles E. Merril publishing company,1982.
4. John. F. Wakerly, "Digital Design Principles and Practices", Pearson Education, 4th Edition,2007.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	-	2	-	-	-	-	3	2	3	3	2
CO2	-	-	-	-	-		-	-	-	-	2	2	3	3	2
CO3	-	3	3	2	-	2	-	-	-	-	2	2	3	3	2
CO4	-	-	-	-	-	-	-	-	-	-	3	2	3	3	2
CO5	-	3	3	3	-	-	-	-	-	-	2	2	3	3	2
Avg	**3**	**2.6**	**2.6**	**2.3**	-	**2**	-	-	-	-	**2.4**	**2**	**3**	**3**	**2**

1 - Low, 2 - Medium, 3 - High

SEMESTER-III
(B.E - ECE)

EC24305	CONTROL SYSTEMS	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

The Students should be made:

- To be able to obtain a working mathematical model of a system.
- To be able to do time-domain and frequency-domain analyses of the model to predict the system's behavior.
- To learn the various approach for the state variable analysis.

UNIT I SYSTEMS COMPONENTS AND THEIR REPRESENTATION 9

Control System: Terminology and Basic Structure-open loop and closed loop systems and their differences-Classification of control systems-Feed forward and Feedback control theory- Mechanical Transfer Function Models-Block diagram Models-Signal flow graphs models.

UNIT II TIME RESPONSE ANALYSIS 9

Transient response-steady state response-Measures of performance of the standard first order and second order system- Analytical design for PD, PI,PID control systems.

UNIT III FREQUENCY RESPONSE AND SYSTEM ANALYSIS 9

Closed loop frequency response-Performance specification in frequency domain-Frequency response of typical systems- Bode Plot- Polar Plot.

UNIT IV CONCEPTS OF STABILITY ANALYSIS 9

Concept of stability-Bounded — Input Bounded — Output stability- Routh stability criterion-Relative stability-Root locus concept-construction of root loci –effect of adding poles and zeros.

UNIT V FREQUENCY COMPENSATION 9

Design of compensators using Bode plots. Compensation techniques-Cascade lead compensation-Cascade lag compensation-Cascade lag-lead compensation

LIST OF EXPERIMENTS:

1. Stability analysis using Pole zero maps and Routh Hurwitz Criterion in simulation Platform
2. Root Locus based analysis in simulation platform.
3. Determination of transfer function of physical system from Bode's asymptotic Plot.
4. Design of Lag, lead compensators and evaluation of closed loop performance.
5. Design of PID controllers and evaluation of closed loop performance.
6. Mini Project 1: Simulation of complete closed loop control systems including sensor and actuator dynamics.
7. Mini Project 2: Demonstration of a closed loop system in hardware.

TOTAL PERIODS: 30

TOTAL PERIODS: 75

COURSE OUTCOMES:

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

CO1: Compute the transfer function of different physical systems.

CO2: Analyse the time domain specification and calculate the steady state error.

CO3: Analyse the frequency response characteristics of open loop and closed loop system response.

CO4: Determine the stability using Routh and root locus techniques.

CO5: Design a compensation techniques for control system.

TEXT BOOKS:

1. M.Gopal,"Control System – Principles and Design", Tata McGraw Hill, 4th Edition, 2012

REFERENCES:

1. J.Nagrath and M.Gopal, "Control System Engineering", New Age International Publishers, 5th Edition, 2007.
2. K.Ogata, "Modern Control Engineering", PHI, 5th Edition, 2012.
3. S.K.Bhattacharya, "Control System Engineering", Pearson, 3rd Edition, 2013.
4. Benjamin.C.Kuo, "Automatic Control Systems", Prentice Hall of India, 7th Edition,1995.

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	3	3	3	3
CO2	3	3	3	3	2	3	-	-	-	-	2	2	3	3	3
CO3	3	2	3	3	2	2	-	-	-	-	2	3	3	2	3
CO4	3	3	3	2	2	2	-	-	-	-	2	2	3	3	3
CO5	2	2	3	3	2	3	-	-	-	-	2	3	2	2	3
Avg	**2.8**	**2.6**	**3**	**2.6**	**2**	**2.4**	-	-	-	-	**2**	**2.6**	**2.8**	**2.6**	**3**

1 - Low, 2 - Medium, 3 - High

SEMESTER-III

(B.E - ECE)

EC24306	ELECTRONIC CIRCUITS AND SIMULATION LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

The Students should be made to:

- Gain the hands on experience in designing electronic circuits.
- Learn the simulation software used in circuit design.
- Analyze the fundamental principles of amplifier ,Oscillator and multivibrator circuits.
- Construct waveform generation circuits and power amplifier.

LIST OF EXPERIMENTS:

Hardware Experiments:

1. Design and construct BJT and FET- CE and CS Amplifier.
2. Construct a Differential amplifier using BJT.
3. Frequency response of Series and Shunt feedback amplifiers.
4. Wien Bridge and Hartley Oscillator.
5. RC Integrator and Differentiator circuits.
6. Astable and Monostable multivibrators.
7. Schmitt trigger.

Software Experiments:

8. Common Emitter amplifier.
9. Wien Bridge Oscillator.
10. Bistable Multivibrator.
11. Schmitt Trigger circuit with Predictable hysteresis.

TOTAL PERIODS: 45

COURSE OUTCOMES:

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

CO1: Analysis the frequency response of BJT and MOSFET amplifiers.

CO2: Illustrate the characteristics of various multistage and differential amplifiers.

CO3: Understand the response of feedback amplifiers and oscillator principles.

CO4: Learn the characteristics of various wave shaping and multivibrator circuits.

CO5: Simulate the concept of amplifier ,Oscillator, multivibrator and power amplifier.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	-	3	-	-	-	1	-	-	1	3	2	-
CO2	3	2	2	-	3	-	-	-	2	1	-	1	3	2	-
CO3	3	2	3	3	3	-	-	-	1	2	3	1	3	2	-
CO4	3	2	2	1	3	-	-	-	1	1	1	1	3	2	-
CO5	3	3	2	-	3	-	-	-	1	-	-	1	3	2	-
Avg	**3**	**2.4**	**2.2**	**2**	**3**	**-**	**-**	**-**	**1.2**	**1.3**	**2**	**1**	**3**	**2**	**-**

1 - Low, 2 - Medium, 3 - High

SEMESTER-III

(B.E - ECE)

CS24308	FUNDAMENTALS OF DATA STRUCTURES LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- To develop applications in C.
- To implement linear and non-linear data structures.
- To understand the different operations of search trees.
- To get familiarized to sorting and searching algorithms.

LIST OF EXPERIMENTS

1. Practice of C programming using statements, expressions, decision making and iterative statements.
2. Practice of C programming using Functions and Arrays.
3. Implement C programs using Pointers and Structures.
4. Implement C programs using Files.
5. Development of real time C applications.
6. Array implementation of List ADT.
7. Array implementation of Stack and Queue ADTs.
8. Linked list implementation of List, Stack and Queue ADTs.
9. Applications of List, Stack and Queue ADTs.
10. Implementation of Binary Trees and operations of Binary Trees.
11. Implementation of Binary Search Trees.
12. Implementation of searching techniques.
13. Implementation of Sorting algorithms: Insertion Sort, Quick Sort, Merge Sort.
14. Implementation of Hashing – any two collision techniques.

TOTAL PERIODS: 45

COURSE OUTCOMES:

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

CO1: Use different constructs of C and develop applications.

CO2: Write functions to implement linear and non-linear data structure operations.

CO3: Suggest and use the appropriate linear / non-linear data structure operations for a given problem.

CO4: Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval.

CO5: Implement Sorting and searching algorithms for a given application.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1	2	2	1	-	-	3	2	3	1	1	2	2
CO2	1	2	1	2	2	-	-	-	2	1	1	2	2	1	2
CO3	2	3	1	2	3	-	-	-	2	2	1	1	1	2	2
CO4	2	1	-	1	1	-	-	-	1	2	1	2	1	3	2
CO5	1	2	1	2	2	1	-	-	3	2	3	2	2	2	1
Avg	**1.6**	**2.2**	**1**	**1.8**	**2**	**1**	-	-	**2.2**	**1.8**	**1.8**	**1.6**	**1.4**	**2**	**1.8**

1 - Low, 2 - Medium, 3 – High

SEMESTER-III

(B.E – ECE)

GE24S01	PROFESSIONAL DEVELOPMENT	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES:

To be proficient in important Microsoft Office tools: MS WORD, EXCEL, POWERPOINT.

- To be proficient in using MS WORD to create quality technical documents, by using standard templates, widely acceptable styles and formats, variety of features to enhance the present ability and overall utility value of content.
- To be proficient in using MS EXCEL for all data manipulation tasks including the common statistical, logical, mathematical etc., operations, conversion, analytics, search and explore, visualize, interlink, and utilizing many more critical features offered.
- To be able to create and share quality presentations by using the features of MS PowerPoint, including: organization of content, present ability, aesthetics, using media elements and enhance the overall quality of presentations.

UNIT I INTRODUCTION TO MS WORD 5

Create and format a document: Working with tables- Working with Bullets and Lists- Working with styles, shapes, smart art, charts-Inserting objects, charts and importing objects from other office tools-Creating and Using document templates.

UNIT II APPLICATIONS OF MS WORD 5

Inserting equations, symbols and special characters-Working with Table of contents and References, citations-Insert and review, comments-Create bookmarks, hyperlinks, endnotes footnote-Viewing document in different modes-Working with document protection and security-Inspect document for accessibility

UNIT III INTRODUCTION TO MS EXCEL 5

Create worksheets-insert and format data-Work with different types of data: text, currency, date, numeric etc. Split, validate, consolidate, Convert data-Sort and filter data-Perform calculations and use functions: (Statistical, Logical, Mathematical, date, Time etc.,)-Work with Lookup and reference formulae-Create and Work with different types of charts.

UNIT IV APPLICATIONS OF MS EXCEL 5

Use pivot tables to summarize and analyze data-Perform data analysis using own formulae and functions-Combine data from multiple worksheets using own formulae and built-in functions to generate, Results-Export data and sheets to other file formats-Working with macros-Protecting data and Securing the workbook.

UNIT V INTRODUCTION TO MS POWERPOINT AND ITS APPLICATIONS 10

Select slide templates, layout and themes-Formatting slide content and using bullets and numbering-Insert and format images, smart art, tables, charts-Using Slide master, notes and handout master-Working with

animation and transitions-Organize and Group slides-Import or create and use media objects: audio, video, animation-Perform slideshow recording and Record narration and create presentable videos.

TOTAL PERIODS: 30

COURSE OUTCOMES

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

CO1: Create document in MS word for technical requirements.

CO2: Create document in MS word for academic requirements.

CO3: Perform Data operation and analytics using MS Excel.

CO4: Perform record creation and retrieving the data for academic requirements.

CO5: Develop document for academic presentation using media objects in MS PowerPoint.

TEXT BOOK:

1. "Microsoft Word Step by Step"Joan Lambert (Microsoft Press)the latest MS Word version (e.g., 2019 or Microsoft 365).
2. "Microsoft Office 365 – In practice (2021 Edition) by Randy Nordel, McGraw Hill Education.

REFERENCE BOOK:

1. MS Word

Book: Microsoft Word 2019 Step by Step by Joan Lambert (Microsoft Press), Covers document creation, formatting, templates, references, and collaboration. ISBN: 978-1509305845.

2. MS Excel

Book: Excel 2019 Bible by Michael Alexander, Richard Kusleika, and John Walkenbach (Wiley), Comprehensive coverage of Excel functions, data analysis, charts, pivot tables, macros., ISBN: 978-1119517948.

3. MS PowerPoint

Book: PowerPoint 2019 For Dummies by Doug Lowe (For Dummies Series), Clear instructions on templates, animations, media, slide masters, and presentations. ISBN: 978-1119514190.

CO-PO MAPPING

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

1 - Low, 2 - Medium, 3 - High

SEMESTER-IV
(B.E - ECE)

EC24401	ELECTROMAGNETICS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

The Students should be made:

- To impart knowledge on the basics of static electric field and the associated laws.
- To impart knowledge on the basics of static magnetic field and the associated laws.
- To give insight into coupling between electric and magnetic fields through Faraday's law, displacement current and Maxwell's equations.
- To gain the behaviour of the propagation of EM waves.
- To study the significance of Time varying fields.

UNIT I INTRODUCTION 9

Electromagnetic model, Review of vector algebra, Rectangular, cylindrical and spherical coordinate systems Apply vector algebra and calculus to electromagnetic problems, Line, surface and volume integrals, Gradient of a scalar field, Divergence of a vector field, Divergence theorem, Curl of a vector field, Stoke's theorem.

UNIT II ELECTROSTATICS 9

Electric field, Coulomb's law, Gauss's law and applications, Electric potential, Conductors in static electric field, Dielectrics in static electric field, Electric flux density and dielectric constant, Boundary conditions, Capacitance, Parallel, cylindrical and spherical capacitors, Poisson's and Laplace's equations, continuity equation.

UNIT III MAGNETOSTATICS 9

Lorentz force equation, Ampere's law, Biot-Savart law and applications, Magnetic field intensity, Scalar and magnetic potential, Magnetic Boundary conditions, Inductance and inductors, magnetic circuits, Magnetic forces and torques.

UNIT IV TIME-VARYING FIELDS AND MAXWELL's EQUATIONS 9

Faraday's law, Displacement current, Derive and apply Maxwell’s equations in integral and differential forms, Electromagnetic boundary conditions, Wave equations and solutions, Observing the Phenomenon of wave propagation with the aid of Maxwell's equations.

UNIT V PLANE ELECTROMAGNETIC WAVES 9

Plane waves in lossless media, Plane waves in lossy media (low-loss dielectrics and good conductors), Analyze EM wave propagation in free space and media, Group velocity, Electromagnetic power flow and Poynting vector, Normal incidence at a plane conducting boundary, Normal incidence at a plane dielectric boundary .

TOTAL PERIODS: 45

COURSE OUTCOMES:

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

CO1: Relate the fundamentals of vector, coordinate system to electromagnetic concepts.

CO2: Analyze the characteristics of Electrostatic field.

CO3: Interpret the concepts of Electric field in material space and solve the boundary conditions.

CO4: Explain the concepts of time-varying fields.

CO5: Determine the significance of plane electromagnetic waves.

TEXT BOOKS:

1. M.N.O.Sadiku and S.V. Kulkarni, Principles of electromagnetics, 6th ed., Oxford(Asian Edition), 2015.

REFERENCES:

1. Edward C. Jordan & Keith G. Balmain,Electromagnetic waves and Radiating Systems, Second Edition, Prentice-Hall Electrical Engineering Series, 2012. Charles H.Roth, Jr, "Fundamentals of Logic Design", Jaico Books, 7th Edition, 2013.
2. W.H. Hayt and J.A. Buck, Engineering electromagnetics, 7th ed., McGraw-Hill (India), 2006.
3. B.M. Notaros, Electromagnetics, Pearson: New Jersey, 2011.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	-	2	1	-	-	1	-	2	2	1	1
CO2	2	2	3	3	2	2	2	-	-	1	1	2	2	2	3
CO3	2	2	3	2	2	2	1	-	-	1	1	2	2	2	3
CO4	2	2	3	2	2	2	1	-	-	1	1	2	2	2	3
CO5	2	2	2	2	2	2	1	-	-	2	2	1	2	2	2
Avg	**2**	**1.8**	**2.4**	**2**	**2**	**2**	**1.2**	**-**	**-**	**1.2**	**1.3**	**1.8**	**2**	**1.8**	**2.4**

1 - Low, 2 - Medium, 3 - High

SEMESTER-IV
(B.E – ECE)

EC24402	LINEAR INTEGRATED CIRCUITS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

The Students should be made:

- To introduce the concept of Operational Amplifier.
- To learn the practical applications of operational amplifiers.
- To introduce the applications of analog multipliers and PLL.
- To study the application of ADC and DAC in real time systems.
- To introduce special function IC's and its construction.

UNIT I BASICS OF OPERATIONAL AMPLIFIERS 9

Introduction to op-amp, Ideal Operational Amplifier, General operational amplifier stages, internal circuit diagrams of IC 741, DC performance characteristics, AC performance characteristics and Differential amplifier using Op-Amp.

UNIT II APPLICATIONS OF OPERATIONAL AMPLIFIERS 9

Inverting and Non-Inverting Amplifiers, Instrumentation amplifier, Integrator, Differentiator, Log and Antilog amplifier, Comparators, Multivibrator's using IC 555, Clipper and Clamper, Low-pass and High-pass filters, V-to-I and I-to-V converters.

UNIT III ANALOG MULTIPLIER AND PLL 9

Analog Multiplier using Emitter Coupled Transistor pair, Gilbert Multiplier cell, analog multiplier ICs and their applications, Operation of the basic PLL, Voltage controlled oscillator, application of PLL for AM detection, FM detection, Frequency synthesizers and compander ICs.

UNIT IV DIGITAL TO ANALOG AND ANALOG TO DIGITAL CONVERTERS 9

D/A converter: Weighted resistor type, R-2R Ladder type, A/D converters: Flash type, Successive Approximation type, Dual slope type ADC.

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 - ICL 8038 function generator IC.

TOTAL PERIODS: 45

COURSE OUTCOMES:

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

CO1 : Analyze the characteristics of operational amplifiers (Op-Amps), including ideal vs. practical behavior, frequency response, and internal schematics (e.g., IC 741).

CO2 : Design of analog linear circuits using operational amplifier.

CO3 : Examine the working principles and applications of special ICs like the 566 VCO, 565 PLL, and AD633 analog multiplier and its applications.

CO4 : Design ADC and DAC using op – amp

CO5 : Design voltage regulator circuits using linear and switching regulators (78xx, 79xx, LM317, 723) and function generators (ICL 8038).

TEXT BOOKS:

1. D.Roy Choudhry, Shail Jain, "Linear Integrated Circuits", New Age International Pvt. Ltd., 2000.

2. Sergio Franco, "Design with Operational Amplifiers and Analog Integrated Circuits", 3rd Edition, Tata McGraw-Hill, 2007.

REFERENCES:

1. Ramakant A. Gayakwad, —OP - AMP and Linear IC's —, Prentice Hall, 2012.
2. Robert F.Coughlin, Frederick F.Driscoll, "Operational Amplifiers and Linear Integrated Circuits", Sixth Edition, PHI, 2001.
3. Michael Jacob, "Applications and Design with Analog Integrated Circuits", Prentice Hall of India, 1996.
4. S.Salivahanan& V.S. KanchanaBhaskaran, "Linear Integrated Circuits", TMH, 2008.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	1	-	2	2	1
CO2	2	3	3	2	-	-	-	-	-	-	-	-	2	1	1
CO3	1	-	-	3	-	-	-	-	-	-	-	-	2	2	1
CO4	2	-	-	2	-	-	-	-	-	-	-	-	2	1	1
CO5	1	2	3	3	-	-	-	-	-	-	-	3	2	1	1
Avg	**1.8**	**2.5**	**3**	**2.5**	-	-	-	-	-	-	**1**	**3**	**2**	**1.4**	**1**

1 - Low, 2 - Medium, 3 - High

SEMESTER-IV
(B.E - ECE)

EC24403	ANALOG COMMUNICATION SYSTEMS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

The Students should be made:

- To introduce the concepts of amplitude modulations and their spectral characteristics.
- To understand the concepts of angle modulations and their spectral characteristics.
- To study the effect of noise on communication systems.
- To impart knowledge in demodulation techniques.

UNITI AMPLITUDE MODULATION GENERATION 9

Introduction, Block schematic of communication system, Need for modulation, Amplitude modulation, Power relations in AM wave. DSB-SC modulation, Generation of DSB-SC waves, Balanced Modulator, Ring Modulator, SSB-SC Modulated wave, vestigial side band modulation.

UNIT II FREQUENCY MODULATION GENERATION 9

Introduction to Frequency Modulation, Narrow band FM, Wide band FM, Generation of FM wave: Direct method, Indirect method, Armstrong method.

UNIT III NOISE 9

Types of noise: Resistive noise, shot noise, white noise, narrow band noise in phase and Quadrature phase components and its properties, Nose in AM system, Nose in angle modulated system, Threshold effect in Angle modulation system, Pre-emphasis and De-emphasis.

UNIT IV RECEIVERS AND DEMODULATORS 9

Introduction, Performances characteristic of receivers: Sensitivity, Selectivity, Fidelity, Image frequency and Image Frequency Rejection Ratio (IFRR), Tuned Radio Frequency (TRF) receiver, Super heterodyne receivers, AM Detectors: Envelop detector and practical diode detector. FM Detectors: Slope detector, phase discriminator and ratio detector.

UNITV PULSE MODULATION 9

Types of Pulse modulation- Generation and detection of Pulse Amplitude Modulation (PAM), Generation and detection of Pulse Width Modulation (PWM) Generation and detection of Pulse Position Modulation (PPM). Pulse Code Modulation: PCM Generation and Reconstruction.

TOTAL PERIODS: 45

COURSE OUTCOMES:

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

CO1: Analyze various continuous wave Amplitude modulation techniques.

CO2: Understand the concept of Angle modulation and demodulation.

CO3: Analyze the effect of noise on analog communication systems.

CO4: Understand the concepts of Receivers and Demodulators.

CO5: Analyze the various Pulse Modulation Techniques.

TEXT BOOKS

1. Simon Haykin, "Communication Systems", John Wiley and Sons, 5th edition, 2020.
2. John. G. Proakis, MasoudSalehi, "Fundamentals of Communication Systems", Pearson Education, 6th edition, 2011.

REFERENCES:

1. D.Roody, J.Coolen, Electronic Communications, 4th edition PHI 2006.
2. Wayner Tomasi, Electronic Communication System, 5th Edition, Pearson Education,2008.
3. Taub and Schilling, Principles of communication systems, TMH, New Delhi, 4th Edition, 2017.
4. Michael P. Fitz, Fundamentals of Communication Systems, Tata McGraw-Hill, 2nd Edition2013.

CO-PO MAPPING

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

1 - Low, 2 - Medium, 3 - High

SEMESTER-IV
(B.E -ECE)

AD24407	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

The Students should be made to:

- Study about uninformed and Heuristic search techniques.
- Learn techniques for reasoning under uncertainty.
- Introduce Machine Learning and Data Preprocessing.
- Study about supervised learning algorithms.
- Study about ensembling and unsupervised learning algorithms.

UNIT I PROBLEM SOLVING 9

Introduction to AI - AI Applications - Problem solving agents – search algorithms – uninformed search strategies – Heuristic search strategies – Local search and optimization problems – adversarial search – constraint satisfaction problems (CSP).

UNIT II PROBABILISTIC REASONING 9

Acting under uncertainty – Bayesian inference – naïve bayes models. Probabilistic reasoning – Bayesian networks – exact inference in BN – approximate inference in BN – causal networks.

UNIT III DATA PREPROCESSING FOR MACHINE LEARNING 9

Introduction to machine learning – Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation - Feature engineering and selection.

UNIT IV SUPERVISED LEARNING 9

Linear Regression Models: Least squares, single & multiple variables, Bayesian linear regression, Logistic regression, Naive Bayes, Support vector machine, Decision Tree, Random forests.

UNIT V ENSEMBLE TECHNIQUES AND UNSUPERVISED LEARNING 9

Combining multiple learners: Model combination schemes, Voting, Ensemble Learning - bagging, boosting, stacking, Unsupervised learning: K-means, Instance Based Learning: KNN, Gaussian mixture models and Expectation maximization.

COURSE OUTCOMES:

At the end of this course, the students will be able to:

CO1: Use appropriate search algorithms for problem solving
CO2: Apply reasoning under uncertainty
CO3: Preprocess the data for machine learning applications
CO4: Build supervised learning models
CO5: Build ensembling and unsupervised models

TOTAL PERIODS: 45

TEXT BOOKS:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence – A Modern Approach", Fourth Edition, Pearson Education, 2021.
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques" Third Edition, Elsevier, 2012.
3. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, Fourth Edition, 2020.

REFERENCES:

1. Dan W. Patterson, "Introduction to Artificial Intelligence and Expert Systems", Pearson Education,2007
2. Kevin Night, Elaine Rich, and Nair B., "Artificial Intelligence", McGraw Hill, 2008
3. Patrick H. Winston, "Artificial Intelligence", Third Edition, Pearson Education, 2006
4. Deepak Khemani, "Artificial Intelligence", Tata McGraw Hill Education, 2013 (http://nptel.ac.in/)
5. Christopher M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2006.
6. Tom Mitchell, "Machine Learning", McGraw Hill, 3rd Edition,1997.
7. Charu C. Aggarwal, "Data Classification Algorithms and Applications", CRC Press, 2014
8. Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar, "Foundations of Machine Learning", MIT Press, 2012.
9. Ian Goodfellow, Yoshua Bengio, Aaron Courville, "Deep Learning", MIT Press, 2016

CO's-PO's & PSO's MAPPING

	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	3	-	-	-	-	1	3	3	3	1	2	2
CO2	1	1	1	3	1	-	-	-	1	2	1	3	2	3	2
CO3	2	1	2	1	1	-	-	-	2	1	1	3	1	1	1
CO4	3	1	3	1	-	-	-	-	2	1	2	1	2	2	2
CO5	3	1	1	2	2	-	-	-	3	1	2	3	2	1	2
AVg.	**2.4**	**1.2**	**2**	**2**	**1.3**	**-**	**-**	**-**	**1.8**	**1.6**	**1.8**	**2.6**	**1.6**	**1.8**	**1.8**

1 - Low, 2 - Medium, 3 - High

SEMESTER- IV
(B.E –ECE)

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

COURSE OBJECTIVES:

The Students should be made:

- 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. 38. 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	-	-	-
CO2	1	2	2	-	1	2	3	2	-	1	-	2	-	-	-
CO3	1	1	2	-	2	3	3	2	-	1	-	2	-	-	-
CO4	1	-	-	-	-	3	3	3	-	1	-	2	-	-	-
CO5	-	1	2	-	1	3	3	3	-	1	-	2	-	-	-
Avg	**1**	**1.3**	**1.8**	-	**1.3**	**2.4**	**3**	**2.4**	-	**1**	-	**1.8**	-	-	-

1 – Low, 2 - Medium, 3 - High

SEMESTER-IV
(B.E - ECE)

EC24404	DISCRETE TIME SIGNAL PROCESSING	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

The Students should be made:

- To learn the concepts of frequency in analog and Digital signals
- To understand the characteristics discrete fourier transform, properties of DFT and its application to linear filtering
- To understand the characteristics of digital filters, design of digital IIR filters and apply these filters to filter undesirable signals in various frequency bands
- To understand the characteristics of digital filters, design of digital FIR filters and apply these filters to filter undesirable signals in various frequency bands
- To understand the fundamental concepts of Finite word length effects in digital filters

UNIT I SIGNALS AND SYSTEMS 9

Discrete time signals and systems-Basic elements of DSP – concepts of frequency in Analog and Digital Signals – Review of Z transform & sampling theorem– Convolution – Compute and interpret convolution of signals.

UNIT II FREQUENCY TRANSFORS 9

Introduction to DFT – Properties of DFT – Filtering long data sequences - overlap save and overlap add method. FFT - Radix-2 Decimation-in-time (DIT), Decimation-in-frequency (DIF).

UNIT III IIR FILTER DESIGN 9

Structures of IIR -Direct form I, Direct form II – Analog filter design – Butterworth filters, Chebyshev filters- IIR filter design by Impulse Invariance, Bilinear transformation Design filters using pole-zero plots.

UNIT IV FIR FILTER DESIGN 9

Structures of FIR – linear phase structure, direct form realizations -Linear phase FIR filter-phase delay-Group delay –Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window).

UNIT V FINITE WORD LENGTH EFFECTS IN DIGITAL FILTERS 9

Binary fixed point and floating-point number representations – Comparison – case study: Quantization – truncation and rounding – quantization noise power- input quantization error- coefficient quantization error – limit cycle oscillations-dead band- Overflow error-signal scaling.

TOTAL PERIODS: 45

LIST OF EXPERIMENTS:
MATLAB / EQUIVALENT SOFTWARE PACKAGE

1. Generation of elementary Discrete-Time sequences.
2. Linear and Circular convolutions.
3. Auto correlation and Cross Correlation.
4. Frequency Analysis using DFT.
5. Design of Butterworth and Chebyshev IIR filters (LPF/HPF/BPF/BSF) and demonstrate the filtering operations.
6. Design of FIR filters (LPF/HPF/BPF/BSF) and demonstrates the filtering operation.
7. Generation of various signals.

TOTAL PERIODS: 30
TOTAL PERIODS: 75

COURSE OUTCOMES:

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

CO1: Perform frequency transforms for the signals.

CO2: Illustrate the concept of DFT and FFT algorithms.

CO3: Design and analyze IIR Filter.

CO4: Understand the Knowledge of FIR filters.

CO5: Apply the various effects of finite word length in digital filters.

TEXT BOOK:

1. John G. Proakis and Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth Edition, Pearson Education, Prentice Hall, 2007.

2. A. V. Oppenheim, R.W. Schafer and J.R. Buck, ―Discrete-Time Signal Processing", 8th Indian Reprint, Pearson, 2004.

REFERENCES:

1. Emmanuel C.Ifeachor, and Barrie.W.Jervis, "Digital Signal Processing", Second Edition, Pearson Education, Prentice Hall, 2002.
2. Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach", Third Edition, Tata Mc Graw Hill, 2007.
3. A.V.Oppenheim, R.W. Schafer and J.R. Buck, Discrete-Time Signal Processing, 8th Indian Reprint, Pearson, 2004.
4. Andreas Antoniou, "Digital Signal Processing", Tata McGraw Hill, 2006.

CO-PO MAPPING

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

1 - Low, 2 - Medium, 3 - High

SEMESTER-IV
(B.E - ECE)

EC24405	LINEAR INTEGRATED CIRCUITS LABORATORY	L	T	P	C
		0	0	3	2

COURSE OBJECTIVES:

The Students should be made:

- To gain hands on experience in designing electronic circuits.
- To learn simulation software used in circuit design.
- To learn the fundamental principles of amplifier circuits.
- To differentiate feedback amplifiers and oscillators.
- To differentiate the operation of various multivibrators.

LIST OF EXPERIMENTS:

Design and analysis of

1. Inverting , Non-Inverting and Differential Amplifier.
2. RC Phase shift oscillator and Wien Bridge Oscillator using OP AMP.
3. Hartley Oscillator and Colpitts Oscillator.
4. RC Integrator and Differentiator circuits using Op-Amp.
5. Astable and Monostable Multivibrators using Op Amp.
6. Instrumentation amplifier.
7. Active low-pass, High pass & Band pass filters.
8. PLL Characteristics and its use as frequency multiplier, clock synchronization.
9. Clipper and Clamper Circuit.

Simulation using spice (using transistor):

10. Tuned Collector Oscillator.
11. Twin -T Oscillator / Wein Bridge Oscillator.
12. Double and Stagger tuned Amplifiers.
13. Bistable Multivibrator.
14. A/D Converters and Analog Multipliers.

TOTAL PERIODS: 45

COURSE OUTCOMES:

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

CO1: Analyze various types of feedback amplifiers

CO2: Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators

CO3: Design and simulate feedback amplifiers,oscillators, tuned amplifiers, wave- shaping circuits and multivibrators, filters.

CO4: Design amplifiers, oscillators, D-A converters using operational amplifiers.

CO5: Design filters using op-amp and perform an experiment on frequency response.

CO-PO MAPPING

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

1 - Low, 2 - Medium, 3 – High

SEMESTER-IV
(B.E - ECE)

EC24406	ANALOG COMMUNICATION SYSTEMS LABORATORY	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

The Students should be made:

- To analyze various analog modulation and demodulation techniques.
- To learn and realize the effects of sampling and TDM.
- To understand the Pulse modulation.

LIST OF EXPERIMENTS:

Hardware Experiments:

1. AM- Modulator and Demodulator.
2. FM - Modulator and Demodulator.
3. Signal sampling and TDM.
4. Pulse Code Modulation and Demodulation.
5. Pulse Amplitude Modulation and Demodulation.
6. Pulse Position Modulation and Demodulation.
7. Pulse Width Modulation and Demodulation.

Software Experiments (Simulation using MATLAB)

1. AM- Modulator and Demodulator.
2. DSB-SC Modulator and Demodulator.
3. Generating White Gaussian Noise in Communication system.
4. Pre-Emphasis and De-Emphasis.
5. Pulse Amplitude Modulation and Demodulation.
6. Pulse Position Modulation and Demodulation.
7. Pulse Width Modulation and Demodulation.

TOTAL PERIODS: 45

COURSE OUTCOMES:

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

CO1: Analyze the mathematical model for generation and detection of different AM systems based on time domain representation and its spectrum.

CO2: Design of FM Transmission & Reception system and analyze it with its mathematical model.

CO3: Simulate & validate the various functional modules of Communication system.

CO4: Apply the concepts of the sampling process.

CO5: Determine the characteristics of Pulse Analog Modulation schemes.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1	2	-	-	-	-	-	-	-	1	2	-	-
CO2	2	2	-	1	-	-	-	-	-	-	-	1	-	-	-
CO3	2	1	2	2	-	-	-	-	-	-	-	-	1	1	-
CO4	1	2	-	1	-	-	-	-	-	-	-	1	-	-	1
CO5	2	2	2	1	-	-	-	-	-	-	-	1	1	1	1
Avg	**1.8**	**2**	**1.7**	**1.4**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1.3**	**1**	**1**

1 - Low, 2 - Medium, 3 – High