



**Common to all Branches of B.E. / B. Tech. Programmes**  
**&**  
**M. Tech. Computer Science Engineering ( 5 Years Integrated)**  
**REGULATIONS 2025**  
**CHOICE BASED CREDIT SYSTEM**  
**CURRICULUM**

SEMESTER I							
S. NO	COURSE CODE	COURSE NAME	COURSE TYPE	PERIODS / WEEK		CREDITS	CATEGORY
				L -T- P	TCP		
1	EN25C01	PROFESSIONAL ENGLISH I ( Lab Integrated )	LIT	2-0-2	4	3	HSMC
2	MA25C01	MATRICES AND CALCULUS	T	3-1-0	4	4	BSC
3	PH25C01	APPLIED PHYSICS	T	3-0-0	3	3	BSC
4	CY25C01	APPLIED CHEMISTRY	T	3-0-0	3	3	BSC
5	CS25C01	PROBLEM SOLVING AND PROGRAMMING IN C	T	3-0-0	3	3	ESC
6	ME25C01	ENGINEERING DRAWING	T	2-0-4	6	4	SDC
7	GE25C01	HERITAGE OF TAMILS	T	1-0-0	1	1	HSMC
8	BS25C01	PHYSICS AND CHEMISTRY LABORATORY	L	0-0-3	3	1.5	BSC
9	CS25C02	PROGRAMMING IN C LABORATORY	L	0-0-3	3	1.5	ESC
Ability Enhancement Courses							
10	SD25C01	APTITUDE COURSE - I	L	0-0-2	2	0	SDC
11	SD25C02	SOFTWARE TRAINING COURSE - I	L	0-0-2	2	0	SDC
TOTAL CREDITS					34	24	

**B.E. Electrical and Electronics Engineering**  
**REGULATIONS 2025**  
**CHOICE BASED CREDIT SYSTEM**  
**CURRICULUM**

<b>SEMESTER II</b>							
S. NO	COURSE CODE	COURSE NAME	COURSE TYPE	PERIODS / WEEK		CREDITS	CATEGORY
				L-T-P	TCP *		
1	EN25C08	PROFESSIONAL ENGLISH II (Lab Integrated)	LIT	2-0-2	4	3	HSMC
2	MA25C03	LINEAR ALGEBRA AND COMPLEX VARIABLES	T	3-1-0	4	4	BSC
3	PH25C03	SEMICONDUCTOR DEVICES FOR MODERN ELECTRONICS	T	3-0-0	3	3	ESC
4	AL25201	FOUNDATIONS OF PYTHON	T	3-0-0	3	3	PCC
5	EE25201	ELECTRIC CIRCUIT ANALYSIS	T	3-0-0	3	3	PCC
6	GE25C02	TAMILS AND TECHNOLOGY	T	1-0-0	1	1	HSMC
7	AL25211	PYTHON PROGRAMMING LABORATORY	L	0-0-3	3	1.5	PCC
8	EE25211	ELECTRIC CIRCUITS AND WIRING PRACTICES LABORATORY	L	0-0-3	3	1.5	PCC
<b>Ability Enhancement Courses</b>							
9	SD25C06	APTITUDE COURSE -II	L	0-0-2	2	0	SDC
10	SD25C07	COMMUNICATION SKILLS ENHANCEMENT	L	0-0-2	2	0	SDC
<b>TOTAL PERIODS</b>					<b>28</b>	<b>20</b>	

EN25C01	<b>PROFESSIONAL ENGLISH I ( Lab Integrated )</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(Common to All Branches &amp; M. Tech (CSE) )</b>	2	0	2	3

## OBJECTIVES

- To improve the communicative competence of learners
- To learn to use basic grammatic structures in suitable contexts
- To acquire lexical competence and use them appropriately in a sentence and understand their meaning in a text
- To help learners use language effectively in professional contexts
- To develop learners' ability to read and write complex texts, summaries, articles, blogs, definitions, essays and user manuals. rewrite it and rephrase it.

## UNIT - I **SHARING INFORMATION RELATED TO ONESELF/FAMILY& FRIENDS** 9

**Listening** - Listening to people talk about their past, Listening to a description of a transportation system, Listening to people talk about capsule hotels, Listening to descriptions of foods

**Speaking** - Introducing yourself; talking about yourself; exchanging personal information; remembering your childhood; asking about someone's childhood, Talking about transportation and transportation problems; evaluating city services; asking for and giving information, Describing positive and negative features; making comparisons; talking about lifestyle changes; expressing wishes, Talking about food; expressing likes and dislikes; describing a favourite snack; giving step-by-step instructions

**Writing / Reading** - Writing a paragraph about your childhood, Reading about the life of a Mexican painter, Writing an online post on a community message board about a local issue, Reading about the happiest cities in the world, Writing an email comparing two living spaces, Reading about living without money, Writing a recipe, Reading about the history of pizza. **CO1**

**Grammar** - Past tense; used to for habitual actions, Expressions of quantity with count and non-count nouns: too many, too much, fewer, less, more, not enough; indirect questions from Wh-questions, Evaluations and comparisons with adjectives: not . . . enough, too, (not) as . . . as; evaluations and comparisons with nouns: not enough . . . , too much/many . . . , (not) as much/many . . . as; wish, Simple past vs. present perfect; sequence adverbs: first, then, next, after that, finally

## UNIT - II **GENERAL READING AND FREE WRITING** 9

**Listening** - Listening to travel advice, Listening to the results of a survey about family life, Listening to a radio program; listening to people give suggestions for using technology, Listening to a description of Carnival in Brazil

**Speaking** - Describing vacation plans; giving travel advice; planning a vacation, Making requests; agreeing to and refusing requests; complaining; apologizing; giving excuses, Describing technology; giving instructions; giving suggestions, Describing holidays, festivals, customs, and special events

**Writing/ Reading** - Writing an email with travel suggestions, Reading about unusual vacations, Writing a message making a request, Reading about unusual hotel requests, Writing a message asking for specific favors, Reading about the sharing, Writing an entry on a travel website about a cultural custom, Reading about interesting New Year's customs

**Grammar** - Future with be going to and will; modals for necessity and suggestion: must, need to, (don't) have to, ought to, -'d better, should (not), Two-part verbs; will for responding to requests; requests with modals and Would you mind . . . ?, Infinitives and gerunds for uses and purposes; imperatives and infinitives for giving suggestions, Relative clauses of time; adverbial clauses of time: when, after, before

CO2

### UNIT -III GRAMMAR AND LANGUAGE DEVELOPMENT

9

**Listening** – Listening to people talk about changes, Listening to people talk about their job preferences, Listening to descriptions of monuments; listening for information about a country, Listening to stories about unexpected experiences

**Speaking** - Talking about change; comparing time periods; describing possible consequences, Describing abilities and skills; talking about job preferences; describing personality traits, Talking about landmarks and monuments; describing countries; discussing facts, Describing recent past events and experiences; discussing someone's activities lately

**Writing / Reading** - Writing a paragraph describing a person's past, present, and possible future, Reading about a town's attempt to attract new residents, Writing an online cover letter for a job application, Reading about understanding cultural differences in an international company, Writing an introduction to an online city guide, Reading about unusual museums, Writing a description of a recent experience, Reading about an unusual rock band

CO3

**Grammar** - Time contrasts; conditional sentences with if clauses, Gerunds; short responses; clauses with because, Passive with by (simple past); passive without by (simple present), Past continuous vs. simple past; present perfect continuous

### UNIT -IV READING AND LANGUAGE DEVELOPMENT

9

**Listening** - Listening for opinions; listening to a movie review, Listening to people talk about the meaning of signs, Listening to people talk about predicaments; listening to a call-in radio show, Listening for excuses

**Speaking** - Describing movies and books; talking about actors and actresses; asking for and giving reactions and opinions, Interpreting body language; explaining gestures and meanings; describing acceptable and prohibited behavior in different situations; asking about signs and their meaning, Speculating about past and future events; describing a predicament; giving advice and suggestions, Reporting what people said; making polite requests; making invitations and excuses

CO4

**Writing / Reading** - Writing a movie review, Reading about unpleasant experiences actors put themselves through, Writing a list of rules, Reading about idioms and their meaning, Writing a blog post asking for advice, Reading an online, Writing a report about people's responses to a survey, Reading about taking a sick day advice forum

**Grammar** - Participles as adjectives; relative pronouns for people and things, Modals and adverbs: might, may, could, must, maybe, perhaps, probably, definitely; permission,

obligation, and prohibition, Unreal conditional sentences with if clauses; past modals, Reported speech: requests and statements.

**UNIT - V Extended Skill Practice** **9**

Listening practice through worksheets (with audio – in class)

Grammar practice through worksheets\*

Vocabulary practice through worksheets\*

Writing practice through worksheets, Speaking Skill Practice (in class)

10-minute conversation practice sessions (with guidance from Placement Test)

**CO5**

**Total Periods: 60**

**Text Books:**

1. Interchange Level 2 - 5th edition published by Cambridge University Press & Assessment
2. English for Science & Technology Cambridge University Press, 2021. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Jovani, Department of English, Anna University.

**Reference Books:**

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 Viswamohan, Mcgraw Hill Education
4. Effective Communication Skill, Kulbhusan Kumar, RS Salaria, Khanna Publishing House.
5. Learning to Communicate – Dr. V. Chellammal, Allied Publishing House, New Delhi, 2003.

**Lab Component**

Getting started: Talk about communication

Listening - Three monologues: Online friendships; At the flower shop; Conversation: learning vocabulary

Speaking - Things you have done recently, learning a foreign language; Giving and responding to opinions; Ways of learning vocabulary

Reading - Article: *But are they real friends?*; Article: *Can you really learn a language in 22 hours?* Article: *What kind of learner are you?*

Writing - A guide; Introducing a purpose; Referring pronouns

Grammar - Subject and object questions; Present simple and present continuous

Vocabulary - Gradable and extreme adjectives

Pronunciation - Word stress: extreme adjectives; Word groups

Everyday English - Giving and responding to opinions.

Getting started - Talk about relationships

Listening - Two monologues: being a twin, a mistake; Conversation: great-grandparents

Speaking - The story of a friendship; Family traditions; Reacting to what people say; Telling a story; A member of your family

Reading - Article: 60 years and 1,000 miles: How a word game brought two unlikely people together; Article: Twin tales; An email about how great-grandparents met

Writing - A biography; Describing time

Grammar - Narrative tenses; *used to*, *usually*

Vocabulary – Relationships. Multi-word verbs

Pronunciation - Linking sounds, Sentence stress: multi-word verbs, Stress in word groups

Everyday English - Telling a story

Getting started - Talk about endangered animals

Listening - Conversation: an environmental project; Interview: inventions inspired by nature;

Talking about possible jobs; Monologue: rescuing whales

Speaking - Predictions about the future; The best place to experience natural beauty; Giving reasons, results and examples; Giving yourself time to think; A quiz about whales

Reading - Web page: The Whitley Fund for Nature; Article: Animals have adapted to survive everywhere; An essay about water pollution

Writing - A discussion essay; Organising an essay; Signposting language

Grammar - Future forms; Zero and first conditionals

Vocabulary – Environmental issues; The natural world

Pronunciation - Sound and spelling: a; Consonant clusters; Voiced and unvoiced consonants

Everyday English - Giving reasons, results and examples

Getting started: Talk about ideal houses

Listening - Four monologues: describing buildings; Conversation: comparing life in a town and a city; Visiting a friend's family; Conversation: a holiday in Florida

Speaking - Describing buildings; Talking about where you live; Making offers and requests and asking for permission; Imagining people's feelings; A recent holiday

Reading - Web page: A more personal place to stay; Web page: Five reasons why small towns are better than cities; Article: Top five things to do ... in and around Miami, Florida; A note

Writing - A note with useful information; Offering choices

Grammar - Modals of deduction; Quantifiers

Vocabulary – Buildings; Verbs and prepositions

Pronunciation - Modal verbs; Sentence stress: verbs and prepositions; Sounding polite

Everyday English - Making offers and requests and asking for permission

**TOTAL PERIODS : 15**

## **COURSE OUTCOMES**

**Upon completion of the course, the students will be able to**

- CO1 To apply accurate grammatical structures and topic-specific vocabulary to formulate clear opinions, narrate stories, and describe personal experiences in spoken and written communication.
- CO2 To analyze and interpret a variety of texts by inferring meaning, identifying arguments, and evaluating the writer's purpose.
- CO3 To compose well-structured written texts, including biographies, discussion essays, and guides, using appropriate signposting language and organizational techniques to enhance clarity and coherence.
- CO4 To demonstrate effective and appropriate spoken communication in everyday contexts by actively listening, responding, telling stories, and exchanging opinions with clarity and politeness
- CO5 To evaluate real-world scenarios by applying conditional structures and modal verbs to discuss possibilities, make deductions, and present reasoned arguments.

MA25C01

**MATRICES AND CALCULUS**  
(Common to All Branches & M. Tech (CSE) )

**L T P C**  
3 1 0 4

**OBJECTIVES**

- The goal of this course is to achieve conceptual understanding and to retain the best traditions of traditional calculus.
- The syllabus is designed to provide the basic tools of calculus mainly for the purpose of modelling the engineering problems mathematically and obtaining solutions.
- Matrix Algebra is one of the powerful tools to handle practical problems arising in the field of engineering.
- This course is designed to cover topics such as ordinary differential equations which plays an important role in the understanding of science and engineering

**UNIT I MATRICES 9+3**

Characteristic equation –Eigenvalues and Eigenvectors of a real matrix- Properties of Eigenvalues and Eigenvectors – Cayley-Hamilton theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms **CO1**

**UNIT II CALCULUS OF ONE VARIABLE 9+3**

Limit of a function - Continuity - Derivatives - Differentiation rules – Interval of increasing and decreasing functions – Maxima and Minima - Intervals of concavity and convexity. **CO2**

**UNIT III CALCULUS 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 – Maxima and minima of functions of two variables – Lagrange’s method of undetermined multipliers. **CO3**

**UNIT IV MULTIPLE INTEGRALS 9+3**

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Change of variables from Cartesian to polar in double integrals-Triple integrals – Volume of solids **CO4**

**UNIT V ORDINARY DIFFERENTIAL EQUATIONS 9+3**

Higher order linear differential equations with constant coefficients - Method of variation of parameters– Homogenous equation of Euler’s and Legendre’s type - System of simultaneous linear differential equation with constant co-efficient. **CO5**

**TOTAL : 60 PERIODS**

**TEXT BOOKS**

1. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 45th Edition, 2024.
2. James Stewart, "Calculus: Early Transcendental", Cengage Learning, 7th Edition, New Delhi, 2015

**REFERENCE BOOKS**

1. Erwin Kreyszig "Advanced Engineering Mathematics", Wiley India Pvt Ltd., New Delhi, 2015.
2. Greenberg M.D., “Advanced Engineering Mathematics”, Pearson Education 2nd Edition, 5th Reprint, Delhi, 2009.
3. Jain R.K. and Iyengar S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, 5th Edition, New Delhi, 2017.

4. Narayanan S. and Manicavachagom Pillai T. K., "Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2009.
5. Peter V.O'Neil, "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, 7 th Edition, New Delhi , 2012.
6. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill Co. Ltd., 11th Reprint, New Delhi, 2010.
7. T. Veerarajan. Engineering Mathematics – I, McGraw Hill Education; First edition 2017.

## **COURSE OUTCOMES**

**Upon completion of the course, students will be able to**

- CO1 Have a clear idea of matrix algebra pertaining to Eigenvalues and Eigenvectors in addition to dealing with quadratic forms.
- CO2 Understand the concept of limit of a function, continuity and derivative of a given function and apply differentiation to solve maxima and minima problems.
- CO3 Have the idea of extension of a function of one variable to several variables. Multivariable functions of real variables are inevitable in engineering.
- CO4 Do double and triple integration so that they can handle integrals of higher order which are applied in engineering field.
- CO5 Master the techniques of solving ordinary differential equations that arises in most of the engineering problems

PH25C01

**APPLIED PHYSICS**  
**(Common to All Branches & M. Tech (CSE) )**

**L T P C**  
**3 0 0 3**

**OBJECTIVES**

- To enable the students to gain knowledge of the Principles of LASER, Nonlinear optics, and their various technological applications.
- To effectively help the students, achieve an understanding of Fiber optics, remote sensing, and their applications in various fields.
- Equipping the students to successfully understand the importance of quantum physics
- Understanding crystal structure: Learn about crystal lattices, unit cells, and the structure of crystals.
- Analyzing the importance of various instrumentation techniques for material analysis.

**UNIT I LASER AND NONLINEAR OPTICS 9**

Introduction to LASER - Stimulated Absorption, Spontaneous and Stimulated emission- Conditions for laser- Einstein's A & B coefficients -Types of Lasers: Nd-YAG Laser, Semiconductor laser – Applications: Defence and Biomedical, AI in photonics. Nonlinear Optics: Nonlinear optical phenomena - Nonlinear optical materials – Applications: Frequency doubling and mixing - Second Harmonic Generation (SHG) Optical Parametric Amplification - Optical Parametric Generation (OPG) - Optical Parametric Oscillators (OPO) – Construction and working. **CO1**

**UNIT II FIBER OPTICS AND REMOTE SENSING 9**

Introduction – Principle - Light propagation through fibre - Numerical Aperture - Acceptance angle - Modes and configuration – Losses – Applications - Communication system with block diagram – Endoscopy - Remote sensing - Active and Passive Remote sensing- Components of remote sensing – RADAR – Block diagram - Transmission lines and Waveguides - Cell phone reception. **CO2**

**UNIT III QUANTUM MECHANICS 9**

Introduction to blackbody radiation – Wien's law - Rayleigh Jeans's law - Planck's radiation law - Scattering of radiation as particles - Compton Effect theory and experimental verification. Wave-particle dualism – de-Broglie hypothesis – Heisenberg uncertainty principle (Qualitative) - Concept of the wave function and its physical significance - Schrodinger's wave equation: time-independent and time-dependent equations - Application of Schrodinger's wave equation: Particle in a one-dimensional rigid box – Tunnelling (Qualitative). **CO3**

**UNIT IV SOLID STATE PHYSICS AND NON-DESTRUCTIVE TESTING 9**

Introduction – Elasticity – Stress strain curve – Bending moment – Modulus of elasticity by uniform bending - Classification of solids – Space lattice – Basis and Unit cell – primitive and nonprimitive unit cell – Lattice parameter - Seven crystal systems - Bravais lattices – structural study of different crystals (Qualitative) – Crystal growth techniques: Bridgman and Czochralski techniques. Ultrasonics – Production - Magnetostriction and Piezoelectric methods –Non-Destructive Testing (NDT) – Liquid penetrant method – Ultrasonic testing – Ultrasonic flaw detector - Principle, Transducers, transmission and pulse echo method, data representation A Scan, B scan and C scan. **CO4**

**UNIT V INSTRUMENTATION FOR MATERIAL ANALYSIS 9**

Introduction to materials and Techniques – Bragg’s law – X ray diffraction: Rotating crystal method – Powder method – AI based structural determination - Optical and Electron Microscopes - Scanning Electron Microscope – Transmission Electron Microscope - Spectroscopy: UV-VIS, CO5 Fourier transform infrared spectroscopy, Electrical Impedance spectroscopy, Scanning Capacitance Spectroscopy.

**TOTAL: 45 PERIODS**

### **TEXTBOOKS**

1. Bhattacharya, D.K. & Poonam, T. “Engineering Physics”. Oxford University Press, 2019.
2. Gaur, R.K. & Gupta, S.L. “Engineering Physics”. Dhanpat Rai Publishers, 2017.
3. Pandey, B.K. & Chaturvedi, S. “Engineering Physics”. Cengage Learning India, 2019

### **REFERENCE BOOKS**

1. Thyagarajan, K and Ghatak, A., “Lasers: Fundamentals and Applications”, Laxmi Publications, (Indian Edition), 2019.
2. David J. Griffiths, Darrell F. Schroeter “Introduction to Quantum Mechanics” 2019.
3. Elmer A. Rosauer “Instruments for Materials Analysis” 1981.

### **COURSE OUTCOMES**

**Upon completion of the course, students will be able to**

- CO1 To gain knowledge of the Principles of LASER, Nonlinear optics, and their various applications
- CO2 Understanding Fiber optics, remote sensing, and their applications in various fields.
- CO3 Equipping the students to understand the importance of quantum physics.
- CO4 Understand the properties of solids, and the relationship between structure and properties.
- CO5 Analysing the importance of various instrumentation techniques for material analysis.

**CY25C01**

**APPLIED CHEMISTRY**  
**(Common to All Branches & M. Tech (CSE) )**

**L T P C**  
**3 0 0 3**

**OBJECTIVES**

- To develop a foundational understanding of types, properties and applications of batteries and renewable energy sources.
- To acquire knowledge about synthesis and uses of nano materials, principles, and applications of electrochemistry.
- To get awareness about water quality parameters and its treatment process.
- To equip students with a comprehensive understanding of significance and merits of phase diagrams and various industrial polymers and composites.
- To evaluate and analyse the vital role of computational chemistry and AI in various industrial domains.

**UNIT I CHEMISTRY IN ENERGY 9**

Introduction – Batteries – Classification – Primary batteries – Alkaline battery, Secondary batteries – Lead-acid battery, Nickel-cadmium battery and Lithium battery; Renewable energy sources – Solar energy – Principle, working and applications of solar cell, Wind energy; Fuel cell – Hydrogen Oxygen fuel cell, Microbial fuel cell; Super capacitors – Storage principle, types and examples; EDLC and its applications; Electric vehicles – working principle. **CO1**

**UNIT II NANO MATERIALS & ELECTROCHEMISTRY 9**

Nano Materials: Introduction – Types – Nanoparticles, Nanoclusters, Nanowires, Nanotubes; Preparation of nanomaterials – Chemical vapour deposition, sol-gel, electro spinning; Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis. **CO2**  
Electrochemistry: Introduction – electrochemical cell – electrode potential – electrochemical series and its significance; Nernst equation – applications; Potentiometric titration (redox titrations) – Conductometric titration (Strong acid Vs Strong base) – Principle, applications.

**UNIT III WATER PURIFICATION TECHNIQUES 9**

Hardness of water – Types – Expression of hardness; Estimation of hardness by EDTA method – Numerical problems on EDTA method; Boiler trouble (scale & sludge); Treatment of boiler feed water – Internal treatment (carbonate, phosphate, colloidal, sodium aluminate and calgon conditioning) – External treatment (Ion exchange process, Zeolite process); Desalination of brackish water by Reverse Osmosis; Municipal water treatment – Primary treatment and disinfection (UV, Ozonation, Breakpoint chlorination). **CO3**

**UNIT IV PHASE RULE AND POLYMER COMPOSITES 9**

Phase rule - Introduction, Definition of terms with examples; One component system – Water system; Construction of simple eutectic phase diagram – Reduced Phase rule – Two component system – Lead-silver system – Pattinson Process. **CO4**  
Polymer composites: Introduction – classification – Thermoplastics, Thermosetting plastics; Preparation, properties, and uses of Engineering plastics (Nylon-6,6, PVC, Teflon, Bakelite); Definition and need for composites; Properties and applications of Metal and ceramic matrix composites; Fiber reinforced polymers.

**UNIT V COMPUTATIONAL CHEMISTRY 9**

Introduction to Computational Chemistry; Cheminformatics – Definition, Scope and Significance; Applications in the industrial sector – Carbon foot print measurements - Data analysis and Interpretation; Applications of Artificial Intelligence (AI) in various fields of chemistry – agriculture, medicine, dyes, petrochemicals, water treatment, nanomaterials, pollution abatement. **CO5**

**TOTAL : 45 PERIODS**

### **TEXT BOOKS**

1. P.C.Jain, Monica Jain, “Engineering Chemistry” 17th Ed., Dhanpat Rai Pub. Co., New Delhi, (2018).
2. S.S. Dara, S.S. Umare, “A text book of Engineering Chemistry” S.Chand & Co.Ltd., New Delhi (2020).
3. P. Kannan, A. Ravikrishnan, “Engineering Chemistry”, Sri Krishna Hi-tech Publishing Company (P) Ltd., Chennai, (2009).
4. Sivasankar B, “Engineering Chemistry”, Tata McGraw-Hill publishing company Ltd, New Delhi, (2008)
5. A.Sheik Mideen, Engineering Chemistry, 1<sup>st</sup> Revised Edition, Airwalk Publications, 2023.

### **REFERENCE BOOKS**

1. O. G. Palanna, “Engineering Chemistry” McGraw Hill Education (India) Private Limited, 2<sup>nd</sup> Edition (2017).
2. B. S. Murty, P. Shankar. Baldev Raj, B. B. Rath and James Murday, “Text book of Nanosciene and Nanotechnology” Universities Press-IIM Series in Metallurgy and Materials science, (2018).
3. Dr. Shikha Gulati, Application of Artificial Intelligence in Wastewater Treatment, Springer, (2024)
4. Andrew R. Leach, V.J. Gillet, An Introduction to Chemoinformatics, Springer, (2007).

### **COURSE OUTCOMES:**

**On completion of this course work, students will be able to:**

- CO1 Understand the principles and applications of batteries and fuel cells.
- CO2 Comprehend the contemporary applications of nano materials and the concepts of electrochemistry
- CO3 Appreciate the significance of water quality parameters and carry out various treatment processes.
- CO4 Apply the phase rule for one, two component systems and get an in-depth idea on the industrial significance of polymers and composites.
- CO5 Acquire the complete knowledge on the practical applications of cheminformatics and Artificial Intelligence in the domains of Chemistry.

<b>CS25C01</b>	<b>PROBLEM SOLVING AND PROGRAMMING IN C</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		3	0	0	3

### OBJECTIVES

- To understand problem solving and learn the basics of C programming and control statements.
- To understand loop control and how to use arrays and strings.
- To explore functions, recursion, and pointers in C.
- To study structures, unions, and data management.
- To learn how to use macros and work with files in C.

#### **UNIT I PROBLEM SOLVING AND BASICS OF C PROGRAMMING 9**

Introduction to Algorithms- Building blocks of algorithms - Algorithmic problem-solving steps - Simple Strategies and notation for developing algorithms - Control flow, Flow charts, Pseudo codes, Programming languages - Introduction to programming paradigms -- Structure of C program - C programming: Data Types - Constants - Keywords - Operators: Precedence and Associativity - Expressions - Input/Output statements, Assignment statements - Decision making statements - Switch statement. **CO1**

#### **UNIT II LOOP CONTROL STATEMENTS AND ARRAYS 9**

Iteration statements: For, while, Do-while statements, nested loops, break & continue statements - Introduction to Arrays: Declaration, Initialization - One-dimensional array - Two-dimensional arrays – Searching and sorting in Arrays – Strings – string handling functions - array of strings. **CO2**

#### **UNIT III FUNCTIONS AND POINTERS 9**

Modular programming - Function prototype - function definition - function call - Built-in functions – Recursion – Recursive functions - Pointers - Pointer increment - Pointer arithmetic - Parameter passing - Pass by value - Pass by reference - pointer and arrays - dynamic memory allocation with malloc/calloc. **CO3**

#### **UNIT IV STRUCTURES AND UNION 9**

Storage class - Structure and union - Features of structures - Declaration and initialization of structures – Self-referential structure - Array of structures - Pointer to structure - Structure and functions – Typedef - Bit fields - Enumerated data types - Union. **CO4**

#### **UNIT V MACROS AND FILE PROCESSING 9**

Preprocessor directives – Simple and Conditional macros with and without parameters - Files - Types of file processing: Sequential and Random access – File operations – read, write & seek – Command Line Arguments. **CO5**

**TOTAL : 45 PERIODS**

#### **TEXT BOOKS**

1. Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2015.
2. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020.

#### **REFERENCE BOOKS**

1. Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.
2. Ashok N Kamthane, Programming in C, Pearson, Third Edition, 2020

3. Reema Thareja, Programming in C, Oxford University Press, Third Edition, 2023.
4. Paul Deitel and Harvey Deitel, How to Program, Ninth edition, Pearson Publication 2022.
5. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C" McGraw-Hill Education, 1996.

## **COURSE OUTCOMES**

**Upon completion of the course, students will be able to**

- CO1** Develop algorithmic solutions to simple computational problems and write C programs using basic constructs.
- CO2** Design searching and sorting algorithms using arrays and strings.
- CO3** Implement modular applications using Functions and pointers.
- CO4** Develop and execute applications using structures and Unions.
- CO5** Solve real world problem using files.

**ME25C01**

**ENGINEERING DRAWING**  
**(Common to All Branches & M. Tech (CSE))**

**L T P C**  
**2 0 4 4**

**OBJECTIVES**

- To develop students graphic skills for communication of concepts, ideas and design of engineering products.
- To inculcate drawing practice in standardized form whenever technical drawing is needed.
- To expose them existing national standards related to technical drawings.

**CONCEPTS AND CONVENTIONS (Not for Examination)**

**1**

Importance of graphics in engineering applications - Use of drafting instruments - BIS conventions and specifications - Size, layout and folding of drawing sheets - Lettering and dimensioning.

**UNIT - I PLANE CURVES AND FREEHAND SKETCHING**

**7 + 12**

Basic Geometrical constructions, Curves used in engineering practices: Conics - Construction of ellipse, parabola and hyperbola by eccentricity method - Construction of cycloid, epicycloids and hypocycloid - construction of involutes of square and circle - Drawing of tangents and normal to the above curves.

Visualization concepts and free hand sketching: Visualization principles -Representation of three-dimensional objects - Layout of views- Freehand sketching of multiple views from pictorial views of objects

**UNIT - II PROJECTION OF POINTS, LINES AND PLANE SURFACE**

**6 + 12**

Orthographic projection - principles - Principal planes - First angle projection - projection of points. Projection of straight lines (only first angle projections) 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**

**5 + 12**

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.

**UNIT - IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES**

**5 + 12**

Sectioning of simple solids like prisms, pyramids, cylinder, and cone in a simple vertical position when the cutting plane is inclined to one of the principal planes and perpendicular to the other - obtaining true shape of section.

Development of lateral surfaces of simple and sectioned solids - Prisms, pyramids cylinders and cones - Graphically finding the shortest distance connecting two points.

**UNIT - V ISOMETRIC AND PERSPECTIVE PROJECTIONS**

**6 + 12**

Principles of isometric projection - isometric scale - Isometric projections and isometric views of simple solids and truncated solids - Prisms, pyramids, cylinders, cones.

Perspective projection of simple solids - Prisms, pyramids and cylinders by visual ray method

## COURSE OUTCOMES

### Upon completion of the course, the students will be able to

- CO1 Understand the fundamentals and standards of Engineering graphics.
- CO2 Perform freehand sketching of basic geometrical constructions and multiple views of objects.
- CO3 Understand the concept of orthographic projections of lines and plane surfaces.
- CO4 Draw projections of the section of solids and development of surfaces.
- CO5 Visualize and to project isometric and perspective sections of simple solids.

### Text Books:

1. Natarajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, Twenty ninth edition 2017
2. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2011.
3. S. Ramachandran and K. Pandian, "Engineering Graphics" Airwalk Publications; 8th edition 2014

### Reference Books:

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53rd Edition, 2019.
2. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2018.
3. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores, Bangalore, 2018.
4. Luzzader, Warren. J. and Duff, John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
5. N S Parthasarathy and Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.
6. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson, 2nd Edition, 2009.

GE25C01

தமிழர் மரபு  
(Common to All Branches & M. Tech (CSE) )

L T P C  
1 0 0 1

**அலகு 1 மொழி மற்றும் இலக்கியங்கள்**

3

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்வியலக்கியங்கள்- சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை - சங்க இலக்கியத்தில் புகிறதல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண, பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

CO1

**அலகு 2 மரபு - பாறை ஓவியங்கள் முதல் தவீன ஓவியங்கள் வரை - சிற்பக்கலை**

3

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை, சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளூர் சிலை, இசைக் கருவிகள் - மிருதங்கம், பறை, நாதஸ்வரம் - தமிழர்களின் சமூக, பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

CO2

**அலகு 3 நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்**

3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியாகூத்து, ஓயிலாட்டம், தோல் பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்

CO3

**அலகு 4 தமிழர்களின் திணைக் கோட்பாடுகள்**

3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு- சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும். கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

CO4

**அலகு 5 இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு**

3

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம்- சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிிகள், தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

CO5

TOTAL 15

**TEXT-CUM-REFERENCE BOOKS**

1. தமிழக வரலாறு மக்களும் பண்பாடும் - டாக்டர் கே.கே. பிள்ளை. (வெளியீடு தமிழ்நாடுபாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித்தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. தபொருறை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் 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 Civilization 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.

### **COURSE OUTCOMES**

**Upon completion of the course, students will be able to**

- CO1 பழந்தமிழ் இலகியங்களின் சிறப்பு, இந்திய மொழிக்குடும்பங்களின் வரலாறு ஆகியவற்றை மாணவர்கள் அறிதல்.
- CO2 நடுகல் முதல் நவீன ஓவியங்கள் மற்றும் இசைக்கருவிகளின் சிறப்பை உணர்தல்..
- CO3 நாட்டுப்புறக் கலைகள் மற்றும் வீரவிளையாட்டுகளின் வரலாறு ஆகியவற்றை தெரிந்து கொள்ளுதல்.
- CO4 பழந்தமிழரின் திணைக்கோட்பாடு, எழுத்தறிவு மற்றும் கல்வி அறிவு முதலானவற்றின் சிறப்பை உணர்தல்.
- CO5 இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு மற்றும் சுயமரியாதை இயக்க சிந்தனைகள் குறித்தும் மாணவர்கள் தெரிந்து கொள்ளுதல்.

GE25C01

**HERITAGE OF TAMILS**  
(Common to All Branches & M.Tech (CSE) )

L T P C  
1 0 0 1

**UNIT 1 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.

CO1

**UNIT 2 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.

CO2

**UNIT 3 FOLK AND MARTIAL ARTS**

3

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

CO3

**UNIT 4 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.

CO4

**UNIT 5 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.

CO5

TOTAL 15

**TEXT-CUM-REFERENCE BOOKS**

1. தமிழக வரலாறு மக்களும் பண்பாடும் – டாக்டர் கே.கே. பிள்ளை. (வெளியீடு தமிழ்நாடுபாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித்தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. தபொருறை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
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print)

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8. The Contributions of the Tamils to Indian Culture (Dr. M. Valarmathi) (Published by: International Institute of Tamil Studies)
9. Keeladi - 'Sangam City Civilization 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.

## **COURSE OUTCOMES**

**Upon completion of the course, students will be able to**

- CO1 Students will learn about the special features of ancient Tamil literature and the history of Indian language families.
- CO2 Realizing the splendor of paintings and musical instruments from the Hero Stone to modern times.
- CO3 Learn about the history of folk arts and martial arts.
- CO4 Realizing the importance of the ancient Tamils & thinai concept, philosophy of religion, educational knowledge, literacy, etc..
- CO5 To make students aware of the role of Tamils in the Indian freedom struggle and the ideas of the self-respect movement..

**BS25C01**

**PHYSICS AND CHEMISTRY LABORATORY**

( Common to All branches & M.Tech (CSE))

L	T	P	C
0	0	3	1.5

**Objectives**

The students will be trained to perform experiments to study the following.

- The Properties of Matter
- Optical properties like Interference and Diffraction.
- Characteristics of Lasers & Optical Fibre
- Electrical & Thermal properties of Materials
- Enable the students to enhance accuracy in experimental measurements.
- To make the student acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.

**Course Outcomes (CO)**

- CO1 Able to understand the concept about the basic properties of matter like stress, strain and types of moduli  
Able to understand the concept of determining the pH value by using pH meter.
- CO2 Able to understand the concept of optics like reflection, refraction, diffraction by using spectrometer grating.  
Able to understand the concept about the measure the conductance of strong acid and strong base and mixture of acids by using conductivity meter.
- CO3 Able to understand the thermal properties of solids, specific heat and some models for specific heat calculation.  
Able to understand the concept about the amount of chloride present in the given sample of water.
- CO4 Able to understand the concept of microscope and its applications in determining the moduli.  
Able to understand the concept of determining the elf values by using potentiometer
- CO5 Able to understand the importance of various growth methods of crystal and its study.  
Able to understand Able to understand the amount of dissolved oxygen present in the water.

**LIST OF EXPERIMENTS - PHYSICS**

(A minimum of 5 experiments to be performed from the given list)

1. Determination of Young's modulus of the material of the given beam by non-uniform bending method.
2. Ultrasonic Interferometer - Velocity of ultrasonic waves in a liquid and compressibility of the liquid
3. Determination of wavelength of mercury spectra using Spectrometer and grating.
4. Determination of Numerical aperture, acceptance angle of an optical fibre and groove width of a CD using laser.
5. Determination of wavelength and particle size using a laser.
6. Determination of Young's modulus of the material of the given beam by uniform bending method.
7. Determination of energy band gap of the semiconductor.
8. Determination of Lattice Cell Parameter Using X-Ray Diffraction data.

## LIST OF EXPERIMENTS - CHEMISTRY

(Any Six experiments to be conducted)

1. Estimation of HCl using  $\text{Na}_2\text{CO}_3$  as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by Iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.
10. Conductometric titration of strong acid Vs strong base.

### DEMONSTRATION EXPERIMENTS

1. Estimation of iron content of the water sample using spectrophotometer (1, 10-Phenanthroline / thiocyanate method).
2. Estimation of sodium and potassium present in water using flame photometer.

**Total Periods: 30**

### LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

Sl. No.	Description of Equipment	Quantity required (R)
1.	Young's modulus by non-uniform bending method	6
2.	Torsion pendulum	6
3.	Wavelength mercury spectrum – spectrometer grating	6
4.	Wavelength, and particle size using Laser, angle in an optical fiber	6
5.	Young's modulus by uniform bending method	6
6.	Band gap of a semiconductor	6
7.	Ultrasonic interferometer	6
8.	Conductivity Meter	10
9.	Flame Photometer	2
10.	Potentiometer	10
11.	Spectrophotometer	2
12.	Viscometer	10
13.	Electronic Balance	1

**CS25C02**

**PROGRAMMING IN C LABORATORY**

**L T P C**

( Common to All branches & M.Tech (CSE))

0 0 3 1.5

**OBJECTIVES**

- To analyse problems and design solutions using algorithms, flowcharts, and pseudocode.
- To apply the concepts of looping and arrays.
- To apply the concepts of functions and pointers.
- To apply structures and union concepts.
- To implement the file operations.

**LIST OF EXPERIMENTS**

1. Write algorithm, draw flowchart and write pseudo code for a real life or scientific or technical problems **CO1**
2. Programs using decision making and branching statements
3. Programs using for, while, do-while loops and nested loops.
4. Programs using arrays and operations on arrays. **CO2**
5. Programs implementing searching and sorting using arrays
6. Programs implementing string operations on arrays
7. Programs using functions and recursion
8. Programs using pointers & strings with pointers **CO3**
9. Programs using Dynamic Memory Allocation
10. Programs using Structures & Unions **CO4**
11. Programs using pointers to structures and self-referential structures.
12. Programs to handle file operations **CO5**
13. Programs to handle file with structure

**TOTAL : 60 PERIODS**

**LAB REQUIREMENTS**

Processors: Intel Core i5, i7, or newer. Operating systems: Ubuntu or any Linux distribution, GCC (GNU Compiler Collection)

**REFERENCE BOOKS**

1. Reema Thareja, Programming in C, Oxford University Press, Third Edition, 2023.
2. Ashok N Kamthane, Programming in C, Pearson, Third Edition, 2020

**WEB REFERENCES**

1. <https://learn.microsoft.com/en-us/cpp/c-language/c-language-reference?view=msvc-170>
2. [https://medium.com/@kasra\\_mp/my-top-4-c-programming-references-f2dda61058](https://medium.com/@kasra_mp/my-top-4-c-programming-references-f2dda61058)

## **COURSE OUTCOMES**

**Upon completion of the course, students will be able to**

- CO1 Analyze problem-solving concepts and decision-making techniques
- CO2 Apply looping constructs and array manipulations
- CO3 Implement the concepts of functions and pointers
- CO4 Implement structure and union concepts.
- CO5 Implement file handling techniques.

**SD25C01**

**APTITUDE COURSE - I**  
(Common to all Branches and M.TECH(CSE))

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
0	0	2	0

**OBJECTIVES**

The course aims to:

- Build strong fundamentals in Quantitative Aptitude & Reasoning.
- Develop analytical and logical problem-solving skills.
- Strengthen competitive exam readiness through structured practice.
- Enhance speed and accuracy in solving aptitude-based problems.
- Apply mathematical and reasoning concepts to real-world and placement scenarios.

**UNIT I    Number System** **3**

- Introduction to Numbers, Types of Numbers, Number Line, Classification: Even/Odd, Prime/Composite, Co-primes.
- Divisibility Rules
- HCF & LCM (methods & word problems)
- Puzzle Practice Questions

**UNIT II    Commercial Mathematics** **3**

- Percentage Concepts, increase/decrease, successive change, comparison, real-life applications and Practice Questions

**UNIT III    Ratio, Proportion** **3**

- Ratio & Proportion (properties, variations)
- Puzzle Practice Questions

**UNIT IV    Averages, Ages & Applications** **3**

- Averages (weighted, replacement cases)
- Ages (equations, ratio-based problems)
- Practice Questions – Topic-wise and mixed tests 4

**UNIT V    Logical Reasoning** **3**

- Series & Sequences (number, alphabet)
- Odd man out (number, alphabet, alphanumeric, missing/wrong term)
- Coding–Decoding (letter, number, symbol, substitution, advanced)
- Direction Sense (Basics)
- Puzzle Practice Questions

**TOTAL PERIODS** **15**

## **COURSE OUTCOMES**

**Upon completion of the course, students will be able to**

- CO1** Understand fundamentals of quantitative aptitude & Number System
- CO2** Apply shortcuts & formulas to solve percentages and commercial math problems
- CO3** Analyze complex problems in ratios and proportion
- CO4** Analyze complex problems in averages, ages and application
- CO5** Create solutions to competitive exam-style and real-life logical reasoning problems

SD25C02

**SOFTWARE TRAINING COURSE - I**  
(Common to all Branches and M.TECH(CSE))

L	T	P	C
0	0	2	0

**TOPIC - 1 Introduction to C Programming**

**Subtopics / Concepts:**

- Structure of C Program
- Compilation & Execution
- Keywords, Identifiers, Data Types
- Input/Output (scanf, printf)
- Type Casting

**Advanced / Placement-Level Problems:**

1. Basic programing and format programs

**TOPIC - 2 Operators and Expressions**

**Subtopics / Concepts:**

- Arithmetic, Relational, Logical
- Bitwise Operators
- Conditional Operator
- Operator Precedence

**Advanced / Placement-Level Problems:**

1. Write a program to swap two numbers without using a third variable.
2. Compute sum of digits using only arithmetic operators.
3. Convert temperature between Celsius and Fahrenheit.

**TOPIC - 3 Control Structures**

**Subtopics / Concepts:**

- Decision Making: if, switch
- Loops: for, while, do-while
- Jump statements (break, continue, goto)

**Advanced / Placement-Level Problems:**

1. Find if a number is odd/even using bitwise operator.
2. Count set bits in an integer.
3. Perform XOR swapping without using extra variables.
4. Print all Armstrong numbers between two intervals.
5. Generate Fibonacci series up to N.
6. Find LCM and GCD of two numbers.

**TOPIC - 4 Functions and Recursion**

**Subtopics / Concepts:**

- Function Declaration & Definition
- Recursion
- Call by Value/Reference
- Storage Classes

**Advanced / Placement-Level Problems:**

1. Find factorial using recursion.
2. Generate nth Fibonacci using recursion.
3. Implement power function without using pow().

## **TOPIC - 5     Arrays and Strings**

### **Subtopics / Concepts:**

- 1D, 2D Arrays
- Searching (Linear/Binary)
- Sorting (Bubble, Insertion, Selection)
- String Functions (strlen, strcmp, strcat)
- Character Arrays

### **Advanced / Placement-Level Problems:**

1. Find second largest element in array.
2. Remove duplicates from array.
3. Reverse a string without using built-in functions.
4. Check if two strings are anagrams.
5. Sort array using Bubble/Quick Sort.

## **TOPIC - 6     Pointers**

### **Subtopics / Concepts:**

- Pointer Basics
- Pointer Arithmetic
- Pointers and Arrays
- Pointers to Functions
- Dynamic Memory (malloc, calloc, realloc, free)

### **Advanced / Placement-Level Problems:**

1. Reverse array using pointers.
2. Find length of string using pointer.
3. Allocate dynamic memory for matrix and find its transpose.
4. Implement function pointer for arithmetic operations.

## **TOPIC - 7     Structures and Unions**

### **Subtopics / Concepts:**

- Structure Declaration
- Nested Structures
- Array of Structures
- Pointer to Structure
- Union vs Structure

### **Advanced / Placement-Level Problems:**

1. Store and display N employee records.
2. Find highest marks student using array of structures.
3. Simulate library system using structures.
4. Demonstrate memory sharing in union.
5. "Store and display N employee records.
6. Find highest marks student using array of structures.
7. Simulate library system using structures.
8. Demonstrate memory sharing in union."

### **File Handling**

## **TOPIC - 8**

### **Subtopics / Concepts:**

- fopen, fclose
- Reading/Writing (fprintf, fscanf, fgetc, fputc)
- Random Access (fseek, ftell)
- Error Handling

### **Advanced / Placement-Level Problems:**

1. Copy contents from one file to another.
2. Count lines, words, and characters in a file.
3. Append student records to a file.
4. Merge two text files into one.

## **TOPIC - 9 Preprocessor and Dynamic Memory**

### **Subtopics / Concepts:**

- #define, #include
- Macros, Conditional Compilation
- Memory Allocation
- Header Files

### **Advanced / Placement-Level Problems:**

1. Create a macro to find max of three numbers.
2. Implement dynamic array using malloc.
3. Demonstrate memory leak detection.

## **TOPIC - 10 Advanced Concepts**

### **Subtopics / Concepts:**

- Command Line Arguments
- Enumerations
- Typedef
- Bit Fields
- Volatile and Const Qualifiers

### **Advanced / Placement-Level Problems:**

1. Sum of numbers using command line arguments.
2. Demonstrate enum for menu-driven program.
3. Bit-field representation for memory optimization.

## **TOPIC - 11 Problem Solving & Logical Thinking**

### **Subtopics / Concepts:**

- Mathematical Problems
- Pattern Printing
- Matrix Operations
- Searching and Sorting Practice

### **Advanced / Placement-Level Problems:**

1. Print spiral matrix pattern.
2. Find saddle point in a matrix.
3. Generate Pascal's Triangle.
4. Sort words in a sentence alphabetically.

### **Mini Projects & Coding Challenges**

## **TOPIC - 12**

### **Subtopics / Concepts:**

- Student Record Management
- Library System
- Banking System
- Quiz Game
- File-based Projects

### **Advanced / Placement-Level Problems:**

Library Management System.

Banking System with File I/O.

Student Record Management using Structure & File.

Word Count Tool like Linux wc.

EN25C08

**PROFESSIONAL ENGLISH II**  
**(Lab Integrated)**

**L T P C**

(Common to All Branches & M.Tech (CSE))

**2 0 2 3**

**OBJECTIVES**

- To engage learners in meaningful language activities to improve their reading and writing skills
- To learn various reading strategies and apply in comprehending documents in professional context.
- To help learners understand the purpose, audience, contexts of different types of writing
- To develop analytical thinking skills for problem solving in communicative contexts
- To demonstrate an understanding of job applications and interviews for internship and placements

**UNIT - I MAKING COMPARISONS**

**9+3**

**Listening** - Listening for descriptions of people; listening for opinions, Listening to the good and bad parts of a job; listening for complaints, Listening to people making, accepting, and declining requests, Listening to news stories; listening to messages and a podcast

**Speaking** - Describing personalities; expressing likes and dislikes; agreeing and disagreeing; complaining, Talking about possible careers; describing jobs; deciding between two jobs, Making direct and indirect requests; accepting and declining requests, Narrating a story; describing events and experiences in the past

**Writing / Reading** - Writing a description of a good friend, Reading about unusual social networking sites, Writing about two career choices, Reading about different types of workplaces, Writing a message with requests, Reading about talking to friends about difficult, Writing a personal account, Reading about the reliability of online content topics

**CO1**

**Grammar** - Relative pronouns as subjects and objects; it clauses + adverbial clauses with when, Gerund phrases as subjects and objects; comparisons with adjectives, nouns, verbs, and past participles, Requests with modals, if clauses, and gerunds; indirect requests, Past continuous vs. simple past; past perfect

**UNIT - II EXPRESSING CAUSAL RELATIONS IN SPEAKING AND WRITING**

**9+3**

**Listening** - Listening for information about living abroad; listening to opinions about customs, Listening to complaints; listening to people exchange things in a store; listening to a conversation about a “throwaway culture”, Listening to environmental problems; listening for solutions, Listening to a conversation with a guidance counsellor; listening for additional information

**Speaking** - Talking about moving abroad; expressing emotions; describing cultural expectations; giving advice, Describing problems; making complaints; explaining something that needs to be done, Identifying and describing problems; coming up with solutions, Asking about preferences; discussing different skills to be learned; talking about learning methods; talking about life skills

**Writing/ Reading** - Writing a pamphlet for tourists, Reading about moving to another country, Writing a critical online review, Reading about a problem with a ride-sharing service, Writing a post on a community website, Reading about a creative solution to lionfish on St. Lucia, Writing about a skill, Reading about different studying styles

**Grammar** - Noun phrases containing relative clauses; expectations: *the custom to*, *(not) supposed to*, *expected to*, *(not) acceptable to*, Describing problems with past participles as adjectives and with nouns; describing problems with *need* + gerund, *need* + passive infinitive, and *keep* + gerund, Passive in the present continuous and present perfect; prepositions of cause; infinitive clauses and phrases, *Would rather* and *would prefer*; *by* + gerund to describe how to do things

CO2

### UNIT - III PROBLEM SOLVING

9+3

**Listening** - Listening to New Year's resolutions, Listening for dates and time periods; listening to predictions, Listening to descriptions of important events; listening to regrets and explanations, Listening for features and slogans

**Speaking** - Talking about things you need to have done; asking for and giving advice or suggestions, Talking about historic events; talking about things to be accomplished in the future, Describing milestones; describing turning points; describing regrets and hypothetical situations, Describing qualities for success; giving reasons for success; interviewing for a job; talking about ads and slogans

**Writing / Reading** - Writing a message of advice, Reading about young scientist Jack Andraka, Writing a biography, Reading about futurists and their predictions for the year 2050, Writing a message of apology, Reading about a conflict with a friend and advice on how to fix it, Writing a TV or web commercial, Reading about what makes some advertisements memorable,

CO3

**Grammar** - Get or have something done; making suggestions with modals + verbs, gerunds, negative questions, and infinitives, Referring to time in the past with adverbs and prepositions: *during*, *in*, *ago*, *from...to*, *for*, *since*; predicting the future with *will*, future continuous, and future perfect, Time clauses: *before*, *after*, *once*, *the moment*, *as soon as*, *until*, *by the time*; expressing regret with *should (not) have* + past participle; describing hypothetical situations with *if* clauses + past perfect and *would/could have* + past participle, Describing purpose with infinitive clauses and infinitive clauses with *for*; giving reasons with *because*, *since*, *because of*, *for*, *due to*, and *the reason*.

### UNIT - IV THE ABILITY TO PUT IDEAS OR INFORMATION COGENTLY

9+3

**Listening** - Listening to explanations; listening for the best solution, Listening for parts of a movie, Listening for solutions to everyday annoyances; listening to issues and Opinions, Listening to past obstacles and how they were overcome; listening for people's goals for the future

**Speaking** - Drawing conclusions; offering explanations; describing hypothetical events; giving advice for complicated situations, Describing how something is done or made; describing careers in film, TV, publishing, gaming, and music, Giving opinions for and against controversial topics; offering a different opinion; agreeing and disagreeing, Giving opinions about inspirational sayings; talking about the past and the future

**Writing / Reading** - Writing about a complicated situation, Reading about unexplained events, Writing about a process, Reading about what the job of film extra is like, Writing a persuasive essay, Reading about plagiarism in the digital age, Writing a personal statement for an application, Reading about the athlete Michael Edwards **CO4**

**Grammar** - Past modals for degrees of certainty: *must (not) have, may (not) have, might (not) have, could (not) have*; past modals for judgments and suggestions: *should (not) have, could (not) have, would (not) have*, The passive to describe process with *is/are + past participle* and modal + *be + past participle*; defining and non-defining relative clauses, Giving recommendations and opinions with passive modals: *should be, ought to be, must be, has to be, has got to be*; tag questions for opinions, Accomplishments with the simple past and present perfect; goals with the future perfect and *would like to have + past participle*

**UNIT - V EXTENDED SKILL PRACTICE 9+3**

Listening practice through worksheets (with audio – in class)

Grammar practice through worksheets\*

Vocabulary practice through worksheets\*

Writing practice through worksheets\* **CO5**

Speaking Skill Practice (in class) - 10-minute conversation practice sessions (with guidance from Placement Test)

**LAB COMPONENT**

Getting started - Talk about the workplace

Listening - Radio show: likeability; A problem; Conversation: life changes

Speaking - Work and training experiences; Interviewing classmates about technology use; Making and responding to suggestions; Sounding sympathetic or pleased; Talking about life changes

Reading - Article: Not the best interview I've ever had! Work and training experiences; Article:

What's your favourite app? Reading an email about a new job Writing - An informal email; Adding new information

Grammar - Present perfect and past simple; Present perfect and present perfect continuous

Vocabulary – Work, technology

Pronunciation - Present perfect and past simple; Sentence stress: main verb / auxiliary verb; Sentence stress

Everyday English - Making and responding to suggestions.

Getting started: Talking about people

Listening - Radio show: successful people; Two monologues: personality types; Asking for help;

Three monologues: websites

Speaking - Becoming successful at something; Describing a person; Question tags; Offering and asking for help; Things people use the Internet for

Getting started: Talk about different cultures

Listening - Three monologues: culture shock; Radio show: vending machines in Japan; A special gift; Three monologues: special occasions

Speaking - Describing different cultures; Describing a special meal; Asking for and giving recommendations; Expressing surprise; Place to go out

Reading - Article: Culture shock? There's an app to deal with that; Blog: Hungry adventures; Reviews of a café

Writing - Two reviews; Positive and negative language; Adverbs  
 Grammar - Modals of obligation; Comparatives and superlatives  
 Vocabulary - Compound nouns; Describing food  
 Pronunciation - Word stress: compound nouns; Sound and spelling; Sounding interested  
 Everyday English - Asking for and giving recommendations.  
 Reading - Article: When will I be famous?; Article: Why the world needs introverts; Three online adverts  
 Writing - An informal online advert; The language of adverts  
 Grammar - Modals and phrases of ability; Articles  
 Vocabulary - Ability; Personality adjectives  
 Pronunciation - Stress with modal verbs, intonation in question tags  
 Everyday English - Offering and asking for help  
 Getting started: Talk about an interesting news story  
 Listening - Podcast: Pod-on-pod; Interview: fake reviews; A job interview; Monologue: a news story  
 Speaking - Giving opinions about podcasts; Describing experiences using reporting verbs; Generalising; Being vague; Air travel  
 Reading - Article: Thinking of making a podcast? Just give it a try!, Article: The restaurant that wasn't there, A news story  
 Writing - An email about a news story; Summarising information  
 Grammar - Reported speech; Verb patterns  
 Vocabulary - Sharing information; Reporting verbs  
 Pronunciation - Sound and spelling  
 Everyday English - Generalising and being vague  
 Getting started: Talk about different kinds of opportunities  
 Listening - Conversation: trying new activities; Making a marriage proposal; Monologue: volunteering  
 Speaking - Taking new opportunities; A past event that made life better; Talking about possible problems and reassuring someone; Changing the subject; Volunteering  
 Reading - Article: Searching for serendipity; A web page about volunteering; Emails giving advice  
 Writing - An email with advice; Advising a course of action  
 Grammar - Second conditional; Third conditional  
 Vocabulary - Sport; Adjectives and prepositions; Expressions with do, make and take  
 Pronunciation - Sentence stress: would, would and have; Sounding sure and unsure  
 Everyday English - Talking about possible problems and reassuring someone

**TOTAL PERIODS**

**60**

**Text Books:**

1. Interchange Level 3 - 5th edition published by Cambridge University Press & Assessment
2. English for Science & Technology Cambridge University Press 2021. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Jovani, Department of English, Anna University.

**Reference Books:**

1. Raman. Meenakshi, Sharma. Sangeeta (2019). Professional English. Oxford university press. New Delhi.
2. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, New Delhi.
3. Learning to Communicate – Dr. V. Chellammal. Allied Publishers, New Delhi, 2003
4. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.
5. Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd. 1990, Delhi.

### **COURSE OUTCOMES**

**Upon completion of the course, the students will be able to**

- CO1** To compare and contrast products and ideas in technical texts.
- CO2** To identify and report cause and effects in events, industrial processes through technical texts
- CO3** To analyse problems in order to arrive at feasible solutions and communicate them in the written format.
- CO4** To present their ideas and opinions in a planned and logical manner
- CO5** To draft effective resumes in the context of job search.

<b>MA25C03</b>	<b>LINEAR ALGEBRA AND COMPLEX VARIABLES</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	(Common to EEE, ECE, MECH and MECHTR)	3	1	0	4

### OBJECTIVES

- To find the basis and dimension of vector space
- To obtain the matrix of linear transformation
- To cover topics such as Vector Calculus, Complex Analysis and Laplace Transform.

### UNIT I VECTOR SPACES 9+3

Vector spaces, Subspaces, Linear combinations, Linear independence and linear dependence, Bases and dimensions. CO1

### UNIT II LINEAR TRANSFORMATION 9+3

Linear transformation - Rank space and null space - Rank and nullity - Dimension theorem - Matrix representation of linear transformation – Inner product and norms - Gram Schmidt orthonormalization process CO2

### UNIT III VECTOR CALCULUS 9+3

Gradient and directional derivative – Divergence and curl - Vector identities – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral - Volume integral - Green's, Gauss divergence and Stoke's theorems – Verification and simple application in evaluating line, surface and volume integrals CO3

### UNIT IV CALCULUS OF COMPLEX VARIABLES 9+3

Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian (C-R equations) – Properties (Statements without proof) – Harmonic conjugates – Construction of analytic function (Milne-Thomson method) – Conformal mapping (Definition)- Bilinear transformation - Singularities – Residues – Cauchy's Residue theorem – Application of residue theorem for evaluation of real integrals – Use of circular contour. CO4

### UNIT V LAPLACE TRANSFORMS 9+3

Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function - Basic properties - Shifting theorems – transforms of derivatives and integrals – Transform of periodic functions - Inverse transforms using properties, partial fractions and Convolution theorem – Application to solution of linear second order ordinary differential equations with constant coefficients. CO5

**TOTAL :** **60 PERIODS**

### TEXT BOOKS

1. Friedberg S.H, Insel A.J. and Spence L, Linear Algebra, Fifth edition, Pearson, 2018
2. Burden R. and Faires J.D. Numerical Analysis, tenth edition, Brooks/Cole, 2015.
3. Strang G, Linear algebra for everyone, Wellesley Cambridge press, 2020.
4. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 45th Edition, 2024.

### REFERENCE BOOKS

1. Seymour Lipschutz and Marc Lipson, Linear Algebra, Sixth edition, McGraw Hill Education India private limited, New Delhi, 2017.
2. Iyengar S.R.K. and Jain R.K., Numerical Methods, Third edition, New age international publications, 2012.
3. Kumaresan S, Linear Algebra - A geometric approach, Prentice Hall of India, New Delhi, Reprint, 2010.
4. Sundara Pandian V, Numerical Linear Algebra, Prentice Hall of India, New Delhi, 2008.
5. Bernard Kolman and David R. Hill, Introductory Linear Algebra, Pearson Educations, New Delhi, First Reprint, 2009.

### **COURSE OUTCOMES**

Upon completion of the course, students will be able to

- CO1 Find the basis and dimension of vector space
- CO2 Obtain the matrix of linear transformation and its eigenvalues and eigenvectors
- CO3 Acquaint the concepts of vector calculus like Gradient, Divergence, Curl, Directional derivative, and Vector integration.
- CO4 Apply the concept of calculus of complex variables and apply residue theorem to evaluate complex integrals.
- CO5 Understand the purpose of using transforms to create new domain in which can give easier ways to handle the problem that is being investigated.

PH25C03	<b>SEMICONDUCTOR DEVICES FOR MODERN ELECTRONICS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	(Common to ECE and EEE)	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **OBJECTIVES**

- To make the student acquainted with the electrical property of conducting and semiconducting materials.
- To gain knowledge on the basics of semiconductor diodes, VI characteristics and various types of diodes their properties, and applications.
- Equipping the students to study and analyse the performance of BJT, and FETs based on their operations.
- Able to understand the classification of Optical materials and their properties.
- Evaluate Nano materials, their applications, and to learn the basics of Quantum computing in Artificial intelligence.

<p><b>UNIT I      CONDUCTORS AND SEMICONDUCTORS</b></p> <p>Introduction – Electron theory of solids – success and failures of Quantum free electron theory– Fermi distribution function – Density of energy states – Band theory(Qualitative) – effective mass of electrons, concept of hole- Bloch theorem - Classification of solids based on band gap - Types of semiconductors - Carrier concentration in Intrinsic semiconductors - Law of mass action - Carrier concentration in Extrinsic (N type and P type) semiconductors - Hall effect - determination of Hall co-efficient, Applications of Hall effect based on Artificial Intelligence.</p>	<p><b>9</b></p> <p><b>CO1</b></p>
<p><b>UNIT II      SEMICONDUCTOR DIODES</b></p> <p>PN junction diode - VI characteristics- Drift and Diffusion transport - forward and reverse bias characteristics, Transition and Diffusion Capacitances, Switching Characteristics - Zener and Avalanche breakdown – Zener diode as a Voltage regulator - Ohmic contact – Schottky diode, Tunnel diode - Varactor diode – Silicon Controlled Resistor – DIAC – TRIAC.</p>	<p><b>9</b></p> <p><b>CO2</b></p>
<p><b>UNIT III      BIPOLAR JUNCTION AND FIELD EFFECT TRANSISTOR</b></p> <p>NPN – PNP – Operations – Input and Output characteristics of Common Emitter, Common Base, Common Collector – Unipolar Junction Transistor - JFET – Drain and Transfer characteristics – MOSFET characteristics – D-MOSFET, E-MOSFET Characteristics – Comparison of MOSFET with JFET.</p>	<p><b>9</b></p> <p><b>CO3</b></p>
<p><b>UNIT IV      OPTICAL MATERIALS</b></p> <p>Classification of optical materials – Carrier generation and recombination processes – Absorption, emission and scattering of light in metals, insulators and semiconductors (concepts only) - Solar cell – Light Dependent Resistor – Liquid Crystal Display- Light Emitting Diode – Organic Light Emitting Diode – Opto Coupler - Phototransistor – Excitons – Quantum Stark effect - Quantum dot laser.</p>	<p><b>9</b></p> <p><b>CO4</b></p>
<p><b>UNIT V      NANO DEVICES AND QUANTUM COMPUTING</b></p> <p>Quantum confinement - Quantum Structures - Density of states in quantum well, quantum wire and quantum dot - Carbon nanotubes – Preparation - Properties and applications - Single electron tunnelling - Coulomb Blockade - Single Electron Transistors (SET) – Magnetic semiconductors</p>	<p><b>9</b></p> <p><b>CO5</b></p>

– Dilute Magnetic Semiconductors - Spintronics - Quantum bits (Qubits) - Characteristics and working of quantum computers – the role of Quantum computing in Artificial intelligence.

TOTAL PERIODS

45

**TEXTBOOKS:**

1. Subramanyam, M. V, Bhupesh Bhatia., Basic Digital Electronics, Laxmi Publications, 2017.
2. Kasap, S.O., Principles of Electronic Materials and Devices, McGraw-Hill Education, 2017.
3. John Wilson, Hawkes, J.F.B, Optoelectronics, Pearson Edition, 2018.
4. Parag K. Lala, Quantum Computing: A Beginner's Introduction, McGraw-Hill Education (Indian Edition), 2020

**REFERENCES:**

1. Askeland, D., Materials Science and Engineering, Brooks/Cole, 2010.
2. Raghavan, V., Materials Science and Engineering: A First Course, PHI Learning, 2015.
3. Kumar, D., and Gupta, P., AI and Machine Learning in Materials Science, Springer, 2020.
4. Wahab, M.A., Solid State Physics: Structure and Properties of Materials, Narosa Publishing House, 2009.

**COURSE OUTCOMES:**

**On completion of this course work, students will be able to:**

- CO1 Understand the electrical properties of conducting and semiconducting materials.
- CO2 Gain knowledge on the basics of semiconductor diodes, VI characteristics and various types of diodes and their properties, and applications.
- CO3 To study and analysis, the performance of BJT, and FETs on the basis of their operation and working.
- CO4 Able to understand the classification of Optical materials and their properties.
- CO5 Evaluate Nano materials, and their applications, and to learn the basics of Quantum computing in advancing Artificial intelligence.

**AL25201**

**FOUNDATIONS OF PYTHON**

**L T P C**

( Common to EEE, Mechatronics. ADS, AML, Biotech and Chemical) 3 0 0 3

**OBJECTIVES**

- Write simple Python programs using basic syntax, data types, operators, and input/output operations.
- Use decision statements, loops, and functions to solve problems and organize code.
- Work with Python data structures like lists, tuples, dictionaries, and sets to store and manipulate data.
- Manipulate strings and perform file operations like reading, writing, and managing files.
- Use object-oriented programming principles like classes, inheritance, and operator overloading in Python.

**UNIT - I BASICS OF PYTHON PROGRAMMING**

**9**

Features of Python – History of Python – Future of Python – Literal Constants -Variables and Identifiers – Data Types – Input Operation – Comments – Reserved Words – Indentation – Operators and Expressions – Expressions in Python – Operations on Strings – Other data types – Type Conversion

**CO1**

**UNIT - II DECISION CONTROL STATEMENTS, FUNCTIONS**

**9**

DECISION CONTROL STATEMENTS: Introduction – Conditional branching statement-If-Statement – If-else statement – Nested If statement – If-elif-else statement – Basic Loop structures – While Loop - For Loop – Selecting an appropriate loop – Nested Loops - Break statement – Continuous statement –Pass statement – Else statement used with loops. FUNCTIONS – Need for function – Definition – Function Call - Variable Scope and Life time – Return statement – More on defining functions – Lambda functions – Recursive functions

**CO2**

**UNIT - III LISTS, TUPLES, DICTIONARIES AND SETS**

**9**

List – Access values in List – Updating Values – Nested List – Cloning – Basic List operations – List methods – Using List as Stack – List as Queue – Looping in List. Tuple – Creating tuple – Accessing Values – Updating tuple – deleting elements in tuple – Basic Tuple operations – Tuple Assignment- Tuple returning multiple values – Nested Tuples – Tuple Methods. Dictionaries: Creating a Dictionary – Accessing Values – Adding and modifying an Item – deleting Items – Sorting Items in Dictionary – Looping over a Dictionary- Nested Dictionaries – Built-In Dictionary functions and methods – String formatting with Dictionaries. Sets- Creating a Set-Set operations.

**CO3**

**UNIT - IV STRINGS AND FILE HANDLING**

**9**

STRINGS: Concatenation, Appending and Multiplying Strings – Immutability – String formatting – Built-In String Methods and functions – Slice Operation – Comparing Strings – Iterating String - String Module – Regular Expressions. FILE HANDLING: File Path - Types of files – Opening and closing - Reading and Writing – File Positions – Renaming and Deleting Files.

**CO4**

**UNIT - V OBJECT ORIENTED PROGRAMMING IN PYTHON**

**9**

CLASSES AND OBJECTS: Defining classes – Creating Objects –Data Abstraction and Hiding – Class Method and self-Argument - The `__init__()` Method - Class and Object Variables – The `__del__()` Method – Other special methods – public and private data members. Private Methods – Calling a Class Method from another Class Method – Class Methods - Static Methods – INHERITANCE: Inheriting classes- Types of Inheritance. OPERATOR OVERLOADING: Introduction – Implementing operator overloading – Reverse Adding – Overriding `__getitem__()` and `__setitem__()` Methods – Overriding the in operator – Overriding the `__call__()` Method.

**CO5**

**Total Periods:**

**45**

**Text Books:**

1. Reema Thareja, “Python Programming using Problem Solving Approach”, Oxford University Press.

**Reference Books**

1. Guido van Rossum and Fred L. Drake Jr, An Introduction to Python Revised and updated for Python 3.2, Network Theory Ltd., 2011A.
2. Mastrodomenico, R, "The Python Book", United Kingdom: Wiley, 2022.

### **COURSE OUTCOMES**

**Upon completion of the course, the students will be able to**

- CO1** Demonstrate proficiency in using python's basic syntax, data types, operators, and input/output operations to write simple programs.
- CO2** Apply decision control statements and loops, and define functions to solve problems and improve code modularity.
- CO3** Utilize Python’s built-in data structures, including lists, tuples, dictionaries, and sets, to efficiently store, manipulate, and access data.
- CO4** Manipulate strings and perform file handling operations, including reading, writing, and managing file data in Python.
- CO5** Apply object-oriented programming principles such as classes, objects, inheritance, and operator overloading to design and implement Python programs.

EE25201

**ELECTRIC CIRCUIT ANALYSIS**

**L T P C**

( EEE )

3 0 0 3

**OBJECTIVES**

- To determine the response of electric circuits using basic analysis methods.
- To impart knowledge on solving circuit equations using network theorems.
- To analyse the transient behaviour of electric circuits with different types of source.
- To understand the concepts of resonance and coupled circuits.
- To analyze the three phase AC circuits and two port networks.

**UNIT - I ANALYSIS OF ELECTRIC CIRCUITS 9**

Electrical circuit elements – Ohm’s Law – Kirchhoff’s laws – Resistors in series and parallel– Voltage and Current division method -Source transformation -Star Delta conversion ;AC circuits - Average and RMS Values – Impedance and Admittance – Power, Power Factor – Phasor diagram; Mesh current and Nodal voltage - methods of analysis. **CO1**

**UNIT - II ANALYSIS OF ELECTRIC CIRCUITS USING NETWORK THEOREMS 9**

Network reduction for AC and DC circuits using circuit theorems: Thevenin’s and Norton’s Theorems – Superposition Theorem – Maximum power transfer theorem – Reciprocity Theorem , Compensation theorem - Mill man’s theorem. **CO2**

**UNIT - III TRANSIENT RESPONSE OF DC AND AC CIRCUITS 9**

Transient response of RL, RC and RLC Circuits using Laplace transform for DC and AC sinusoidal inputs. **CO3**

**UNIT - IV RESONANCE AND COUPLED CIRCUITS 9**

Series and parallel resonance frequency response– Bandwidth - Q factor – Selectivity; Mutual coupled circuits: Self and mutual inductance – Coefficient of coupling – Dot Convention in coupled circuits; Ideal Transformer; Tuned circuits – single tuned circuits. **CO4**

**UNIT - V THREE PHASE CIRCUITS AND TWO PORT NETWORKS 9**

Three Phase Circuits: Analysis of three phase 3-wire and 4-wire star circuits - delta circuits, balanced and unbalanced three phase loads - phasor diagram of voltages and currents – power and power factor measurements in three phase circuits. Two Port Networks: terminal pairs, two port variables, impedance (Z) parameters, admittance (Y) parameters, transmission parameters (ABCD) and hybrid parameters (H). **CO5**

**Total Periods: 45**

**Text Books:**

1. M Nahvi I J A Edminster “Electric Circuits”; Schaum's outline series , Tata Mcgraw Hill companies, 4th Edition, 2019.

2. Charles K. Alexander, Mathew N.O. Sadiku, “Fundamentals of Electric Circuits”, Fifth Edition, McGraw Hill, 2020.
3. Sudhakar. A, Shyammoan. S.P “Circuits and Networks-Analysis and Synthesis”. Tata McGraw Hill publishers, 2018.

**Reference Books:**

1. K. V. V. Murthy and M. S. Kamath, “Basic Circuit Analysis”, Jaico Publishers, 2017.
2. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, “Engineering Circuits Analysis”, Tata McGraw Hill publishers, New Delhi, 2019.
3. M. E. Van Valkenburg, “Network Analysis”, Prentice Hall, 2020.
4. D. Roy Choudhury, “Networks and Systems”, New Age International Publications, 2018.
5. David A Bell ,” Electric circuits “, Oxford University Press, 2019.

**COURSE OUTCOMES**

**Upon completion of the course, the students will be able to**

- CO1** Able to construct and analyze electrical circuits.
- CO2** Able to solve circuit equations using network theorem.
- CO3** Able to compute solutions to first and second order networks.
- CO4** Able to analyze resonance and coupled circuits.
- CO5** Able to analyze three phase circuits and two port network.

<b>GE25C02</b>	<b>தமிழரும் தொழில்நுட்பமும்</b> (Common to All Branches & M.Tech (CSE) )	L	T	P	C
		1	0	0	1
<b>அலகு 1</b>	<b>நெசவு மற்றும் பானைத் தொழில்நுட்பம்</b>				<b>3</b>
	சங்க காலத்தில் நெசவுத் தொழில்- பானைத் தொழில்நுட்பம்- கருப்பு சிவப்பு பாண்டங்கள்- பாண்டங்களில் கீறல் குறியீடுகள்.				<b>CO1</b>
<b>அலகு 2</b>	<b>வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்</b>				<b>3</b>

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

**அலகு 3 உற்பத்தித் தொழில்நுட்பம்** 3

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை-இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள்- எலும்புத்துண்டுகள் - தொல்லியல் சான்றுகள் -சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

**அலகு 4 வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்** 3

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

**அலகு 5 அறிவியல் தமிழ் மற்றும் கணித்தமிழ்** 3

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

TOTAL 15

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு மக்களும் பண்பாடும் – டாக்டர் கே.கே. பிள்ளை. (வெளியீடு தமிழ்நாடுபாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).

2. கணினித்தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. தபொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் 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 Civilization 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.

### COURSE OUTCOMES

Upon completion of the course, students will be able to

- CO1 பழந்தமிழகத்தில் நடைபெற்ற நெசவுத் தொழிலின் தொன்மை மற்றும் மட்பாண்டக்கலையின் சிறப்பு முதலியவற்றை அறிந்து கொள்ளுதல்.
- CO2 சங்ககால கட்டிட வடிவமைப்பு, சிற்பக்கலை, கோயில் கட்டிடக்கலை முதலியனவற்றின் சிறப்பை மாணவர்கள் உணர்தல்.
- CO3 பழந்தமிழகத்தில் நடைபெற்ற அறிவியல் பூர்வமான தொழில்வகைகளின் சிறப்பை தெரிந்து கொள்ளுதல்.
- CO4 பழந்தமிழகத்தில் நடைபெற்ற வேளாண்மை மற்றும் நீர்பாசனத் தொழில் நுட்பங்கள், கடல் சார் அறிவு முதலியவற்றை உணர்தல்.
- CO5 அறிவியல் தமிழ் வளர்ச்சி மற்றும் கணினியின் இணையப் பயன்பாடு ஆகியவற்றின் பயன்பாட்டை உணர்தல்.

<b>GE25C02</b>	<b>TAMILS AND TECHNOLOGY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(Common to All Branches &amp; M.Tech (CSE) )</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>

**UNIT 1 WEAVING AND CERAMIC TECHNOLOG** **3**

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries. **CO1**

**UNIT 2 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. **CO2**

**UNIT 3 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. **CO3**

**UNIT 4 AGRICULTURE AND IRRIGATION TECHNOLOGY** **3**

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoempu 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. **CO4**

**UNIT 5 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. **CO5**

**TOTAL** **15**

**TEXT-CUM-REFERENCE BOOKS**

1. தமிழக வரலாறு மக்களும் பண்பாடும் – டாக்டர் கே.கே. பிள்ளை. (வெளியீடு தமிழ்நாடுபாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித்தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. தபொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் 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 Civilization 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.

### **COURSE OUTCOMES**

**Upon completion of the course, students will be able to**

- CO1 பழந்தமிழகத்தில் நடைபெற்ற நெசவுத் தொழிலின் தொன்மை மற்றும் மட்பாண்டக்கலையின் சிறப்பு முதலியவற்றை அறிந்து கொள்ளுதல்.
- CO2 சங்ககால கட்டிட வடிவமைப்பு, சிற்பக்கலை, கோயில் கட்டிடக்கலை முதலியனவற்றின் சிறப்பை மாணவர்கள் உணர்தல்.
- CO3 பழந்தமிழகத்தில் நடைபெற்ற அறிவியல் பூர்வமான தொழில்வகைகளின் சிறப்பை தெரிந்து கொள்ளுதல்.
- CO4 பழந்தமிழகத்தில் நடைபெற்ற வேளாண்மை மற்றும் நீர்பாசனத் தொழில் நுட்பங்கள், கடல் சார் அறிவு முதலியவற்றை உணர்தல்.
- CO5 அறிவியல் தமிழ் வளர்ச்சி மற்றும் கணினியின் இணையப் பயன்பாடு ஆகியவற்றின் பயன்பாட்டை உணர்தல்.

**AL25211**

**PYTHON PROGRAMMING LABORATORY**

**L T P C**

(Common to EEE, Mechatronics, ADS, AML, Biotech and Chemical) 0 0 3 1.5

**OBJECTIVES**

- Develop the ability to use conditional statements to make decisions and looping technique to repeatedly execute a block of code
- Understand the importance of functions and how to use them to make the code modular and reusable.
- Learn how to work with lists, tuples, dictionary and set
- Develop an understanding of string manipulation techniques and the basics of file handling in Python
- Understand object-oriented programming concepts

**LIST OF EXPERIMENTS**

1. Programs using decision making
  - Check if a Number is Positive, Negative, or Zero
  - Check if a year is leap year or not
2. Programs using looping
  - Find the sum on natural numbers
  - Printing multiplication table for a given number
3. Program using decision making and looping
  - Factorial computation
  - Find prime numbers within a range
4. Programs using Functions in Python
  - Find area of a circle
  - Compute gcd, lcm of two numbers
  - Fibonacci sequence using recursion
5. Programs using List
  - Sum of All Elements in a List
  - Find the Maximum and Minimum Elements in a List
  - Remove Duplicates from a List
6. Programs using Tuple
  - Creating and accessing a tuple
  - Tuple unpacking
  - Concatenate tuple
7. Programs using Dictionary and Set
  - Creating and accessing dictionary
  - Adding, Updating and Removing Dictionary elements
  - Perform basic set operations

- Checking subset and superset
- 8. Programs using Strings
  - Count the number of Vowels in a String
  - Check if a String is a Palindrome
  - Check for Substring
- 9. Python Program to read, write, and append to a file.
- 10. Python Program to calculate Student's grade using Class & Object.
- 11. Python Program to demonstrate multiple inheritance.
- 12. Python Program to perform operator overloading.

**TOTAL PERIODS**

**60**

**Reference Books:**

1. Reema Thareja, “Python Programming using Problem Solving Approach”, Oxford University Press,
2. Guido van Rossum and Fred L. Drake Jr, An Introduction to Python Revised and updated for Python 3.2, Network Theory Ltd., 2011.
3. Mastrodomenico, R, & quot ; The Python Book & quot ;, United Kingdom: Wiley, 2022.

**COURSE OUTCOMES**

**Upon completion of the course, the students will be able to**

- CO1 apply decision-making and looping constructs in Python to solve basic computational and logical problems.
- CO2 develop programs using functions, recursion, and modular design to enhance code reusability and readability.
- CO3 implement and manipulate Python data structures like lists, tuples, dictionaries, and sets for effective data handling.
- CO4 utilize string and file handling techniques for text processing and data storage applications.
- CO5 demonstrate object-oriented programming concepts such as classes, inheritance, and operator overloading to design real-world problem solutions.

<b>EE25211</b>	<b>ELECTRIC CIRCUITS AND WIRING PRACTICES</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>LABORATORY</b> ( EEE )	0	0	3	1.5

**OBJECTIVES**

- To simulate and verify various electric circuits using MATLAB / Pspice / Multisim / Tinkercad
- To analyze transient and frequency response of RLC electric circuit using simulation software and experimental methods.
- To analyze the performance of the given three-phase circuit using simulation software (and experimental methods).
- To provide exposure to the electrical wiring and earth resistance measurement.

**LIST OF EXPERIMENTS**

1. Simulation and experimental verification of electrical circuit using Thevenin's and Norton's theorem.
2. Simulation and experimental verification of electrical circuit using Superposition theorem.
3. Simulation and experimental verification of electrical circuit using Maximum Power transfer theorem.
4. Simulation and experimental verification of RL and RC transients.
5. Simulation and Experimental validation of frequency response of RLC electric circuit.
6. Simulation and Experimental verification of three phase balanced and unbalanced star, delta networks circuit (Power and Power factor calculations).
7. Residential house wiring using switches, fuse, indicator, lamp and energy meter and measurement of energy using single phase energy meter
8. Fluorescent lamp wiring with introduction to CFL and LED types wiring.
9. Stair case wiring and Godown wiring - one – way, two – way and Intermediate control.
10. Measurement of Earth Resistance using Megger.

**Self-Learning for industry oriented skills**

1. Simulation and Verification of Reciprocity Theorem in Electrical Networks using Tinkercad.
2. Study of CRO and measurement of sinusoidal voltage, frequency and power factor.
3. Simulation study of Two Port Parameters and Characteristics for Simple Networks using Multisim.
4. Study of Ceiling Fan Regulator wiring and iron box wiring.

**Mini Project**

Design of simple residential wiring layout (with cost estimation and symbol representation).

**TOTAL PERIODS**

**60**

**LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS**

1. Assorted electrical components for house wiring -15 sets
2. Electrical measuring instruments -10 sets
3. Regulated Power Supply: 0 – 15 V D.C - 10 Nos
4. Function Generator (1 MHz) - 10 Nos.
5. Oscilloscope (20 MHz) - 10 Nos.
6. Digital Storage Oscilloscope (20 MHz) – 1 No.
7. PC with Circuit Simulation Software (min 10 Users) (MATLAB / Multisim / Pspice / Tinkercad and other Equivalent software Package) - 10 Nos.
8. Printer - 1 No.
9. AC/DC - Voltmeters (10 Nos.), Ammeters (10 Nos.) , Wattmeter ( 5 Nos.) and Multimeters (10 Nos.)
10. Decade Resistance Box, Decade Inductance Box, Decade Capacitance Box - 6 Nos each.
11. Bread Boards - 10 Nos.
12. Necessary Quantities of Resistors, Inductors, Capacitors of various capacities (Quarter Watt to 10 Watt).
13. Megger – 2 Nos.
14. Switches (one way, Two way), fuse, indicator, Fluorescent lamp, CFL, LED lamp – 10 Nos.
15. Energy meter – 2 Nos.
16. Ceiling Fan Regulator and iron box wiring setup – Each 1 set

## **COURSE OUTCOMES**

**Upon completion of the course, the students will be able to**

- CO1 Able to analyze, design and simulate the basic electric circuits using network theorems.
- CO2 Able to analyze, design and simulate the RL, RC transient circuits.
- CO3 Able to analyze, design and simulate the RLC frequency response.
- CO4 Able to analyze the three phase circuits with star and delta connected load.
- CO5 Able to carry out basic electrical wiring and measurement of earth resistance.

**SD25C06**

**APTITUDE COURSE - II**

**L T P C**

(Common to all Branches and M.TECH (CSE))

0 0 2 0

**OBJECTIVES**

The course aims to:

- Build strong fundamentals in commercial mathematics and problem-solving.
- Strengthen logical and critical reasoning abilities for competitive exams.
- Develop speed and accuracy in aptitude-based problem solving.
- Enable application of quantitative & reasoning skills to real-world scenarios.
- Prepare students for aptitude tests in **placements, SSC, Bank PO, and higher studies.**

**UNIT I Permutations & Combinations 3**

- Counting Principles (Addition, Multiplication)
- Permutations (with/without repetition, identical objects, word problems)
- Circular Permutations
- Combinations (properties, restrictions, real-life applications)
- Puzzle Practice Questions

**UNIT II Probability 3**

- Basics of Probability: definitions, sample space, types of events
- Addition Rule of Probability
- Multiplication Rule of Probability
- Independent & Dependent Events
- Puzzle Practice Questions

**UNIT III Time & Work 3**

- Work Efficiency Basics – Units of work, rate-time relationship, efficiency ratios
- Work Equations –  $\text{Work} = \text{Rate} \times \text{Time}$ , combined work, partial work problems
- Work Sharing – Two/more persons, alternate days, joining/leaving scenarios
- Pipes & Cisterns – Inlet/outlet pipes, leakage, alternate working problems
- Practice Questions – Topic-wise & mixed

**UNIT IV Time, Speed & Distance 3**

- Concepts – Speed-distance-time, unit conversions, relative speed, average speed
- Problems on Trains – Crossing objects, platforms, overtaking, relative speed train problems
- Problems on Boats & Streams – Upstream/downstream, average speed, advanced word problems
- Practice Questions – Topic-wise & mixed

**UNIT V Logical Reasoning – Advanced 3**

- **Syllogism** – Categorical statements, Venn diagrams, possibility-based, reverse syllogism
- **Data Sufficiency** – Yes/No vs value-based, arithmetic & logical reasoning applications
- **Venn Diagrams** – Set theory, classification problems, application in DI & reasoning

- **Arrangement-Based** – Linear, circular, square, advanced puzzles (blood relations + seating)
- **Statement & Arguments** – Strong vs weak arguments, assumptions, traps in reasoning
- **Statement & Conclusions** – Inference vs conclusion, syllogism-based vs context-based
- **Cause & Effect** – Identifying causes, sequential chains, correlation vs causation

**TOTAL PERIODS**

**15**

### **COURSE OUTCOME**

**Upon completion of the course, students will be able to**

- CO1 Apply fundamentals of arithmetic, percentages, profit/loss, interest, time–work–speed
- CO2 Analyze and solve advanced quantitative aptitude problems
- CO3 Employ logical reasoning (syllogism, arrangements, data sufficiency, Venn)
- CO4 Evaluate arguments, conclusions, and cause–effect relationships
- CO5 Develop efficient strategies for aptitude-based tests