DEPARTMENT OF

ELECTRICAL AND ELECTRONICS ENGINEERING

VISION OF THE DEPARTMENT

To excel in Education, Technology and Research in Electrical and Electronics Engineering leading to sustainable socioeconomic development of the nation.

MISSION OF THE DEPARTMENT

- Excellent teaching-learning environment imbibed with professional ethics and social responsibility in promoting quality education.

- Promoting research through industry collaborations and innovative projects.

B.TECH.

(ELECTRICAL AND ELECTRONICS ENGINEERING)

B.TECH. (EEE)

PROGRAM EDUCATIONAL OBJECTIVES

PEO-I: Excel in chosen career and/or higher education with technical competency in Electrical and Electronics Engineering and allied engineering disciplines

PEO-II: Demonstrate multidisciplinary skills and professional ethics in providing sustainable solutions for engineering issues through innovative product design and services to broader societal context

PEO-III: Work effectively as an individual, team member and/or entrepreneur with good managerial and Communication skills

PEO-IV: Engage in lifelong learning to maintain and enhance professional skills to align with changing societal needs

B.TECH. (EEE)

PROGRAM OUTCOMES

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

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

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

PO-4: **Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO-5: **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including

prediction and modeling to complex engineering activities with an understanding of the limitations.

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

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

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

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

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

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

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

B.TECH. (EEE)

PROGRAM SPECIFIC OUTCOMES

PSO-1: Specify Analyze and Design Electrical Systems in the context of Energy Generation, Transmission, Distribution, Operation, Control and Utility purpose with ICT.

PSO-2: Comprehensive knowledge in Electrical and Electronics Systems using state of art practices of hardware and software tools

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY HYDERABAD
B.TECH. I YEAR
ELECTRICAL AND ELECTRONICS ENGINEERING

I SEMESTER **R22**

Course Code	Title of the Course	L	T	P/D	CH	C
22BS1MT101	Matrices and Calculus	3	1	0	4	4
22ES1EE106	Circuit Theory	3	0	0	3	3
22BS1CH102	Chemistry For Engineers	3	0	0	3	3
22ES1CS101	Programming for Problem Solving	3	0	0	3	3
22ES1EI101	Introduction to Internet of Things	2	0	0	2	2
22ES3ME102	Engineering Drawing	0	0	4	4	2
22BS2CH101	Engineering Chemistry Laboratory	0	0	2	2	1
22ES2CS101	Programming for Problem Solving Laboratory	0	0	2	2	1
22SD5EE101	Elements of Electrical and Electronics Engineering	0	0	2	2	1
22MN6HS101	Induction Programme	2	0	0	2	0
Total		**16**	**1**	**10**	**27**	**20**

II SEMESTER **R22**

Course Code	Title of the Course	L	T	P/D	CH	C
22BS1MT102	Ordinary Differential Equations and Vector Calculus	2	1	0	3	3
22ES1EE107	Network Analysis	3	0	0	3	3
22ES1CS102	Data Structures	3	0	0	3	3
22BS1PH102	Applied Physics	3	0	0	3	3
22HS1EN101	English for Skill Enhancement	2	0	0	2	2
22ES2EE107	Network Analysis Laboratory	0	0	2	2	1
22BS2PH102	Applied Physics Laboratory	0	0	2	2	1
22HS2EN101	English Language and Communication Skills Laboratory	0	0	2	2	1
22ES2CS102	Data Structures Laboratory	0	0	2	2	1
22ES2ME101	Engineering Workshop	1	0	2	3	2
22MN6HS103	Happiness and Wellness	2	0	0	2	0
Total		**16**	**1**	**10**	**27**	**20**

L – Lecture T – Tutorial P – Practical D – Drawing CH – Contact Hours/Week
C – Credits SE – Sessional Examination CA – Class Assessment ELA – Experiential Learning Assessment
SEE – Semester End Examination D-D – Day to Day Evaluation LR – Lab Record
CP – Course Project PE – Practical Examination

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22BS1MT101) MATRICES AND CALCULUS

TEACHING SCHEME		
L	T/P	C
3	1	4

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE PRE-REQUISITES: Matrices, Differentiation, Integration

COURSE OBJECTIVES:

- To know the rank of the matrix and its application to consistency of system of linear equations
- To know Eigen values and Eigen vectors
- To know the nature of Quadratic forms
- To know maximum and minimum of a given function with several variables
- To evaluate multiple integrals and their applications

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Compute the rank of a matrix and analyze the solution of a system of linear equations

CO-2: Calculate Eigen values and Eigen vectors

CO-3: Reduce the quadratic form to its canonical form

CO-4: Solve problems involving Maxima and Minima

CO-5: Evaluate multiple integrals and its applications in areas and volumes

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	3	2	1	-	-	1	1	-	2	1	-	2	-	-
CO-2	3	2	2	1	-	1	1	-	2	1	-	2	-	-
CO-3	3	2	2	-	-	1	1	-	2	1	-	2	-	-
CO-4	3	2	1	1	-	1	1	-	2	1	-	2	-	-
CO-5	3	2	1	-	-	1	1	1	2	1	-	2	-	-

UNIT-I:

Matrices: Types of real matrices, symmetric, skew symmetric and orthogonal matrices; Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; Consistency of Homogeneous and Non-Homogeneous equations, LU Decomposition method.

UNIT-II:

Eigen Values and Eigen Vectors: Eigen values and eigenvectors and their properties, Diagonalization of matrices; Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem

UNIT-III:

Complex Matrices and Quadratic Forms: Types of complex matrices; Hermitian; Skew-Hermitian, Unitary Matrices and its properties; Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical form using Linear Transformation and Orthogonal Transformation.

UNIT-IV:

Functions of Several Variables: Definitions of Limits, Continuity. Partial differentiation: partial derivatives of first and second order, Euler's theorem, Total derivative, Jacobian, Functional dependence, Taylor's theorem of two variables (without proof). Maxima and Minima of two variables, Lagrange's method of undetermined Multipliers.

UNIT-V:

Multiple Integrals with Applications: Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form), Change of variables (Cartesian to polar). Evaluation of Triple integrals, Change of variables (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals. Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1. Higher Engineering Mathematics, B. V. Ramana, Tata McGraw Hill, New Delhi,11th Reprint, 2010
2. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Narosa Publications
3. Advanced Engineering Mathematics, Erwin Kreyszig, 9th Edition, John Wiley India Pvt. Ltd.

REFERENCES:

1. Linear Algebra and its Applications, Gilbert Strang, Cengage Publication
2. Matrices, A. R. Vasishtha and A. K. Vasishtha, Krishna's Educational Publishers
3. Engineering Mathematics, N. P. Bali, 4th Edition, Laxmi Publications (P) Ltd.
4. Calculus and Analytic Geometry, G. B. Thomas and R. L. Finney, 9th Edition, Pearson, 2002
5. Linear Algebra and its Applications, David C. Lay, Pearson Education India, 2003

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES1EE106) CIRCUIT THEORY

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To understand the basic concepts of circuit analysis
- To analyze single phase AC circuits and magnetic circuits
- To apply network theorems for circuit analysis
- To understand the graph theory for circuit analysis

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Apply basic concepts for analyzing electrical and magnetic circuits
CO-2: Analyze AC circuits and understand resonance phenomenon
CO-3: Apply network theorems for the analysis of electrical circuits
CO-4: Apply graph theory for topology solutions

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	3	3	3	3	3	3	3	1	2	1	1	2	3	2
CO-2	3	3	3	3	3	3	3	3	3	3	2	3	2	3
CO-3	3	2	2	2	3	3	3	2	1	3	3	2	2	2
CO-4	3	3	3	2	1	1	1	1	1	1	1	1	3	2

UNIT-I:

Introduction to Electrical Circuits: Circuit Concept – Types of Elements-R-L-C parameters – Voltage and Current sources – Independent and dependent sources Source transformation – Voltage – Current relationship for passive elements. Kirchhoff's laws – network reduction techniques – series, parallel, series parallel connections, Star/Delta transformation.

UNIT-II:

Mesh and Nodal Analysis: Mesh Analysis: Circuits with Independent and Dependent Voltage and current sources, Super Mesh Analysis- problems

Nodal analysis: Circuits with Independent and Dependent Voltage and current sources, Super Node Analysis – problems, Concept of duality and dual networks

UNIT-III:

Single Phase AC Circuits: R.M.S, Average values and form factor for different periodic wave forms, Concept of phasor, Phase and Phase difference, Rectangular and Polar form representation, Steady state analysis of R, L C (in series, parallel and series parallel combinations) with sinusoidal excitation, Concept of Reactance, Impedance,

Susceptance and Admittance, Complex power, Real and Reactive powers, Power factor, numerical problems.
Resonance: series and parallel circuits, concept of band width and Q factor.

UNIT-IV:
Network Theorems: Superposition, Reciprocity, Thevenin's, Norton's and Maximum Power Transfer theorems for D.C. and A.C. excitations
Network Topology: Definitions, Graph, Tree, Basic cut-set and Basic Tie-set matrices for planar networks.

UNIT-V:
Magnetic Circuits: Magnetic Circuits – Faraday's laws of electromagnetic induction – concept of self and mutual inductance – dot convention – coefficient of coupling – composite magnetic circuit - Analysis of series and parallel magnetic circuits.

TEXT BOOKS:

1. Engineering Circuit Analysis, William Hayt and Jack E. Kemmerly, 8th Edition McGraw Hill Company, 2013
2. Circuit Theory, A. Chakrabarti, 6th Edition, Dhanpat Rai and Co., 2018
3. Fundamentals of Electric Circuits, Charles K. Alexander, Mathew N. O. Sadiku, 3rd Edition, Tata McGraw Hill Company, 2019

REFERENCES:

1. Network Analysis, M. E. Van Valkenburg, 3rd Edition, PHI, 2019
2. Linear Circuit Analysis (Time Domain Phasor and Laplace Transform Approaches), Raymond A. Decarlo and Pen-min-lin, 2nd Edition, Oxford University Press, 2004
3. Network Theory, N. C. Jagan and C. Lakshminarayana, 1st Edition, B. S. Publications, 2012
4. Electrical Circuit Theory, K. Rajeswaran, Pearson Education, 2004
5. Circuits and Networks Analysis and Synthesis, A. Sudhakar, Shyammohan S Palli, 5th Edition, Tata McGraw Hill Company, 2017

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22BS1CH102) CHEMISTRY FOR ENGINEERS

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE PRE-REQUISITES: General Chemistry and Basic Mathematics

COURSE OBJECTIVES:

- To analyze the quality of water for sustainable living
- To acquire the knowledge about polymer science and its applications in various fields
- To outline the importance of non-conventional energy sources and portable electric devices
- To imbibe the conceptual knowledge of corrosion science
- To recognize the significance of engineering materials for multidisciplinary environs

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Assess the specification of water regarding its usage in domestic & Industrial scenarios
CO-2: Analyze the efficacy of polymers in diverse applications
CO-3: Recognize the transformations in energy sources & battery technology
CO-4: Predict the suitable corrosion control methods in safeguarding the structures
CO-5: Interpret the role of engineering materials in various sectors

COURSE ARTICULATION MATRIX:
*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	3	2	1	-	-	1	1	-	2	1	-	2	-	-
CO-2	3	2	2	1	-	1	1	-	2	1	-	2	-	-
CO-3	3	2	2	-	-	1	1	-	2	1	-	2	-	-
CO-4	3	2	1	1	-	1	1	-	2	1	-	2	-	-
CO-5	3	2	1	-	-	1	1	1	2	1	-	2	-	-

UNIT - I:

Water and its Treatment: Introduction- Hardness - causes, expression of hardness, units of hardness, types of hardness, Numerical problems (temporary & permanent hardness of water). Estimation of hardness by EDTA method.

Potable water and its specifications. Steps involved in the treatment of potable water – screening, sedimentation, coagulation, filtration, and disinfection methods- boiling, chlorination (By Chlorine gas, Bleaching powder, Chloramine), Breakpoint of chlorination.

Boiler troubles - boiler corrosion, caustic embrittlement, scale & sludge formation. Internal treatment- Calgon, phosphate, and colloidal conditioning, External

treatment - Softening of water by ion- exchange processes. Desalination of brackish water – Reverse osmosis and its advantages.

UNIT – II:

Polymer Science: Definition – Classification of polymers with examples, Types of polymerizations, addition, and condensation polymerization with examples. Properties of polymers-crystallinity & glass transition temperature.

Plastics: Definition and characteristics-thermoplastic and thermosetting plastics, Preparation, Properties, and applications of Teflon, PMMA, PC, PET, Bakelite.

Moulding of Plastics (Compression, Extrusion, Blow moulding and Thermoforming).

Fiber reinforced plastics (FRP)-features & applications.

Conducting Polymers: Classification and applications of conducting polymers.

Shape Memory Polymers (SMPs): Definition, classification based on their mode of activation (thermo-responsive, light-responsive, electrically, magnetically Induced and water activated -brief note) and applications of SMPs in various fields.

UNIT – III:

Energy Sources & Battery Technology: Definition and characteristics of fuel, Types of fuels, analysis of coal – proximate and ultimate analysis. Petroleum and its Refining Cracking- Definition, types -moving bed catalytic cracking process. Knocking – octane and cetane rating, Gaseous fuels –Types of hydrogen fuel, generation of green hydrogen-mechanism of electrolysis of water.

Battery Technology: Definition, Characteristics of a good battery, Classification of batteries- primary, secondary, reserve and fuel cells with examples.

Primary Batteries: Zn-air battery-Construction and working.

Rechargeable batteries: Construction and working of lithium-ion battery and its importance in electric vehicles.

Fuel Cell: Definition, construction, working, principle, and applications of methanol-oxygen fuel cell.

UNIT – IV:

Corrosion and its Control: Introduction causes and effects of corrosion, mechanism of chemical and electrochemical corrosion. Types-differential aeration corrosion (Pitting and waterline corrosion), differential metal corrosion (Galvanic corrosion).

Factors affecting corrosion-nature of metal (position, passivity, purity, areas of anode and cathode) & nature of environment (temperature, pH, humidity).

Corrosion control methods - cathodic protection-Sacrificial anodic and impressed current cathodic protection, comparison of galvanizing and tinning.

UNIT – V:

Engineering Materials:

Nanomaterials: Definition, Synthesis of nanomaterials- Top-down and bottom-up approaches. Characterization techniques of Nanomaterials – STM and AFM working principle, advantages, and limitations.

Self-Healing Materials: Features, principle, and applications.

Biosensors: Definition, characteristics, classification-, construction & working, applications and advantages of biosensors. Biochips -Definition, advantages, and applications.

Lubricants: Definition and need for lubricants, types- liquid, semi-solid, solid, mechanisms of lubrication-thick film lubrication, thin film lubrication and extreme pressure lubrication. Properties of lubricants-viscosity, cloud and pour point, flash and fire point, their definition and significance.

TEXTBOOKS:

1. Engineering Chemistry, P. C. Jain and M. Jain, Dhanpat Rai Publishing Company, 2010
2. Engineering Chemistry, Rama Devi, Venkata Ramana Reddy and Rath, Cengage Learning, 2016

REFERENCES:

1. Engineering Chemistry, Shikha Agarwal, Cambridge University Press, 2015
2. Engineering Chemistry, Shashi Chawla, Dhanpat Rai, 2011
3. A Textbook of Engineering Chemistry, M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021
4. Textbook of Engineering Chemistry, Jaya Shree Anireddy, Wiley Publications

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES1CS101) PROGRAMMING FOR PROBLEM SOLVING

TEACHING SCHEME		
L	T/P	C
3	0	3

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:

- To relate basics of programming language constructs and problem-solving techniques
- To classify and implement control structures and derived data types
- To analyze and develop effective modular programming
- To construct mathematical problems and real time applications using C Language

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Illustrate the flowchart, algorithm, pseudo code for a given problem

CO-2: Execute programs using various data types and operators

CO-3: Implement programs using conditional and iterative statements for a given problem

CO-4: Exercise on programs using arrays, pointers, dynamic memory management, structures and unions

CO-5: Develop solution for a given problem using modular approach and perform file handling

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	2	2	3	1	-	-	-	-	2	2	1	-	-	-
CO-2	2	2	3	2	1	-	-	-	2	2	-	2	-	-
CO-3	2	2	3	2	1	1	-	-	2	2	-	2	-	-
CO-4	1	2	3	1	1	1	-	-	2	2	2	2	-	-
CO-5	1	2	3	1	1	1	-	-	2	2	2	2	-	-

UNIT - I:

Introduction to Programming:

Compilers, compiling and executing a program.

Representation of Algorithm, Flowchart/ Pseudocode with examples, Program design and structure of C programming.

Variables, Data types Operators, expressions and precedence, Expression evaluation, Storage classes, type conversion.

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.

Conditional Branching: Branching with if, if-else, nested if-else, else-if ladder, switch-case, goto,

UNIT - II:

Loops, Arrays, Strings:

Loops: Iteration with for, while, do- while loops, break and continue statements.

Arrays: One and two dimensional arrays, creating, accessing and manipulating elements of arrays

Strings: Introduction to strings, handling strings as array of characters, string functions available in C arrays of strings.

UNIT – III:

Searching, Sorting, Functions:

Searching: Basic searching in an array of elements (linear and binary search techniques)

Sorting: Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexity through the example programs

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value. Recursion with examples. Some C standard functions and libraries.

UNIT-IV:

Structures and Pointers:

Structures: Defining structures, initializing structures, unions, Array of structures,

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Passing arrays to functions and structures to functions. Dynamic memory allocation, self-referential structures

UNIT - V:

Preprocessor Directives and File Handling in C:

Preprocessor Directives: Symbolic constants, macro expansion and file inclusion.

User Defined Data Types: enum, typedef

Files: Text and Binary files, file input/output operations, Error Handling in Files, random access of files, command line arguments.

TEXT BOOKS:

1. The C Programming Language , Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall of India
2. C Programming and Data Structures, B. A. Forouzan and R. F. Gilberg, 3rd Edition,
3. Cengage Learning
4. C: The Complete Reference, Herbert Schildt, Mc Graw Hill, 4th Edition

REFERENCES:

1. Problem Solving and Program Design in C, Jeri R. Hanly and Elliot B. Koffman, 7th Edition, Pearson
2. Computer Fundamentals and C, E. Balagurusamy, 2nd Edition, McGraw-Hill
3. Let Us C, Yashavant Kanetkar, 18th Edition, BPB
4. How to Solve it by Computer, R. G. Dromey, 16th Impression, Pearson
5. Programming in C, Stephen G. Kochan, 4th Edition, Pearson Education

ONLINE RESOURCES:

1. https://nptel.ac.in/courses/106105171
2. https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_ug/307

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES1EI101) INTRODUCTION TO INTERNET OF THINGS

TEACHING SCHEME		
L	T/P	C
2	0	2

EVALUATION SCHEME				
SE	CA	ELA	SEE	TOTAL
30	5	5	60	100

COURSE OBJECTIVES:
- To understand the basics of Internet of Things
- To impart knowledge of components of Internet of Things
- To understand the methodologies for IoT Systems
- To understand skills required to build real-life IoT based projects

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Establish knowledge in a concise manner how the Internet of things work
CO-2: Illustrate various enabling technologies for IoT
CO-3: Identify and interpret design methodology of IoT platform
CO-4: Appreciate the applications of IoT in various domains

COURSE ARTICULATION MATRIX:
*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	1	-	1	1	1	1	-	1	-	1	-	1	2	1
CO-2	-	-	1		1	1	-	1	-	1	-	2	2	1
CO-3	1	-	1	1	1	-	-	1	-	1	-	1	2	1
CO-4	-	-	1	-	-	1	1	1	-	1	-	1	2	1

UNIT – I:
Introduction to Internet of Things (IoT):
IoT definition, Characteristics of IoT, Physical Design of IoT: Things in IoT, IoT Protocols, Logical Design of IoT: IoT Functional Blocks, IoT Communication Models, IoT Communication APIs.

UNIT – II:
IoT Enabling Technologies: Wireless Sensor Networks, Cloud Computing, Big Data Analytics, Communication Protocols, Embedded Systems. IoT Levels-Level 1 to Level 6

UNIT – III:
IoT Design Methodology: Purpose & Requirements Specification, Process Specification, Domain Model Specification, Information Model Specification, Service Specifications, IoT Level Specification, Functional View Specification, Operational View Specification, Device & Component Integration, Application Development. Case Study on IoT system for Weather monitoring.

UNIT – IV:
Domain Specific IoT Applications - I: Introduction, home automation- Smart Appliances, Smoke/Gas Detectors, Cities – Smart Parking, Smart Lighting, Smart roads,

Environment- Weather Monitoring, Air Pollution Monitoring, Noise Pollution Monitoring, Energy- Smart Grids, Renewable Energy systems

UNIT – V:

Domain Specific IoT Applications - II: Retail- Inventory Management, Smart payments, Logistics- Route Generation &Scheduling, Remote vehicle diagnostics, Agriculture- Smart Irrigation, Industry- Machine Diagnosis & Prognosis, Indoor Air quality monitoring, Health and Life style- Health & Fitness monitoring, Wearable Electronics

TEXT BOOKS:

1. Internet of Things, A Hands on Approach, Vijay Madisetti, ArshdeepBahga, University Press
2. Internet of Things with Raspberry Pi and Arduino, Boca Raton, Singh R., Gehlot A., Gupta L., Singh B., Swain M, CRC Press, 2020

REFERENCES:

1. Internet of Things for Architects: Architecting IoT Solutions by Implementing Sensors, Communication Infrastructure, Edge Computing, Analytics, and Security, Perry Lea, Packt Publishing Ltd., 2018
2. The Internet of Things: Enabling Technologies, Platforms, and Use Cases, Pethuru Raj and Anupama C. Raman, CRC Press
3. Getting Started with Arduino, Massimo Banzi, 1st Edition, O'Reilly Media, Inc. 2009
4. Exploring Raspberry Pi: Interfacing to the Real World with Embedded Linux, Derek Molloy, Wiley

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES3ME102) ENGINEERING DRAWING

TEACHING SCHEME		
L	T/P	C
0	4	2

EVALUATION SCHEME				
D-D	SE	CP	SEE	TOTAL
10	20	10	60	100

COURSE OBJECTIVES:

- To understand the importance of engineering curves
- To learn to use the orthographic projections for points, lines and planes
- To Understand the Projections of Solids in different positions
- To learn the importance of Isometric Projections and its conversions

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Apply the concepts of engineering curves and its construction using AutoCAD
CO-2: Solve the problems of projections of points, lines and planes in different positions using AutoCAD
CO-3: Solve the problems of Projections of Solids using AutoCAD
CO-4: Solve the problems on Conversion of Isometric views to Orthographic Views & Orthographic to Isometric Views using AutoCAD

COURSE ARTICULATION MATRIX:
*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	3	2	2	1	3	-	-	-	3	2	2	-	-	-
CO-2	3	2	2	1	3	-	-	-	3	2	2	-	-	-
CO-3	3	2	2	1	3	-	-	-	3	2	2	-	-	-
CO-4	3	2	2	1	3	-	-	-	3	2	2	-	-	-

Introduction to AutoCAD Software:
The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line, The Status Bar, Different methods of zoom as used in CAD, Select and erase objects

UNIT-I:
Introduction to Engineering Drawing: Principles of Engineering drawing and their significance and Conventions
Engineering Curves: Construction of Ellipse, Parabola and Hyperbola – General and Special methods; Cycloidal curves- Epicycloids and Hypocycloids

UNIT-II:
Orthographic Projections, Projections of Points & Straight Lines: Principles of Orthographic Projections – Conventions; Projections of Points in all positions; Projections of lines inclined to both the planes

UNIT-III:
Projections of Planes: Projections of Planes- Surface Inclined to both the Planes

UNIT-IV:
Projections of Regular Solids: Projections of Regular Solids inclined to both the Planes – Prisms, Pyramids, Cylinder and Cone

UNIT-V:
Isometric Projections: Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and Compound Solids Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions

TEXT BOOKS:
1. Engineering Drawing, N. D. Bhatt, 53rd Edition, Charotar Publishing House, 2016
2. Textbook on Engineering Drawing, K. L. Narayana & P. Kannaiah, Scitech Publishers, 2010
3. Engineering Drawing and Computer Graphics, M. B. Shah & B. C. Rana, Pearson Education, 2010

REFERENCES:
1. Mastering AutoCAD 2021 and AutoCAD LT 2021, George Omura and Brian C Benton (AutoCAD 2021), 1st Edition, John Wiley & Sons

ONLINE RESOURCES:
1. https://www.classcentral.com/course/swayam-engineering-graphics-5305
2. https://www.mooc-list.com/tags/engineering-drawing

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22BS2CH101) ENGINEERING CHEMISTRY LABORATORY

TEACHING SCHEME		
L	T/P	C
0	2	1

EVALUATION SCHEME					
D-D	PE	LR	CP	SEE	TOTAL
10	10	10	10	60	100

COURSE PRE-REQUISITES: Basic Knowledge of Volumetric Analysis and Mathematics

COURSE OBJECTIVES:

- To understand the preparation of standard solutions and handling of instruments
- To determine and evaluate the water quality
- To measure physical properties like absorption of light, surface tension, pH, conductance and viscosity of various liquids
- To conduct and collect the experimental data using different laboratory techniques
- To summarize the data and find the applicability to real world scenario

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Learn and apply the basic laboratory methodologies for the preparation of the standard solutions and handling of instruments
CO-2: Estimate the ions / metal ions present in domestic and industrial water
CO-3: Utilize the instrumental techniques to assess the physical properties of oils and water
CO-4: Analyze the experimental data to predict solutions for complex engineering problems
CO-5: Apply the skills gained to solve societal issues related to real world scenario

COURSE ARTICULATION MATRIX:
*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	3	2	1	-	-	1	1	-	2	1	-	2	-	-
CO-2	3	2	2	1	-	1	1	-	2	1	-	2	-	-
CO-3	3	2	2	-	-	1	1	-	2	1	-	2	-	-
CO-4	3	2	1	1	-	1	1	-	2	1	-	2	-	-
CO-5	3	2	1	-	-	1	1	1	2	1	-	2	-	-

LIST OF EXPERIMENTS:

1. Estimation of hardness of water by complexometric method using EDTA.
2. Determination of chloride content in the given sample water using Argentometric method.
3. Estimation of copper present in the given solution by colorimetric method.
4. Conductometric titration of Acid vs Base.
5. Titration of Acid vs Base using pH metric method.

6. Conductometric titration of mixture of strong acid and weak acid by strong base
7. Determination of viscosity of sample oil by Redwood Viscometer-I.
8. Estimation of acid value of given lubricant oil.
9. Determination of surface tension of a liquid by drop method using Stalagmometer.
10. Synthesis of a Polymer-Bakelite/Nylon.

VIRTUAL LAB EXPERIMENTS:

11. Basic operations of Transmission Electron Microscope (Imaging and Diffraction Pattern)
12. Polymer processing technology- study construction and working of compression moulding.
13. Basics of Scanning Electron Microscopy: Secondary Electron and BSE imaging mode.
14. Batteries for electrical vehicles

TEXT BOOKS:

1. Laboratory Manual on Engineering Chemistry, S. K. Bhasin and Sudha Rani, Dhanpat Rai Publications
2. College Practical Chemistry V. K. Ahluwalia, Sunitha Dhingra, Adargh Gulati, University Press Pvt. Ltd.
3. Practical Chemistry, Dr. O. P. Pandey, D. N. Bajpai, and Dr. S. Giri, S. Chand Publications

REFERENCES:

1. Vogel's Text book of Quantitative Chemical Analysis, G.N. Jeffery, J. Bassett, J. Mendham and R. C. Denny, Longmann, ELBS
2. Advanced Practical Physical Chemistry, J. D. Yadav, Goel Publishing House
3. Practical Physical Chemistry, B. D. Khosla, R. Chand and Sons

ONLINE RESOURCES: (Virtual labs)

1. https://emb-iitk.vlabs.ac.in/exp/transmission-electron-microscope
2. http://vlabs.iitb.ac.in/vlabs-dev/labs/mit_bootcamp/polymer_process/experimentlist.html
3. https://emb-iitk.vlabs.ac.in/exp/sem-basics/

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES2CS101) PROGRAMMING FOR PROBLEM SOLVING LABORATORY

TEACHING SCHEME		
L	T/P	C
0	2	1

EVALUATION SCHEME					
D-D	PE	LR	CP	SEE	TOTAL
10	10	10	10	60	100

COURSE OBJECTIVES:

- To gain a working knowledge of C programming to write modular, efficient and readable C programs by Identifying the structural elements and layout of C source code
- To declare and manipulate single and multi-dimensional arrays of the C data types and derived data types like structures, unions
- To use functions from the portable C library and to describe the techniques for creating program modules using functions and recursive functions
- To manipulate character strings in C programs. Utilize pointers to efficiently solve problems

COURSE OUTCOMES: After completion of the course, the student will be able to
CO-1: Use various data types for a specified problem
CO-2: Design, implement, debug a given problem using appropriate language constructs
CO-3: Execute the programs using derived and user defined data types
CO-4: Implement programs using modular approach and file I/O
CO-5: Solve a given problem using C language

COURSE ARTICULATION MATRIX:
*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	2	2	3	2	1	-	-	-	2	2	-	2	-	-
CO-2	2	2	3	2	1	1	-	-	2	2	-	2	-	-
CO-3	1	2	3	1	1	1	-	-	2	2	2	2	-	-
CO-4	1	2	3	1	1	1	-	-	2	2	2	2	-	-
CO-5	2	2	2	2	1	1	-	-	2	2	2	2	-	-

LIST OF PROGRAMS:

WEEK 1:

a. Programs on input, output statements
b. Programs on various operators
c. Programs on expression evaluation

WEEK 2:

a. Program that converts one given data type to another using auto conversion and casting. Take the values from standard input.

b. Programs on conditional statements- Simple if, if-else, Nested if-else, Else-if ladder, switch case

WEEK 3:

a. Programs on simple loops- while, for, do. while
b. Programs on Nested loops- while, for, do. while
c. Programs to understand goto, break, continue

WEEK 4:

a. Programs on 1-D arrays
b. Programs on linear, binary searching
c. Programs on bubble, selection and insertion sorting

WEEK 5:

a. Programs on 1-D strings
b. Programs using string handling functions

WEEK 6:

a. Programs on 2-D arrays
b. Programs on 2-D strings

WEEK 7:

a. Programs on user defined functions
b. Programs on passing arrays and strings to functions

WEEK 8: Internal Lab Exam -1

WEEK 9:

a. Programs on recursion
b. Programs on structures – simple structure, array of structures, array within structure, nested structure
c. Programs on Unions

WEEK 10:

Programs on pointers to variables

a. Programs on pointers to arrays(1-D, 2-D)

WEEK 11:

a. Program to understand call by value and call by address
b. Programs on pointers to strings
c. Programs on pointers to structure
d. Programs using malloc, calloc , realloc, free

WEEK 12:

a. Programs on macros, file inclusion, enum , typedef
b. Programs on sequential file accessing

WEEK 13:

a. Programs on error handling functions in files
b. Programs on Random file accessing

c. Programs on command line arguments

WEEK 14: Lab Internal Exam -2

TEXT BOOKS:

1. The C Programming Language, Brian W. Kernighan and Dennis M. Ritchie, Prentice Hall of India
2. C Programming and Data Structures, B. A. Forouzan and R. F. Gilberg, 3rd Edition, Cengage Learning
3. C: The Complete Reference, Herbert Schildt, 4th Edition, McGraw Hill

REFERENCES:

1. Problem Solving and Program Design in C, Jeri R. Hanly and Elliot B. Koffman, 7th Edition, Pearson
2. Computer Fundamentals and C, E. Balagurusamy, 2nd Edition, McGraw-Hill
3. Let Us C, Yashavant Kanetkar, 18th Edition, BPB
4. How to Solve it by Computer, R. G. Dromey, Pearson, 16th Impression
5. Programming in C, Stephen G. Kochan, 4th Edition, Pearson Education

ONLINE RESOURCES:

1. https://nptel.ac.in/courses/106105171
2. https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_ug/307

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22SD5EE101) ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING

TEACHING SCHEME		
L	T/P	C
0	2	1

EVALUATION SCHEME						
D-D	PE	LR	CP	VV	SEE	TOTAL
10	10	10	10	10	-	50

COURSE OBJECTIVES:

- To understand the significance of electrical and electronics engineering and relevancy to emerging industry trends
- To get acquaintance with electrical and electronics components, instruments, Electrical machines, power electronic converters and low voltage electrical installations
- To develop basic circuits on bread board and analyze various responses

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Identify and use various electrical and electronic components and instruments

CO-2: Develop basic circuits on breadboard and analyze them using basic laws theorems

CO-3: Demonstrate the components of low-voltage electrical installations, electrical machines, power electronic converters and drives

COURSE ARTICULATION MATRIX:

*(Correlation of Course Outcomes with Program Outcomes and Program Specific Outcomes using **mapping levels 1 = Slight, 2 = Moderate and 3 = Substantial**)*

CO	PROGRAM OUTCOMES (PO)												PROGRAM SPECIFIC OUTCOMES (PSO)	
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2
CO-1	3	2	1	0	1	0	0	0	2	0	2	2	1	3
CO-2	3	2	1	0	3	1	0	1	1	2	1	2	3	3
CO-3	3	2	1	1	3	2	0	0	1	0	2	2	1	3

LIST OF EXPERIMENTS:

1. Understand the significance of Electrical and Electronics Engineering courses.
2. (i)Introduction to Basic Electrical and Electronic Components and Devices: Introduction to various electrical passive components such as Resistors, inductors and capacitors, introduction to active components, introduction to breadboard, Measurement of resistance using the color code, series and parallel connection of the resistances and its implementation on breadboard. Measurement of the voltage and current in the circuit implemented on breadboard using multimeter.
   (ii) Introduction to Electrical and Electronics Instruments: Exposure to usual equipment/instruments such as Multi-meter, Oscilloscope, Function generator, Power supply, Information about their front panels, Demonstrations on their working, Hands-on for measurement of component values and DC voltage using multi-meter, measurement of amplitude, time period and frequency of the waveform square wave/any small signal from function generator on Oscilloscope
3. Verification of Ohm's Law and Kirchhoff's laws.
4. Verification of Thevenin's and Norton's theorem
5. Verification of Superposition and Reciprocity theorem

6. Verification of Maximum Power Transfer Theorem.
7. Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and verification. Observation of phase differences between current and voltage.
8. Design and development of inductor and resistor
9. Measurement of Voltage, Current in a Single-Phase Transformer and verification of transformation ratio.
10. Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor);
    Demonstration of (a) dc-dc converters (b) dc-ac converters (c)the use of converters for speed control of dc and ac motor
11. Demonstration of various components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing; Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption; Lamps- fluorescent, CFL, LED. Electrical measuring instruments applications- energy meter, megger, tong tester: Solar Panel
12. Know the available Software for Electrical and Electronics Engineering applications

TEXT BOOKS:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, Tata McGraw Hill, 4th Edition, 2019
2. Basic Electrical Engineering, M. S. Naidu and S. Kamakshaiah, Tata McGraw Hill, 2nd Edition, 2008
3. Fundamentals of Electric Circuits, Charles K. Alexander, Mathew N. O. Sadiku, 3rd Edition, Tata McGraw Hill Company, 2019

REFERENCES:

1. Basic Electrical Engineering, P. Ramana, M. Suryakalavathi, G. T. Chandrasheker, 2nd Edition, S. Chand, 2019
2. Basic Electrical Engineering, D. C. Kulshreshtha, McGraw Hill, 2009
3. Basic Electrical Engineering, Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, 2nd Edition, McGraw Hill, 2021
4. E. Hughes, Electrical and Electronics Technology, Pearson, 2010
5. Electrical Engineering Fundamentals, V. D. Toro, Prentice Hall India, 1989