DEPARTMENT OF

ELECTRONICS AND COMMUNICATION ENGINEERING

VISION OF THE DEPARTMENT

A resource centre of academic excellence for imparting technical education with high pattern of discipline through dedicated staff which shall set global standards, making National and International students technologically superior and ethically strong, who in turn shall improve the quality of life.

MISSION OF THE DEPARTMENT

- To provide quality education in the domain of Electronics and Communication Engineering through effective learner centric process.
- To provide industry specific best of breed laboratory facilities beyond curriculum to promote diverse collaborative research for meeting the changing industrial and societal needs.

B.TECH.

(ELECTRONICS AND COMMUNICATION ENGINEERING)

B.TECH. (ECE)

PROGRAM EDUCATIONAL OBJECTIVES

PEO-I: Produce Electronics and Communication Engineering Professionals with a solid foundation in Mathematics, Science and Technology which is essential to solve engineering problems.

PEO-II: Train students in good engineering practices to comprehend, analyze, design, and create novel products for industry specific processes and real life problems.

PEO-III: Prepare students to adopt the learning culture for higher qualification, research and successful professional career.

PEO-IV: Inculcate organizational, managerial and entrepreneurial skills essential for professional growth.

PEO-V: Develop the consciousness among students towards moral values and professional ethics for innovative solutions to meet the societal needs.

B.TECH. (ECE)

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, review research literature, and analyze complexengineering 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 team work:** 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 in the broadest context of technological change.

B.TECH. (ECE)

PROGRAM SPECIFIC OUTCOMES

PSO-1: Analyze, Design and Implement efficient systems for Analog and Digital domain, Communications, Signal and Image Processing Applications

PSO-2: Incluate problem solving skills to provide innovative solutions for the society.

PSO-3: Identify and Apply Domain specific tools for Design, Analysis and Synthesis in the areas of Electronics and Communications

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY HYDERABAD
B.TECH. I YEAR
ELECTRONICS AND COMMUNICATION 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
22BS1PH102	Applied Physics	3	0	0	3	3
22ES1CS101	Programming for Problem Solving	3	0	0	3	3
22HS1EN101	English for Skill Enhancement	2	0	0	2	2
22ES1EE104	Electrical Circuits	2	0	0	2	2
22ES2ME101	Engineering Workshop	1	0	2	3	2
22BS2PH102	Applied Physics Laboratory	0	0	2	2	1
22ES2CS101	Programming for Problem Solving Laboratory	0	0	2	2	1
22HS2EN101	English Language and Communication Skills Laboratory	0	0	2	2	1
22SD5EC101	Elements of Electronics and Communication 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
22BS1CH102	Chemistry for Engineers	3	0	0	3	3
22ES1EE105	Basic Electrical Engineering	2	0	0	2	2
22PC1EC101	Electronic Devices and Circuits	3	0	0	3	3
22ES1CS102	Data Structures	3	0	0	3	3
22ES3ME102	Engineering Drawing	0	0	4	4	2
22ES2EE105	Basic Electrical Engineering Laboratory	0	0	2	2	1
22BS2CH101	Engineering Chemistry Laboratory	0	0	2	2	1
22PC2EC101	Electronic Devices and Circuits Laboratory	0	0	2	2	1
22ES2CS102	Data Structures Laboratory	0	0	2	2	1
22MN6HS102	Environmental Science	2	0	0	2	0
Total		**15**	**1**	**12**	**28**	**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, 11th Reprint, Tata McGraw-Hill, 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

(22BS1PH102) APPLIED PHYSICS

TEACHING SCHEME		
L	T/P	C
3	0	3

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

COURSE PRE-REQUISITES: 10+2 Physics

COURSE OBJECTIVES:

- To apply the principles of lasers for various laser systems and optical fibers
- To understand the principles of quantum physics and band theory of solids
- To explain various types of semiconductors and semiconductor devices
- To study the fundamental concepts related to the dielectric and magnetic materials
- To identify the importance of energy materials and nanomaterials

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

CO-1: Explain various aspects of lasers, optical fiber and their applications in diverse fields.

CO-2: Apply quantum mechanics to behavior of a particle and classify solids based on band gap

CO-3: Identify the role of semiconductor devices in science and engineering applications.

CO-4: Illustrate applications of dielectric, magnetic materials.

CO-5: Explore the features and applications of energy materials and nanomaterials.

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	PSO-3
CO-1	3	2	1	1	-	1	1	-	1	1	-	1	-	-	-
CO-2	3	2	1	-	1	1	-	-	1	1	-	1	-	-	-
CO-3	3	2	2	1	-	2	-	-	1	1	-	1	-	-	-
CO-4	3	2	1	1	-	1	-	-	1	1	-	1	-	-	-
CO-5	3	2	2	1	1	2	2	-	1	1	-	1	-	-	-

UNIT-I:

Laser and Fiber Optics: Lasers: Laser beam characteristics-Three quantum processes (Absorption, Spontaneous emission & Stimulated emission), Lifetime, Metastable state, Population inversion, Pumping methods- Lasing action -Block diagram of laser-Einstein coefficients and their relations, Ruby laser, He-Ne laser, Applications of laser.

Fiber Optics: Introduction to optical fiber- Advantages of optical fibers - Total internal reflection, Construction of optical fiber - Acceptance angle - Numerical aperture- Classification of optical fibers. fiber optic laser - Applications.

UNIT-II:

Quantum Physics and Band Theory of Solids:

Quantum Physics: Introduction to quantum physics-Planck's law, Wave-particle duality, de-Broglie hypothesis, Matter waves, Davisson and Germer experiment – Heisenberg uncertainty principle and its applications - Born interpretation of the wave function – Time independent Schrodinger wave equation - Particle in one dimensional infinite potential well.

Band Theory Solids: Free electron theory (Drude& Lorentz.)-Electrical Conductivity- Verification of Ohm's law -Bloch's theorem -Kronig-Penney model (qualitative) – E-k diagram, Effective mass of electron -Origin of energy bands- Classification of solids.

UNIT-III:

Semiconductors and Devices:

Semiconductors: Intrinsic Semiconductors-Intrinsic carrier concentration, Extrinsic semiconductors (Qualitative), Fermi level and its temperature dependence, Hall effect-Hall coefficient, Applications of Hall effect.

Semiconductor Devices: Direct and indirect band gap semiconductors-Formation and characteristics of P-N junction diode, construction, working principle, Characteristics and applications of LED, and Solar cell, Construction and working principle of Laser diode.

UNIT-IV:

Dielectric and Magnetic Materials:

Dielectric Materials: Basic definitions- Types of polarizations (qualitative) -Frequency dependence of polarization, Local field, Clausius-Mossotti relation, Ferroelectric, Piezoelectric, and Pyroelectric materials – Applications.

Magnetic Materials: Basic definitions- Types of Magnetic materials, Antiferro and ferri magnetic materials, Weiss-Domain theory of ferromagnetism, Hysteresis - Soft and hard magnetic materials, Multiferroics – Applications.

UNIT-V:

Energy Materials and Nanotechnology:

Energy Materials: Introduction to energy materials, Electrolytes for super capacitors - Rechargeable ion batteries, Solid fuel cells.

Nanotechnology: Introduction, Quantum confinement, Surface to volume ratio, Physical properties, Bottom-up approach: Sol-gel, Top-down approach: Ball milling - Characterization techniques – Average crystallite size using X-ray diffraction pattern, Scanning electron microscopy - Applications of nanomaterials.

TEXT BOOKS:

1. A Text Book of Engineering Physics, M. N. Avadhanulu, P. G. Kshirsagar & T. V. S. Arun Murthy, 11th Edition, S. Chand Publications, 2019

2. Engineering Physics, B. K. Pandey and S. Chaturvedi, 2nd Edition, Cengage Learning, 2022
3. Engineering Physics, P. K. Palanisamy, Scitech Publications

REFERENCES:

1. Essentials of Nanoscience & Nanotechnology, K. Narasimha Reddy, 1st Edition, Nano Digest, 2021
2. Fundamentals of Physics, Halliday, Resnick and Walker, 11th Edition, John Wiley & Sons, 2018
3. Introduction to Solid State Physics, A. C. Kittel, Wiley Eastern, 2019
4. Nano Materials, A. K. Bhandhopadhya, 1st Edition, New Age International, 2007
5. Energy Materials A Short Introduction to Functional Materials for Energy Conversion and Storage, A. S. Bandarenka, 1st Edition, CRC Press, Taylor & Francis Group Energy Materials, 2022

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, 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, 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

(22HS1EN101) ENGLISH FOR SKILL ENHANCEMENT

TEACHING SCHEME		
L	T/P	C
2	0	2

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

COURSE OBJECTIVES:

- To enhance vocabulary through word formation processes
- To read and comprehend different kinds of texts (tone, tenor, sound, sense, diction, etc. - sub-skills)
- To write clear, concise, and correct sentences and paragraphs to produce appropriate technical prose
- To improve coherence and cohesion in writing and speaking
- To recognize and practice the use of rhetorical elements necessary for the successful practice of scientific and technical communication

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

CO-1: Use vocabulary contextually and effectively

CO-2: Employ reading skills to comprehend different kinds of texts. (tone, tenor, sound, sense, diction, etc.

CO-3: Apply principles of critical thinking and problem-solving for clarity, conciseness and accuracy of expression in academic and professional communication

CO-4: Demonstrate improved competence in Standard Written English, including grammar, sentence and paragraph structure and coherence, and use this knowledge to accurately communicate technical information

CO-5: Employ appropriate rhetorical patterns of discourse in scientific and technical communication

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	-	2	1	1	2	3	2	2	-	-
CO-2	2	2	2	2	2	2	2	1	3	3	2	2	-	-
CO-3	2	2	2	2	1	3	2	1	3	3	2	2	-	-
CO-4	1	1	1	1	1	2	2	1	2	3	2	2	-	-
CO-5	1	1	1	1	-	2	1	1	2	2	1	1	-	-

UNIT-I:

1. Reading: On the Conduct of Life by William Hazlitt
2. Grammar: Conjunctions and Prepositions
3. Vocabulary: Word Formation (Affixation, Compounding, Conversion, Blending, Borrowing)
4. Writing: Punctuation, Clauses and Sentences Transitional Devices- Paragraph Writing- Process

UNIT-II:

1. Reading: How I Became a Public Speaker by G.B. Shaw
2. Grammar: Articles, Noun-Pronoun Agreement, Concord
3. Vocabulary: Word Formation- (Prefixes, Suffixes, Root Words)
4. Writing Skills: Principles of Good Writing-Coherence, Cohesion Essay Writing - Descriptive, Argumentative, Expository

UNIT-III:

1. Reading: Muhammad Yunus
2. Grammar: Misplaced Modifiers
3. Vocabulary: Synonyms and Antonyms
4. Writing Skills: Letter Writing- Formal Letters - Letter of Complaint, Letter of Requisition, Email Writing; Email Etiquette

UNIT-IV:

1. Reading: Politics and the English Language by George Orwell
2. Grammar: Cliches, Redundancies
3. Vocabulary: Common Abbreviations
4. Writing Skills: Summary Writing; Job Application; Resume

UNIT-V:

Organizational Patterns for writing

1. Patterns of Writing: Comparison and Contrast Pattern
2. Patterns of Writing: Cause and Effect Pattern
3. Patterns of Writing: Classification Pattern
4. Patterns of Writing: Problem-Solution Pattern

TEXT BOOKS:

1. Language and Life: A Skills Approach, Orient Black Swan
2. Technical Communication Rebecca E. Burnett, 6th Edition, Cengage Learning

REFERENCES:

1. Communication Skills, Pushplata and Kumar, Sanjay, OU Press, 2015
2. Remedial English Grammar, Wood F. T., Macmillan, 2007
3. Study Writing, Hamp, Liz., Lyons and Heasly, Ben, C U Press, 2006
4. Practical English Usage, Swan, Michael, OU Press, 1995
5. Longman Dictionary of Common Errors, Turton N. D. and Heaton J. B., 1991

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES1EE104) ELECTRICAL CIRCUITS

TEACHING SCHEME		
L	T/P	C
2	0	2

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

COURSE PRE-REQUISITES: Basic Mathematics

COURSE OBJECTIVES:
- To understand the basic concepts of circuit analysis
- To analyze single phase AC circuits and response
- To apply network theorems for circuit analysis
- To understand basic concepts of magnetic circuits

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Apply basic concepts for analyzing electrical circuits
CO-2: Analyze AC circuits along with resonance phenomenon
CO-3: Understand the network theorems applied for different applications
CO-4: Analyze the magnetic circuit with electrical circuit analogy

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	PSO-3
CO-1	3	3	3	3	3	3	3	1	2	1	1	2	-	-	-
CO-2	3	3	3	3	3	3	3	3	3	3	2	3	-	-	-
CO-3	3	2	2	2	3	3	3	2	1	3	3	2	-	-	-
CO-4	3	3	3	2	1	1	1	1	1	1	1	1	-	-	-

UNIT-I:
Introduction to Electrical Circuits: 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 Dependant Voltage and current sources, Super Mesh Analysis- problems
Nodal analysis: Circuits with Independent and Dependant Voltage and current sources, Super Node Analysis – problems

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 series, parallel and series parallel combinations of R, L and C with sinusoidal excitation, Concept of Reactance, Impedance, Susceptance and Admittance, Complex power, Real and Reactive powers, Power factor, numerical problems.

UNIT-IV:

Resonance: series and parallel circuits, concept of band width and Q factor.

Magnetic Circuits: Faraday's laws of electromagnetic induction – concept of self and mutual inductance – dot convention – coefficient of coupling

UNIT-V:

Network Theorems: Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, and Compensation theorems for D.C. excitation, Duality and Dual networks

TEXTBOOKS:

1. Engineering Circuit Analysis, William Hayt and Jack E. Kemmerly, 8th Edition McGraw-Hill, 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, 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, 2017

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES2ME101) ENGINEERING WORKSHOP

TEACHING SCHEME		
L	T/P	C
1	2	2

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

COURSE OBJECTIVES:

- To know the different popular manufacturing process
- To gain a good basic working knowledge required for the production of various engineering products
- To provide hands on experience about use of different engineering materials, tools, equipment and processes those are common in the engineering field
- To identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Understand various types of manufacturing processes
CO-2: Fabricate/make components from wood and steels through hands on experience
CO-3: Understand different machining processes like turning, drilling, tapping, etc.
CO-4: Understand electrical and electronic components and their assembly

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	2	2	2	1	2	1	3	2	1	2	3	2
CO-2	2	1	2	2	2	1	2	1	3	2	1	2	3	2
CO-3	2	2	2	2	2	1	2	1	3	2	1	2	3	2
CO-4	2	1	2	2	2	1	2	1	3	2	1	2	3	2

LECTURES & VIDEOS:

1. Manufacturing Methods - Casting, Forming, Machining, Joining, Advanced Manufacturing Methods
2. CNC Machining, Additive Manufacturing
3. Fitting Operations & Power Tools
4. Electrical & Electronics
5. Carpentry
6. Plastic Moulding, Glass Cutting
7. Welding (Arc Welding & Gas Welding), Brazing
8. Power Tools
9. Printed Circuit Boards

LIST OF EXPERIMENTS:

I. Carpentry
i. Cross lap joint
ii. Mortise & tenon joint

II. Fitting
i. Square fitting
ii. L-fitting

III. Arc Welding
I. Butt joint
II. Lap joint

IV. Smithy
i. Rectangular Tray (Tin smithy)
ii. U-hook (Black smithy)

V. Electrical & Electronics
i. Single lamp connection & Stair case connection
ii. Soldering and de-soldering on a PCB.

VI. Machine Shop
i. Step turning on lathe
ii. Drilling & tapping

TEXT BOOKS:

1. Workshop Manual, P. Kannaiah and K. L. Narayana, 3rd Edition, Scitech, 2015
2. Elements of Workshop Technology Vol. 1 & 2, S. K. Hajra Choudhury, A. K. Hajra Choudhury and Nirjhar Roy, 13th Edition, Media Promoters & Publishers Pvt. Ltd., 2010
3. Printed Circuit Boards - Design, Fabrication, Assembly and Testing, R. S. Khandpur, Tata McGraw-Hill, 2005

REFERENCES:

1. Manufacturing Engineering and Technology, Serope Kalpakjian, Steven R. Schmid, 4th Edition, Pearson Education India Edition, 2002
2. Manufacturing Technology-I, S. Gowri, P. Hariharan and A. Suresh Babu, Pearson Education, 2008
3. Processes and Materials of Manufacture, Roy A. Lindberg, 4th Edition, Prentice Hall India, 1998
4. Manufacturing Technology Vol-1 & 2, P. N. Rao, Tata McGraw-Hill, 2017

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22BS2PH102) APPLIED PHYSICS 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 understand the working principle of lasers and optical fibers
- To analyze the characteristics of semiconductor devices and resonance phenomena
- To measure the time constant of RC circuit and dielectric constant of material
- To study the behavior of magnetic materials and understand least square method
- To compare the experimental results with the classroom learning

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Demonstrate the total internal reflection in optical fiber using lasers
CO-2: Realize importance of optoelectronics and resonance in daily life
CO-3: Illustrate discharging of a capacitor and polarizability of dielectric material
CO-4: Identify the importance of least square fitting and applications of magnetic materials
CO-5: Correlate the experimental results with the classroom learning

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	PSO-3
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. Torsional pendulum: understanding the method of least squares
2. Determination of acceptance angle and numerical aperture of an optical fiber
3. Determination of wavelength of given LASER using grating
4. Determine the width of given wire- using LASER
5. Determination of energy gap of a semiconductor
6. V-I characteristics of light emitting diode (LED)
7. V-I Characteristics of solar cell
8. Measurement of dielectric constant
9. Study the B-H curve of magnetic material
10. Determination of time constant of RC circuit
11. Melde's Experiment

12. AC frequency sonometer

TEXT BOOKS:

1. Applied Physics Laboratory Manual/Observation, Physics Faculty of VNRVJIET
2. A textbook of Practical Physics, S. Balasubramanian, M. N. Srinivasan, S. Chand Publishers, 2017

ONLINE RESOURCES:

1. https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=1
2. https://vlab.amrita.edu/index.php?sub=1&brch=280&sim=1518&cnt=1

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, Yashwant 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

(22HS2EN101) ENGLISH LANGUAGE AND COMMUNICATION SKILLS 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 train students to use neutral accent through phonetic sounds, symbols, stress and intonation
- To provide practice in vocabulary usage & grammatical construction
- To provide ample practice in LSRW skills and train the students in oral presentations, public speaking, role play, and situational dialogue
- To provide practice in defining technical terms and describing processes
- To equip students with excellent writing skills and information transfer skills

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Speak fluently with a neutral accent
CO-2: Use contextually apt vocabulary and sentence structures
CO-3: Make Presentations with great confidence
CO-4: Define technical terms and describe processes
CO-5: Write accurately, coherently, and lucidly

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	3	1	1	-	-
CO-2	1	1	1	1	3	1	1	1	2	3	1	1	-	-
CO-3	1	1	-	-	-	2	2	-	3	3	3	1	-	-
CO-4	2	2	2	2	-	2	2	-	2	3	1	1	-	-
CO-5	1	1	1	1	-	2	1	-	2	3	2	1	-	-

LIST OF EXERCISES:

1. Self-Introduction
2. Phonetics- Identifying sounds-Word stress- Intonation
3. Reading Comprehension – Reading for Gist & for Specific Details; Making inferences
4. Story Telling
5. Making Short Oral Presentations
6. Listening Comprehension- Listening for Global meaning & specific details; note taking
7. Learning vocabulary from context
8. Book Review
9. Writing Resume and CV

10. Information Transfer
11. Social Media Skills – Writing a Blog
12. Defining Technical Terms and Describing Processes

TEXT BOOKS:

1. Technical Communication, Rebecca E. Burnett, 6th Edition, Cengage Learning

REFERENCES:

1. Practical English Usage, Swan, Michael, Oxford University Press, 1995
2. Remedial English Grammar, F. T. Wood, Macmillan, 2007
3. Exercises in Spoken English, Parts I-III, CIEFL, Hyderabad, Oxford University Press
4. Fowler's Modern English Usage-Revised, R. W. Burchfield
5. Technical Communication, Raman, Meenakshi and Sharma, Sangeeta, Oxford University Press, 2005

ONLINE RESOURCES:

1. https://caw.ceu.edu/academic-skills
2. https://www.biz-e-training.com/resources-for-learners/academic-writing-online-resources/

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22SD5EC101) ELEMENTS OF ELECTRONICS AND COMMUNICATION 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 identify various active and passive components
- To understand the functionality of various measuring instruments
- To know the characteristics of various signal used for analog and digital communications

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Identify and analyse various devices used for electronic applications
CO-2: Measure different parameters using various measuring instruments
CO-3: Distinguish various signals used for analog and digital communications

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	PSO-3
CO-1	3	2	1	1	-	-	-	-	3	2	-	-	3	-	-
CO-2	3	2	3	2	-	-	-	-	3	2	-	-	3	-	-
CO-3	3	3	2	1	-	-	-	-	3	2	-	-	3	-	-

LIST OF EXPERIMENTS:

1. Understand the significance of Electronics and communications subjects
2. Identify the different passive and active components
3. Color code of resistors, finding the types and values of capacitors
4. Measure the voltage and current using voltmeter and ammeter
5. Measure the voltage, current with Multimeter and study the other measurements using Multimeter
6. Study the CRO and measure the frequency and phase of given signal
7. Draw the various Lissajous figures using CRO
8. Study the function generator for various signal generations
9. Study of Spectrum analyzer and measure the spectrum
10. Operate Regulated power supply for different supply voltages
11. Study the various gates module and write down the truth table of them
12. Identify various Digital and Analog ICs
13. Observe the various types of modulated signals.
14. Know the available Software's for Electronics and communication applications
15. Identification, Specification, testing of Potentiometer (SPDT, DPDT and DIP), Coils, Gang Condensers, Relays, Bread Board, PCB.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. II Semester

(22BS1MT102) ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

TEACHING SCHEME		
L	T/P	C
2	1	3

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

COURSE PRE-REQUISITES: Differentiation, Integration, Vectors, Vector Point Function

COURSE OBJECTIVES:

- To methods of solving first order differential equations and learn about its applications to basic engineering problems
- To methods of solving higher order differential equations and learn about its applications to basic engineering problems
- To application of Laplace transforms in solving differential equations
- To basic properties of vector point function and their applications to line, surface and volume integrals

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

CO-1: Formulate and solve the problems of first order differential equations

CO-2: Solve the problems of second and higher order differential equations

CO-3: Apply knowledge of Laplace transform to solve differential equations

CO-4: Find the gradient, divergence, curl and its physical interpretations

CO-5: Transform line integral to surface and surface to volume integrals

COURSE ARTICULATION MATRIX:

*(Define 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	PSO-3
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:

First Order, First Degree ODE and its Applications:

Differential Equations of First Order and First Degree: Exact and non-exact differential equations, Linear and Bernoulli differential equations, Applications of differential equations of first order and first degree: Newton's law of cooling, Law of natural growth and decay.

UNIT-II:

Second and Higher Order Ordinary Differential Equations: Higher order linear differential equations with constant coefficients - Solution of Homogenous, Non homogeneous differential equations-Non-Homogeneous terms of the type eax,sin (ax), cos (ax), polynomials in x, eaxV(x), xV(x).Variable coefficient differential equations-Method of variation of parameters, Euler-Cauchy differential equation.

UNIT-III:

Laplace Transforms: Laplace transforms, Existence condition, Laplace transform of Elementary functions, Properties of Laplace transforms (Without Proofs), Laplace transform of special functions (Unit step function, Dirac delta function and Periodic function). Inverse Laplace transform and its properties, Convolution theorem (without proof) and its applications, solving linear differential equations with constant coefficients using Laplace transform.

UNIT-IV:

Vector Differential Calculus: Vector point functions and scalar point functions. Gradient and its physical interpretation, Angle between the two surfaces, Directional derivatives, Divergence, Curl and their physical interpretations, Solenoidal vectors and Irrotational vectors, Scalar potential functions, Vector Identities (without proofs).

UNIT-V:

Vector Integral Calculus

Line Integrals: Work done by force and circulation, Evaluation of Surface and Volume Integrals. Vector integral theorems: Green's theorem, Gauss-Divergence theorem, Stokes theorem (without proofs) and their problems.

TEXT BOOKS:

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

REFERENCES:

1. Advanced Engineering Mathematics, Peter 'O' Neil, Cengage Learning
2. Engineering Mathematics, N. P. Bali, 4th Edition, Laxmi Publications
3. Calculus and Analytic Geometry, G. B. Thomas and R. L. Finney, 9th Edition, Pearson, 2002

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. II 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.

TEXT BOOKS:

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. II Semester

(22ES1EE105) BASIC ELECTRICAL ENGINEERING

TEACHING SCHEME		
L	T/P	C
2	0	2

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

COURSE PRE-REQUISITES: Electric Circuits, Calculus for Engineers

COURSE OBJECTIVES:

- To analyze transient response of circuits with dc excitation
- To understand two port network parameters, filters and attenuators
- To know about performance of DC machines
- To understand the operation of transformers and AC machines

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

CO-1: Analyze transient response of circuits

CO-2: Evaluate two port parameters and design simple filters

CO-3: Appreciate the working of DC machines

CO-4: Understand the operation of transformers and AC machines

COURSE ARTICULATION MATRIX:

*(Define 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	PSO-3
CO-1	3	3	3	3	3	2	2	1	2	1	1	2	3	2	-
CO-2	3	3	3	3	3	2	1	1	1	1	1	2	3	2	-
CO-3	3	3	3	3	3	2	1	1	1	1	1	2	3	2	-
CO-4	3	3	3	3	3	2	1	1	1	1	1	2	3	2	-

UNIT-I:

Transient Analysis (First and Second Order Circuits): Transient Response of RL, RC and RLC Circuits for DC excitations, Initial Conditions, Solution using Differential Equations approach and Laplace Transform Method.

UNIT-II:

Two Port Networks: Impedance Parameters, Admittance Parameters, Hybrid Parameters, Transmission (ABCD) Parameters, Conversion of one Parameter to another, Conditions for Reciprocity and Symmetry, Interconnection of Two Port networks in cascde configuration

UNIT-III:

Filters: Classification of Filters, Classification of Pass band and Stop band, Characteristic Impedance in the Pass and Stop Bands, Constant-k and mderived filters-Low Pass Filter and High Pass Filters.

UNIT-IV:

DC Generators: Principles of Operation, construction, EMF equation, Types of Generators, Magnetization Characteristics of DC Generators.

DC Motors: Principle, Types of Dc Motors, speed –Torque Characteristics of Dc shunt Motor, Losses and Efficiency, Swinburne's Test, Speed Control of Dc Shunt Motor- Flux and Armature Voltage control methods.

UNIT-V:

Transformers: Principle of Operation, Types, Constructional Features, Phasor Diagram on No Load and Load, Equivalent Circuit, Losses, Efficiency and Regulation of Transformer, Simple Problems

Three Phase Induction Motor: Principle of operation -types, torque-Slip characteristics.

Alternators: Principle of operation.

TEXT BOOKS:

1. Principles of Electrical Engineering, A. Sudhakar, Shyammohan S. Palli, 8th Edition, TMH, 2011
2. Introduction to Electrical Engineering, M. S. Naidu and S. Kamakshaiah, TMH, 2017
3. Network Analysis and Synthesis, C. L. Wadhwa, 3rd Edition, New Age International, 2018

REFERENCES:

1. Engineering Network Analysis and Filter Design, Gopal G. Bhise, Prem R. Chadha & Durgesh C. Kulshreshtha Gopal, 1st Edition, Umesh Publication, 1999
2. Engineering Circuit Analysis, W. H. Hayt, J. E. Kemmerly and S. M. Durbin, 8th Edition, McGraw-Hill, 2013
3. Circuit Theory, A. Chakrabarti, 6th Edition, Dhanpat Rai and Co., 2018
4. Network Analysis, N. C. Jagan and C. Lakshmi Narayana, 1st Edition, B. S. Publications, 2012
5. Circuits and Networks Analysis and Synthesis, A. Sudhakar, Shyammohan S. Palli, 5th Edition, Tata McGraw-Hill, 2010

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. II Semester

(22PC1EC101) ELECTRONIC DEVICES AND CIRCUITS

TEACHING SCHEME		
L	T/P	C
3	0	3

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

COURSE PRE-REQUISITES: Engineering Physics

COURSE OBJECTIVES:

- To understand the construction, principle of operation and characteristics of various semiconductor devices
- To study the applications of various semiconductor devices
- To learn the biasing techniques of semiconductor devices

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Know the principle of operation of Diode and its applications
CO-2: Acquire knowledge about Special purpose Devices
CO-3: Understand the principle of operation of BJT, JFET and MOSFET
CO-4: Appreciate the need for biasing and stabilization

COURSE ARTICULATION MATRIX:
*(Define 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	PSO-3
CO-1	3	2	1	-	-	-	-	-	-	-	-	-	2	-	-
CO-2	3	1	-	-	-	-	-	-	-	-	-	-	1	-	-
CO-3	3	2	2	-	-	-	-	-	-	-	-	-	2	-	-
CO-4	3	3	2	-	-	-	-	-	-	-	-	-	2	-	-

UNIT-I:
PN-Junction Diode: Formation of p-n Junction as a Diode, Derivation of Diode Current Equation, Volt-Ampere Characteristics, Ideal and Practical Diode Equivalent Circuits, Diffusion and Transition Capacitances, Diode as a Switch, Breakdown Mechanisms in Semi-Conductor Diodes, Zener Diode and its Characteristics, Zener diode as Voltage Regulator.

UNIT-II:
Diode Applications: Half wave Rectifier, Full wave rectifier, Bridge Rectifier, Rectifiers with Capacitor filters, Inductor filters and π- section filters.
Special Purpose Devices: Principle of Operation and Characteristics Tunnel Diode, UJT, Varactor Diode, Photo Diode, LED, SCR and LCD.

UNIT-III:
Bipolar Junction Transistor (BJT): Principle of Operation, Common Emitter, Common Base and Common Collector Configurations-input and output characteristics, Transistor as a switch and amplifier.

UNIT-IV:

Junction Field Effect Transistor (FET): Construction and operation of Junction Field Effect Transistor (JFET), Volt-Ampere characteristics- Drain and Transfer Characteristics, Comparison of BJT and FET, FET as Voltage Variable Resistor, Construction and operation of MOSFET, MOSFET characteristics in Enhancement and Depletion modes, MOSTET as a capacitor.

UNIT-V:

Transistor Biasing: BJT Biasing and Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Self Bias, Bias Stability, Bias Compensation using Diode.
FET- Biasing Techniques

TEXT BOOKS:

1. Electronic Devices and Circuits, J. Millman, C. Halkias and Satyabrata Jit, 4th Edition, Tata McGraw-Hill, 2015
2. Electronic Devices and Circuits, R. L. Boylestad and Louis Nashelsky, 11th Edition, Pearson/Prentice Hall, 2016

REFERENCES:

1. Electronic Devices and Circuits, David A. Bell, 5th Edition, Oxford
2. Basic Electronics, Principles and Applications, Chinmoy Saha, Arindam Halder, Debaati Ganguly, Cambridge, 2018

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. II Semester

(22ES1CS102) DATA STRUCTURES

TEACHING SCHEME		
L	T/P	C
3	0	3

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

COURSE OBJECTIVES:

- To introduce various searching and sorting techniques
- To demonstrate operations of linear and non-linear data structure
- To develop an application using suitable data structure

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

CO-1: Understand basic concepts of data structures and analyse computation complexity

CO-2: Apply linear data structures to implement various sorting, searching techniques

CO-3: Solve the given problem using linear data structures

CO-4: Execute the given problem using non-linear data structures

CO-5: Analyze appropriate and efficient data structure to implement a given problem

COURSE ARTICULATION MATRIX:

*(Define 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	PSO-3
CO-1	3	3	-	-	3	-	-	-	-	2	-	2	3	2	2
CO-2	3	3	2	2	3	-	-	-	2	2	-	2	2	3	2
CO-3	3	3	2	2	3	-	-	-	2	2	-	2	2	3	3
CO-4	3	3	2	2	3	-	-	-	2	2	-	2	2	3	3
CO-5	3	3	3	2	3	2	2	2	3	3	1	2	3	3	3

UNIT-I:

Introduction to Data Structures: Abstract Data Types (ADT), Asymptotic Notations. Time- Space trade off. Searching: Linear Search and Binary Search Techniques and their time complexities.

Linear Data Structures: Stacks - ADT Stack and its operations: Applications of Stacks: Recursion, Expression Conversion and evaluation.

UNIT-II:

Linear Data Structures: Queues - ADT queue, Types of Queue: Linear Queue, Circular Queue, Double ended queue, operations on each types of Queues

Linked Lists: Singly linked lists: Representation in memory, Operations: Traversing, Searching, insertion, Deletion from linked list; Linked representation of Stack and Queue.

Doubly Linked List, Circular Linked Lists: All operations

UNIT-III:

Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Binary Search Tree, AVL Tree; Tree Operations on each of the trees and their algorithms with time complexities.

B-Trees: Definition, Operations.

UNIT-IV:

Priority Queue: Definition, Operations and their time complexities.

Sorting: Objective and properties of different sorting algorithms: Quick Sort, Heap Sort, Merge Sort; Radix sort

UNIT-V:

Dictionaries: Definition, ADT, Linear List representation, operations- insertion, deletion and searching, Hash Table representation, Hash function-Division Method, Collision Resolution Techniques-Separate Chaining, open addressing-linear probing, quadratic probing, double hashing, Rehashing.

Graphs: Graph terminology –Representation of graphs –Graph Traversal: BFS (breadth first search) –DFS (depth first search) –Minimum Spanning Tree.

TEXT BOOKS:

1. Fundamental of Data Structure, Horowitz and Sahani, Galgotia Publication
2. Data Structure, Lipschutz, Schaum Series
3. Data Structures and Algorithms, Alfred V. Aho, John E. Hopperoft, Jeffrey D. Ullman

REFERENCES:

1. Algorithms, Data Structures, and Problem Solving with C++, Mark Allen Weiss, Addison-Wesley Publishing Company
2. How to Solve it by Computer, 2nd Impression, R. G. Dromey, Pearson Education
3. Introduction to Algorithms, Cormen, Leiserson and Rivest
4. Data Structures: A Pseudo-code Approach with C, Gilberg & Forouzan, Thomson Learning
5. Data Structures using C & C++, Ten Baum, Prentice-Hall International

ONLINE RESOURCES:

1. https://nptel.ac.in/courses/106102064
2. https://onlinecourses.swayam2.ac.in/cec19_cs04/preview

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. II 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	PSO-3
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. II Semester

(22ES2EE105) BASIC ELECTRICAL ENGINEERING LABORATORY

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 PRE-REQUISITES: Electrical Circuits

COURSE OBJECTIVES:
- To understand the construction of electrical equipment
- To apply different circuit reduction techniques using theorems
- To analyze the transient and steady state behavior of the RLC networks
- To practice the techniques to control and assess electrical machines

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Identify different parts of electrical equipment and appreciate their purpose
CO-2: Apply different network theorems to solve complex electrical circuits
CO-3: Analyze the transient and steady state behavior of the RLC networks
CO-4: Realize the compatibility of electrical machines in different engineering fields
CO-5: Control different electrical machines and evaluate their performance

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	PSO-3
CO-1	2	3	3	3	2	1	1	1	1	1	1	1	1	2	3
CO-2	2	3	3	3	2	1	1	1	1	1	1	1	1	2	3
CO-3	3	2	3	2	1	1	1	1	1	1	1	1	2	2	3
CO-4	1	1	1	1	1	3	3	1	1	1	1	1	2	2	3
CO-5	3	2	3	2	1	1	1	1	1	1	1	1	1	2	3

LIST OF EXPERIMENTS:

1. Verification of superposition and reciprocity theorems.
2. Verification of maximum power transfer theorem.
3. Verification of Thevenin's and Norton's theorems
4. Analysis of series RL, RC and RLC circuits.
5. Series resonant frequency, bandwidth and Q-factor determination for RLC network.
6. Time response of RC and RL circuits.
7. Two port network parameters –Z and Y-parameters.
8. Load test on 1- φ transformer.
9. Speed control of DC shunt motor.
10. Torque-Speed characteristics of separately excited DC motor.
11. Brake test on 3- φ Induction motor.
12. Control of synchronous generator voltage through its field excitation.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. II Semester

(22PC2EC101) ELECTRONIC DEVICES AND CIRCUITS LABORATORY

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 PRE-REQUISITES: Engineering Physics

COURSE OBJECTIVES:
- To know the characteristics of various active devices
- To verify the operation of Special purpose devices
- To verify the applications of semiconductor devices

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Analyze the characteristics of various semiconductor devices
CO-2: Implement the applications using electronic devices
CO-3: Verify the operation of Special purpose devices

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	PSO-3
CO-1	3	3	1	-	-	-	-	-	3	2	2	-	3	-	-
CO-2	3	2	2	-	-	-	-	-	3	2	2	-	3	-	-
CO-3	2	1	-	-	-	-	-	-	3	2	2	-	2	-	-

LIST OF EXPERIMENTS:

Verify any twelve experiments in H/W Laboratory

1. V-I characteristics of PN junction diode under forward and reverse bias
2. V-I characteristics of Zener diode and Zener voltage regulator
3. Half wave Rectifier without filter and with π filter.
4. Full wave Rectifier without filter and with π filter.
5. Characteristics of UJT
6. SCR Characteristics.
7. Photo diode characteristics
8. LED Characteristics
9. Input and Output characteristics of CE transistor configuration
10. Input and Output characteristics of CB transistor configuration
11. Characteristics of FET under CS configuration
12. Characteristics of MOS FET in CS Configuration
13. Transistor as a switch

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. II 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. II Semester

(22ES2CS102) DATA STRUCTURES 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 impart the basic concepts of data structures and algorithms
- To learn the concepts about searching and sorting
- To understand the basic concepts about stacks, queues, lists
- To know the concepts of trees and graphs

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

CO-1: Implement all operations on different linear data structures
CO-2: Develop all operations on different Non- linear data structures
CO-3: Apply various searching and sorting techniques
CO-4: Understand the complexity analysis of linear and non linear data structures
CO-5: Use appropriate data structure for any given problem

COURSE ARTICULATION MATRIX:

*(Define 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	PSO-3
CO-1	3	3	2	-	3	-	-	-	2	2	-	2	2	2	2
CO-2	3	3	2	2	3	-	-	-	2	2	-	2	2	3	2
CO-3	3	3	2	2	3	-	-	-	2	2	-	2	2	3	2
CO-4	2	2	1	2	-	-	-	-	2	2	-	1	3	3	3
CO-5	3	3	3	2	3	2	2	2	3	3	1	2	3	3	3

LIST OF EXPERIMENTS:

WEEK 1:

Implement Stack using Array

WEEK 2:

a) Program to convert infix expression to postfix expression.
b) Program to postfix evaluation.

WEEK 3:

Implement the following

a) Linear Queue using Array b) Circular Queue using Array

WEEK 4:

Implement Dequeue using Array

WEEK 5:
Implement Single Linked List operations

WEEK 6:
Implement following
a) Circular Linked List Operations b) Double Linked List Operations

WEEK 7:
Implement following
a) Stack using Linked List b) Queue using Linked List

WEEK 8: Lab Internal - 1

WEEK 9:
Implement BST operations

WEEK 10:
Implement B Tree operations

WEEK 11:
Implement following sorting techniques
a) Merge b) Heap c) Radix d) Quick

WEEK 12:
Implement following Hashing Techniques
a) Separate Chaining b) Linear Probing

WEEK 13:
Implement following Graph traversals
a) BFS b) DFS

WEEK 14: Internal Lab -2

TEXT BOOKS:
1. Fundamental of Data Structure, Horowitz and Sahani, Galgotia Publication
2. Data Structure, Lipschutz, Schaum Series
3. Data Structures and Algorithms, Alfred V. Aho, John E. Hopperoft, Jeffrey D. Ullman

REFERENCES:
1. Algorithms, Data Structures, and Problem Solving with C++, Mark Allen Weiss, Addison-Wesley
2. How to Solve it by Computer, 2nd Impression, R. G. Dromey, Pearson Education
3. Introduction to Algorithms, Cormen, Leiserson and Rivest
4. Data Structures: A Pseudo-code Approach with C, Gilberg & Forouzan, Thomson Learning
5. Data Structures using C & C++, Ten Baum, Prentice Hall International

ONLINE RESOURCES:

1. https://nptel.ac.in/courses/106102064
2. https://onlinecourses.swayam2.ac.in/cec19_cs04/preview

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. II Semester

(22MN6HS102) ENVIRONMENTAL SCIENCE

TEACHING SCHEME		
L	T/P	C
2	0	0

EVALUATION SCHEME			
SE-I	SE-II	SEE	TOTAL
50	50	-	100

COURSE PRE-REQUISITES: Basic knowledge on environmental issues

COURSE OBJECTIVES:
- To recognize the impacts of human interventions towards environment
- To list out the benefits in creating a sustainable world
- To sketch out various activities in achieving a cleaner environment
- To emphasize the role of frontier technologies for a better planet to live

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Gain a variety of experiences & acquire a basic knowledge about the environment & its allied problems
CO-2: Interpret the key components in safeguarding the environment
CO-3: Appraise the quality of environment in order to create a healthy atmosphere
CO-4: Familiarize with the importance of emerging technologies towards green revolution

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	-	-

MODULE 1:
Introduction to Environmental Science: Importance of Environmental Science, Overview of the environment & its components, Human intervention in destruction or sustenance of environment. Relationship between environmental science & society - Influence of Industry, Innovation & infrastructure on environment

MODULE 2:
Synergy With Environment: Health & Well Being-ensuring healthy lives and promoting wellbeing at all ages. Reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination. Life under water and on land-conservation & sustainable usage, measures to protect marine & coastal ecosystems from various impacts. Protect and restore terrestrial ecosystems, sustainably managing forests, combat desertification. Biodiversity a valuable resource- biological diversity as a support for food, water, medicine, shelter, cleaning of air and water and other material goods for sustaining life and increase resilience

MODULE 3:

Climate Change: Science behind climate change-factors responsible for climate change, Scientific evidence about past climate and present. Expected consequences of climate change- Impacts of climate change on growth and development. Role of greenhouse gases- Global temperature rise & its impact on environment & human health. Carbon footprint-Briefing on Paris agreement, Identify key sectors for low carbon footprint. Climate change mitigation & adaptation strategies

MODULE 4:

Moving Towards Sustainability: Eco-Audit and its importance. Sustainable agriculture-Organic farming and hydroponics. Role of AI & IOT for efficient management of environmental issues-Health, air, water, and soil. Sustainable living practices-minimizing waste, limited use of earth's natural resources, wise use of environment and ensuring quality working/living environments

MODULE 5:

Innovations in Environmental Science: Sustainable cities and communities-case study, Responsible consumption & production- Refuse, Reduce, Reuse and Recycle with examples. Innovative approaches to waste management-smart waste management, Plastic recycling-innovative ideas.

TEXT BOOKS:

1. Environmental Studies for UG Courses, Erach Bharucha, UGC Publications, 2004
2. Environmental Studies, Rajagopalan, Oxford University Press
3. Introduction to Climate Change, Andreas Schmittner, Oregon State University, 2018

REFERENCES:

1. Green Development: Environment and Sustainability in a Developing World, Bill Adams, 4th Edition, Routledge Publishers, 2021
2. Fixing Climate, Robert Kunzig & Wallace S. Broecker, Profile Books Publisher, 2009
3. Plastic Waste and Recycling-Environmental Impact, Societal Issues, Prevention and Solutions, 1st Edition, Academic Press 2020

ONLINE RESOURCES:

1. https://www.coursera.org/learn/beyond-the-sustainable-development-goals-addressing-sustainability-and-development
2. https://www.coursera.org/specialization/climatechangeandsustainableinvesting