DEPARTMENT OF

COMPUTER SCIENCE AND ENGINEERING (DS, CYS, AIDS)

VISION OF THE DEPARTMENT

➢ To produce engineers with in-depth technical knowledge and ethical values.

➢ To incorporate ingeniousness and self-driven capabilities to the students in the fields of mezzanine technologies.

➢ To nurture the ecosystem of Innovation, Research and Development through an integrated teaching-learning environment for faculty and students.

MISSION OF THE DEPARTMENT

➢ Offer diverse curriculum in line with industry, professional and research bodies.

➢ Provide project-based learning environment for developing diverse practical capabilities.

➢ Offer advanced trainings to enable process skills and competencies.

B.TECH. CSE (CYS)

PROGRAM EDUCATIONAL OBJECTIVES

PEO-I: Provide sustainable solutions for real time cyber-attacks as a part of professional career and research. (Professional accomplishment)

PEO-II: Practice lifelong learning through pursuing higher education, professional programs, training and certifications (Continuing Education)

PEO-III: Demonstrate proactive team spirit, competencies, and ethical behavior in their careers. (Attitudes)

PEO-IV: Generate innovative solutions and explore opportunities to become entrepreneurs.

B.TECH. CSE (CYS)

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. CSE (CYS)

PROGRAM SPECIFIC OUTCOMES

PSO-1: Explore, employ, and support security systems for the networked devices and data.

PSO-2: Respond to security events, and protect devices and systems from cybersecurity risks, threats, and vulnerabilities.

PSO-3: Provide awareness to people regarding the cyber security threats and propagate ethical standards.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY HYDERABAD
B.TECH. I YEAR
COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)

I SEMESTER   **R22**

Course Code	Title of the Course	L	T	P/D	CH	C
22BS1MT101	Matrices and Calculus	3	1	0	4	4
22BS1CH102	Chemistry For Engineers	3	0	0	3	3
22ES1EE101	Basic Electrical and Electronics Engineering	3	0	0	3	3
22ES1CS101	Programming for Problem Solving	3	0	0	3	3
22ES1CY101	Introduction to Cyber Security	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
22ES2EE101	Basic Electrical and Electronics Engineering Laboratory	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
22BS1MT103	Statistical Methods for Data Analysis	3	0	0	3	3
22HS1EN101	English for Skill Enhancement	2	0	0	2	2
22ES1CS102	Data Structures	3	0	0	3	3
22BS1PH102	Applied Physics	3	0	0	3	3
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
22ES2ME102	Engineering and IT Workshop	1	0	2	3	2
22SD5CS101	Elements of Computer Science and Engineering	0	0	2	2	1
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

(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

(22ES1EE101) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

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 use of Electrical Energy in different engineering fields
* To analyze electrical circuits using different network reduction techniques
* To know the working & construction of electrical machines, electronic devices and
* components
* To identify different LT electrical installation components and know the safety measures

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

CO-1: Appreciate the role of Electrical Energy in various engineering branches and analyze the DC circuits using various network reduction techniques

CO-2: Analyze the various electrical parameters of AC circuits with R-L-C elements

CO-3: Understand the operation of various Electrical Machines

CO-4: Know about Low Voltage Electrical Installation components and the safety measures

CO-5: Get familiarized with different electronic components and to find their suitability in the relevant fields of engineering

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

UNIT - I:

Introduction to Electrical Energy and DC Circuits: The role of Electrical Energy in modern life and various engineering branches- Circuit Concept – Types of Elements- R-L-C parameters – Voltage and Current sources – Independent and dependent sources- Kirchhoff's laws – network reduction techniques: series, parallel, series parallel, star/delta transformations, Superposition theorem, Thevenin's theorem.

UNIT - II:

Steady State AC Circuits: Representation of sinusoidal waveforms, average and RMS values, form factor and peak factor, phasor representation, Analysis of single-phase AC circuits consisting of R, L, C, series RL, RC, RLC combinations, real power, reactive power, apparent power, power factor - Three-phase balanced circuits, voltage and current relations in star and delta connections (Derivation only).

UNIT-III:

Transformers and DC Machines: Transformer principle, Ideal and Practical Transformers, Equivalent circuit, Regulation and Efficiency,
Basic Construction of DC machine, DC generator principle, Emf equation, DC motor principle, back Emf, Load characteristics and speed control of separately excited DC motor.

UNIT-IV:

Alternating Current Machines: Three phase induction motor, types, principle, torque Slip characteristics, Working principle of Synchronous generator.
Electrical Installations and Batteries: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, MCCB, Types of Wiring, Earthing: Need of earthing, Types (Pipe and Plate earthing), classification of batteries, working and electrical characteristics of Lead Acid battery.

UNIT-V:

Semi-Conductor Devices and Data Acquisition: P-N junction diode, symbol, V-I Characteristics, Diode Applications: Half wave, Full wave rectifiers. Bipolar Junction Transistor construction (NPN and PNP transistors), Common-Emitter configuration, Transistor as an amplifier. A/D and D/A converters, Data Acquisition and Control.

TEXT BOOKS:
1. Basic Electrical Engineering, D. C. Kulshreshtha, 2nd Edition, TMH, Revised 2019
2. Basic Electrical Engineering, P. Ramana, M. Suryakalavathi, G. T. Chandra Sekhar, 1st Edition, S. Chand Technical Publications, 2018
3. Electronic Devices and Circuits, S. Salivahanan and N. Suresh Kumar, 3rd Edition TMH, 2019

REFERENCES:
1. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
2. Electrical Engineering Fundamentals, Vincent Deltoro, 2nd Edition, Prentice Hall India, 1989
3. Electrical and Electronics Measurements and Instrumentation, A. K. Sawhney, 3rd Edition, Dhanpat Rai & Co 1983
4. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, 3rd Edition, Tata McGraw Hill, 2010
5. Engineering Circuit Analysis, William Hayt and Jack E. Kemmerly, 8th Edition, McGraw Hill, 2013

ONLINE RESOURCES:
https://nptel.ac.in/courses/108108076

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

(22ES1CY101) INTRODUCTION TO CYBER SECURITY

TEACHING SCHEME		
L	T/P	C
2	0	2

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

COURSE OBJECTIVES:
- To gain knowledge on the various properties of the Integers
- To understand various algorithms for the computation over large integers
- To get insights into the algebraic structures used in the Security
- To be familiar with the concept of cybercrimes and cyber security
- To learn cyber security components and the primitives used in the data security

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Analyse primality testing and integer factorization algorithms
CO-2: Analyse large integer computations over Zn
CO-3: Develop algorithms for computations in groups, rings, and fields
CO-4: Examine the need of security on the internet
CO-5: Apply the cryptographic algorithms against attack models

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

UNIT-I:
Basic Properties of Integers: Divisibility and primality, Greatest Common Divisors, Unique Factorization, Congruences, Residue classes, Euler's Phi function, Fermat Little Theorem.

UNIT-II:
Computation with Large Integers: Basic Integer Arithmetic, Computing in Zn, Basic Euclidean Algorithm, Extended Euclidean Algorithm, Modular Inverse, Chinese Remainder Theorem.

UNIT-III:
Algebraic Structures: Group- Cosets and Quotient Groups, Cyclic Groups, Rings-Definition, Polynomial rings, Ideals and quotient rings, Fields-Definition, Existence of Finite Fields, Congruence, Quadratic residue, Vector Spaces-Linear Dependence and Independence, Basis.

UNIT-IV:
Introduction to Cyber Security: History and impact of Internet, Reasons of Cybercrime, Need of Cyber Security, History of Cyber Security, Types of Cyber Crimes: Phishing Crimes, Identity Theft, Cyber Bullying, Stalking, Hacking- Ethical and Unethical Hacking, Types of Hackers.

UNIT-V:
Cyber Security Components:
Network Security: Basics, Types of Network Attacks- Unauthorized access, Man in the Middle Attack, Data Security- Notation and attack models, Private and Public-key Cryptography, Perfect Secrecy, One-time Pad, Shannon Theorem, One-Way Function, Proof by Reduction.

TEXT BOOKS:
1. A Computational Introduction to Number Theory and Algebra, Victor Shoup, Cambridge University Press, 2008
2. Introduction to Cyber Security: Guide to the world of Cyber Security, Anand Shinde, Notion Press, 2021
3. Introduction to Modern Cryptography, Jonathan Katz and Yehuda Lindell, CRC Press, 2014

REFERENCES:
1. A Course in Computational Algebraic Number Theory, Henri Cohen, Springer-Verlag, 2000
2. Computational Number Theory, Abhijit Das, Cambridge University Press, 2013
3. Course on Number Theory and Cryptography, Neil Koblitz, Springer Verlag, 1986
4. Handbook of Applied Cryptography, Menezes A. et al, CRC Press, 1996

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

(22ES2EE101) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING 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 Electrical and Electronics Engineering

COURSE OBJECTIVES:
- To understand the construction of electrical equipment and operation of electronic devices
- To recognize different circuit reduction techniques
- To practice the techniques to control and assess electrical machines
- To know different electric safety measures

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 reduction techniques to solve and analyze electrical circuits
CO-3: Realize the compatibility of electrical machines in different engineering fields
CO-4: Control different electrical machines and evaluate their performance
CO-5: Appreciate the operation of various electronic 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	2	3	3	3	2	1	1	1	1	1	1	1	-	-	-
CO-2	2	3	3	3	2	1	1	1	1	1	1	1	-	-	-
CO-3	3	2	3	2	1	1	1	1	1	1	1	1	-	-	-
CO-4	1	1	1	1	1	3	3	1	1	1	1	1	-	-	-
CO-5	3	2	3	2	1	1	1	1	1	1	1	1	-	-	-

LIST OF EXPERIMENTS:

1. Demonstration of safety precautions, measuring instruments, electrical and electronic components
2. Demonstration of LT switchgear components
3. Verification of KVL & KCL
4. Verification of superposition theorem
5. Verification of thevenin's theorem
6. Analysis of series RL, RC and RLC circuits
7. Load test on 1- φ transformer
8. Speed Control of DC Shunt motor
9. Brake test on 3- φ induction motor

10. Control of synchronous generator voltage through its field excitation
11. P-N junction diode characteristics
12. Transistor CE characteristics (Input and Output)

TEXT BOOKS:
1. Basic Electrical Engineering, D. C. Kulshreshtha, 2nd Edition, TMH, 2019
2. Basic Electrical Engineering, P. Ramana, M. Suryakalavathi, G. T. Chandra Sekhar, 1st Edition, S. Chand Technical Publications, 2018
3. Electronic Devices and Circuits, S. Salivahanan and N. Suresh Kumar, 3rd Edition TMH, 2019

REFERENCES:
1. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
2. Electrical Engineering Fundamentals, Vincent Deltoro, 2nd Edition, Prentice Hall India, 1989
3. Electrical and Electronics Measurements and Instrumentation, A. K. Sawhney, 3rd Edition, Dhanpat Rai & Co., 1983
4. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, 3rd Edition, Tata McGraw Hill, 2010
5. Engineering Circuit Analysis, William Hayt and Jack E. Kemmerly, 8th Edition, McGraw Hill, 2013