DEPARTMENT OF

COMPUTER SCIENCE AND ENGINEERING

VISION OF THE DEPARTMENT

To achieve academic and research excellence in essential technologies of Computer Science and Engineering by promoting a creative environment for learning and innovation.

MISSION OF THE DEPARTMENT

- To provide dynamic, innovative and flexible curriculum which equip the students with the necessary problem driven skills to strengthen their career prospects and potential to pursue higher studies.
- To foster inquisitive-driven research among students and staff so as to reinforce the domain knowledge and address contemporary societal issues.
- To inculcate ethical values, leadership qualities and professional behaviour skills for improving the living standards of people

B.TECH.

(COMPUTER SCIENCE AND BUSINESS SYSTEMS)

B.TECH. COMPUTER SCIENCE AND BUSINESS SYSTEMS

PROGRAM EDUCATIONAL OBJECTIVES

PEO-I: To equip students with the essential knowledge, skillsets and attitude to be society and Industry ready and make a meaningful contribution to the growth of the Indian economy.

PEO-II: To prepare students with fundamental concepts of Computer Science and additionally Develop an inherent capacity for liberal arts, innovative mind-set, life values and an Appreciation of sustainability issues.

PEO-III: To prepare 'Business Engineers', a cluster of engineering talent tuned to the needs of Business 4.0.

PEO-IV: To enable students to appreciate the technologies of the future and understand the fundamental concepts of business management and develop the 'Innovation' mind-set.

PEO-V: To ensure students are future-ready with emerging topics such as Cyber Security, Machine Learning, Cloud Computing, IoT, Analytics etc. as part of the curriculum.

B.TECH. COMPUTER SCIENCE AND BUSINESS SYSTEMS

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. COMPUTER SCIENCE AND BUSINESS SYSTEMS

PROGRAM SPECIFIC OUTCOMES

PSO-1: Apply the fundamentals of mathematics, science and technology abstraction to develop computational tools and applications in the areas related to algorithms, big data analytics, machine learning, and artificial intelligence and networking.

PSO-2: Leverage new age technologies to solve contemporary challenges of varying complexity and develop 'Innovation' mind-set and entrepreneurial skills.

PSO-3: Be adept at designing business solutions using the fundamental concepts of business management, leadership and entrepreneurial skills and appreciate life values and sustainability issues.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY HYDERABAD
B.TECH. I YEAR
COMPUTER SCIENCE AND BUSINESS SYSTEMS

I SEMESTER **R22**

Course Code	Title of the Course	L	T	P/D	CH	C
22BS1MT104	Discrete Mathematics	3	0	0	3	3
22BS1MT105	Introductory Topics in Statistics, Probability and Calculus	3	0	0	3	3
22ES1CB101	Fundamentals of Computer Science	2	1	0	3	3
22ES1EE102	Principles of Electrical Engineering	3	0	0	3	3
22BS1PH103	Physics for Computing Science	3	0	0	3	3
22ES2CB101	Fundamentals of Computer Science Laboratory	0	0	2	2	1
22ES2EE102	Principles of Electrical Engineering Laboratory	0	0	2	2	1
22BS2PH103	Physics for Computing Science Laboratory	0	0	2	2	1
22HS2EN102	Business Communication and Value Science - I	1	0	2	3	2
22MN6HS101	Induction Programme	2	0	0	2	0
Total		**17**	**1**	**8**	**26**	**20**

II SEMESTER **R22**

Course Code	Title of the Course	L	T	P/D	CH	C
22BS1MT106	Linear Algebra	2	1	0	3	3
22BS1MT107	Statistical Modeling	3	0	0	3	3
22ES1CB102	Data Structures and Algorithms	2	1	0	3	3
22ES1EC101	Principles of Electronics Engineering	3	0	0	3	3
22HS1MG101	Fundamentals of Management	3	0	0	3	3
22BS2MT107	Statistical Modeling Laboratory	0	0	2	2	1
22ES2CB102	Data Structures and Algorithms Laboratory	0	0	2	2	1
22ES2EC101	Principles of Electronics Engineering Laboratory	0	0	2	2	1
22HS2EN103	Business Communication and Value Science – II	1	0	2	3	2
22MN6HS102	Environmental Science	2	0	0	2	0
Total		**16**	**2**	**8**	**26**	**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

(22BS1MT104) DISCRETE MATHEMATICS

TEACHING SCHEME		
L	T/P	C
3	0	3

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

COURSE PRE-REQUISITES: Set, Relation, Mapping, Permutations and Combinations

COURSE OBJECTIVES:
- To know the concepts of sets and relation to understand Group's and Ring theory
- To know combinatorics techniques in solving the system by various methodology
- To learn Boolean expressions, operations and truth tables
- To learn graphs serving as models for many standard problems

COURSE OUTCOMES: After completion of the course, students should be able to
CO-1: Represent characteristics of Sets, Groups, Rings and Fields
CO-2: Explain and exemplify tautology, contradiction and contingency
CO-3: Identify underlying combinatorial structures
CO-4: Analyse the design of various combinational & sequential logic circuits using the concepts of Boolean Algebra
CO-5: Apply graph theory-based tools in solving practical problems

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

UNIT-I:
Abstract Algebra: Sets, Finite sets, Power sets, Set Operations, Algebra of sets and duality, Partitions, Relations, Types of relations, Closure properties, Equivalence relations, Partial Ordering, Groups, subgroups, Lagrange's theorem on finite groups. Introduction to Ring, Integral domain and Field.

UNIT-II:
Logic: Propositional calculus - propositions and connectives, truth assignments and truth tables, validity and satisfiability, tautology; Logical Equivalence and normal forms; Algebra of propositions, Conditional and Bi-conditional statements, Logical implication, Quantifiers, Negation of quantified statements.

UNIT-III:

Combinatorics: Introduction, Basic counting, Factorial notation, Bionomial coefficients, generating functions, recurrence relations, pigeonhole principle, principle of mathematical induction.

UNIT-IV:

Boolean Algebra: Introduction of Boolean algebra, principle of duality, Basic logic gates, truth table, Boolean expressions, canonical form, Karnaugh map.

UNIT-V:

Graph Theory: Graphs, Types of Graphs, digraphs, adjacency matrix, isomorphism, Trees, Properties of trees, Spanning trees, Minimal Spanning trees using Kruskal's and Prims Algorithms. Eulerian paths and circuits in graphs and digraphs, Hamiltonian paths and circuits in graphs, Planar graphs, dual of a planer graph, Euler's formula, chromatic number, statement of Four-color theorem.

TEXT BOOKS:

1. Topics in Algebra, I. N. Herstein, 2nd Edition, John Wiley and Sons, 1975
2. Digital Logic & Computer Design, M. Morris Mano, 2nd Edition, Pearson, 2017
3. Elements of Discrete Mathematics, C. L. Liu, 2nd Edition, McGraw Hill, 1985

REFERENCES:

1. Mathematical Logic for Computer Science, L. Zhongwan, 2nd Edition, World Scientific, Singapore, 1998
2. Introduction to Linear Algebra, Gilbert Strang, 5th Edition, Wellesley, 2017
3. Introductory Combinatorics, R. A. Brualdi, 3rd Edition, North-Holland, New York, Prentice Hall, 1998
4. Graph Theory with Applications to Engineering and Computer Science, N. Deo, Prentice Hall, Englewood Cliffs, 1974
5. Introduction to Mathematical Logic, E. Mendelsohn, 2nd Edition, Van-Nostrand, London

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22BS1MT105) INTRODUCTORY TOPICS IN STATISTICS, PROBABILITY AND CALCULUS

TEACHING SCHEME		
L	T/P	C
3	0	3

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

COURSE PREREQUISUTES: Permutations, Combinations and Basic Calculus

COURSE OBJECTIVES:
- To basic probability theory and statistical parameters
- To different types of probability distributions
- To basic objectives of statistic, classification, and descriptive measures of data
- To basic optimization techniques
- To differential and integral calculus

COURSE OUTCOMES: After completion of the course, students should be able to
CO-1: Compute expected values of discrete and continuous random variables
CO-2: Identify the suitable probability distribution to solve the problems
CO-3: Classify and Analyze the given data through basic statistics
CO-4: Apply basic optimization techniques to problems involving functions of two variables
CO-5: Calculate areas and volumes of solids by applying multiple integrals

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

UNIT-I:
Basic Probability & Mathematical Expectations: Concept of experiments, sample space, event, Definition of Combinatorial Probability. Conditional Probability, Baye's Theorem. Discrete and continuous random variables, Expected values and moments: mathematical expectation and its properties, Moments (including variance) and their properties, interpretation, Moment generating function.

UNIT-II:
Probability Distributions
Discrete Distributions: Binomial, Poisson and Geometric distribution. Continuous distributions: Uniform, Exponential, Normal, Chi-square, t and F distributions

UNIT-III:

Introduction to Statistics: Definition of Statistics. Basic objectives. Applications in various branches of science with examples. Collection of Data: Internal and external data, Primary and secondary Data. Population and sample, Representative sample.

Descriptive Statistics: Classification and tabulation of univariate data, graphical representation, Frequency curves. Descriptive measures - central tendency and dispersion. Bivariate data. Summarization, marginal and conditional frequency distribution.

UNIT-IV:

Differential Calculus: Limit of functions, continuity, derivatives. Taylor's and Maclaurin's series expansions, Partial derivatives, Maxima and minima of function of two variables.

UNIT-V:

Integral Calculus: Length of a plane curve, Volume of solid of revolution, Area of surface of a solid of revolution (Cartesian form). Multiple Integrals- double integrals with constant and variable limits (Cartesian and polar form), change of order of integration (Cartesian form), triple integrals (Cartesian coordinates), applications of double and triple integrals: Area as double integration in Cartesian coordinates and Volume as a triple integration.

TEXTBOOKS:

1. Introduction of Probability Models, S. M. Ross, 11th Edition, Academic Press, 2014
2. Introduction to Probability and Statistics for Engineers and Scientists, Sheldon M. Ross, 4th Edition, Academic Press, 2009
3. Fundamentals of Statistics, A. Goon, M. Gupta and B. Dasgupta, Vol. I & II, WorldPress

REFERENCES:

1. Probability and Statistics for Engineers, I. R. Miller, J. E. Freund and R. Johnson, 4th Edition, PHI
2. Introduction to the Theory of Statistics, A. M. Mood, F. A. Graybill and D. C. Boes, McGraw Hill Education
3. Advanced Engineering Mathematics, Peter V. O'Neil, 7th Edition, Thomson Learning
4. Advanced Engineering Mathematics, M. D. Greenberg, 2nd edition, Pearson Education
5. Applied Mathematics, P. N. Wartikar and J. N. Wartikar, Vol. I & II, Vidyarthi Prakashan

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES1CB101) FUNDAMENTALS OF COMPUTER SCIENCE

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

UNIT-I:

General Problem Solving Concepts: Algorithm, and Flowchart for problem solvingwith Sequential Logic Structure, Decisions and Loops.

Operator and Expressions with discussion of variable naming and Hungarian Notation: Variable Names, Data Type and Sizes (Little Endian Big Endian), Constants, Declarations, Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion, Increment Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, proper variable naming and Hungarian Notation

UNIT-II:

Control Flow with Discussion on Structured and Unstructured Programming: Statements and Blocks, If-Else-If, Switch, Loops – while, do, for, break and continue, Goto Labels, structured and un- structured programming

UNIT-III:

Functions and Program Structure with Discussion on Standard Library: Basics of functions, parameter passing and returning type, C main return as integer, External, Auto, Local, Static, Register Variables, Scope Rules, Block structure, Initialization, Recursion, Preprocessor, Standard Library Functions and return types

UNIT-IV:

Pointers, Arrays and Structures: Pointers and address, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, character Pointers and Functions, Pointer Arrays, Pointer to Pointer, Initialization of Pointer Arrays, Command line arguments. Basic Structures, Structures and Functions, Array of structures, Pointer of structures, Self-referral Structures, Table look up, typedef, Unions, Bit-fields

UNIT-V:

Input and Output, Unix System Interface, Programming Method: Standard I/O, Formatted Output – printf, Formatted Input – scanf, Variable length argument list, file access including FILE structure, fopen, stdin, sdtout and stderr, Error Handling , Low level I/O – read and write, Open, create, close and unlink, Random access – lseek, Discussions on Listing Directory,. Macro, User Defined Header, User Defined Library Function, make file utility.

TEXT BOOKS:

1. The C Programming Language, B. W. Kernighan and D. M. Ritchi, 2nd Edition, PHI
2. Programming in C, B. Gottfried, 2nd Edition, Schaum Outline Series
3. Let Us C, Yashavant P. Kanetkar, 16th Edition, 2019, BPB Publications

REFERENCES:

1. C: The Complete Reference, Herbert Schildt, 4th Edition, McGraw Hill
2. Problem Solving with C, Jacqueline A. Jones and Keith Harrow, Pearson Education
3. Programming in ANSI C, E. Bal Guruswamy, 8th Edition, McGraw Hill Education, 2019
4. A Book on C, Al Kelley, Ira Pohl, 4th Edition, Pearson Education
5. Stephen G. Kochan, Programming in C, CBS Publishers

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES1EE102) PRINCIPLES OF ELECTRICAL ENGINEERING

TEACHING SCHEME		
L	T/P	C
3	0	3

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

COURSE PRE-REQUISITES: Physics, Mathematics

COURSEOBJECTIVES:
- To understand the basic concepts of electrical and magnetic circuits
- To understand the electromechanical energy conversion process in machines
- To identify the types of sensors and measure quantities in AC and DC systems
- To study various electrical installation components and safety measures

COURSE OUTCOMES: After completion of the course, the student Should be able to
CO-1: Understand the basic concepts and terminology of electrical quantities
CO-2: Analyze the DC circuit using various network theorems
CO-3: Analyze the electrical parameters of AC circuits with R-L-C elements
CO-4: Understand the concepts of Electro-static, Electromagnetic fields, and operation of Electrical Machines
CO-5: Understand the components of Low Voltage Electrical Installations and the safety measures

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

UNIT-I:
Basic Circuit Concepts and Theorems: Concept of voltage, potential difference, current- Fundamental linear passive and active elements to their functional current-voltage relation, independent voltage source and Independent current sources: ideal and practical sources, Kirchhoff's laws-series and parallel connections-Network solutions using mesh and nodal analysis, Theorems: Thevenin's and Norton's theorems, Superposition theorem.

UNIT-II:
AC Circuit Analysis: Representation of Sinusoidal waveform- RMS and average values, form factor and peak factor-series RL, RC and RLC circuits -phasorre presentation in polar and rectangular form, concept of impedance, admittance - active, reactive,

and apparent powers, power factor-Three phase balanced circuits: Star and delta connections (Derivation Only)

UNIT-III:

Electro Static and Electro Magnetic Fields: Electro static Fields: electric field intensity and strength, energy stored in a capacitor, charging, and discharging of capacitors absolute and relative permitivities.

Electromagnetic Fields: Magneto Motive Force, Flux Density, Faraday's laws of Electromagnetic Induction, self and mutual inductances, series magnetic circuit, magnetic materials and BHcurve.

UNIT-IV:

Transformers and DC Machines:

Transformer: Single phase transformer principle, emf equation, Transformation ratio, ideal and practical transformer, losses in a transformer, Efficiency and Voltage regulation (Elementary Treatment only)

DC Machines: DC generator construction, principle, emf generated, types of DC generators, DC motor principle, back emf.

UNIT-V:

Measurements, Electrical Installation and Safety Measures: Introduction to electrical measurements, types of instruments, indicating type instruments (MC andMI) (Elementary treatment only)

Electrical Installation and Safety Measures: 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.

TEXTBOOKS:

1. Basic Electrical Engineering, D. C. Kulshreshtha, 2nd Edition, TMH, 2019
2. Basic of Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford University Press, 2011
3. Electromagnetic Field Theory, K. A. Gangadhar, P. M. Ramanathan, 16th Edition, Khanna, 2011

REFERENCES:

1. Basic Electrical Engineering, V. K. Mehta, S. Chand and Company Ltd.
2. Circuits and Networks Analysis and Synthesis, A. Sudhakar, Shyammohan S. Palli, Tata McGraw-Hill, 2010
3. Engineering Electromagnetics, William H. Hayt, Jr. John A. Buck, 8th Revised Edition, McGraw-Hill Higher Education, 2011
4. Fundamentals of Electrical and Electronics Engineering, Smarjith Ghosh, Prentice Hall (India)Pvt. Ltd., 2010.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22BS1PH103) PHYSICS FOR COMPUTING SCIENCE

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 discuss the fundamentals of oscillatory systems
- To analyze various phenomena of light- Interference, Diffraction and Polarization
- To apply the basic principles of LASER to various laser systems and optical fibers
- To explain the basic concepts in electromagnetism, quantum physics and semiconductors
- To understand the crystal structures and state the laws of thermodynamics

COURSE OUTCOMES: After completion of the course, the student should be able to
CO-1: Describe the fundamentals of oscillatory systems
CO-2: Extend the importance of Interference in thin films, diffraction and Polarization
CO-3: Explain the lasing action of various laser sources and optical fiber materials
CO-4: Apply the concepts of electromagnetism, quantum mechanics and semiconductors for engineering applications
CO-5: Recall the importance crystal structures and applications of thermodynamics

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

UNIT-I:
Oscillations: Periodic motion-simple harmonic motion-characteristics of simple harmonic motion-vibration of simple spring- mass system. Resonance-definition., damped harmonic oscillator – heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators.

UNIT-II:
Wave Optics: Interference-principle of superposition-young's experiment, Temporal and Spatial Coherence, Theory of interference fringes-types of interference-Fresnel's prism-Newton's rings, Diffraction- Two kinds of diffraction-Difference between interference and diffraction-Fresnel's half period zone and zone plate-Fraunhofer diffraction at single slit-plane diffraction grating.

Polarization of Light: Polarization, Concept of production of polarized beam of light from two SHM acting at right angle; plane, elliptical and circularly polarized light, Brewster's law, double refraction.

UNIT-III:

Laser and Fiber Optics:

Properties of Laser Beams: mono-chromaticity, coherence, directionality and brightness, Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: Ruby Laser, CO2 and Neodymium lasers; laser speckles, applications of lasers in engineering.
Fiber optics, Types of optical fibers and Applications.

UNIT-IV:

Quantum Mechanics: Introduction - Planck's quantum theory- Matter waves, de-Broglie wavelength, Heisenberg's Uncertainty principle, time independent and time dependent Schrödinger's wave equation, Physical significance of wave function, Particle in a one dimensional potential box, Heisenberg Picture.
Semiconductor Physics: Basic concept of Band theory; conductor, semiconductor and Insulator.
Basic Idea of Electromagnetism: Continuity equation for current densities, Maxwell's equations in vacuum and non-conducting medium.

UNIT-V:

Crystallography: Basic terms-types of crystal systems, Bravais lattices, miller indices, d spacing, Atomic packing factor for SC, BCC, FCC and HCP structures.
Thermodynamics: Zeroth law of thermodynamics, first law of thermodynamics, brief discussion on application of 1st law, second law of thermodynamics and concept of Engine, entropy, change in entropy in reversible and irreversible processes.

TEXTBOOKS:

1. Concepts of Modern Physics, Beiser A., 5th Edition, McGraw-Hill International
2. Fundamentals of Physics, David Halliday, Robert Resnick, Jearl Walker, Wiley
3. Physics for Computer Science Students: With Emphasis on Atomic and Semiconductor Physics, Damask, A., Garcia, N., Springer, 2012

REFERENCES:

1. Optics, Ajoy Ghatak, 5th Edition, Tata McGraw Hill
2. University Physics, Sears & Zemansky, Addison-Wesley
3. Fundamentals of Optics, Jenkins and White, 3rd Edition, McGraw-Hill
4. College Physics, Urone P. P., Brooks/Cole, 1997
5. Polarized Light and Optical Systems, Young G., Lam W. S. T., Chipman R. A., CRC Press, 2018

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES2CB101) FUNDAMENTALS OF COMPUTER SCIENCE 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 the 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, 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	PSO-3
CO-1	2	2	3	2	1	-	-	-	2	2	-	2	3	-	-
CO-2	2	2	3	2	1	1	-	-	2	2	-	2	3	1	-
CO-3	1	2	3	1	1	1	-	-	2	2	2	2	3	1	-
CO-4	1	2	3	1	1	1	-	-	2	2	2	2	3	1	-
CO-5	2	2	2	2	1	1	-	-	2	2	2	2	3	1	-

LIST OF PROGRAMS:

WEEK 1:

Algorithm and flowcharts of small problems like GCD Structured code writing with:

WEEK 2:

Small but tricky codes

WEEK 3:

Proper parameter passing

WEEK 4:
Command line Arguments

WEEK 5:
Variable parameter

WEEK 6:
Pointer to functions

WEEK 7:
User defined header

WEEK 8:
Make file utility

WEEK 9:
Multi file program and user defined libraries

WEEK 10:
Interesting substring matching / searching programs

WEEK 11 & WEEK 12:
Parsing related assignments

TEXT BOOKS:

1. The C Programming Language, B. W. Kernighan and D. M. Ritchi, 2nd Edition, PHI
2. Programming in C, B. Gottfried, 2nd Edition, Schaum Outline Series
3. Let Us C, Yashavant P. Kanetkar, 16th Edition, BPB Publications, 2019

REFERENCES:

1. C: The Complete Reference, Herbert Schildt, 4th Edition, McGraw Hill
2. Problem Solving with C, Jacqueline A. Jones and Keith Harrow, Pearson Education
3. Programming in ANSI C, E. Balaguruswamy, 8th Edition, McGraw Hill Education, 2019
4. A Book on C, Al Kelley, Ira Pohl, 4th Edition, Pearson Education
5. Programming in C, Stephen G. Kochan, CBS Publishers

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22ES2EE102) PRINCIPLES OF 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: Principles of Electrical Engineering

COURSE OBJECTIVES:
- To design electrical systems
- To analyse a given network by applying various network theorems
- To verify phase relationships in star and delta connected three phase networks
- To study various electrical safety precautions

COURSE OUTCOMES: After completion of the course, the students should be able to
CO-1: Understand the basic concepts and terminology of electrical quantities
CO-2: Analyse the DC circuits using various network theorems
CO-3: Analyse the electrical parameters of AC circuits with R-L-C elements
CO-4: Control different electrical machines and Transformers and evaluate their performance using different testing methods
CO-5: Simulate the electrical circuits using suitable software

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

LIST OF EXPERIMENTS:

1. Demonstration of safety precautions, measuring instruments and electrical installation components
2. Verification of KVL and KCL
3. Verification of Thevenin's theorem
4. Verification of Norton's theorem
5. Verification of Superposition theorem
6. Analysis of single-phase RL, RC and RLC series circuits
7. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
8. Verification of voltage and current relationships in a star connected balanced three Phase Circuit
9. Measurement of electrical quantities in DC and AC circuits
10. Open circuit characteristics of separately excited DC generator

11. Simulation of series RLC circuit (XL>XC, and XL< XC)
12. Simulation of time response of RC circuit

TEXT BOOKS:

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath, 4th Edition, Tata McGraw Hill, 2019
2. Basic Electrical Engineering, M. S. Naidu and S. Kamakshaiah, 2nd Edition, Tata McGraw Hill, 2008

REFERENCES:

1. Basic Electrical Engineering, P. Ramana, M. Suryakalavathi, G. T. Chandrashekar, 2nd Edition, S. Chand, 2019
2. Basic Electrical Engineering, D. C. Kulshreshtha, McGraw Hill, 2009
3. Basic Electrical and Electronics Engineering, M. S. Sukhija, T. K. Nagsarkar, 1st Edition, Oxford, 2012
4. Basic Electrical Engineering, Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, 2nd Edition, McGraw Hill, 2021
5. Electrical and Electronics Technology, E. Hughes, Pearson, 2010

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. I Semester

(22BS2PH103) PHYSICS FOR COMPUTING SCIENCE 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 verify Biot –Savart law
- To study hall co-efficient of semiconductor
- To determine Planck's and Stefan's constant.
- To practically learn interaction of light with matter through physical phenomena like interference, diffraction and total internal reflection
- To compare the experimental results with the classroom learning

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

CO-1: Realize tangent law of magnetism

CO-2: Demonstrate the optical phenomena with formation of Newton Rings and to evaluate grating parameters

CO-3: Evaluate the Planck's and Stefan's constant

CO-4: Demonstrate the optical phenomena with formation of Newton Rings and to evaluate grating parameters

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. Magnetic field along the axis of current carrying coil – Stewart and Gee
2. Determination of Hall coefficient of semi-conductor
3. Determination of Plank constant
4. Determination of wavelength of light by Laser diffraction method
5. Determination of wavelength of light by Newton's Ring method
6. Determination of laser and optical fiber parameters
7. Determination of Stefan's Constant

TEXT BOOKS:

1. Physics for Computing Science 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

(22HS2EN102) BUSINESS COMMUNICATION AND VALUE SCIENCE – I

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 PRE-REQUISITES:

- Basic communication in tenses (past, present, future)
- Awareness of common words (adjectives used in daily verbal communication)
- Basic idea of sentence formation and thereby paragraph building and writing
- Communication according to daily and varied contextual scenarios
- Basic communication model/channel (sender, receiver and feedback), Active and passive listening skills
- Basic social etiquettes and knowledge of group work and communication that will enhance their professional growth

COURSE OBJECTIVES:

- To understand what life skills are and their importance in leading a happy and well-adjusted life
- To motivate students to look within and create a better version of self
- To introduce them to key concepts of values, life skills and business communication
- To enable them to practice basic communication

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

CO-1: Recognize the need for life skills and values
CO-2: Recognize own strengths and opportunities
CO-3: Apply the life skills to different situations
CO-4: Understand the basic tenets of communication
CO-5: Apply basic communication practices in real life situations

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

UNIT-I:

Overview of Leadership Oriented Learning:

i. Self Introduction
ii. Recognise the need of life Skills and Values
iii. Overview of Business Communication

iv. Identify Strengths and Opportunities- Identity, body awareness
v. Stress- Management

UNIT-II:

Essential Grammar:

i. Parts of speech
ii. Tenses
iii. Sentence Formation (General & technical)
iv. Common errors
v. Voices

UNIT-III:

Overview of Communication Skills:

i. Importance of effective communication
ii. Types of communication- verbal and non - verbal
iii. Barriers of communication, effective communication
iv. Importance of Questioning
v. Listening Skills: Law of nature- Importance of listening skills, Difference between listening and hearing; Types of listening.

UNIT-IV:

Written Communication:

i. Letter Writing –Formal and Informal letter writing, Application letters, Job application letter
ii. Summary writing
iii. Story Writing
iv. Report writing
v. Building Curriculum Vitae.

UNIT-V:

Realities of Facing Life:

i. Stress management Working with rthym and balance, Team work
ii. Need for Life skills and values, their importance, Critical life skills
iii. Multiple Intelligences- Embracing diversity
iv. Values: Leadership, Teamwork, dealing with ambiguity, motivation, creativity, result orientation.

Note: Handouts and reference links will be shared

REFERENCES:

1. Strategic Writing, Charles Marsh
2. The Seven Basic Plots, Christopher Booker
3. Business Communication, Saroj Hiremath
4. English vocabulary in Use, Alan McCarthy and O'Dell

WEB REFERENCES:

1. Train your mind to perform under pressure- Simon sinekhttps://curiosity.com/videos/simon-sinek-on-training-your-mind-to-perform-under-pressure-capture-your-flag/
2. Brilliant way one CEO rallied his team in the middle of layoffshttps://www.inc.com/video/simon-sinek-explains-why-you-should-put-people-before-numbers.html

3. Will Smith's Top Ten rules for success https://www.youtube.com/watch?v=bBsT9omTeh0

ONLINE RESOURCES:

1. https://www.coursera.org/learn/learning-how-to-learn
2. https://www.coursera.org/specializations/effective-business-communication