GLOBAL INSTITUTE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)
COURSE CATALOGUE
REGULATIONS B.TECH – GR - 25
COMPUTER SCIENCE AND ENGINEERING
I YEAR II SEMESTER

Course Code	Course Name	Subject Area	Category	Periods Per Week			Credits	Scheme of Examination Max Marks		
				L	T	P		CIA	SEE	Total
THEORY										
MA201BS	Ordinary Differential Equations and Vector Calculus	BSC	Foundation	3	0	0	3	40	60	100
EE202ES	Basic Electrical Engineering	ESC	Foundation	3	0	0	3	40	60	100
PH203BS	Advanced Engineering Physics	BSC	Foundation	3	0	0	3	40	60	100
CS204ES	Data Structures	ESC	Foundation	3	0	0	3	40	60	100
ME205ES	Computer Aided Engineering Drawing	ESC	Foundation	2	0	2	3	40	60	100
PRACTICAL										
EE206ES	Basic Electrical Engineering Lab	ESC	Foundation	0	0	2	1	40	60	100
PH207BS	Advanced Engineering Physics Lab	BSC	Foundation	0	0	2	1	40	60	100
CS208ES	Data Structures Lab	ESC	Foundation	0	0	2	1	40	60	100
CS209ES	Python Programming Lab	ESC	Foundation	0	0	2	1	40	60	100
CS210ES	IT Workshop	ESC	Foundation	0	0	2	1	40	60	100
			Total Credits	**14**	**0**	**12**	**20**			

COURSE CONTENT

ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS								
I Year - II Semester: ECE, CSE, CSE (AI & ML), CSE (Data Science), CE & ME								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
MA201BS	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**-**	**-**	**3**	**40**	**60**	**100**
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil				**Total Classes: 48**		
Prerequisite: Mathematical Knowledge at the pre-university level								

1. COURSE OVERVIEW

This course serves as a foundation course on differential equations and vector calculus. It includes techniques for solving ordinary differential equations, partial differential equations, vector differentiation and vector integration. It is designed to extract the mathematical developments, and skills, from basic concepts to advanced level of engineering problems to meet technological challenges.

2. COURSE OBJECTIVE

The students will try to Learn:

1) Methods of solving the differential equations of first and higher order.
2) Concept, properties of Laplace transforms
3) Solving ordinary differential equations using Laplace transform techniques
4) The physical quantities involved in the engineering field related to vector-valued functions
5) The basic properties of vector-valued functions and their applications to line, surface and volume integrals

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Identify whether the given differential equation of first order is exact or not.
CO 2	Solve higher differential equations and apply the concept of differential equations to real-world problems.
CO 3	Use the Laplace transforms techniques to solve ODEs.
CO 4	To find Gradient, Divergence, Curl and Vector identities
CO 5	Evaluate the line, surface and volume integrals and convert them from one to another

4. COURSE CONTENT

UNIT - I: First Order Ordinary Differential Equations **8 L**

Exact differential equations – Equations reducible to exact differential equations – linear and Bernoulli's equations – Orthogonal Trajectories (only in Cartesian Coordinates).

Applications: Newton's law of cooling – Law of natural growth and decay.

UNIT - II: Ordinary Differential Equations of Higher Order **10 L**

Second-order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, sinax , cosax, polynomials in $x, e^{ax}V(x), and\ xV(x)$, Method of variation of parameters.

UNIT - III: Laplace Transforms **10 L**

Laplace Transforms: Laplace Transform of standard functions – First shifting theorem – Laplace transforms of functions multiplied by 't' and divided by 't' – Laplace transforms of derivatives and integrals of function – Evaluation of integrals by Laplace transforms – Laplace transform of periodic functions – Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method.

UNIT - IV: Vector Differentiation **10 L**

Vector point functions and scalar point functions – Gradient – Divergence and Curl – Directional derivatives – Vector Identities – Scalar potential functions – Solenoidal and Irrotational vectors**.**

UNIT-V: Vector Integration **10 L**

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

5. TEXT BOOKS

1) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2) R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.

6. REFERENCE BOOKS

1) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3) N.P. Bali and Manish Goyal, A textbook of Engineering Mathematics, Laxmi Publications,
4) Reprint, 2008.
5) H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

CO-PO-PSO Mapping

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

COURSE CONTENT

BASIC ELECTRICAL ENGINEERING								
I Year - II Semester: CSE								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
EE202ES	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**-**	**-**	**3**	**40**	**60**	**100**
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil				**Total Classes: 48**		
Prerequisite:								

1. COURSE OVERVIEW

This course provides fundamental knowledge of electricity, circuit laws, and electrical machinery, serving as a core subject for many engineering branches

2. COURSE OBJECTIVE

The students will try to Learn:

1) To understand DC and Single & Three phase AC circuits.
2) To study and understand the different types of DC, AC machines and Transformers.
3) To import the knowledge of various electrical installations and the concept of power, power factor and its improvement.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Understand and analyze basic Electrical circuits
CO 2	Study the working principles of Electrical Machines and Transformers
CO 3	Introduce components of Low Voltage Electrical Installations

4. COURSE CONTENT

UNIT – I:

D.C. Circuits: Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time domain analysis of first-order RL and RC circuits.

UNIT – II:

AC. Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance in series R-L-C circuit. Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT - III:

Transformers: Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

UNIT - IV:

Electrical Machines: Construction and working principle of dc machine, performance characteristics of dc shunt machine. Generation of rotating magnetic field, Construction and working of a three-phase induction motor, Significance of torque-slip characteristics. Single-phase induction motor, Construction and working. Construction and working of synchronous generator.

UNIT - V:

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

5. TEXT BOOKS

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

6. REFERENCE BOOKS

1) P. Ramana, M. Suryakalavathi, G.T. Chandrasheker, "Basic Electrical Engineering", S. Chand, 2nd Edition, 2019.
2) D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3) M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.
4) Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.
5) L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6) E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
7) V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989

7. ELECTRONIC RESOURCES

1) **https://nptel.ac.in/courses/108108076**

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	**3**	**3**	**2**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**2**	**2**
CO 2	**3**	**3**	**2**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**2**	**2**
CO 3	**3**	**3**	**2**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**1**	**1**	**2**	**2**

COURSE CONTENT

ADVANCED ENGINEERING PHYSICS								
I Year - I Semester: CE, ME, ECE, CSE(AIML), CSE(DS) **I Year - II Semester: CSE**								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
PH203BS	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**-**	**-**	**3**	**40**	**60**	**100**
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil				**Total Classes: 48**		
Prerequisite: 10+2								

1. COURSE OVERVIEW

This course provides engineering students with a foundational understanding of key physics concepts relevant to advanced materials, quantum mechanics, modern technologies, and engineering applications. It bridges theory and practical knowledge crucial for material characterization, quantum computing, magnetic and dielectric properties, and photonic technologies.

2. COURSE OBJECTIVE

The students will try to Learn:

1) The crystal structures, defects, and material characterization techniques like XRD and SEM.
2) The fundamental concepts of quantum mechanics and their applications in solids and nanomaterials.
3) The quantum computing principles, quantum gates, and basic quantum algorithms.
4) The properties and applications of magnetic and dielectric materials.
5) To explore the working and applications of lasers and fibre optics in modern technology.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Analyse crystal structures, identify defects, and apply XRD and SEM techniques for material characterization.
CO 2	Apply quantum mechanical principles to explain particle behaviour and energy band formation in solids
CO 3	Understand quantum computing concepts, use quantum gates, and explain basic quantum algorithms.
CO 4	Classify magnetic and dielectric materials and explain their properties, synthesis, and applications.
CO 5	Explain the principles of lasers and fibre optics and their applications in communication and sensing.

4. COURSE CONTENT

UNIT – I:

Crystallography & Materials Characterization: Introduction: Unit cell, space lattice, basis, lattice parameters; crystal structures, Bravais lattices, packing factor: SC, BCC, FCC; Miller indices, inter-planar distance; defects in crystals (Qualitative): point defects, line defects, surface defects and volume defects. concept of nanomaterials: surface to volume ratio, X -ray diffraction: Bragg's law, powder method, calculation of average crystallite size using Debye Scherrer's formula, scanning electron microscopy (SEM): block diagram, working principle.

UNIT – II:

Quantum Mechanics : Introduction, de-Broglie hypothesis, Heisenberg uncertainty principle, physical significance of wave function, postulates of quantum mechanics: operators in quantum mechanics, eigen values and eigen functions, expectation value; Schrödinger's time independent wave equation, particle in a 1D box, Bloch's theorem (qualitative), Kronig-Penney model (qualitative): E-k diagram, effective mass of electron, formation of energy bands, origin of bandgap, classification of solids, concept of discrete energy levels and quantum confinement in nanomaterials.

UNIT - III:

Quantum Computing: Introduction, linear algebra for quantum computation, Dirac's Bra and Ket notation and their properties, Hilbert space, Bloch's sphere, concept of quantum computer, classical bits, Qubits, multiple Qubit system, quantum computing system for information processing, evolution of quantum systems, quantum measurements, entanglement, quantum gates, challenges and advantages of quantum computing over classical computation, quantum algorithms: Deutsch-Jozsa, Shor, Grover.

UNIT - IV:

Magnetic and Dielectric Materials: Introduction to magnetic materials, origin of magnetic moment-classification of magnetic materials, hysteresis, Weiss domain theory of ferromagnetism, soft and hard magnetic materials, synthesis of ferrimagnetic materials using sol-gel method, applications: magnetic hyperthermia for cancer treatment, magnets for EV, Giant Magneto Resistance (GMR) device. Introduction to dielectric materials, types of polarization (qualitative): electronics, ionic & orientation; ferroelectric, piezoelectric, pyroelectric materials and their applications: Ferroelectric Random-Access Memory (Fe-RAM), load cell and fire sensor.

UNIT - V:

Laser and Fibre Optics: Introduction to laser, characteristics of laser, Einstein coefficients and their relations, metastable state, population inversion, pumping, lasing action, Ruby laser, He-Ne laser, CO2 laser, semiconductor diode laser, applications: Bar code scanner, LIDAR for autonomous vehicle. Introduction to fibre optics, total internal reflection, construction of optical fibre, acceptance angle, numerical aperture, classification of optical fibres, losses in optical fibre, applications: optical fibre for communication system, sensor for structural health monitoring.

5. TEXT BOOKS

1) Walter Borchardt-Ott, Crystallography: An Introduction, Springer.
2) Charles Kittel, Introduction to Solid State Physics, John Wiley & Sons, Inc.
3) Thomas G. Wong, Introduction to Classical and Quantum Computing, Rooted Grove

6. REFERENCE BOOKS

1) Jozef Gruska, Quantum Computing, McGraw Hill
2) Michael A. Nielsen & Isaac L. Chuang, Quantum Computation and Quantum Information, Cambridge University Press.
3) John M. Senior, Optical Fiber Communications Principles and Practice, Pearson Education Limited.

CO-PO-PSO Mapping

	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**	**2**	**2**							**3**	**3**	**2**
CO 2	**3**	**3**	**2**	**2**	**2**							**3**	**3**	**3**
CO 3	**3**	**2**	**3**	**2**	**3**							**3**	**3**	**3**
CO 4	**3**	**2**	**2**	**2**	**2**		**2**					**2**	**3**	**2**
CO 5	**3**	**2**	**2**	**3**	**3**		**2**					**3**	**3**	**3**

COURSE CONTENT

DATA STRUCTURES								
I Year - II Semester: CSE								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CS204ES	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**-**	**-**	**3**	**40**	**60**	**100**
Contact Classes: 48	Tutorial Classes: Nil	Practical Classes: Nil				**Total Classes: 48**		
Prerequisite:								

1. COURSE OVERVIEW

The "Data Structures " course provides a comprehensive understanding of data structures and their implementation using the C programming language. Students will explore foundational and advanced data structures, including linear lists, stacks, queues, search trees, hash tables, graphs, and tries. The course emphasizes designing and implementing efficient algorithms for operations such as searching, sorting, and pattern matching. By the end of the course, students will be equipped with the skills to solve real-world computational problems and optimize data management using appropriate data structures.

2. COURSE OBJECTIVE

The students will try to Learn:

1) Exploring basic data structures such as stacks and queues.
2) Introduces a variety of data structures such as hash tables, search trees, tries, heaps, graphs.
3) Introduces sorting and pattern matching algorithms.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Implement linear data structures such as arrays, stacks, queues, and linked lists.
CO 2	Apply tree traversal algorithms and perform operations on Binary Search Trees.
CO 3	Design and implement multi-way search trees and heaps for efficient data processing.
CO 4	Apply graph traversal algorithms and advanced sorting techniques in problem solving.
CO 5	Implement hashing techniques and file organization methods for efficient data storage and retrieval.

4. COURSE CONTENT

UNIT - I: **10 L**

Introduction to Data Structures: Basic Terminology, Classification of Data Structures, Operation on Data Structures, abstract data types, selecting a Data Structure, Linear list – Introduction, singly linked list, Circular Linked Lists, Doubly Linked List, Stacks- Operations, Stack algorithm, Stack ADT, Stack applications, Queues- operations, Queue Algorithm, Queue ADT, Queue Applications.

UNIT - II: **10 L**

Trees: Introduction, Types of Trees, creating a Binary Tree from a General Tree, traversing a Binary Tree, Binary Search Trees (BST), BST Operations- Searching, Insertion and Deletion, BST ADT, BST Applications, Threaded Binary Trees, AVL Trees, Red –Black Trees, Splay Trees.

UNIT - III: **10 L**

Multi way Search Trees: Introduction, B Trees, B Trees ADT, 2-3 Trees, 2-3- Tree, B* Tree, B+ Trees Heaps: Binary Heaps, Binomial heaps, Fibonacci heaps, Comparison of Various Heaps, Applications Searching: Introduction, Interpolation Search, Jump search.

UNIT - IV: **10 L**

Graphs: Introduction, Directed Graphs, Bi connected Components, Representation of Graphs, Graph Traversal Algorithms, Graph ADT, Applications of Graphs.

Sorting: Radix Sort, Heap sort, Shell Sort, Tree Sort.

UNIT-V: **8 L**

Hashing and Collision: Introduction, Hash Tables, Hash Functions, Different Hash Functions: Division Method, Multiplication Method, Mid-square Method, Folding Method; collisions: Collision Resolution by Open Addressing, Collision Resolution by Chaining.

Files and their Organization: Introduction, Data hierarchy, File Attributes, Text and Binary Files, Basic File Operations, File Organization, Indexing.

5. TEXT BOOKS

1) Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A.Forouzan, Cengage Learning.
2) Data Structure using C– Reema Thareja, 3rd Edition, Oxford University Press.

6. REFERENCE BOOKS

1) Data Structures using C – A. S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	**3**	**3**	**2**	**1**	**2**							**1**		
CO 2	**3**	**3**	**2**	**1**	**2**							**1**		
CO 3	**3**	**3**	**3**	**2**	**3**							**2**		
CO 4	**3**	**3**	**2**	**2**	**3**							**2**		
CO 5	**3**	**2**	**2**	**1**	**3**							**2**		

COURSE CONTENT

COMPUTER AIDED ENGINEERING DRAWING								
I Year - II Semester: CSE								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
ME205ES	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		2	**-**	**2**	**3**	**40**	**60**	**100**
Contact Classes: 32	Tutorial Classes: Nil	Practical Classes: 32				**Total Classes: 64**		
Prerequisite: Nil								

1. COURSE OVERVIEW

This course offers a comprehensive foundation in Engineering Drawing, blending conventional drawing techniques with computer-aided design tools. It begins with the principles of geometrical constructions, scales, and conic sections, progressing to orthographic projections of points, lines, and planes. Students will explore projections and sectional views of regular solids, along with the development of their surfaces. The curriculum culminates in mastering isometric projections and the conversion between isometric and orthographic views. Emphasis is placed on both manual drafting skills and digital proficiency to prepare students for modern engineering design challenges.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To develop a strong foundation in geometrical constructions, scales, and curves including conic sections and cycloidal paths, essential for precise technical drawing.
2) To develop a strong foundation in geometrical constructions, scales, and curves including conic sections and cycloidal paths, essential for precise technical drawing.
3) To train students in creating accurate projections and sectional views of regular solids, enhancing spatial understanding and CAD proficiency.
4) To impart skills in unfolding 3D objects into 2D layouts, facilitating fabrication and design of engineering components.
5) To equip students with the ability to construct and interpret isometric views and convert between isometric and orthographic projections for comprehensive design communication.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Construct precise geometrical figures and curves such as conic sections and cycloidal paths using conventional drafting techniques
CO 2	Generate accurate orthographic projections of points, lines, and planes using both manual methods and computer-aided drafting tools.
CO 3	Visualize and represent regular solids through sectional and auxiliary views, enhancing their spatial reasoning and CAD proficiency
CO 4	Develop the surfaces of 3D solids like prisms, cylinders, pyramids, and cones to support fabrication and design applications.
CO 5	Create and interpret isometric views of objects and convert between isometric and orthographic projections for effective technical communication.

4. COURSE CONTENT

UNIT – I: Introduction to Engineering Graphics (Conventional)
Principles of Engineering Graphics and their Significance, Geometrical Constructions, Scales, Plain and Diagonal, Conic Sections including the Rectangular Hyperbola, General method only. Cycloid, Epicycloid and Hypocycloid.

UNIT – II: Orthographic Projections (Conventional and Computer Aided)
Principles of Orthographic Projections, Conventions, Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes. Computer aided orthographic projections, points, lines and planes. Introduction to Computer aided drafting, views, commands and conics.

UNIT - III: Projections of Regular Solids (Conventional and Computer Aided)
Auxiliary Views, Sections or Sectional views of Right Regular Solids, Prism, Cylinder, Pyramid, Cone, Auxiliary views, Computer aided projections of solids, sectional views.

UNIT - IV: Development of Surfaces (Conventional)
Prism, Cylinder, Pyramid and Cone.

UNIT - V: Isometric Projections (Conventional and Computer Aided)
Principles of Isometric Projection, Isometric Scale, Isometric Views, Conventions, Isometric Views of Lines, Plane Figures, Simple and Compound Solids, Isometric Projection of objects having non, isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions. Conversion of orthographic projection into isometric view.

Note:
1. The End Semester Examination will be in conventional mode.
2. CIE – I will be in conventional mode.
3. CIE – II will be using Computer.

5. TEXT BOOKS

1) Engineering Drawing, N. D. Bhatt, Charotar, 54th Edition, 2023.
2) Engineering Drawing and graphics Using AutoCAD, T. Jeyapoovan and Vikas, S. Chand and company Ltd., 3rdEdition,2010.

6. REFERENCE BOOKS

1) Engineering Drawing, Basant Agrawal and C.M. Agrawal, McGraw Hill, 3rd Edition, 2019.
2) Engineering Graphics and Design, WILEY, John Wiley and Sons Inc, 3rdEdition, 2020.
3) Engineering Drawing, M. B. Shah and B.C. Rane, Pearson, 2nd Edition, 2009.
4) Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford, 1st Edition, 2015.
5) Computer Aided Engineering Drawing, K. Balaveera Reddy, CBS Publishers, 2nd Edition, 2015.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	**3**	**3**	**3**		**3**							**1**	**2**	**1**
CO 2	**3**	**3**	**3**	**2**	**3**								**3**	**1**
CO 3	**3**	**3**	**3**		**3**								**2**	**3**
CO 4	**3**	**3**	**3**		**3**								**3**	**3**
CO 5	**3**	**3**	**3**	**3**	**3**	**1**				**3**		**1**	**3**	**3**

COURSE CONTENT

BASIC ELECTRICAL ENGINEERING LAB								
I Year - II Semester: CSE								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
EE206ES	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	**-**	**2**	**1**	**40**	**60**	**100**
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				**Total Classes: 32**		
Prerequisite: Nil								

1. COURSE OVERVIEW

This course provides hands-on experience with electrical circuit components, measuring instruments like multimeters and oscilloscopes, and electrical machines.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To measure the electrical parameters for different types of DC and AC circuits using conventional and theorems approach.
2) To study the transient response of various R, L and C circuits using different excitations.
3) To determine the performance of different types of DC, AC machines and Transformers.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Verify the basic Electrical circuits through different experiments.
CO 2	Evaluate the performance calculations of Electrical Machines and Transformers through various testing methods.
CO 3	Analyze the transient responses of R, L and C circuits for different input conditions.

4. LIST OF EXPERIMENTS/DEMONSTRATIONS:

PART- A (compulsory)

1) Verification of KVL and KCL
2) Verification of Thevenin's and Norton's theorem
3) Transient Response of Series RL and RC circuits for DC excitation
4) Resonance in series RLC circuit
5) Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits
6) Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
7) Performance Characteristics of a DC Shunt Motor
8) Torque-Speed Characteristics of a Three-phase Induction Motor.

PART- B (any two experiments from the given list)

1) Verification of Superposition theorem.
2) Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
3) Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
4) Measurement of Active and Reactive Power in a balanced Three-phase circuit
5) No-Load Characteristics of a Three-phase Alternator

5. TEXT BOOKS

1) Lab manual

6. MATERIALS ONLINE:

1) Course template
2) Lab manual

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	**3**	**3**	**2**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**
CO 2	**3**	**3**	**3**	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**
CO 3	**3**	**3**	**2**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**3**

COURSE CONTENT

ADVANCED ENGINEERING PHYSICS LABORATORY								
I Year - I Semester: CE, ME, ECE, CSE(AIML), CSE(DS) **I Year - II Semester: CSE**								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
PH207BS	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	**-**	**2**	**1**	**40**	**60**	**100**
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				**Total Classes: 32**		
Prerequisite: 10+2								

1. COURSE OVERVIEW

This lab course is designed for first-year B.Tech. students providing practical exposure to key concepts in advanced and modern physics through hands-on experiments. This course equips students with essential lab skills in material synthesis, characterization, and advanced technology measurements, supporting their theoretical learning with applicable experimental techniques.

2. COURSE OBJECTIVE

The students will try to Learn:

1) The Practical exposure to advanced concepts in solid-state and modern physics.
2) The synthesize and study the physical properties of materials like semiconductors, ferromagnetic, and ferroelectric substances.
3) The Perform semiconductor characterization using Hall effect and band gap experiments.
4) To explore the working principles of lasers and optical fibers through hands-on experiments.
5) To develop skills in data analysis, interpretation, and scientific reporting.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Synthesize and analyze nanomaterials such as magnetite (Fe_3O_4) using chemical methods.
CO 2	Determine key electrical, magnetic, and optical properties of semiconductors and other functional materials.
CO 3	Characterize semiconductors using Hall effect and energy gap measurement techniques.
CO 4	Demonstrate working knowledge of laser systems and optical fiber parameters through experimental study.
CO 5	Apply scientific methods for accurate data collection, analysis, and technical report writing.

4. LIST OF EXPERIMENTS:

1) Synthesis of magnetite (Fe3O4) powder using sol-gel method.
2) Determination of energy gap of a semiconductor.
3) Determination of Hall coefficient and carrier concertation of a given semiconductor.
4) Determination of magnetic moment of a bar magnet and horizontal earth magnetic field.
5) Study of B-H curve of a ferro magnetic material.
6) Determination of work function and Planck's constant using photoelectric effect.
7) Determination of dielectric constant of a given material.
8) V-I and L-I characteristics of light emitting diode (LED)
9)
    a) Determination of wavelength of a laser using diffraction grating.
    b) Study of V-I & L-I characteristics of a given laser diode.

10)

a) Determination of numerical aperture of a given optical fibre.
b) Determination of bending losses of a given optical fibre.

Note: Any 8 experiments are to be performed

5. REFERENCE BOOK

1) S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.

CO-PO-PSO Mapping

	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**	**2**	**2**							**3**	**3**	**2**
CO 2	**3**	**3**	**2**	**2**	**2**							**3**	**3**	**3**
CO 3	**3**	**3**	**2**	**3**	**3**							**3**	**3**	**3**
CO 4	**3**	**2**	**3**	**2**	**3**							**3**	**3**	**3**
CO 5	**2**	**2**	**2**	**3**	**2**							**3**	**2**	**3**

COURSE CONTENT

DATA STRUCTURES LAB								
I Year - II Semester: CSE								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CS208ES	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	**-**	**2**	**1**	**40**	**60**	**100**
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				**Total Classes: 32**		
Prerequisite: Nil								

1. COURSE OVERVIEW

The "Data Structures Lab" course introduces students to the practical application of various data structures using the C programming language. It aims to enhance problem-solving skills by teaching students how to implement fundamental data structures like arrays, linked lists, stacks, queues, trees, graphs, and hash tables. The course also focuses on common sorting and searching algorithms, allowing students to efficiently solve real-world problems using C.

2. COURSE OBJECTIVE

The students will try to Learn:

1) It covers various concepts of C programming language.
2) It introduces searching and sorting algorithms.
3) It provides an understanding of data structures such as stacks and queues.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Implement linear data structures (singly, doubly, and circular linked lists, stacks, and queues) using functions and Abstract Data Types (ADT).
CO 2	Apply and analyze various sorting algorithms (Radix Sort, Heap Sort, Shell Sort, Tree Sort) for arranging data efficiently.
CO 3	Develop and implement tree-based data structures (BST, AVL, B-Trees, B+ Trees, Red-Black Trees) and perform tree traversal methods (recursive and non-recursive).
CO 4	Apply graph traversal algorithms (DFS, BFS) for solving connectivity and path-finding problems.
CO 5	Implement hashing techniques using different hash functions and analyze their effectiveness in handling collisions.

4. LIST OF EXPERIMENTS

1) Write a program that uses functions to perform the following operations on singly linked list.:

   i) Creation ii) Insertion iii) Deletion iv) Traversal

2) Write a program that uses functions to perform the following operations on doubly linked list.:

   i) Creation ii) Insertion iii) Deletion iv) Traversal

3) Write a program that uses functions to perform the following operations on circular linked list.:

   i) Creation ii) Insertion iii) Deletion iv) Traversal

4) Write a program that implement stack (its operations) using

i) Arrays ii) ADT

5) Write a program that implement Queue (its operations) using

i) Arrays ii) ADT

6) Write a program that implements the following sorting methods to sort a given list of integers in ascending order

i) Radix Sort, ii) Heap sort, iii) Shell Sort, iv) Tree Sort

7) Write a program to implement the tree traversal methods (Recursive and Non-Recursive).

8) Write a program to implement

i) Binary Search tree ii) B Trees iii) B+ Trees iv) AVL trees v) Red - Black trees

9) Write a program to implement the graph traversal methods.

10) Write a program to implement the following Hash Functions:

i) Division Method, ii) Multiplication Method, iii) Mid-square Method, iv) Folding Method

5. TEXT BOOKS

1) Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2) Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein, PHI/Pearson Education.

6. REFERENCE BOOKS

1) Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B. A. Forouzan, Cengage Learning.

CO-PO-PSO Mapping

	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**	**2**							**1**		
CO 2	**3**	**3**	**2**	**2**	**2**							**1**		
CO 3	**3**	**3**	**2**	**2**	**3**							**2**		
CO 4	**3**	**3**	**2**	**2**	**3**							**2**		
CO 5	**3**	**2**	**2**	**1**	**3**							**2**		

COURSE CONTENT

PYTHON PROGRAMMING LAB								
I Year - II Semester: CSE								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CS209ES	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	**-**	**2**	**1**	**40**	**60**	**100**
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				**Total Classes: 32**		
Prerequisite: Nil								

1. COURSE OVERVIEW

The course focuses on practical Python programming skills through a series of progressively challenging tasks. In the initial weeks, students get familiar with Python basics, including using the interpreter, writing simple programs, and understanding basic functions. As the course advances, students work on more complex problems like matrix operations, file handling, and implementing algorithms. They also explore object-oriented programming concepts, exception handling, and basic GUI development. The course culminates with applications in numerical computing and digital logic, preparing students for real-world problem-solving scenarios.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To install and run the Python interpreter.
2) To learn control structures.
3) To Understand Lists, Dictionaries in python.
4) To Handle Strings and Files in Python.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Develop the application specific codes using python.
CO 2	Understand Strings, Lists, Tuples and Dictionaries in Python
CO 3	Verify programs using modular approach
CO 4	Verify programs using file I/O, Python standard library
CO 5	Implement Digital Systems using Python

4. LIST OF EXPERIMENTS:

1)
   a) Use a web browser to go to the Python website http://python.org. This page contains information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation.
   b) Start the Python interpreter and type help () to start the online help utility.
2) Start a Python interpreter and use it as a Calculator.
3) Write a program to calculate compound interest when principal, rate and number of periods are given.
4) Read the name, address, email and phone number of a person through the keyboard and print the details.

5) Print the below triangle using for loop.

```
 5
4 4
3 3 3
2 2 2 2
1 1 1 1 1
```

6) Write a program to check whether the given input is digit or lowercase character or uppercase character or a special character (use 'if-else-if' ladder)

7) Python program to print all prime numbers in a given interval (use break)

8) Write a program to convert a list and tuple into arrays.

9) Write a program to find common values between two arrays.

10) Write a function called palindrome that takes a string argument and returns True if it is a palindrome and False otherwise. Remember that you can use the built-in function len to check the length of a string.

11) Write a function called is sorted that takes a list as a parameter and returns True if the list is sorted in ascending order and False otherwise.

12) Write a function called has duplicates that takes a list and returns True if there is any element that appears more than once. It should not modify the original list.

13) Write a function called remove duplicates that takes a list and returns a new list with only the unique elements from the original. Hint: they don't have to be in the same order.

14) The wordlist I provided, words.txt, doesn't contain single letter words. So you might want to add "I", "a", and the empty string.

15) Write a python code to read dictionary values from the user. Construct a function to invert its content. i.e., keys should be values and values should be keys.

16) Add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'

17) Remove the given word in all the places in a string?

18) Write a function that takes a sentence as an input parameter and replaces the first letter of every word with the corresponding upper case letter and the rest of the letters in the word by corresponding letters in lower case without using a built-in function?

19) Writes a recursive function that generates all binary strings of n-bit length

20) Write a python program that defines a matrix and prints

21) Write a python program to perform multiplication of two square matrices

22) How do you make a module? Give an example of construction of a module using different geometrical shapes and operations on them as its functions.

23) Use the structure of exception handling all general-purpose exceptions.

24) Write a function called draw_rectangle that takes a Canvas and a Rectangle as arguments and draws a representation of the Rectangle on the Canvas.

25) Add an attribute named color to your Rectangle objects and modify draw_rectangle so that it uses the color attribute as the fill color.

26) Write a function called draw_point that takes a Canvas and a Point as arguments and draws a representation of the Point on the Canvas.

27) Define a new class called Circle with appropriate attributes and instantiate a few Circle objects. Write a function called draw_circle that draws circles on the canvas.

28) Write a python code to read a phone number and email-id from the user and validate it for correctness.

29) Write a Python code to merge two given file contents into a third file.

30) Write a Python code to open a given file and construct a function to check for given words present in it and display on found.

31) Write a Python code to Read text from a text file, find the word with most number of occurrences

32) Write a function that reads a file *file1* and displays the number of words, number of vowels, blank spaces, lower case letters and uppercase letters.

33) Import numpy, Plotpy and Scipy and explore their functionalities.

34) Install NumPy package with pip and explore it.

35) Write a program to implement Digital Logic Gates – AND, OR, NOT, EX-OR

36) Write a GUI program to create a window wizard having two text labels, two text fields and two buttons as Submit and Reset.

5. TEXT BOOKS

1) Supercharged Python: Take your code to the next level, Overland.
2) Learning Python, Mark Lutz, O'reilly.

6. REFERENCE BOOKS

1) Python Programming: A Modern Approach, Vamsi Kurama, Pearson.
2) Python Programming A Modular Approach with Graphics, Database, Mobile, and Web Applications, Sheetal Taneja, Naveen Kumar, Pearson.
3) Introduction to Python Programming, Gowrishakar S, Veena A, CRC Press.
4) Programming with Python, A User's Book, Michael Dawson, Cengage Learning, India Edition.
5) Python for Data Science, Dr. Mohd Abdul Hameed, Wiley publications.
6) Core Python Programming, Dr. R. Nageswara Rao, Dreamtech press.
7) Introduction to Python, Gowrishankar S, Veena A., CRC Press.

CO-PO-PSO Mapping

	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**	**2**							**1**		
CO 2	**3**	**3**	**2**	**2**	**2**							**1**		
CO 3	**3**	**3**	**2**	**2**	**3**							**2**		
CO 4	**3**	**3**	**2**	**2**	**3**							**2**		
CO 5	**3**	**2**	**2**	**1**	**3**							**2**		

COURSE CONTENT

IT WORKSHOP								
I Year – II Semester: CSE								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
CS210ES	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	**-**	**2**	**1**	**40**	**60**	**100**
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 32				**Total Classes: 32**		
Prerequisite: Nil								

1. COURSE OVERVIEW

The IT Workshop course is designed to provide students with foundational knowledge and practical skills in Information Technology. The course introduces essential IT tools, concepts, and practices used in both academic and professional environments. Students will gain hands-on experience in working with computer hardware, operating systems, basic networking, office productivity software, and internet tools.

2. COURSE OBJECTIVE

The students will try to Learn:

1) The IT Workshop for engineers include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, PowerPoint and Publisher.

3. COURSE OUTCOMES

After successful completion of the course, students should be able to:

CO 1	Perform Hardware troubleshooting
CO 2	Understand Hardware components and inter dependencies
CO 3	Safeguard computer systems from viruses/worms
CO 4	Document/ Presentation preparation
CO 5	Perform calculations using spreadsheets

4. COURSE CONTENT

PC Hardware

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both Windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: Search Engines & Netiquette: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of LaTeX and MS office or equivalent (FOSS) tool Word asword Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using LaTeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word**.**

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA - Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

PowerPoint

Task 1: Students will be working on basic power point utilities and tools which help them create basic PowerPoint presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

5. REFERENCE BOOK

1) Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
2) The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, WILEY Dreamtech
3) Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4) PC Hardware - A Handbook – Kate J. Chase PHI (Microsoft)
5) LaTeX Companion – Leslie Lamport, PHI/Pearson.
6) IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7) IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan – CISCO Press, Pearson Education.

CO-PO-PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	**3**	**3**	**2**	**2**	**3**				**2**			**2**		
CO 2	**3**	**2**	**2**	**2**	**2**							**2**		
CO 3	**2**	**2**			**2**	**2**		**2**				**2**		
CO 4	**2**				**3**				**2**	**3**	**2**	**2**		
CO 5	**3**	**2**			**3**					**2**	**2**	**2**		