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

Course Code	Course Name	Subject Area	Category	Periods Per Week			Credits	Scheme of Examination Max Marks		
				L	T	P		CIA	SEE	Total
INDUCTION PROGRAM										
THEORY										
MA101BS	Matrices and Calculus	BSC	Foundation	3	1	0	4	40	60	100
ME102ES	Computer Aided Engineering Drawing	ESC	Foundation	2	0	2	3	40	60	100
PH103BS	Advanced Engineering Physics	BSC	Foundation	3	0	0	3	40	60	100
DS104ES	C Programming and Data Structures	ESC	Foundation	3	1	0	4	40	60	100
EC106ES	Elements of Electrical Engineering	ESC	Foundation	2	0	0	2	40	60	100
PRACTICAL										
ME105ES	Engineering Workshop	ESC	Foundation	0	0	2	1	40	60	100
PH107BS	Advanced Engineering Physics Lab	BSC	Foundation	0	0	2	1	40	60	100
DS108ES	C Programming and Data Structures Lab	ESC	Foundation	0	0	2	1	40	60	100
EC109ES	Elements of Electrical Engineering Lab	ESC	Foundation	0	0	2	1	40	60	100
			Total Credits	**13**	**2**	**10**	**20**			

COURSE CONTENT

MATRICES AND CALCULUS								
I Year - I Semester: ECE, CSE, CSE (AI & ML), CSE (Data Science), CE & ME								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
MA101BS	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**1**	**-**	**4**	**40**	**60**	**100**
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				**Total Classes: 64**		
Prerequisite: Mathematical Knowledge at the pre-university level								

1. COURSE OVERVIEW

This course Matrices and Calculus is a foundation course of mathematics for all engineering branches. The concepts of Matrices, Eigen Values, Eigen Vectors, Functions of Single and Several Variables, Curve Tracing and Multiple Integrals. This course is applicable for simulations, colour imaging processes, and finding optimal solutions in all fields of industries.

2. COURSE OBJECTIVE

The students will try to Learn:

1) Types of matrices and their properties.
2) The concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
3) Concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form.
4) A geometrical approach to the mean value theorems and their application to the mathematical problems.
5) Evaluation of surface areas and volumes of revolutions of curves.
6) A basic idea of tracing geometrical figure of an algebraic equation.
7) Partial differentiation, the concept of total derivative.
8) Finding maxima and minima of a function of two and three variables.
9) Evaluation of multiple integrals and their applications.

3. COURSE OUTCOMES

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

CO 1	Find rank of a matrix by Echelon and Normal Form. Write the matrix representation of a set of linear equations and analyse the solution of the system of equations.
CO 2	Find the Eigen Values and Eigenvectors. Reduce the quadratic form to canonical form using orthogonal transformations. To do verification and Application of Cayley Hamilton Theorem.
CO 3	Solve the applications on the mean value theorems. Expand a function using Taylors Series. Trace a basic geometrical figure of a given curve.
CO 4	Find the extreme values of functions of two variables with / without constraints and to apply Lagrange's Multipliers.
CO 5	Evaluate the multiple integrals, change the order and apply the concept to find areas, volumes.

4. COURSE CONTENT

UNIT - I: Matrices **8 L**

Rank of a matrix by Echelon form and Normal form – Inverse of Non-singular matrices by Gauss-Jordan method. System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations. Gauss Seidel Iteration Method.

UNIT - II: Eigen values and Eigen vectors **10 L**

Linear Transformation and Orthogonal Transformation: Eigen values – Eigen vectors and their properties – Diagonalization of a matrix – Cayley-Hamilton Theorem (without proof) – Fnding inverse and power of a matrix by Cayley-Hamilton Theorem. Quadratic forms and Nature of the Quadratic Forms – Reduction of Quadratic form to canonical form by Orthogonal Transformation.

UNIT - III: Single Variable Calculus **10 L**

Limit and Continuous of functions and its properties. Mean value theorems: Rolle 's Theorem – Lagrange's Mean value theorem with their Geometrical Interpretation and applications – Cauchy's Mean value Theorem – Taylor's Series (All the theorems without proof).

Curve Tracing: Curve tracing in cartesian coordinates. Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates).

UNIT - IV: Multivariable Calculus (Partial Differentiation and applications) **10 L**

Definitions of Limit and continuity – Partial Differentiation: Euler's Theorem – Total derivative – Jacobian – Functional dependence & independence. Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

UNIT-V: Multivariable Calculus (Integration) **8 L**

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

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

COURSE CONTENT

COMPUTER AIDED ENGINEERING DRAWING								
I Year - I Semester: Common to CSE (AIML), CSE (DS) and ECE								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
ME102ES	**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

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**		
PH103BS	**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

C PROGRAMMING AND DATA STRUCTURES								
I Year - I Semester: ECE/CE/ME								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
DS104ES	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	**1**	**-**	**4**	**40**	**60**	**100**
Contact Classes: 48	Tutorial Classes: 16	Practical Classes: Nil				**Total Classes: 64**		
Prerequisite: Nil								

1. COURSE OVERVIEW

This course introduces the fundamentals of C programming and the core concepts of data structures, enabling students to develop efficient programs and solve computational problems. Students will gain both theoretical knowledge and practical skills in structured programming, algorithm design, and data handling.

2. COURSE OBJECTIVE

Introduce the importance of programming, C language constructs, program development, data structures, searching and sorting.

3. COURSE OUTCOMES

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

CO 1	**Describe** the fundamental concepts of computer systems, computing environments, and the structure of a C program including identifiers, data types, operators, and input/output operations.
CO 2	**Apply** control structures, functions, and arrays in C to design structured and modular programs for problem-solving.
CO 3	**Demonstrate** the use of pointers, dynamic memory allocation, and string handling functions in C programming.
CO 4	**Develop** programs using derived data types (structures, unions, enums) and implement file handling operations with text and binary streams.
CO 5	**Analyze and implement** sorting, searching, and basic data structures (linked lists, stacks, queues) for efficient data manipulation and storage.

4. COURSE CONTENT

UNIT - I: **10 L**

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development.

Introduction to C Language – Background, Simple C programs, Identifiers, Basic data types, Variables, Constants, Input / Output

Structure of a C Program – Operators, Bit-wise operators, Expressions, Precedence and Associatively, Expression Evaluation, Type conversions, Statements

UNIT - II: **10 L**

Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Recursion.

Designing Structured Programs- Functions, basics, user defined functions, inter function communication, standard functions.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays.

UNIT - III: **10 L**

Pointers – Introduction, Pointers for inter function communication, pointers to pointers, compatibility.

Pointer Applications – Passing an array to a function, Memory allocation functions, array of pointers

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion.

UNIT - IV: **10 L**

Derived types – The Typedef, enumerated types, Structures – Declaration, definition and initialization of structures, accessing structures, operations on structures, complex structures.

Unions – Referencing unions, initializers, unions and structures.

Input and Output – Text vs Binary streams, standard library functions for files, converting file types, File programs – copy, merge files.

UNIT-V: **8 L**

Sorting- selection sort, bubble sort, insertion sort.

Searching-linear and binary search methods.

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

5. TEXT BOOKS

1) C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2) Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition, Pearson Education.
3) The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education.

6. REFERENCE BOOKS

1) C & Data structures – P. Padmanabham, 3rd Edition, B.S. Publications.
2) C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
3) Programming in C – Stephen G. Kochan, III Edition, Pearson Education.
4) C for Engineers and Scientists, H. Cheng, McGraw-Hill International Edition
5) Data Structures using C – A. M. Tanenbaum, Y. Langsam, and M.J. Augenstein, Pearson Education / PHI
6) C Programming & Data Structures, E. Balagurusamy, TMH.
7) C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
8) C & Data structures – E V Prasad and N **B Venkateswarlu, S. Chand & Co.**

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

COURSE CONTENT

ELEMENTS OF ELECTRICAL ENGINEERING								
I Year - I Semester: ECE								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
EC106ES	**Foundation**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		2	**-**	**-**	**2**	**40**	**60**	**100**
Contact Classes: 32	Tutorial Classes: Nil	Practical Classes: Nil				**Total Classes: 32**		
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. Timedomain 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

ENGINEERING WORKSHOP								
I Year - I Semester: Common to Civil Engineering, Mechanical Engineering, ECE and CSE								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
ME105ES	**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: Practical skill								

1. COURSE OVERVIEW

This hands-on workshop course offers foundational training across key engineering trades, blending practical exercises with technical demonstrations. Students will gain proficiency in Carpentry, Fitting, Tin Smithy, Foundry, Welding, House Wiring, and Black Smithy through structured joint-making, moulding, and fabrication tasks. Complementary exposure to Plumbing, Machine Shop operations, Water Plasma cutting, and power tools enhances real-world readiness. Each module emphasizes safety, precision, and craftsmanship to build core industrial skills. The course fosters a multidisciplinary understanding essential for careers in mechanical and construction fields.

2. COURSE OBJECTIVE

The students will try to Learn:

1) To acquire hands-on skills in key trades: Carpentry, Welding, Fitting, House Wiring, Foundry, Tin Smithy, and Black Smithy.
2) To perform essential fabrication techniques including joint making, sand moulding, metal shaping, and electrical installations.
3) To gain exposure to advanced tools and processes in Plumbing, Machine Shop, Water Plasma Cutting, and Wood Working.
4) To emphasize safety, accuracy, and craftsmanship in all practical sessions.

3. COURSE OUTCOMES

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

CO 1	Demonstrate practical skills in core trades such as carpentry, welding, fitting, house wiring, smithy, and foundry through completion of structured exercises.
CO 2	Apply fabrication techniques including joint making, metal shaping, sand moulding, and electrical installations with accuracy and safety.
CO 3	Operate basic and advanced tools used in plumbing, machining, water plasma cutting, and wood working with confidence and care.
CO 4	Interpret technical drawings and instructions to execute trade-specific tasks effectively in workshop settings.
CO 5	Exhibit professional workshop behaviour, including adherence to safety protocols, teamwork, and time management.

4. COURSE CONTENT

1) TRADES FOR EXERCISES:

At least two exercises from each trade:

i. Carpentry: T- Lap Joint, Dovetail Joint, Mortise and Tenon Joint
ii. Fitting: Straight Fitting, V- Fit, and Dovetail Fit
iii. Tin Smithy: Square Tin, Rectangular Scoop and Conical Hopper
iv. Foundry: Preparation of Green Sand Mould using Single Piece and Split Pattern
v. Welding Practice: Arc Welding - Butt Joint and Lap Joint
vi. House wiring: Parallel and Series, Two-way Switch and Tube Light
vii. Black Smithy: Round to Square, Fan Hook and S- Hook

2) TRADES FOR DEMONSTRATION AND EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working.

5. TEXT BOOKS

1) Workshop Practice, B. L. Juneja, Cengage Learning India, 1st edition, 2015.
2) Workshop Practice Manual, K. Venkata Reddy, BS Publication,6th Edition, Rpt.2025.

6. REFERENCE BOOKS

1) Workshop Manual, K. Venugopal, Anuradha Publications, 2012th edition, 2012

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

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**		
PH107BS	**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

C PROGRAMMING AND DATA STRUCTURES LAB								
I Year – I Semester: ECE/CE/ME								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
DS108ES	**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 laboratory component of this course provides hands-on experience in implementing the concepts of C programming and data structures. Students will practice problem-solving, program development, debugging, and execution skills. The lab sessions are designed to strengthen theoretical knowledge through practical application.

2. COURSE OBJECTIVE

The students will try to Learn:

1) Introduce the importance of programming, C language constructs, program development, data structures, searching and sorting.

3. COURSE OUTCOMES

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

CO 1	Develop modular and readable C Programs
CO 2	Solve problems using strings, functions
CO 3	Handle data in files
CO 4	Implement stacks, queues using arrays, linked lists.
CO 5	To understand and analyze various searching and sorting algorithms.

4. LIST OF EXPERIMENTS

1) Write a C program to find the sum of individual digits of a positive integer.
2) Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
3) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
4) Write a C program to find the roots of a quadratic equation.
5) Write a C program to find the factorial of a given integer.
6) Write a C program to find the GCD (greatest common divisor) of two given integers.
7) Write a C program to solve Towers of Hanoi problem.
8) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
9) Write a C program to find both the largest and smallest number in a list of integers.

10) Write a C program that uses functions to perform the following:
    a) Addition of Two Matrices
    b) Multiplication of Two Matrices
11) Write a C program that uses functions to perform the following operations:
    a) To insert a sub-string in to a given main string from a given position.
    b) To delete n Characters from a given position in a given string.
12) Write a C program to determine if the given string is a palindrome or not
13) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.
14) Write a C program to count the lines, words and characters in a given text.
15) Write a C program to generate Pascal's triangle.
16) Write a C program to construct a pyramid of numbers.
17) Write a C program that uses functions to perform the following operations:
    a) Reading a complex number
    b) Writing a complex number
    c) Addition of two complex numbers
    d) Multiplication of two complex numbers
    (Note: represent complex number using a structure.)
18)
    a) Write a C program which copies one file to another.
    b) Write a C program to reverse the first n characters in a file.
    (Note: The file name and n are specified on the command line.)
19)
    a) Write a C program to display the contents of a file.
    b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)
20) Write a C program that uses functions to perform the following operations on singly linked list.:
    i) Creation ii) Insertion iii) Deletion iv) Traversal
21) Write C programs that implement stack (its operations) using
    i) Arrays ii) Pointers
22) Write C programs that implement Queue (its operations) using
    i) Arrays ii) Pointers
23) Write a C program that implements the following sorting methods to sort a given list of integers in ascending order
    i) Bubble sort ii) Selection sort iii)Insertion sort
24) Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:
    i) Linear search ii) Binary search

5. TEXT BOOK

1) C Programming & Data Structures, B.A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2) Let us C, Yeswanth Kanitkar.
3) C Programming, Balaguruswamy.

6. REFERENCE BOOK

1) Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
2) E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3) Yashavant Kanetkar, Let Us C, 18th Edition, BPB
4) R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
5) Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6) Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
7) Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

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

COURSE CONTENT

ELEMENTS OF ELECTRICAL ENGINEERING LABORATORY								
I Year – I Semester: ECE								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
EC109ES	**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 OBJECTIVES:

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**