Contents

UG PHYSICS COURSE OUTCOME

MJ 01 MECHANICS	**Course Objective:** The objective of this course is to introduce students to the fundamental concepts and principles of classical mechanics, focusing on dynamics, work-energy relations, rotational motion, elasticity, fluid dynamics, gravitation, oscillations, and the basics of relativity. By the end of the course, students will develop a deep understanding of the physical laws governing motion and forces and be able to apply mathematical methods to solve complex physical problems. The course will also emphasize real-world applications and provide a foundation for more advanced studies in physics. **Course Outcomes:** Upon successful completion of this course, students will be able to: 1. Understand and apply Newton's laws of motion to describe the dynamics of particles and systems, including systems of variable mass. 2. Analyze and solve problems related to the centre of mass, momentum conservation, and the motion of systems in inertial and non-inertial reference frames. 3. Describe and solve problems in rotational dynamics, including the concepts of angular momentum, torque, moment of inertia, and energy considerations in rotating systems. 4. Apply principles of work and energy to a wide range of mechanical systems, including both conservative and non-conservative forces, and understand the role of energy conservation in various mechanical contexts. 5. Study elastic and fluid systems, including the behaviour of materials under stress (elasticity), and fluid dynamics with applications to capillary flow and Poiseuille's law. 6. Understand the fundamentals of gravitation and central force motion, including the laws of planetary motion, satellite orbits, and Kepler's laws. 7. Examine oscillatory motion in both undamped and damped systems, including the resonance phenomenon and real-world examples of oscillations. 8. Explore the basic concepts of special relativity, including Lorentz transformations, time dilation, length contraction, and the energy-momentum relation, and apply these to understand relativistic phenomena such as the Doppler effect.
MJ 02 MATHEMATICAL PHYSICS I	**Course Objective:** The objective of this course is to equip students with the mathematical tools essential for solving physical problems. The course introduces fundamental concepts of calculus, differential equations, vector calculus, and special functions, which are widely applied in various branches of physics. Emphasis is placed on the physical interpretation of mathematical operations and their applications in real-world problems. By the end of the course, students will develop problem-solving skills necessary for advanced topics in theoretical and applied physics. **Course Outcomes:** Upon successful completion of this course, students will be able to: 1. Apply calculus techniques such as Taylor and binomial series expansions to approximate functions and solve problems in mathematical physics.

	2. Solve first and second-order differential equations, including homogeneous equations with constant coefficients, and understand the significance of the Wronskian in determining the independence of solutions. 3. Understand the fundamentals of vector calculus, including vector algebra, triple products, and their physical interpretations in different coordinate systems. 4. Compute derivatives of scalar and vector fields, including directional and normal derivatives, and apply operators such as gradient, divergence, curl, and Laplacian with physical significance. 5. Evaluate vector integrals using multiple integration techniques, and apply Gauss' divergence theorem, Green's theorem, and Stokes' theorem to solve physics problems. 6. Understand and derive vector differential operators in orthogonal curvilinear coordinates, including Cartesian, spherical, and cylindrical systems. 7. Grasp the concept of the Dirac delta function, its representations, and its properties, and apply it in solving integral problems. 8. Evaluate special integrals involving Beta and Gamma functions, understand their interrelation, and use them in mathematical physics applications. 9. Apply the error function in statistical and probability distributions relevant to physics.
MJ 03 ELECTRICITY & MAGNETISM I	**Course Objective:** This course aims to develop a strong conceptual foundation in electricity and magnetism by introducing fundamental circuit elements, DC and AC circuits, network theorems, and measurement techniques. Emphasis is placed on analytical problem-solving, practical applications, and understanding the behaviour of electrical circuits using mathematical techniques. The course also covers AC bridges and ballistic galvanometers, which are essential for precise electrical measurements. **Course Outcomes:** Upon successful completion of this course, students will be able to: 1. Understand basic circuit elements and apply Kirchhoff's Voltage Law (KVL) and Kirchhoff's Current Law (KCL) to analyze resistive networks using mesh and nodal methods. 2. Analyze DC circuits, including the growth and decay of current in CR, LR, and series LCR circuits. 3. Solve AC circuit problems by applying Kirchhoff's laws, calculating complex reactance and impedance, and analyzing series and parallel LCR circuits for resonance, power dissipation, quality factor, and bandwidth. 4. Understand the working principles of a ballistic galvanometer, including torque on a current loop, charge sensitivity, and logarithmic damping. 5. Apply AC bridge techniques, such as Anderson's, De Sauty's, Owen's, Schering's, and Carey-Foster's bridges, to measure electrical parameters accurately. 6. Utilize network theorems, including Thevenin's, Norton's, Superposition, Reciprocity, Maximum Power Transfer, Miller's, Wye-Delta transformation, and Tellegen's theorem, for circuit analysis and simplification. 7. Analyze two-port networks using T and π representations and

	understand parameter representations such as H, Y, Z, and ABCD matrices.
MJ 04 WAVES AND OPTICS	**Course Objective:** This course aims to provide students with a comprehensive understanding of wave phenomena and optical principles. It covers harmonic oscillations, wave motion, interference, diffraction, and polarization, with a focus on both theoretical concepts and experimental applications. By the end of the course, students will develop a solid foundation in wave optics, enabling them to analyze and apply optical principles in various physical systems. **Course Outcomes:** Upon successful completion of this course, students will be able to: 1. Understand and apply the principle of superposition to analyze the superposition of harmonic oscillations, beat formation, and Lissajous figures with their applications. 2. Describe the fundamental properties of wave motion, including plane and spherical waves, longitudinal and transverse waves, wave equations, and energy transport in different media. 3. Analyze stationary waves and determine the velocity of transverse vibrations in stretched strings and longitudinal waves in fluids using Newton's and Laplace's formulas. 4. Explain the principles of interference, including temporal and spatial coherence, Young's double-slit experiment, Fresnel's biprism, and interference in thin films. 5. Apply the concepts of interference in optical instruments, including Newton's rings, Michelson and Fabry-Perot interferometers, and their applications in wavelength and refractive index measurement. 6. Study diffraction phenomena, including Fraunhofer and Fresnel diffraction, and analyze single-slit, double-slit, multiple-slit, and circular aperture diffraction patterns. 7. Evaluate the resolving power of optical instruments, such as telescopes and diffraction gratings, based on diffraction principles. 8. Apply Fresnel's assumptions and zone plate theory to explain rectilinear propagation of light and diffraction effects due to edges, slits, and wires. 9. Understand the concept of polarization, including linear, circular, and elliptical polarization, and study the propagation of electromagnetic waves in anisotropic media. 10. Analyze double refraction in uniaxial and biaxial crystals and explain the working of Nicol prisms and wave plates (quarter-wave and half-wave plates). 11. Demonstrate an understanding of rotatory polarization, including Biot's laws, Fresnel's theory of optical rotation, and the concept of specific rotation in optically active materials. 12. Apply optical principles to real-world applications, such as spectroscopy, laser optics, and optical communication systems.
MJ 05 ELECTRICITY & MAGNETISM II	**Course Objective:** This course aims to provide students with a deep understanding of advanced topics in electricity and magnetism, including electrostatics, electric fields in matter, magnetostatics, induction, and magnetic properties of materials. The emphasis is on mathematical formulations and physical interpretations, helping students develop problem solving skills in classical electromagnetism. **Course Outcomes:** Upon successful completion of this course, students will be able to:

	1. Understand the fundamental principles of electrostatics, including quantization, conservation, and invariance of electric charge. 2. Apply Coulomb's Law and Gauss's Law to solve problems related to electric fields from continuous charge distributions. 3. Analyze electrostatic potential and energy, solve Poisson's and Laplace's equations, and apply boundary conditions for electric fields. 4. Apply the method of images and multipole expansion to calculate electric potentials in various charge distributions. 5. Describe the behaviour of electric fields in matter, including polarization, electric displacement, dielectric properties, and energy storage in dielectric systems. 6. Solve boundary value problems for dielectric interfaces and understand forces acting on dielectric materials. 7. Understand magnetostatics and apply the Biot-Savart law and Ampere's law to determine magnetic fields due to steady currents. 8. Compare electrostatics and magnetostatics, and analyze the concept of the vector potential, boundary conditions, and multipole expansion of magnetic fields. 9. Apply Faraday's Law of induction to analyze electromagnetic induction, RLC circuits, and the displacement current. 10. Introduce Maxwell's Equations and their role in unifying electricity and magnetism. 11. Study magnetic fields in matter, including magnetization in diamagnetic, paramagnetic, and ferromagnetic materials. 12. Analyze torques and forces on magnetic dipoles and understand the effect of magnetic fields on atomic orbits. 13. Understand bound currents and their physical interpretation and apply Ampere's law in magnetized materials. 14. Differentiate between linear and nonlinear magnetic media, magnetic susceptibility, permeability, and ferromagnetic behaviour.
MJ 06 MATHEMATICAL PHYSICS II	**Course Objective:** This course introduces students to advanced mathematical techniques essential for solving problems in physics. It covers Fourier series, special functions, partial differential equations, and integral transforms, providing a strong foundation for theoretical and applied physics. **Course Outcomes:** Upon successful completion of this course, students will be able to: 1. Understand and apply Fourier series to represent periodic functions, determine Fourier coefficients, and use orthogonality properties of sine and cosine functions. 2. Utilize complex Fourier series representation and expand functions with arbitrary periods, including even and odd function expansions. 3. Apply Fourier series techniques to solve physical problems in heat conduction, signal processing, and wave analysis. 4. Solve differential equations using the Frobenius method, particularly in cases where power series solutions are needed. 5. Analyze special functions such as Legendre, Bessel, Hermite, and Laguerre functions, which frequently appear in physics problems. 6. Understand the properties of Legendre polynomials, including Rodrigues' formula, generating functions, orthogonality, and recurrence relations.

	7. Expand functions in a series of Legendre polynomials and apply them to solve physics problems, especially in electrostatics and quantum mechanics. 8. Understand Bessel functions, their generating functions, recurrence relations, orthogonality, and the significance of their zeros. 9. Solve partial differential equations (PDEs) using separation of variables in Cartesian, cylindrical, and spherical coordinate systems. 10. Apply PDE techniques to solve Laplace's equation in symmetric physical problems. 11. Solve the wave equation for vibrational modes of a stretched string, understanding the role of boundary conditions. 12. Understand Fourier transforms and the Fourier integral theorem and apply them to represent nonperiodic functions. 13. Compute Fourier transforms for trigonometric, Gaussian, and finite wave train functions. 1 4. Express the Dirac delta function as a Fourier integral and compute the Fourier transforms of derivatives. 15. Understand inverse Fourier transforms and their properties, including translation, scaling, and conjugation. 16. Apply Fourier transforms to solve differential equations, particularly in wave and heat conduction problems. 17. Understand and compute Laplace transforms for elementary functions and use properties such as shifting and scaling theorems. 18. Evaluate Laplace transforms of derivatives and integrals and apply them to solve differential equations. 19. Compute the Laplace transform of the unit step function and periodic functions and use the convolution theorem in problem-solving.
MJ07 HEAT AND THERMODYNAMICS	**Course Objective:** This course provides a comprehensive understanding of the fundamental principles of heat and thermodynamics. It covers real gas behavior, thermodynamic laws, transport phenomena, thermodynamic potentials, and radiation theory. The course aims to develop problem-solving skills in classical thermodynamics and prepare students for advanced topics in statistical mechanics and thermal physics. **Course Outcomes:** Upon successful completion of this course, students will be able to: 1. Understand the deviations of real gases from the ideal gas behavior and analyze them using the Virial equation. 2. Explain the concept of critical constants and Boyle temperature and apply Van der Waals' equation of state to real gases. 3. Interpret P-V diagrams and the Law of Corresponding States to understand phase transitions in gases. 4. Analyze free adiabatic expansion of a perfect gas and study the Joule-Thomson effect for real and Van der Waals gases. 5. Determine the Joule-Thomson coefficient and understand the concept of the temperature of inversion. 6. Explain transport phenomena in gases, including mean free path, viscosity, thermal conductivity, and diffusion. 7. Apply the First Law of Thermodynamics to different thermodynamic processes, including isothermal and adiabatic processes. 8. Derive relations between heat capacities (CP and CV) and understand their implications in various thermodynamic systems.

	9. Calculate work done during isothermal and adiabatic processes and apply these concepts to practical problems. 10. Differentiate between reversible and irreversible processes and understand their significance in thermodynamics. 11. Explain the Second Law of Thermodynamics, including the concepts of entropy, Carnot's cycle, and Carnot's theorem. 12. Calculate entropy changes in reversible and irreversible processes and interpret entropy-temperature diagrams. 13. Understand the Third Law of Thermodynamics and its implications on the unattainability of absolute zero. 14. Define thermodynamic potentials such as internal energy, enthalpy, Helmholtz free energy, and Gibbs free energy and explain their physical significance. 15. Derive Maxwell's relations and apply them to thermodynamic problems such as the Clausius-Clapeyron equation and TdS equations. 16. Analyze first and second-order phase transitions and their relevance in condensed matter physics. 17. Explain the principles of black-body radiation and the spectral distribution of radiation. 18. Derive and apply laws of radiation, including Stefan-Boltzmann law, Wien's displacement law, and Rayleigh-Jeans law. 19. Understand Planck's hypothesis and derive Planck's law of black-body radiation. 20. Apply the concept of mean energy of an oscillator to explain quantum aspects of thermal radiation
MJ08 DIGITAL ELECTRONICS	**Course Objective:** The course provides an introduction to digital electronics, focusing on digital circuits, logic gates, Boolean algebra, arithmetic circuits, sequential circuits, and memory systems. It aims to equip students with the knowledge of designing and analyzing digital systems, both combinational and sequential, using fundamental concepts such as logic gates, flip-flops, timers, shift registers, and counters. Additionally, the course will introduce memory systems and microprocessors, preparing students for further studies in digital system design and microprocessor-based systems. **Course Outcomes:** Upon successful completion of this course, students will be able to: 1. Differentiate between analog and digital circuits and understand the significance of binary, octal, and hexadecimal number systems. 2. Convert numbers between decimal, binary, octal, and hexadecimal and understand the importance of BCD (Binary-Coded Decimal) representation in digital systems. 3. Understand the basic logic gates such as AND, OR, NOT, NAND, NOR, XOR, and XNOR, and apply these gates to build simple digital circuits. 4. Apply Boolean algebra to simplify logical circuits using Boolean laws and De Morgan's Theorems, and convert truth tables into equivalent logic circuits using Sum of Products (SOP) method and Karnaugh Maps (K-map). 5. Design and analyze binary arithmetic circuits for addition and subtraction using 2's complement and implement half and full adders, subtractors, and a 4-bit binary adder/subtractor. 6. Understand sequential circuits and design flip-flops, including SR, D, and JK flip-flops, both leveltriggered and edge-triggered, and resolve

	issues like race-around conditions in JK flip-flops. 7. Apply IC 555 timers in astable and monostable multivibrator configurations for practical applications. 8. Design and implement shift registers of various types (SISO, SIPO, PISO, PIPO) and understand their use in serial and parallel data storage and transfer. 9. Design and work with 4-bit counters, including ring counters, asynchronous counters, decade counters, and *synchronous counters. 10. Understand the principles of A/D conversion using resistive networks and successive approximation and evaluate the accuracy and resolution in conversion systems. 11. Gain knowledge of memory systems, including ROM, RAM, and DRAM basics, and understand their roles in digital circuits. 12. Familiarize with microprocessors, including the evolution of microprocessors, registers in the 8085 microprocessor and the concept of data and address bus multiplexing.
MJ09 MATHEMATICALPHYSICS III	**Course Objective:** The objective of this course is to introduce students to advanced mathematical techniques essential for understanding complex physical systems. Topics covered will include the fundamentals of complex analysis, matrix theory, tensor analysis, and group theory. Emphasis will be placed on the application of these mathematical tools to solve real-world physics problems, including the evaluation of integrals, matrix diagonalization, the use of tensors in physical contexts, and the symmetry operations of physical systems. **Course Outcomes:** By the end of this course, students will be able to: 1. Understand and apply the principles of complex analysis, including the use of Cauchy's theorem, Cauchy's integral formula, and residue calculus to solve physical problems. 2. Perform matrix operations and apply matrix theory in physical contexts, including solving eigenvalue problems and diagonalization. 3. Grasp the concept of tensors and apply tensor operations in various physical situations, particularly in the context of Cartesian and covariant tensors. 4. Use group theory to analyze the symmetry properties of physical systems, construct character tables, and understand the significance of group representations in physics. 5. Solve problems involving branch cuts and principal value integrals and use dispersion relations to extract physical insights.
MJ 10 SOLID STATE PHYSICS I	**Course Objective:** 1. To introduce students to the fundamental concepts of crystallography, the structure of solids, and the types of crystal bonds that govern the physical properties of materials. 2. To explain the role of lattice vibrations and their effect on the heat capacity of solids and provide a quantum mechanical description of phonons. 3. To introduce the free electron theory and band theory to understand the electrical properties of materials, including conductors, semiconductors, and insulators. 4. To explore the dielectric properties of materials, including polarization, electric susceptibility, and ferroelectric and piezoelectric effects. **Course Outcomes:** Upon completion of the course, students will be able to:

	1. Understand the basics of crystallography, including the distinction between crystalline and amorphous materials, unit cells, Miller indices, and X-ray diffraction techniques for structure determination. 2. Analyze crystal bonding in materials, including ionic, covalent, and weak bonding, and calculate cohesive energy and compressibility of solids. 3. Describe lattice vibrations and their quantum mechanical properties, including the concept of phonons, and apply models such as Dulong-Petit, Einstein, and Debye for the heat capacity of solids. 4. Apply free electron and band theory models to understand the electrical properties of solids, specifically the conduction behaviour of metals, semiconductors, and insulators. 5. Examine dielectric properties, including the concepts of polarization, electric susceptibility, and the classical theory of electric polarizability, as well as ferroelectric and piezoelectric behaviours.
MJ 11 CLASSICAL MECHANICS	**Course Objective:** 1. Understand the Lagrangian formulation: To provide students with a solid foundation in Lagrangian mechanics, focusing on the concept of generalized coordinates, constraints, and the principle of virtual work. 2. Study the dynamics of systems under central forces: To familiarize students with the theory of central force motion, including the two-body problem, effective potential, and Kepler's laws. 3. Analyze rigid body motion: To enable students to study the motion of rigid bodies, understanding concepts like moment of inertia, Euler's equations, precession, and nutation. 4. Learn the Hamiltonian formalism: To introduce students to Hamiltonian mechanics, including generalized momenta, Hamilton's equations, phase space, and cyclic coordinates. 5. Explore canonical transformations: To introduce and apply the theory of canonical transformations, Poisson brackets, and their relationship with conservation laws. 6. Study the Hamilton-Jacobi theory: To familiarize students with the Hamilton-Jacobi equation (HJE), action-angle variables, and its application in integrable systems. **Course Outcomes:** By the end of this course, students should be able to: 1. Apply the Lagrangian formulation: Derive and solve Lagrange's equations for simple mechanical systems, including systems with constraints and forces expressed in generalized coordinates. 2. Solve central force problems: Analyze and solve problems related to central forces, including the two-body problem, energy conservation, and the Rutherford scattering problem. 3. Understand rigid body dynamics: Solve problems involving rigid bodies, calculate the moment of inertia tensor, and analyze rotational motion, including precession and gyroscopic effects. 4. Use the Hamiltonian formalism: Understand and apply Hamilton's equations of motion, identify conserved quantities using cyclic coordinates, and work in phase space. 5. Perform canonical transformations: Identify and perform canonical transformations, use generating functions, and apply Poisson brackets to simplify complex systems. 6. Analyze the Hamilton-Jacobi equation: Apply the Hamilton-Jacobi equation and action-angle variables to solve problems in integrable

	systems and understand their significance in classical mechanics.
MJ 12 COMPUTATIONAL PHYSICS	**Course Objective:** 1. To introduce students to the fundamentals of numerical errors, floating-point computations, and iterative methods in computational physics. 2. To provide practical knowledge of solving algebraic, transcendental, and linear system equations using various numerical techniques. 3. To develop an understanding of eigenvalue problems and techniques for finding eigenvalues and eigenvectors. 4. To teach students interpolation, approximation, and curve-fitting methods, with a focus on least-squares fitting and B-splines. 5. To provide skills in numerical differentiation, integration, and solving ordinary differential equations using different methods. 6. To expose students to Monte Carlo methods and their application in physics simulations and optimization techniques. **Course Outcomes:** By the end of this course, students will be able to: 1. Understand and apply the concepts of numerical errors, floating-point arithmetic, and iterative methods to solve physical problems. 2. Solve algebraic, transcendental, and linear systems of equations efficiently using appropriate numerical methods. 3. Apply eigenvalue problems and calculate eigenvalues and eigenvectors for physical systems. 4. Use interpolation and curve-fitting techniques to approximate functions and data in physics applications. 5. Perform numerical differentiation and integration on physical models and extract meaningful results. 6. Solve initial and boundary value problems of ordinary differential equations using numerical methods and understand their error estimations. 7. Implement Monte Carlo methods for simulations and optimization and apply these methods to real world physics problems.
MJ 13 QUANTUM MECHANICS I	**Course Objective:** 1. Introduction to Quantum Concepts: To introduce students to the fundamental concepts of quantum mechanics, including the limitations of classical physics, wave-particle duality, and the basic postulates of quantum mechanics. 2. Mathematical Formulation: To familiarize students with the mathematical formalism of quantum mechanics, including the Schrödinger equation, wave functions, operators, and Dirac notation, as well as their application to solving quantum systems. 3. Applications of Quantum Mechanics: To provide students with a deep understanding of the applications of quantum mechanics to real-world problems, such as the particle in a box, quantum tunneling, and the behavior of quantum systems like the harmonic oscillator and hydrogen atom. 4. Development of Quantum Operators and States: To explore the role of linear operators in quantum mechanics, their eigenvalues and eigenfunctions, and how these relate to observable physical quantities, such as energy and momentum. 5. Understanding of Quantum Phenomena: To explore quantum phenomena like the uncertainty principle, complementarity, and wave-

	particle duality through experiments like the Davisson-Germer experiment and understand the relationship between classical and quantum descriptions of nature. 6. Quantum Mechanical Representations: To provide an understanding of various representations in quantum mechanics (Schrödinger and Heisenberg) and their applications to solving quantum systems. **Course Outcomes:** By the end of this course, students will be able to: 1. Understand the Limitations of Classical Physics: Explain the inadequacies of classical physics through phenomena like blackbody radiation, the photoelectric effect, and the Compton effect, and recognize the need for quantum theory. 2. Apply Wave Mechanics: Derive and solve the Schrödinger equation for simple systems such as a particle in a box, harmonic oscillator, and potential barriers, and understand the probabilistic nature of quantum states. 3. Work with Quantum Operators: Use the mathematical formalism of quantum mechanics to compute eigenvalues and eigenfunctions, apply commutation relations, and understand the significance of observables and their measurement. 4. Interpret Wave Functions: Understand and apply the physical interpretation of wave functions, including probability density, current density, and the normalization condition, in the context of quantum systems. 5. Solve Problems Using Quantum Formalism: Solve problems involving quantum states in both one dimensional and three-dimensional potentials, applying the concepts of superposition and the uncertainty principle. 6. Analyze Quantum Systems with Different Representations: Apply Schrödinger and Heisenberg representations to analyze time-dependent and time-independent quantum systems, and compute physical observables using the corresponding operators. 7. Explore Quantum Phenomena in Real-World Contexts: Analyze and explain quantum mechanical phenomena such as tunneling, angular momentum quantization, and spin in various quantum systems, including the hydrogen atom. 8. Master Quantum Mechanical Notation: Utilize Dirac notation, bra-ket formalism, and the algebra of Hermitian operators to represent and solve quantum problems systematically.
MJ 14 ELECTRODYNAMICS	**Course Objective:** 1. To understand the fundamental concepts and mathematical framework of electromagnetism through Maxwell's equations. 2. To explore the nature of electromagnetic waves, including their propagation in various media, and their interaction at boundaries between different materials. 3. To gain an understanding of the principles of electromagnetic radiation and its generation, particularly through dipole and point charge radiation. 4. To apply the concepts of relativity in electrodynamics, including Lorentz transformations and the covariant formulation of electromagnetism. 5. To develop the ability to solve problems involving wave propagation, reflection, refraction, and radiation in both unbounded and bounded media.

	Course Outcomes: Upon successful completion of this course, students will be able to: 1. Derive and solve Maxwell's equations and their boundary conditions in various media, including vacuum and dielectric materials. 2. Analyze and solve problems related to wave propagation in free space, dielectric media, and conducting media, including understanding the concept of skin depth and plasma frequency. 3. Apply the principles of reflection, refraction, and transmission at boundaries between different media and understand their physical implications. 4. Understand and calculate electromagnetic radiation from various sources, including electric and magnetic dipoles, as well as a moving point charge. 5. Utilize special relativity concepts in electromagnetism, including Lorentz transformations and the covariant formulation of electrodynamics to analyze electromagnetic field transformations.
MJ 15 ANALOG ELECTRONICS	**Course Objective:** 1. To introduce students to the basic concepts and applications of two-terminal devices, including rectifiers, diodes, LEDs, and photodiodes. 2. To develop a deep understanding of the working principles, characteristics, and applications of Bipolar Junction Transistors (BJTs) in different configurations. 3. To familiarize students with transistor biasing techniques and the analysis of transistor circuits in various configurations. 4. To provide knowledge on the design and analysis of amplifiers, with a focus on frequency response, feedback effects, and gain. 5. To explore the concept of sinusoidal oscillators and their use in electronics, including RC, Hartley, and Colpitts oscillators. 6. To introduce Junction Field Effect Transistors (JFET) and MOSFET, including their principles of operation and characteristics. 7. To provide a detailed study of operational amplifiers (Op-Amps) and their applications in analog circuits, including inverting and non-inverting amplifiers, and specialized circuits like integrators and differentiators. **Course Outcomes:** 1. Students will be able to analyze and design various rectifier circuits using diodes, understanding their efficiency and ripple factors. 2. Students will gain proficiency in analyzing and designing amplifier circuits, including biasing methods, and understand the effects of feedback on circuit performance. 3. Students will be able to design and analyze sinusoidal oscillators and apply Barkhausen's criterion for determining the frequency of oscillations. 4. Students will understand the characteristics and applications of BJTs, JFETs, MOSFETs, and Op-Amps in real-world analog circuits. 5. Students will acquire the ability to design practical circuits using BJTs, FETs, and Op-Amps, solving problems related to gain, stability, and frequency response. 6. Students will be able to evaluate the performance of transistors in different regions and use load line analysis to find the Q-point and predict the behaviour of amplifiers.
MJ 16	**Course Objective:** 1. To deepen understanding of quantum mechanics through the

QUANTUM MECHANICS II	formalism of linear vector spaces, Hilbert spaces, and Dirac notation. 2. To explore the theory of angular momentum in quantum systems and its connection to symmetry, invariance, and conservation laws. 3. To provide an in-depth study of scattering theory, including partial wave analysis, Born approximation, and the use of Green's function. 4. To introduce approximation methods in quantum mechanics, including perturbation theory, WKB approximation, and Fermi's Golden Rule. 5. To study the behaviour of identical particles, including symmetrization postulates and the addition of angular momentum. 6 . To analyze relativistic quantum mechanics using the Klein-Gordon and Dirac equations and understand their physical implications. 7. To understand the process of field quantization and apply it to scalar, electromagnetic, and Dirac fields. **Course Outcomes:** Upon completion of the course, students will be able to: 1. Apply the formalism of linear vector spaces and Dirac notation to quantum states, operators, and observables. 2. Analyze and solve problems involving angular momentum and understand its relationship to symmetry and conservation laws. 3. Calculate scattering cross-sections and apply partial wave analysis, Born approximation, and Green's function in scattering problems. 4. Utilize approximation methods like perturbation theory, WKB, and Fermi's Golden Rule for solving quantum mechanical systems. 5. Understand the behaviour of identical particles, apply symmetrization, and use Clebsch-Gordon coefficients for angular momentum addition. 6. Solve the Klein-Gordon and Dirac equations and interpret their applications in relativistic quantum mechanics. 7. Quantize scalar, electromagnetic, and Dirac fields and understand the role of symmetries and conservation laws in field theory.
MJ 17 STATISTICAL MECHANICS	**Course Objective:** 1. To introduce the fundamental principles of classical and quantum statistics, including probability theory, phase space, and statistical equilibrium. 2. To explore the Maxwell-Boltzmann distribution and its applications to thermodynamic quantities of ideal gases, including the equipartition theorem and Gibbs' paradox. 3. To understand quantum statistics and study Bose-Einstein and Fermi-Dirac statistics, ideal gases, and applications like black body radiation and Bose-Einstein condensates. 4. To provide insight into irreversible processes, random walks, Brownian motion, and Langevin equation. 5. To analyze fluctuations, the fluctuation-dissipation theorem, and applications of quantum statistics in the classical limit. 6. To investigate the concept of thermodynamic fluctuations and their impact on physical systems through Fourier analysis and Onsager relations. **Course Outcomes:** Upon completion of the course, students will be able to: 1. Understand and apply classical statistical mechanics principles, including phase space, ensembles, and statistical equilibrium. 2. Derive and apply the Maxwell-Boltzmann distribution to ideal gases and

	para-magnetism and calculate thermodynamic quantities using the canonical distribution. 3. Analyze quantum ideal gases using Bose-Einstein and Fermi-Dirac statistics and understand applications such as Bose-Einstein condensates and white dwarf stars. 4. Study irreversible processes and the role of fluctuations in thermodynamics, including random walk theory and Brownian motion. 5. Apply the fluctuation-dissipation theorem and Fourier analysis of random functions to analyze the impact of fluctuations in physical systems. 6. Solve problems
MJ 18 NUCLEAR AND PARTICLE PHYSICS	**Course Objective:** 1. To introduce the general properties of nuclei, including their intrinsic properties such as mass, radius, binding energy, and nuclear excitations. 2. To study various nuclear models, including the liquid drop model, semi-empirical mass formula, and the shell model, and understand nuclear stability and the concept of nuclear forces. 3. To understand the processes of radioactive decay, including alpha, beta, and gamma decays, and apply theories such as the Gamow factor and Geiger-Nuttall law. 4. To explore nuclear reactions, their kinematics, conservation laws, and reaction types, including compound and direct reactions, resonance, and Coulomb scattering. 5. To analyze the interaction of nuclear radiation with matter, including ionization energy loss, Cerenkov radiation, and gamma ray interaction mechanisms. 6. To introduce various nuclear radiation detectors, their principles, and applications, including gas detectors, scintillation detectors, and semiconductor detectors. 7. To study particle accelerators and their use in nuclear and particle physics experiments, with emphasis on accelerators available in India. 8. To explore particle physics, including particle interactions, symmetries, and conservation laws, and introduce the concept of quark models and colour quantum numbers. **Course Outcomes:** Upon completion of the course, students will be able to: 1. Understand and explain the general properties of nuclei, including binding energy, angular momentum, parity, and nuclear magnetic moments. 2. Apply nuclear models such as the liquid drop model and shell model to explain nuclear stability and behaviour and interpret nuclear magic numbers and forces. 3. Analyze radioactive decay processes (alpha, beta, gamma) and their corresponding kinematics, and apply decay laws in practical scenarios. 4. Understand and compute the kinematics of nuclear reactions, Q-values, reaction rates, and cross-sections, and differentiate between various types of reactions. 5. Explain the interaction of nuclear radiation with matter and apply the Bethe-Bloch formula, Compton scattering, and pair production to various physical situations. 6. Identify and compare different types of nuclear radiation detectors and

	their applications in detecting charge particles, photons, and neutrons. 7. Describe the working principles of particle accelerators and their role in nuclear and particle physics research, with an understanding of accelerator facilities in India. 8. Understand the symmetries and conservation laws in particle physics, including concepts such as quark model, baryon and lepton numbers, iso spin, and gluons, and apply them to analyze particle interactions.
MJ 19 SOLID STATE PHYSICS II	**Course Objective:** 1. To introduce the basic concepts of semiconductors, including intrinsic and extrinsic semiconductors, energy bands, and carrier concentration. 2. To study the advanced phenomena in semiconductors, such as Schottky barriers, quantum Hall effect, optical properties, and photovoltaic effects, and their technological significance. 3. To explore the magnetic properties of materials, including diamagnetism, para-magnetism, ferromagnetism, antiferromagnetism, and ferrimagnetism, along with their underlying mechanisms and applications. 4. To understand the phenomenology of superconductivity, including critical temperature, Meissner effect, and the classification of Type I and Type II superconductors. 5. To discuss the microscopic theory of superconductivity (BCS theory) and its implications for understanding the behaviour of superconducting materials. 6. To examine the thermodynamic and magnetic properties of superconductors, and explore applications of superconductivity in technology, including SQUIDs, Josephson effects, superconducting magnets, and cryogenic techniques. 7. To investigate the future prospects and challenges of superconductivity, particularly in relation to power transmission and technological advancements. **Course Outcomes:** Upon completion of the course, students will be able to: 1. Understand the fundamental properties of semiconductors, including the behaviour of carrier concentration, mobility, Fermi levels, and temperature dependence in both intrinsic and extrinsic semiconductors. 2. Analyze and explain advanced semiconductor phenomena, such as Schottky barriers, quantum Hall effect, excitons, and the photovoltaic effect, and their practical applications in devices like solar cells. 3. Demonstrate a comprehensive understanding of magnetism in materials, including the concepts of diamagnetism, para-magnetism, ferromagnetism, and ferrimagnetism, and apply these to real-world magnetic materials. 4. Understand the phenomenology of superconductivity and explain the significance of the Meissner effect, critical temperature, and the differences between Type I and Type II superconductors. 5. Apply BCS theory to explain superconductivity and understand its implications for the behaviour and properties of superconducting materials. 6. Analyze the thermodynamic and magnetic properties of superconductors and apply this knowledge to understand the functioning of superconducting devices such as SQUIDs and Josephson junctions. 7. Evaluate the technological applications of superconductivity, including its use in magnetic resonance imaging (MRI), power transmission, and the

	challenges associated with the development of practical superconducting materials. 8. Investigate the future prospects of superconductivity in advanced technologies and critically assess the challenges that need to be overcome for widespread practical application.
MJ 20 ATOMIC, MOLECULAR & LASER PHYSICS	**Course Objective:** 1. To understand the principles behind atomic spectra, including space quantization, the relationship between angular momentum and magnetic moment, and the fine structure of spectral lines. 2. To study the coupling schemes like LS and JJ coupling and their applications in atomic spectra. 3. To analyze the quantum theory of the Zeeman and Paschen-Back effects, as well as the Stark effect and hyperfine structure in atomic transitions. 4. To learn about molecular rotation and vibration, and how isotopic substitution affects rotational spectra, with a focus on diatomic molecules and the Born-Oppenheimer approximation. 5. To understand the principles and techniques involved in molecular spectroscopy, including infrared and Raman spectroscopy of diatomic molecules. 6. To explore the fundamental concepts of resonance spectroscopy such as NMR, NQR, ESR, and Mossbauer spectroscopy, and their experimental studies and applications. 7. To introduce the theory of lasers, including the principles of spontaneous and stimulated emission, population inversion, and laser systems, with applications in holography and data storage. **Course Outcomes:** Upon successful completion of the course, students will be able to: 1. Understand and explain the principles behind atomic spectra, including space quantization, fine structure of spectral lines, and Zeeman and Stark effects, and apply these concepts to interpret atomic spectra. 2. Describe LS and JJ coupling schemes and apply the quantum theory of the Zeeman effect to analyze atomic spectra. 3. Analyze molecular rotational and vibrational spectra and understand the effects of isotopic substitution and the Born-Oppenheimer approximation in molecular systems. 4. Apply the principles of infrared and Raman spectroscopy to analyze the vibrational and rotational spectra of diatomic molecules and understand the Frank-Condon principle in electronic transitions. 5. Understand the fundamentals of resonance spectroscopy (NMR, NQR, ESR, Mossbauer spectroscopy) and apply them to various experimental and practical scenarios in molecular and atomic physics. 6. Describe the basic principles of laser operation, including population inversion and the Einstein A and B coefficients, and understand the different types of lasers (Ruby, He-Ne, CO_2, semiconductor lasers) and their applications. 7. Understand the principles and applications of holography, including its practical use in data storage and other technological applications.
AMJ 01	**Course Objective:**

NANO SCIENCE AND TECHNOLOGY	1. To introduce the fundamental principles of nanoscience and technology, focusing on nanoscale systems and their unique properties. 2. To provide students with an understanding of the various methods of synthesizing nanostructure materials using top-down and bottom-up approaches. 3. To familiarize students with state-of-the-art techniques used for the characterization of nanomaterials, including X-ray diffraction, electron microscopy, and atomic force microscopy. 4. To explore the optical properties and quantum behaviour of nanostructures, including excitons, quasiparticles, and the impact of quantum confinement. 5. To discuss the electron transport phenomena in nanostructures, focusing on carrier transport mechanisms and the effects of defects and impurities. 6. To analyze the applications of nanomaterials in diverse fields such as photonic devices, single-electron devices, and nano-electromechanical systems (NEMS) **Course Outcomes:** By the end of the course, students will be able to: 1. Understand and describe the various types of nanostructures (1D, 2D, 3D), their formation, and the impact of quantum confinement at the nanoscale. 2. Identify and differentiate between the top-down and bottom-up approaches for the synthesis of nanomaterials and explain the techniques such as photolithography, PVD, CVD, and sol-gel synthesis. 3. Employ characterization tools such as X-ray diffraction, SEM, TEM, AFM, and STM to analyze nanostructures and interpret experimental data. 4. Explain the optical properties of nanostructures, including the role of Coulomb interactions, excitons, and radiative processes, and their applications in photonic devices. 5. Analyze electron transport mechanisms in nanomaterials, including Coulomb blockade, tunneling, and thermionic emission, as well as the effects of defects and impurities on conductivity. 6. Assess and discuss the various applications of nanomaterials in advanced devices such as quantum dot lasers, solar cells, MEMS, NEMS, and magnetic data storage.
AMJ 02 FIBER OPTICS AND ITS APPLICATIONS	**Course Objective:** 1. To introduce the fundamental principles of fiber optics, focusing on light propagation, different fiber types, and key transmission characteristics such as attenuation, scattering, and polarization. 2. To provide a thorough understanding of the various modes of light propagation in optical fibers, with emphasis on mode coupling, intermodal and intramodal dispersion, and their impact on data rates and bandwidth. 3. To explore the principles of optical sources (LEDs, lasers) and detectors (photodiodes, phototransistors), their operation, and the technologies behind optical feedback, laser oscillation, and detector performance. 4. To examine the design and operation of optical communication systems, including multiplexing techniques (OTDM, WDM), system performance metrics (BER, eye pattern), and fiber optic measurement tools (OTDR, optical power meters). 5. To discuss advanced fiber optic applications, including their use in long-

	haul communication, sensor networks, LANs, and medical or military domains, and analyze the role of fiber optics in modern technologies. 6. To familiarize students with optical amplifiers and network systems, including the operation of semiconductor optical amplifiers (SOAs), EDFAs, and the integration of SONET/SDH networks for high-speed communication. **Course Outcomes:** By the end of the course, students will be able to: 1. Understand the principles of light propagation in optical fibers, including meridional and skew ray paths, and analyze key factors affecting fiber transmission such as attenuation, scattering, and polarization. 2. Identify and analyze the different modes of light propagation in optical fibers, and evaluate the effects of intermodal and intramodal dispersion, mode coupling, and their influence on data rate and bandwidth. 3. Describe the operation of optical sources such as LEDs and lasers, with an understanding of optical feedback, laser oscillation, and the characteristics of quantum-well lasers, including their applications in fiber optic communication systems. 4. Understand the working principles of optical detectors (e.g., PIN, avalanche photodiodes), and evaluate their performance in terms of detectability, noise, and bandwidth, along with the design of related detector circuitry. 5. Design and analyze optical communication systems utilizing OTDM and WDM techniques, and calculate key performance metrics such as bandwidth, rise time, Bit Error Rate (BER), and interpret eye patterns for system optimization. 6. Apply fiber optic measurement techniques and field-testing equipment, such as optical power meters and OTDR, to evaluate and troubleshoot fiber optic systems. 7. Understand the diverse applications of fiber optics in areas such as long-haul communication, fiber optic sensors, local area networks (LANs), medical and military applications, and other modern technological fields. 8. Analyze and explain the operation of optical amplifiers (e.g., EDFAs, semiconductor optical amplifiers) and their use in modern high-speed optical networks, including SONET/SDH, and understand the key technologies that enable high-speed data transmission over optical fiber.
AMJ 03 MICROPROCESSOR AND MICROCONTROLLER	**Course Objective:** 1. To provide students with a comprehensive understanding of the architecture, operations, and components of microprocessors (8085, 8086) and microcontrollers (8051), including memory, I/O devices, and peripheral interfacing. 2. To equip students with the skills to write assembly programs for microprocessors and microcontrollers, covering data transfer, arithmetic operations, logic operations, and advanced techniques such as interrupts, timers, and serial communication. 3. To teach students how to interface peripheral devices (such as LCD, keyboard, ADC, DAC, sensors, and motors) with microprocessors and microcontrollers, including memory and I/O interfacing. 4. To enable students to understand and program the 8086 microprocessor, with an emphasis on addressing modes, memory segmentation, and peripheral interfacing. 5. To provide practical exposure

	to the 8051 microcontroller, its internal architecture, programming techniques, and interfacing with external devices. 6. To develop the ability to design and implement embedded systems using microprocessors and microcontrollers, with a focus on applications like data acquisition, control systems, and communication systems. **Course Outcomes:** Upon successful completion of this course, students will be able to: 1. Understand Microprocessor Architectures: Demonstrate a thorough understanding of the architecture, memory organization, and operations of the 8085, 8086, and 8051 microprocessor/microcontroller families. 2. Write Efficient Assembly Programs: Write and debug assembly language programs for performing basic arithmetic, logic, and data transfer operations, as well as implementing complex tasks such as time delays, counter operations, and interrupts. 3. Interface Peripheral Devices: Interface a variety of peripheral devices (LCD, keyboard, ADC, DAC, sensors, etc.) with microprocessors and microcontrollers, and program them effectively to perform desired operations. 4. Design Systems with 16-bit Microprocessors (8086): Design and program systems using the 8086 microprocessor, including memory addressing, segmentation, and peripheral device interfacing. 5. Program the 8051 Microcontroller: Write and execute assembly language programs on the 8051 microcontroller, including tasks like I/O operations, serial communication, and interrupt handling. 6. Apply Microcontroller Knowledge in Embedded Systems: Develop and implement practical embedded systems by using microprocessor and microcontroller systems, focusing on control, automation, and communication applications. 7. Implement Practical Applications: Interface and program external devices such as stepper motors, sensors, and displays, demonstrating the ability to work on real-world applications in embedded systems.
RC	**Course Objective:** The course aims to equip students with essential skills in data analysis, research methodology, and scientific writing. It introduces concepts of uncertainties in measurements, probability distributions, and error analysis to enhance precision in experimental and computational research. The course also covers research theory, data collection techniques, statistical analysis, hypothesis testing, and report writing to develop a strong foundation for conducting scientific investigations. **Course Outcomes:** Upon successful completion of the course, students will be able to: 1. Understand and quantify uncertainties in measurements, distinguish between systematic and random errors, and apply significant figures in calculations. 2. Analyze probability distributions, including Binomial, Poisson, Gaussian, and Lorentzian distributions, and apply them to experimental and statistical data. 3. Perform error analysis using statistical and instrumental uncertainty methods, propagate errors, and assess numerical errors in iterative computations. 4. Develop a structured research project by understanding research

	theory, problem definition, research design principles, and ethical considerations. 5. Apply different data collection methods, measurement techniques, and scaling strategies to ensure accuracy in research. 6. Process and analyze data using statistical tools, including measures of central tendency, dispersion, skewness, regression, and correlation. 7. Conduct hypothesis testing using parametric tests, compare datasets, and evaluate statistical significance in research studies. 8. Develop scientific interpretation skills and write well-structured research reports with proper methodology and critical analysis.

UG CHEMISTRY COURSE OUTCOME

MJ 01 INORGANIC CHEMISTRY 1	**Learning objective:** • Atomic theory and its evolution. • Elements in periodic table; physical and chemical characteristics, periodicity. • Characterize bonding between atoms, molecules, interaction and energetic, hybridization and shapes of atomic, molecular orbital's, bond parameters, bond distances and energies.
MJ 02 ORGANIC CHEMISTRY 1	**Learning objective:** • Basic of organic molecules, structure, bonding, reactivity and reaction mechanisms. • Stereochemistry of organic molecules. • Aromatic compounds and Aromaticity, mechanism of aromatic reactions • Electrophilic, Nucleophilic, free radicals, electro negativity, resonance, and intermediates along the reaction pathways.
MJ 03 PHYSICAL CHEMISTRY 1	**Learning objective:** • Familiarization with various states of matter. • Understanding Kinetic model of gas and its properties. • Ionic equilibria – electrolyte, ionization, dissociation.
MJ 04 INORGANIC CHEMISTRY 2	**Learning objective:** • Oxidation-Reductions and their use in metallurgy. • Chemistry of s and p-block elements. • Inorganic polymers and their use. • Chemistry of noble gases and their compounds; application of VSEPR theory in explaining structure and bonding.
MJ 05 ORGANIC CHEMISTRY 2	**Learning objective:** • Basic uses of reaction mechanisms. • Name reactions, uses of various reagents and the mechanism of their action • Organometallic compounds and their uses. • Use of reagents in various organic transformation reactions.
MJ 06 INORGANIC CHEMISTRY 3	**Learning objective:** • Co-ordination compounds – its nomenclature, theories, d-orbital splitting in complexes, chelate. • Transition metals, it's stability, colour, oxidation states and complexes. • Bio-inorganic chemistry – metal ions in biological systems, its toxicity; haemoglobin.
MJ 07 ORGANIC CHEMISTRY 3	**Learning objective:** • Nitrogen containing functional groups and their reactions. • Familiarization with Polynuclear hydrocarbons and their reactions. • Alkaloids and Tarpenes.
MJ 08 PHYSICAL CHEMISTRY 2	**Learning objective:** • Understanding the application of thermodynamics: Joule Thompson effects, partial molar quantities. • Understanding the concepts of heat of reactions and use of equations in calculations of bond energy, enthalpy, etc. • Dilute solutions and its properties.

UG MATHEMATICS COURSE OUTCOME

MJ 01 CALCULUS	**Course Learning Outcomes:** This course will enable the students to: a) Apply the rules of differentiation, including the chain rule, to compute derivatives of functions. Also, able to apply different mean value theorems, such as Rolle's theorem and Lagrange's mean value theorem, to establish results about the behaviour of differentiable functions. b) Approximate functions using Maclaurin's and Taylor's series, analyze the error of these approximations using Taylor's theorem with Lagrange, Cauchy, and Roche-Schlomilch forms of remainder, and use these results to find extrema of functions. c) Define and compute the curvature of a curve at a given point and understand its geometric significance and identify the different types of asymptotes of general algebraic curves, including parallel asymptotes, asymptotes parallel to axes, and slant asymptotes. d) Trace Cartesian, polar, and parametric curves and identify their key features, as well as use calculus techniques to analyze the behaviour of curves and solve real-world problems that involve curve tracing. e) Derive and apply reduction formulae, parameterize curves, and compute arc length, area of bounded curves, volume, and surface area of surfaces of revolution.
MJ 02 MATRICES	**Course Learning Outcomes:** This course will enable the students to: a) Understand and apply fundamental concepts in number theory, including well ordering property, division algorithm, congruence relations, mathematical Induction, and the fundamental theorem of arithmetic. b) Gain a thorough understanding of matrices, including types of matrices, determinants, operations, invertibility, matrix rank, normal forms, and the rank-nullity theorem c) Gain a strong grasp of systems of linear equations, including their matrix form, augmented matrices, consistency (both necessary and sufficient conditions), and methods for solving homogeneous and non-homogeneous linear equations. d) Find eigenvalues and corresponding eigenvectors for a square matrix.
MJ 03 ANALYTICAL GEOMETRY & TRIGONOMETRY	**Course Learning Outcomes:** This course will enable the students to: a) Develop skills in two-dimensional analytical geometry, including transformations c rectangular axes, reduction of general equations to normal form, analysis of conic systems and understanding the polar equation of conics. b) Gain proficiency in three-dimensional analytical geometry, including the concepts c direction cosines, straight lines, planes, spheres, intersecting spheres, spheres passing through a given circle, cones, and cylinders. c) Gain the ability to analyze and classify conicoid, understand their plane sections, determine generating lines, reduce equations to normal form, and classify quadrics. d) Develop concepts in trigonometry, including the polar form of complex numbers, De-Moivre's theorem, and its applications in trigonometric function expansions. e) Develop proficiency in working with their properties and applications hyperbolic and exponential functions, understanding their properties and applications.
MJ 04	**Course Learning Outcomes:** This course will enable the students to:

REAL ANALYSIS	a) Understand many properties of the real line R and learn to define sequence in terms of functions from R to a subset of R. b) Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence. c) Apply the ratio, root, alternating series and limit comparison tests for convergence and absolute convergence of an infinite series of real numbers. d) Learn some of the properties of Riemann integrable functions, and the applications of the fundamental theorems of integration.
MJ 05 VECTOR	**Course Learning Outcomes:** This course will enable the students to: a) Understand the concepts of scalar & vector products of three and four vectors. b) Understand the concept of vector function of scalar variable t, Scalar point functions, vector point functions, Grad, Curl and Divergence. c) Inter-relationship amongst the line integral, double and triple integral formulations d) Realize importance of Green, Gauss and Stokes' theorems in other branches of mathematics.
MJ 06 REAL ANALYSIS & SET THEORY	**Course Learning Outcomes:** This course will enable the students to: a) Understand the concept of limit & continuity of a function. b) Understand the concept of differentiation and expansion of function with remainder. c) Understand the definition and condition for Riemann Integrability. d) Understand the generalized set operations and relation on sets.
MJ 07 ODE	**Course Learning Outcomes:** This course will enable the students to: a) solve ordinary differential equation of first order and understand its physical significance. b) solve higher order differential equation using concept of complimentary function & particular integral. c) solve ordinary differential equation with variable coefficients. d) solve simultaneous & total differential equation and understand its geometrical significance.
MJ 08 GROUP THEORY	**Course Learning Outcomes:** This course will enable the students to: a) Understand concept of groups & their properties. b) Understand the concept of subgroups and cyclic groups. c) Understand the concept or Factor group, centralizer and normalizer of group. d) Understand the concept of Homomorphism in Group & Isomorphism and related properties.
MJ 09 MECHANICS	**Course Learning Outcomes:** This course will enable the students to: a) Understand necessary conditions for the equilibrium of particles acted upon by various forces and learn the principle of virtual work for a system of coplanar forces acting on a rigid body. b) Understand the concept of friction and laws of friction. Student will be able to solve problems related to friction. c) Deal with the kinematics of the rectilinear and planar motions of a particle including the constrained oscillatory motions of particles. d) Understand concept work and energy and related laws.
MJ 10 THEORY OF EQUATION & HIGHER ARITHMETIC	**Course Learning Outcomes:** This course will enable the students to: a) solve polynomial equation using relation of roots and coefficients b) solve cubic equation by Cardon's method. c) understand the concept of congruences and their properties. d) solve simultaneous linear congruences.

MJ 11 COMPLEX ANALYSIS	**Course Learning Outcomes:** This course will enable the students to: a) apply the concept of continuity & differentiability of function of two variables. b) apply the concept of analytic function & form analytic function. c) understand standard transformations. d) understand the concept of conformal mapping.
MJ 12 DYNAMICS & STATICS	**Course Learning Outcomes:** This course will enable the students to: a) apply the condition for equilibrium in problems. b) solve problems related to common catenary. c) solve problems related to gravitation % Newton's laws of motion. d) solve problems related to projectile.
MJ 13 LPP & STATISTICS	**Course Learning Outcomes:** This course will enable the students to: a) solve problems related to linear programming problems. b) solve problems related to transportation & assignment problems. c) study the nature of curve, fit a suitable curve for bivariate data. d) study correlation and do regression analysis.
MJ 14 ANALYSIS II & RING	**Course Learning Outcomes:** This course will enable the students to: a) test the convergence of improper integral. b) solve multiple integrals using theorems like Green's theorem, Stokes theorem. c) understand the concept of ring and Ideals. d) explain the concept of field & homeomorphism.
MJ 15 NUMERICAL ANALYSIS & PROGRAMMING IN C	**Course Learning Outcomes:** This course will enable the students to: a) find roots of equation and interpolate by numerical methods. b) differentiate % integrate by numerical methods. c) know about the logics and algorithms needed for computer programming.
MJ 16 FLUID MECHANICS & SPECIAL FUNCTION	**Course Learning Outcomes:** This course will enable the students to: a) understand the nature of fluid, its pressure and centre of pressure. b) explain the fluid motion using equation of continuity and Bernoulli's theorem. c) find series solution of differential equations about ordinary and singular points. d) understand the properties of Legendre polynomials and properties of Hypergeometric functions.
MJ 17 METRIC SPACES & DISCRETE MATHEMATICS	**Course Learning Outcomes:** This course will enable the students to: a) Develop the concept of metric space and related properties. b) Learn the idea of completeness of a space with its properties. c) Learn the idea of continuous and uniform continuous functions. d) Learn the concept of cardinality & mathematical induction. e) understand the concept of graph and lattices.
MJ 18 INTEGRAL TRANSFORM	**Course Learning Outcomes:** This course will enable the students to: a) learn concept of Laplace and inverse Laplace transform. b) solve the differential equation using Laplace transform. c) learn the concept and properties of Fourier transform. d) learn application of Fourier sine & cosine transform.
MJ 19 PDE	**Course Learning Outcomes:** This course will enable the students to: a) apply a range of techniques to solve first & second order partial differential equations. b) apply Monge's method to solve non-linear equation of second order. c) model physical phenomena using partial differential equations such as the heat and w equations.
MJ 20	**Course Learning Outcomes:** This course will enable the students to:

LINEAR ALGEBRA & LINEAR DIFFERENTIAL EQUATION	a) understand concept of basis of vector spaces and construct orthonormal basis. b) understand the concept of rank & nullity. c) construct difference equations and find its general solutions. d) find solution of linear difference equations and homogeneous difference equations.
AMJ 1 TOPOLOGY	**Course Learning Outcomes:** This course will enable the students to: a) learn about the concept of compactness in metric space. b) define topological space its bases and different types of spaces. c) learn different types of compactness in topological spaces. d) learn different types of separation axioms in topological spaces and also the connectedness of topological spaces
AMJ 2 COMPLEX ANALYSIS II	**Course Learning Outcomes:** This course will enable the students to: a) apply complex integration in solving problems. b) learn about power series expansion and their convergence. c) apply method of contour integration. d) learn about conformal mapping.
AMJ 3 REAL ANALYSIS & MEASURE THEORY	**Course Learning Outcomes:** This course will enable the students to: a) learn the concept of uniform convergence in sequence & series of functions. b) learn about Fourier series and its applications. c) learn the concept of measure theory and its properties. d) know about the measurable functions & its properties.

UG POLITICAL SC. COURSE OUTCOME

MJ 01	**Course Objective:** This course is specially designed for students of understanding of Political Science with the different meaning of Political Theory and politics. The course has been designed to introduce key concepts in politics to the students to sharpen their understanding of political discourses and the ability to make the scientific enquiry into the political phenomenon and political questions. This will help students for critical engagements with ideologies to develop their own understanding of politics. Since the state occupies a central position in the discourses on politics, the understanding of different theories on the state will allow the students to understand the role of the state in the society. The key concepts and contemporary debates like power, democracy, equality, freedom, democracy, citizenship, and justice allow the students to understand the expanding horizons of discourses in the discipline. Students will understand the media and civil society as these the drivers of the politics as they perform a communication role, important for information and ideology transmission. **Learning Outcomes:** 1. The students will understand different approaches to Political Theory and Politics 2. They will discourses on Political Theory, Politics and functions of Political Theory 3. The students will understand the liberal and Marxist views of Politics 4. They will understand the theories of Power, democracy, justice, freedom and equality 5. Students will be able to understand and make a distinction between nation and state. 6. They will come to know about different theories on nationalism. 7. The students would be able to answer what are social movements and make a distinction between the old and new social movements.
MJ 02	**Course Objective:** The aim and objective of the course is to familiarize the students with the key elements of Indian constitution and enable them to critically assess the working of government institutions. This will help students of understanding broader framework of constitutionality and factors and forces which attempts to influence them. The course has been specially designed to know and understanding of partition subsequent integration of Princely states and how the decision on key significant symbols such as national flag, national song, national anthem, etc. of the constitution was arrived at through comprehensive debates in the Constituent Assembly. **Learning Outcomes:** 1. Students will be able to understand the terms of partition and how princely states were integrated. 2. They will be able to answer how princely states of Junagarh, Hyderabad, Goa, and Kashmir were integrated into India. 3. They will come to know the importance of the Preamble in the constitutional design of India. 4. They will be able to answer how constituent assembly decided about our National flag, National song, and Anthem and how debates unfolded on National language and Minority rights in the Constitution.

	5. They will be able to answer questions pertaining to the function and role of the President, Prime Minister, Governor, Chief Minister, Parliament and State legislature, and the courts in the Constitutional design of India.
MJ 03	**Course Objective:** This course is designed for the students to understand the functioning of governments and political systems in comparative perspectives. This course exposes the students to understand the concepts and approaches which can apply to different political regimes in terms of the origin of governmental structures and their functioning. We have different political regimes even within the broader category of democratic regimes. However, they differ from each other in many respects. This course will help the students to understand their functioning in a comparative perspective. **Learning Outcomes:** 1. The students will be able to understand and apply different approaches to explain the functioning of different types of governing regimes. 2. The Students will be able to compare democratic regimes and evaluate their functioning. 3. They will be able to critically reflect on critical aspects of electoral democracy that includes functioning of parties and the relation between representation and democracy. 4. They will be able to explain how media has changed the contours of elections and electoral democracy.
MJ 04	**Course Objectives:** This course intends to acquaint students with the vast repository of ideas and institutions produced by ancient Indian philosophers on politics and management of statecraft. The thinking on politics and statecraft has been in all the great civilizations including India which is one of the most ancient and rich civilizations of the world. In India, academic sages and philosophers produced huge treasures of wisdom on politics, kingship, the functioning of government including the monarchy and bureaucracy, and their relationship with the people. This course has been designed to familiarize the students with key ideas of political thinkers of ancient India whose ideas have impacted the society and polity significantly. Their thoughts and legacy give insights into their ideas of India and the kind of society and polity that they had dreamed of for building a visionary India. **Learning Outcomes:** 1. The student will come to know about the ideas of individual sages and philosophers on politics and functioning of government. 2. They will be able to interlink the themes on the functioning of the Monarchy and its relationship with the people taking the cue from the ideas of individual thinkers. 3. Students will be able to explain the trajectory of ideas on key political questions and institutions of ancient India.
MJ 05	**Course Objective:** This course seeks to familiarize the students with meaning, key concepts, and schools of thoughts in public administration. The module deals with the structure and functioning of the organization and seeks to develop understanding in students why do we study public administration and how to make the functioning of their working far more economic and efficient which are common goals of all the organizations. This course will allow the students to understand and examine how different schools have responded to these questions and what are their limitations. This course also provides thorough understanding of the public policy

	to the students. A sound public policy design, execution, monitoring and evaluation for the success of any public policy. It also explains how citizen's participation is so important for effective implementation of the public policy. Rules and Acts become redundant or ineffective in the absence of active citizenry. This course enables the students to examine some of the key public policies initiatives in India. **Learning Outcomes:** 1. The students will be able to make a difference between the public administration and private administration. 2. They will be able to explain the journey of discourse in public administration in the sense that how the old public administration view was contested by the idea of new public administration and subsequently the discourse moved beyond that and started talking about New Public Management and New Public Service. 3. What is the scientific management school by Taylor and Fayol and how it was contested by the Human Relation School? 4. They will be able to explain what is the decision-making approach of Herbert Simon? 5. Students will be able to explain about different theories on Public Policy. 6. They will be able to explain how to design a good public policy. 7. They will be able to answer what is needed to ensure the successful implementation of public policy. 8. They will be able to critically examine and answer questions pertaining to some of the key public policies in India in respect of food, sanitation, health, education, poverty, education, and environment. 9. They will come to know how citizens can effectively participate in public policy implementation.
MJ 06	**Course Objective:** The purpose of this module is to introduce to the students some classical political thinkers from the West who shaped the ideas and key concepts of political Science in the Anglo-American tradition. Developing a 'just society' and a 'just state' has been a perennial question for all civilizations. But the answers are not alike. They are different across civilizations and times. This course examines the ideas of some of the prominent classical political thinkers beginning from Plato and ending with Machiavelli whose response to political questions vividly influenced political thinking. The seeds of the conceptual themes which seem to be so enriched today also found expressions in older times with different accentuation and nodes. The course seeks to the trace that ideas and tradition and examine them critically. **Learning Outcomes:** 1. The students will know the key ideas of all the political philosophers given in the course. 2. They will be able to explain what was the ideal state according to Plato and how was it linked to his scheme of education and theory of justice. 3. They will be able to answer how Aristotle differed from his master Plato on the conception of justice. 4. They will be able to answer how and why Machiavelli gave an overriding priority to pragmatism above ethics and values in operation of statecraft.
MJ 07	**Course Objective:** The field of international relations is made up of diverse actors, processes, and outcomes. The key objective of this course is to introduce the students to both the mainstream International Relations (IR)approaches such as realism (and its nexus with Classical Geopolitics), liberalism and constructivism and to critical approaches

	such as post colonialism and feminism. The term 'Geopolitics' was coined at the very end of the 19th century at the service of new forms of nationalism, colonial projects and inter- imperialist rivalry in Europe and beyond. With the complex interplay between space and power at its conceptual core, geopolitics has most often been associated with a 'realist' and state-centric approach to international relations. This course is also expected to act as a catalyst for students to think creatively and critically in search of 'global' or more 'international' international relations that is inclusive of non-Western experiences, traditions and interactions and critical of the western domination and euro-centric bias of mainstream IR and its neglect of the history, politics and contributions made by non-Western traditions of thought and theorizing. **Learning Outcomes:** 1. Familiarization with the key concepts of the discipline of IR. 2. Understanding of linkages between Classical Realism and Classical Geopolitics. 3. Comprehensive understanding of the key assumptions and arguments of the mainstream IR. 4. Appreciation of what is Global IR and why non-western perspectives are needed. 5. Greater appreciation of the important role played by non-Western countries in building post-War norms and institutions in key areas such as universal sovereignty, human rights, development, and regionalism. 6. Understanding the agency of the Global South in these areas is key to countering IR's ethnocentrism and developing new concepts, theories, and methods.
MJ 08	**Course Objective:** This course deals with the politics in states in India. All the states have different social, demographic, gender, ethnic, linguistics and other variations which shape their politics. And yet, there are common issues also that influence the dynamics of political questions and the issues. There are examples wherein common social and religious variables have produced different results in different states. Besides, different paths and factors and forces in the formation of states, they would come to know state common as well as state - specific issues enabling the students to understand why different states have the different voting pattern, political and civic culture, development patterns, working of the party system and working of the social forces. **Learning Outcomes:** a. The students will know how different states have been formed in India. b. They will know the approach to understand and explain the state politics in India. c. They will be able to explain what the key issues are in state politics. d. They will know about the state - specific issues as well as common states' issues against the centre. e. They will be able to explain the voting pattern and how the social and ethnic forces influence it. f. Students would be able to reflect on the farm crisis in India.

UG ENGLISH COURSE OUTCOME

MJ 01 INDIAN CLASSICAL LITERATURE	**Course Level Learning Outcomes:** • Explain the eco-socio-political-cultural context of the age that produced Indian classical literature from its early beginning till 1100AD • appreciate the pluralistic and inclusive nature of Indian classical literature and its attributes • historically situate the classical literature and diverse literary cultures from India,mainly from Sanskrit, but also Tamil, Prakrit and Pali by focusing on major texts in the principal genres • trace the evolution of literary culture(s) in India in its/their contexts, issues of genres, themes and critical cultures • understand, analyze and appreciate various texts with comparative perspectives
MJ 02 EUROPEAN CLASSICAL LITERATURE	**Course Level Learning Outcomes** Some of the course learning outcomes that students of this course are required to demonstrate run thus: • historically situate classical European, i.e., Greek and Latin literary cultures and their socio-political-cultural contexts • engage with classical literary traditions of Europe from the beginning till the 5th century AD • grasp the evolution of the concept of classic and classical in the European literary thinking and its reception over a period of time • appreciate classical literature of Europe and pursue their interests in it • examine different ways of reading and using literary texts across a wide range of classical authors, genres and periods with comparative perspectives • develop ability to pursue research in the field of classics • develop academic and practical skills in terms of communication and presentation and also learn about human and literary values of classical period
MJ 03 INDIAN WRITING IN ENGLISH	**Course Level Learning Outcomes** Some of the course learning outcomes that students of this course are required to demonstrate run thus: • Appreciate the historical trajectory of various genres of IWE from colonial times till the present • Critically engage with Indian literary texts written in English in terms of colonialism/postcolonialism, regionalism, and nationalism • Critically appreciate the creative use of the English language in IWE • Approach IWE from multiple positions based on historical and social locations

MJ 04 BRITISH POETRY AND DRAMA: 14Th TO 17Th CENTURIES	**Course Level Learning Outcomes** Some of the course learning outcomes that students of this course are required to demonstrate run thus: • understand the tradition of English literature from 14th to 17th centuries. • develop a clear understanding of Renaissance Humanism that provides the basis for the texts suggested • engage with the major genres and forms of English literature and develop fundamental skills required for close reading and critical thinking of the texts and concepts • appreciate and analyze the poems and plays in the larger socio-political and religious
MJ 05 AMERICAN LITERATURE	**Course Level Learning Outcomes** **Some of the course learning outcomes that students of this course are required to demonstrate run thus:** • Understand the depth and diversity of American literature, keeping in mind the history and culture of the United States of America from the colonial period to the present (17th century to 21st century) • understand the historical, religious and philosophical contexts of the American spirit in literature; social-cultural-ecological-political contexts may, for example, include the idea of democracy, Millennial Narratives, the Myth of Success, the American Adam, the Myth of the Old South, the Wild West, Melting pot, Multiculturalism, etc. • appreciate the complexity of the origin and reception of American literature, given its European and non-European historical trajectories, particularly in relation to writers of European (Anglo-Saxon, French, Dutch and Hispanic) descent, as well as writers from black and non-European (African, American Indian, Hispanic-American and Asian) writing traditions • critically engage with the complex nature of American society, given its journey from specific religious obligations and their literary transformations (such as Puritanism, Unitarianism, Transcendentalism, etc.) to the growth of anti-ornon-Christian sensibilities • critically appreciate the diversity of American literature in the light of regional variations in climate, cultural traits, economic priorities • explore and understand the nature of the relationships of human beings to other human beings and other life forms in relation to representative literary texts in various genres
MJ 06 POPULAR LITERATURE	**Course Level Learning Outcomes** Some of the course learning outcomes that students of this course are required to demonstrate run thus: • trace the early history of print culture in England and the emergence of genre fiction and best sellers • engage with debates on high and low culture, canonical and non-canonical literature • articulate the characteristics of various genres of non-literary

	fiction • investigate the role of popular fiction in the literary poly system of various linguistic cultures • demonstrate how popular literature belongs to its time • Use various methods of literary analysis to interpret popular literature
MJ 07 BRITISH POETRY AND DRAMA: 17Th & 18Th CENTURIES	**Course Level Learning Outcomes** Some of the course learning outcomes that students of this course are required to demonstrate run thus: • identify the major characteristics of the Comedy of Manners and Mock-Heroic poetry • demonstrate in-depth knowledge and understanding of the religious, socio-intellectual and cultural thoughts of the 17th and 18th centuries • examine critically key themes in representative texts of the period, including Sin, Transgression, Love, Pride, revenge, sexuality, human follies, among others • show their appreciation of texts in terms of plot-construction, socio-cultural contexts and genre of poetry and drama • analyze literary devices forms and techniques in order to appreciate and interpret the texts
MJ 08 BRITISH LITERATURE: 18Th CENTURY	**Course Level Learning Outcomes** Some of the course learning outcomes that students of this course are required to demonstrate run thus: • explain and analyze the rise of the critical mind • trace the development of Restoration Comedy and anti-sentimental drama • examine and analyze the form and function of satire in the eighteenth century • appreciate and analyze the formal variations of Classicism • map the relationship between the formal and the political in the literature of the neoclassical period

UG COMMERCE COURSE OUTCOME

MJ 01 BUSINESS ORGANISATION AND MANAGEMENT	**Objectives:** To acquaint learners with the basics of business concepts and functions, forms of business organisation, and functions of management. The learners will be able to: **Learning Outcomes:** After completion of the course, 1. Distinguish and explain each form of business. 2. Prepare draft of Article of Association & Memorandum of Association for a business. 3. Explain principles and functions of management implemented in the Organisation. 4. Identify and explain the different type of plans and organisation. 5. Analyse the concept of Delegation of Authority, coordination, and control.
MJ 02 FINANCIAL ACCOUNTING	**Objective:** The course aims to help learners to acquire conceptual knowledge on financial accounting, to impart skills for recording various kinds of business transactions and to prepare financial statements. **Learning Outcomes**: After completion of the course, learners will be able to: 1. Apply the generally accepted accounting principles while recording transactions and preparing financial statements. 2. Demonstrate accounting process under computerized accounting system. 3. Measure business income applying relevant Accounting Standards. 4. Evaluate the importance of depreciation and inventories in financial statements. 5. Prepare accounts for Partnership Firms 6. Prepare accounts for Inland Branches and Not-for-Profit Organizations.
MJ 03 BUSSINESS LAW	**Objective:** The course aims to give the learners abroad understanding about important aspects of legal environment of business; to make them study how various special contracts are brought into force; and to impart knowledge about legal agreements that they get acquainted with the process of establishing legal relationships and to have knowledge of various measures protecting the interest of the consumers. **Learning Outcomes:** After the completion of the course, the learners will be able to: 1. Examine various aspects of entering into a contract and implications of different types of contract. 2. Interpret the regulation governing the Contract of Sale of Goods. 3. Discuss the laws governing partnership and legal consequences of their transactions and other actions in relation with the partnership, and examine contractual obligations and provisions governing limited liability partnership; 4. Describe the significant provisions of the Competition Act to prevent practices having adverse effect on competition and provisions of the Consumer Protection Act to protect the interest of the consumers.
MJ 04 CORPORATE LAW	**Objective:** The course aims to impart the learners working knowledge of the provisions of the Companies Act, 2013.

	Learning Outcomes: After completion of the course, learners will be able to: 1. Explain relevant definitions and provisions relating to issue of prospectus and allotment of shares; 2. Synthesize company processes, meetings, and decisions; 3. Describe the framework of dividend distribution, Accounts of the company and Audit and Auditors of company; 4. Determine the role of Board of directors and their legal position; 5. State regulatory aspects involved in Oppression, Mismanagement, corporate restructuring and Winding Up.
MJ 05 INCOME TAX LAW AND PRACTICE	**Objective:** The course aims to provide knowledge of the various provisions of income-tax law in India and enable the learners to apply such provisions to compute total income and tax liability of individuals. **Learning Outcomes:** After the completion of the course, the learners will be able to: 1. Comprehend the concepts of taxation, including assessment year, previous year, assesses, person, income, total income, agricultural income and determine the residential status of persons. 2. Compute income under different heads, applying the charging provisions, deeming provisions;-exemptions and deductions. 3. Calculate the tax liability of an individual.
MJ 06 CORPORATE ACCOUNTING	**Objectives:** The course aims to help learners to acquire conceptual knowledge of corporate accounting system and to learn the techniques of preparing the financial statements of companies. **Learning Outcomes:** After completion of the course, learners will be able to: 1. Describe the rationale, merits, and demerits of issuing bonus shares for a company; 2. Prepare financial statements (Profit & Loss Account, Balance Sheet, etc.) using online software; 3. Prepare balance sheet after Internal Reconstruction of company; 4. Analyse the case study of major amalgamations of companies in India;
MJ 07 ENTREPRENEURSHIP DEVELOPMENT	**Objective:** The course aims to equip the learners to entrepreneurship so that they are inspired to look at entrepreneurship as a viable, lucrative, and preferred option of professional life**.** **Learning Outcomes:** After completion of the course, learners will be able to: 1. Discern distinct entrepreneurial traits; 2. Identify the parameters to assess opportunities and constraints for new business ideas; 3. Develop a business idea by adopting systematic process; 4. Design strategies for successful implementation of ideas; 5. Create a Business Plan.
MJ 08 BUSINESS MATHEMATICS AND BUSINESS STATISTICS	**Objective:** The course aims to familiarize students with the applications of Mathematics and Statistical techniques in business decision making. **Learning Outcomes:** After completing the course, the student shall be able to: 1. Acquire proficiency in using different mathematical tools (matrices, calculus and mathematics of finance) in solving real life business and economic

	problems; 2. Develop an understanding of the various averages and measures of dispersion to describe statistical data; 3. Explain the relationship between two variables through correlation and regression; 4. Explain the construction and application of index numbers to real life situations; 5. Analyse the trends and tendencies over a period of time through time series analysis.

UG AEC COURSE OUTCOME

AEC 2	**Course Level Learning Outcomes** • Acquire the basic understanding of English grammar. • Acquire the official and business writing skills. • Acquire skills to present one's ideas in English.
AEC 3	**Course Level Learning Outcomes** • To use literature as a medium to teach/learn grammar, reading, spelling, vocabulary, writing mechanics, creative writing and thinking skills • To strengthen contextual understanding of the language through texts relevant to specific disciplines and offer scope for imaginative involvement and self-expression • To stimulate interest in acquiring twenty first century skills • To engage in self-assessment activities for self- development • To help absorb the values, ethics and attitudes of life and culture expressed in literature
AEC 4	**Course Level Learning Outcomes** • To use literature as a medium to teach/learn grammar, reading, spelling, vocabulary, writing mechanics, creative writing and thinking skills • To strengthen contextual understanding of the language through texts relevant to specific disciplines and offer scope for imaginative involvement and self-expression • To stimulate interest in acquiring twenty first century skills • To engage in self-assessment activities for self- development • To help absorb the values, ethics and attitudes of life and culture expressed in literature