		PLOs	PLO 1 Apply appropriate physical laws and mathematical techniques to analyze various physical situations	PLO 2 Perform various scientific experiments and to analyze data to check agreement with theoretical predictions				
CERTIFICATE/PROGRAM:	**Physics ADT**							
COURSE:	**PHY-4A Mechanics**							
SLO 1	Explain the concepts of kinematics, such a as velocity, displacement and acceleration, and their relationships to each other.		X	X				
SLO 2	Determine the forces and torques acting on an object and determine the motion of an object through application of the Laws of Motion.		X	X				
SLO 3	Explain the concepts of conservation of energy and conservation of momentum, and use each to solve problems in mechanics.		X	X				
SLO 4	Apply the definitions of oscillatory and wave motion to construct solutions to problems.		X	X				
SLO 5	Apply the methods of Newtionian mechanics to solve problems relating to extended objects in static equilibrium; and define stress, strain and elastic modulus.		X	X				
SLO 6	Define Newton's Law of gravity and the related gravitational potential energy function and apply the methods of Newtonian mechanics to analyze systems in the contect of Newton's law of gravitation.		X	X				
SLO 7	Perform simple physical experiments that relate to the subject matter of the course; and analyze and interpret data collected in such experiments.		X	X				
COURSE:	**PHY-4B Electricity and Magnetism**							
SLO 1	Determine the magnitude and direction of the electric field and force due to a charge distribution using the principles of superpoition and vector addition.		X	X				
SLO 2	Determine torque and potential energy of electric dipole systems.		X					
SLO 3	Utilize Gauss's Law to calculate electric flux and to determine electric fields for highly symmetrical geometries.		X					
SLO 4	Determine the scalar electric potential using the principles of superposition and Faraday's Law and apply this concept to conservation of energy.		X					
SLO 5	Define capacitance and it's properties. Analyze capacitive circuits to determine their charge, voltage, energy and electric fields.		X	X				
SLO 6	Define current, resistance and electromotive force. Utilize Kirchhoff's rules		X	X				

		PLOs	PLO 1 Apply appropriate physical laws and mathematical techniques to analyze various physical situations	PLO 2 Perform various scientific experiments and to analyze data to check agreement with theoretical predictions				
	for DC circuits. Derive the RC circuit equations.							
SLO 7	Demonstrate proficiency in the use of multimeter, oscilloscope, waveform generator and power supply.			X				
SLO 8	Determine the magnitude and direction of the magnetic field using the principles of superposition and vector addition. Determine the Lorentz force on charges and current carrying wires in magnetic and electric fields. Analyze torque and potential energy of magnetic dipole systems.		X	X				
SLO 9	Obtain expressions for the magnetic field utilizing Ampere's law.		X					
SLO 10	Utilize Farady's law to calculate induced and motional. Determine the direction of current using Lenz's law. Explain the electic motor and generator.		X					
SLO 11	Determine the inductance of a circuit element. Analyze inductive circuits.		X	X				
SLO 12	Define and determine the impedance of an AC circuit and determine the current voltage phase relationships.		X	X				
SLO 13	State Maxwell's equations and demonstrate that a light wave is a solution to Maxwell's equations.		X					
COURSE:	**PHY-4C Heat, Light and Waves**							
SLO 1	Apply the definitions of oscillatory and wave motion to construct solutions to problems.		X					
SLO 2	Define the concepts of fluid mechanics, including pressure, density, and buoyancy, and use them to solve appropriate problems.		X	X				
SLO 3	Explain the concepts of thermodynamics, such as temperature, heat and internal energy, and their relationships to each other and apply these concepts to solve problems.		X	X				
SLO 4	Apply the concepts of physical and geometric optics to construct solutions to problems related to these concepts.		X	X				
SLO 5	Record and analyze measured data in a laboratory environment by applying concepts related to material presented in lecture.		X	X				
COURSE:	**MAT-1A Calculus I**							

		PLOs	PLO 1 Apply appropriate physical laws and mathematical techniques to analyze various physical situations	PLO 2 Perform various scientific experiments and to analyze data to check agreement with theoretical predictions				
SLO 1	Calculate the limit of a function.		X					
SLO 2	Determine the continuity of a function.							
SLO 3	Find the derivatives of algebraic and transcendental functions.		X					
SLO 4	Solve related rates problems.		X					
SLO 5	Apply the absolute and relative extrema to curve sketching and optimization problems.		X					
SLO 6	Use Newton's method to approximate the roots of a function.							
SLO 7	Evaluate a definite integral using Riemann sums.		X					
COURSE:	**MAT-1B Calculus II**							
SLO 1	Employ the basic concepts of convergence and divergence of infinite sequences and series.							
SLO 2	Derive Taylor Series and approximate polynomials of analytic functions.							
SLO 3	Graph, differentiate, and integrate functions in polar and parametric form.		X					
SLO 4	Evaluate definite, indefinite, and improper integrals using techniques of integration.		X					
SLO 5	Solve applications of integration problems, including those involving area, volume, work, arc length and force.		X					
COURSE:	**MAT-IC Calculus III**							
SLO 1	Write vector dot and cross products and apply sot and cross product to writing equations for lines and planes and surfaces in space.		X					
SLO 2	Write Cartesion equations in Spherical and cylindrical coordinates.		X					
SLO 3	Differentiate and integrate vector valued functions.		X					
SLO 4	Apply integration and differentiation to finding velocity and acceleration of bodies in space.		X					
SLO 5	Find unit tangent and unit normal vectors and their application to velocity, acceleration and curvature.		X					
SLO 6	Compute partial derivatives, differentials, directional derivatives and gradients.		X					

		PLOs	PLO 1 Apply appropriate physical laws and mathematical techniques to analyze various physical situations	PLO 2 Perform various scientific experiments and to analyze data to check agreement with theoretical predictions				
SLO 7	Apply partial derivatives and language multipliers to solve the Optimization Problems.							
SLO 8	Compute double and triple integrals and apply double and triple integration to the solution of center of mass, area and volume problems.		X					
SLO 9	Use the Jacobian and transformation of coordinates to solve multiple integration problems.							
SLO 10	Graph vector fields.		X					
SLO 11	Compute line and surface integrals.		X					
SLO 12	Use Green's Divergence and Stoke's Theorems to solve various types of physical applications.		X					