

PROGRAMME SPECIFIC OUTCOMES, PROGRAMME OUTCOMES AND COURSE OUTCOMES

PG DEPARTMENT OF PHYSICS

B.Sc., (PHY), EXTRA-CREDIT COURSES & VALUE-ADDED COURSES

PSO, PO & CO STATEMENTS / 2022

PSOs	PROGRAMME SPECIFIC OUTCOMES
PSO1	Understanding the basic concepts of Physics.
PSO2	Knowing the concurrence between the theory and experiment.
PSO3	Strengthening knowledge to carry out experiments to arrive at scientific results.
PSO4	Applying computing tools to solve problems.
PSO5	Gaining knowledge to use laboratory devices and electronics circuits in scientific applications.

B.Sc., PHYSICS

B.Sc., PHYSICS / PROGRAMMES OUTCOMES

POs	Description of POs
PO1	Understanding of core knowledge in physics.
PO2	Learning laboratory skills
PO3	Demonstrating written and oral communication skills in communicating physics-related topics.
PO4	Pursuing to higher studies and undertaking research work.
PO5	Taking up to future academic carrier and establishing in global scenario.

B.Sc., PHYSICS / COURSE OUTCOMES

	Description of COs	Bloom's Taxonomy / Cognitive Domain
AUPC1	Mechanics and Properties of Matter	
CO1.	Understanding the significance of longitudinal and transverse waves	Remembering (Level K1) Understanding (Level K2)

CO2.	Distinguishing between the phase velocity of a travelling wave and the group velocity of a wave group	Understanding (Level K2)
CO3.	Deriving and solving the equations of motions for physical systems that undergo SHM.	Understanding (Level K2)
CO4.	Demonstrating the laws of transverse vibration of a stretched string using sonometer	Applying (Level K3)
CO5.	Knowing the production and applications of ultrasonic waves, factors affecting acoustics of buildings	Understanding (Level K2)
AUPC2 Electricity		
CO1.	Learning the basic concepts of static electricity.	Remembering (Level K1) Understanding (Level K2)
CO2.	Understanding the Gauss's Law and its applications.	Remembering (Level K1) Understanding (Level K2)
CO3.	Getting the knowledge about principles and types of capacitors.	Understanding (Level K2)
CO4.	Applying the Kirchhoff's Laws in the electrical devices.	Applying (Level K3)
CO5.	Understanding the laws of thermo emf, measurement and its applications.	Understanding (Level K2)
AUPAC1 Acoustics		
CO1.	Understanding the significance of longitudinal and transverse waves.	Remembering (Level K1) Understanding (Level K2)
CO2.	Distinguishing the phase velocity of a travelling wave and the group velocity of a wave group.	Understanding (Level K2)
CO3.	Deriving and solve the equations of motions for physical systems that undergo SHM.	Applying (Level K3)
CO4.	Demonstrating the laws of transverse vibration of a stretched string using sonometer.	Understanding (Level K2)
CO5.	Knowing the production and applications of ultrasonic waves, factors affecting acoustics of buildings.	Understanding (Level K2)
AUPA1 Mechanics, Properties of Matter and Thermal Physics		
CO1.	Analyzing the behavior of objects in circular and rotational motion	Understanding (Level K2)
CO2.	Understanding the gravitational force and variation of 'g' with altitude and depth.	Understanding (Level K2)
CO3.	Understanding various properties of matters and apply in experimental measurements	Applying (Level K3)
CO4.	Acquiring knowledge of heat transfer processes	Remembering (Level K1)
CO5.	Apply the heat transfer processes for day-today activities	Applying (Level K3)
AUPC3 Electromagnetism		
CO1.	Understanding the basic concepts and laws of magnetism	Remembering (Level K1) Understanding (Level K2)
CO2.	Applying the laws of electromagnetic induction in determining the self inductance and mutual inductance	Applying (Level K3)
CO3.	Applying Maxwell's equations for electromagnetic wave propagation	Applying (Level K3)

CO4.	Understanding the circuit analysis using resistance, capacitance and inductance connected to A.C source	Remembering (Level K1) Understanding (Level K2)
CO5.	Designing ,setup and carry out experiments and compare with theoretical predictions using A.C Bridges	Understanding (Level K2)
AUPCM2 Computer Fundamentals & MS Office		
CO1.	Describing the usage of computers and why computers are essential components in business and society.	Remembering (Level K1) Understanding (Level K2)
CO2.	Working with the basic features of Word, create high quality document designs and layouts.	Applying (Level K3)
CO3.	Modifying worksheet data and structure and format data in a Worksheet	Understanding (Level K2)
CO4.	Sorting data, manipulating data using formulas and functions and add and modify charts in a worksheet	Applying (Level K3)
CO5.	Preparing power point presentation for a seminar	Applying (Level K3)
AUPP1 Core Practical Course-I		
CO1.	Applying knowledge of mathematics and physics fundamentals and an instrumentation to arrive solution for various problems.	Applying (Level K3)
CO2.	Understanding the usage of basic laws and theories to determine various properties of the materials given	Applying (Level K3)
CO3.	Gaining knowledge in the scientific methods and learn the process of measuring different Physical Variables.	Remembering (Level K1) Understanding (Level K2)
CO4.	Understanding the application side of the experiments.	Understanding (Level K2)
CO5.	Using standard methods to calibrate the given low range voltmeter and ammeter and to measure resistance of the given coil.	Applying (Level K3)
AUPA2 Electricity, Electronics and Optics		
CO1.	Gaining deeper understanding of electrostatics.	Understanding (Level K2)
CO2.	Acquiring knowledge on elementary ideas of electricity and logic gates.	Understanding (Level K2)
CO3.	Understanding the working of Junction diode , Zener diode and transistor.	Understanding (Level K2)
CO4.	Using the electronic devices for doing experiments in the laboratory.	Applying (Level K3)
CO5.	Demonstrate fundamental knowledge and insight into geometrical optics in the areas of lenses, aberrations and physical optics.	Understanding (Level K2)
AUPAP Ancillary Physics Praticals		
CO1.	Gaining knowledge in the scientific methods and learn the process of measuring different Physical variables.	Remembering (Level K1) Understanding (Level K2)
CO2.	Understanding the given concepts and its physical significance	Understanding (Level K2)
CO3.	Having a deep knowledge of fundamentals of optics and electric circuits	Understanding (Level K2)
CO4.	Using standard methods to calibrate the given low range voltmeter and ammeter and to measure resistance	Applying (Level K3)

	of the given coil and various physical quantities	
CO5.	Applying the theory to design the basic electrical circuits	Applying (Level K3)
AUPC4 Optics		
CO1.	Knowing about lenses and different defects arising in using lenses.	Understanding (Level K2)
CO2.	Knowing to use lenses in constructing eyepieces and the formation of rainbows.	Remembering (Level K1) Understanding (Level K2)
CO3.	Understanding the function of interferometers.	Understanding (Level K2)
CO4.	Understanding the concept of diffraction and the theory of diffraction grating.	Understanding (Level K2)
CO5.	Understanding the phenomenon of polarization and apply the concept of optical activity in polarimeters.	Understanding (Level K2) Applying (Level K3)
AUPAP3 Astrophysics		
CO1.	Learning fundamental concepts in astrophysics that will equip them to better understand new scientific discoveries made in the coming years	Understanding (Level K2)
CO2.	Applying basic physical principles from a broad range of topics in physics to astronomical situations	Applying (Level K3)
CO3.	Coming to view science as a constantly evolving process instead of a static set of rules and equations	Remembering (Level K1) Understanding (Level K2)
CO4.	Understanding about stars and our galaxy	Understanding (Level K2)
CO5.	Understanding astrophysics as a way to describe our real physical world	Remembering (Level K1) Understanding (Level K2)
AUPN1 Fundamentals of Physics		
CO1.	Learning fundamental concepts of measurements of physical quantities	Understanding (Level K2)
CO2.	Knowing the types of matter and applications of plasma	Remembering (Level K1)
CO3.	Understanding the various kinds of Energy	Applying (Level K3)
CO4.	Familiarizing renewable and non- renewable energy sources	Understanding (Level K2)
CO5.	Understanding the basics of optical devices like mirror and lens and its applications	Applying (Level K3)
AUPC6 Analog Electronics		
CO1.	Applying the knowledge of basic semiconductors Physics.	Understanding (Level K2)
CO2.	Analyzing the characteristics of various electronic devices like diode transistor etc,	Understanding (Level K2) Analyzing (Level K4)
CO3.	Classifying and analyze the various circuits configurations of transistors.	Understanding (Level K2) Analyzing (Level K4)
CO4.	Analyzing simple circuits like rectifiers, amplifiers, oscillators etc,	Applying (Level K3)

		Analyzing (Level K4)
CO5.	Becoming aware of the latest technological changes in electronic devices.	Understanding (Level K2)
AUPC7 Heat and Thermodynamics		
CO1.	Applying equation theorem and counts number of degrees of freedom of a thermo dynamical system	Applying (Level K3)
CO2.	Applying the concepts of low temperature physics in liquefaction of gases	Applying (Level K3)
CO3.	Applying the concepts and laws of thermo dynamics to solve problems in thermo dynamics systems such as gases, heat engines etc.,	Applying (Level K3)
CO4.	Using the concepts and principles of black body radiation to analyse radiation process in thermo dynamics systems.	Understanding (Level K2) Analyzing (Level K4)
CO5.	Becoming familiarize with the properties of systems close to absolute zero	Understanding (Level K2)
AUPBI4 Biomedical Instrumentation		
CO1.	Becoming familiarize with the physics of human body.	Remembering (Level K1)
CO2.	Applying knowledge of Electricity and Electromagnetism in medicine.	Applying (Level K3)
CO3.	Applying knowledge of sound and light in medicine.	Applying (Level K3)
CO4.	Applying the concepts of X-ray spectra in medical instruments.	Applying (Level K3)
CO5.	Applying the skills about diagnostic methods and recording setups of EEG, EMG and CT scanner in everyday life.	Applying (Level K3)
AUPP2 Core Practical Course -II		
CO1.	Applying knowledge of mathematics and physics fundamentals and an instrumentation to arrive solution for various problems.	Applying (Level K3)
CO2.	Understanding the usage of basic laws and theories to determine various properties of the materials given.	Applying (Level K3)
CO3.	Gaining knowledge in the scientific methods and learn the process of measuring different Physical variables.	Understanding (Level K2)
CO4.	Understanding the application side of the experiments by using spectrometers, Microscopes and learned to construct electrical bridges.	Understanding (Level K2)
CO5.	Acquiring practical knowledge about many theories related to lenses, aberrations, refractive indices, wavelengths, capacitances and resistances.	Applying (Level K3)
AUPC8 Atomic and Nuclear Physics		
CO1.	Understanding the critical potentials and their experimental determination	Understanding (Level K2)
CO2.	Acquiring knowledge about the structure of atom models	Remembering (Level K1) Understanding (Level K2)

CO3.	Gaining a clear picture of nuclear composition	Understanding (Level K2)
CO4.	Having a deep knowledge about Radio activity, nuclear Fission and Nuclear Fusion	Understanding (Level K2)
CO5.	Becoming familiar with different particle accelerators and working of detectors	Understanding (Level K2) Applying (Level K3)
AUPC9 Digital Electronics		
CO1.	Understanding the basic concepts of number system.	Understanding (Level K2)
CO2.	Getting knowledge of logic gates and the applications of logic gates in different digital circuits.	Understanding (Level K2)
CO3.	Gaining the know-how of multivibrators	Understanding (Level K2) Applying (Level K3)
CO4.	Constructing counters and registers using flip flops.	Understanding (Level K2)
CO5.	Knowing basic concepts of operational amplifier and their applications.	Applying (Level K3)
AUPE1 Computer Programming in C		
CO1.	Getting a basic knowledge of fundamental concepts of 'C' programming language	Remembering (Level K1) Understanding (Level K2)
CO2.	Becoming able to write algorithm and are able to draw flow charts.	Understanding (Level K2)
CO3.	Knowing how to write simple programmes in 'C'	Applying (Level K3)
CO4.	Knowing various control statements, if, if-else, do-while, while switch case and understanding how to use 'for' loops to create iteration	Understanding (Level K2) Applying (Level K3)
CO5.	Able to write programs with structure, union and pointers.	Applying (Level K3)
AUPE1 Spectroscopy		
CO1.	Imparting the broad knowledge of Microwave Spectroscopy	Understanding (Level K2)
CO2.	Gaining knowledge and understanding of the Infrared Spectroscopy	Remembering (Level K1) Understanding (Level K2)
CO3.	Familiarizing with the Raman Spectroscopy and the experimental techniques.	Understanding (Level K2)
CO4.	Getting the idea about experimental setup and arrangement of electronic spectroscopic instruments	Applying (Level K3)
CO5.	Applying the knowledge of Instrumentation and Techniques in Infrared spectroscopy	Applying (Level K3)
AUPE2 Nano Physics		
CO1.	Learning about the background on Nanoscience and synthesis of nanomaterials	Remembering (Level K1)
CO2.	Imparting the basics of Carbon nanotubes and its synthesis techniques	Understanding (Level K2)
CO3.	Learning about nanomolecular self assembly	Remembering (Level K1)
CO4.	Applying their learned knowledge to develop Nanosensors & Nanorobotics	Applying (Level K3)
CO5.	Applying the applications of Nanotechnology in various fields	Applying (Level K3)

AUPE2		Basic Instrumentation
CO1.	Impart the broad knowledge of basic measurements techniques	Remembering (Level K1) Understanding (Level K2)
CO2.	Gaining knowledge and understanding of the Cathode Ray Oscilloscope	Understanding (Level K2)
CO3.	Knowing the Signal Generators and Analysis Instruments	Understanding (Level K2) Analyzing (Level K4)
CO4.	Applying the knowledge of Impedance Bridges & Q-Meters.	Applying (Level K3)
CO5.	Getting the idea about experimental setup and arrangement of digital instruments.	Applying (Level K3)
AUPCP5		Computer Programming 'C' Practicals
CO1.	Writing simple programme in 'C'.	Understanding (Level K2)
CO2.	Using control statements and simple if else statements in writing programmes.	Applying (Level K3)
CO3.	Writing programs using switch case.	Applying (Level K3)
CO4.	Writing programe using for loop.	Applying (Level K3)
CO5.	Writing programe using functions.	Applying (Level K3)
AUPC10		Solid State Physics
CO1.	Studying of crystallography is given to the students through this Course.	Understanding (Level K2)
CO2.	Studying of defects in solids make the students to understand the structural defects of crystals.	Understanding (Level K2)
CO3.	Getting knowledge of lattice vibrations in crystals.	Remembering (Level K1) Understanding (Level K2)
CO4.	Getting detailed ideas of the properties of different magnetic materials.	Understanding (Level K2)
CO5.	Getting knowledge of superconductors and superconducting materials and their applications.	Applying (Level K3)
AUPC11		Advanced Mechanics and Relativity
CO1.	Defining and demonstrate the different formalism in classical dynamics of a system.	Understanding (Level K2)
CO2.	Applying the formalism to obtain equations of motion for simple systems.	Applying (Level K3)
CO3.	Understanding the matter waves and the uncertainty relation.	Understanding (Level K2)
CO4.	Understanding the idea of wave function and to solve Schrödinger equation for simple potential.	Understanding (Level K2)
CO5.	Understanding the concepts of constant relative motion of different bodies in different frame of reference.	Understanding (Level K2)
AUPE3		Laser and Fiber Optics
CO1.	Exploring the Laser fundamentals.	Understanding (Level K2)
CO2.	Understanding the types of Lasers.	Applying (Level K3)
CO3.	Get adequate knowledge about Industrial and medical applications of laser for day-to-day applications.	Understanding (Level K2)

CO4.	Recognizing and classify the structure of Optical fibre.	Understanding (Level K2) Remembering (Level K1)
CO5.	Understanding the Optical sensors and their applications.	Understanding (Level K2) Applying (Level K3)
AUPE3 Mathematical Physics		
CO1.	Solve ordinary and partial differential equations in physical sciences.	Applying (Level K3)
CO2.	Using Green Functions.	Understanding (Level K2)
CO3.	Using Fourier series and integral transformations and understand the basic theory of vectors and tensors.	Remembering (Level K1) Understanding (Level K2)
CO4.	Understanding the functions of complex variables and elements of distribution theory	Understanding (Level K2)
CO5.	Analyzing Fourier series	Applying (Level K3)
AUPP3 Core Practical - Course III		

CO1.	Imparting the broad knowledge of experimental methods and measurements.	Understanding (Level K2) Applying (Level K3)
CO2.	Gaining knowledge and understanding the components and handling equipments.	Understanding (Level K2) Applying (Level K3)
CO3.	Familiarizing with the experimental techniques.	Understanding (Level K2) Applying (Level K3)
CO4.	Getting the idea about experimental setup and arrangement of devices.	Applying (Level K3)
CO5.	Verifying the experimental results with theoretical values.	Applying (Level K3)
AUPP4 Core Practical - Course IV		
CO1.	Remembering the applications of semiconductor devices.	Remembering (Level K1) Applying (Level K3)
CO2.	Gaining the idea and principles of electronics practically.	Understanding (Level K2) Applying (Level K3)
CO3.	Accessing the action of electronic devices such as diode, transistor etc.,	Understanding (Level K2) Applying (Level K3)
CO4.	Imparting the broad knowledge of experimental methods and measurements.	Applying (Level K3)
CO5.	Gaining knowledge and understanding the components and handling equipments.	Applying (Level K3)
AUPN2 Types of Energy & Their Utilization		
CO1.	Learning fundamental concepts of energy.	Understanding (Level K2)
CO2.	Imparting the usage of non-renewable energy sources.	Applying (Level K3)
CO3.	Applying basic characteristics of renewable sources of energy and technologies for their utilization	Understanding (Level K2)
CO4.	Giving review on utilization trends of renewable sources of energy.	Remembering (Level K1)
CO5.	Interpreting the advantages and disadvantages of different renewable and non-renewable sources of energy.	Understanding (Level K2)
EXTRA-CREDIT COURSES		
UGEEH All Under-graduation Programmes / Semester – I / Extra-credit Course – I / Energy Harvesting - I		
CO1.	Understand how electrical energy can be used in day today appliances. Acquire knowledge of the Ac currents and generators	Understand (Level K1) & Knowledge (Level K2)
CO2.	Develop an awareness and knowledge of magnetic fields, flux and other magnetic vectors.	Application (Level K3)
CO3.	Provide with useful educational experiences to them in the concept of photovoltaic effects.	Knowledge (Level K2) Analyze (Level K4)

CO4.	Understand and appreciate the use of thermal energy and to develop skill needed in using it.	Application (Level K3)
CO5.	Give them the opportunities to study the concepts nuclear energy and energy generation.	Analyze (Level K4)
UGEEA All Under-graduation Programmes / Semester – III / Extra-credit Course – II / Electrical Appliances		
CO1.	Understand how day today appliances are functioning. Acquire knowledge of the Ac currents and generators	Understand (Level K1) & Knowledge (Level K2)
CO2.	Acquire the knowledge of working of Refrigerators and Air conditioner.	Application (Level K3)
CO3.	Provide with useful educational experiences to understand the of the basic idea of Electrical bell and Room heater.	Analyze (Level K4)
CO4.	Understand and appreciate the use of thermal energy and to develop skill needed in using it.	Application (Level K3)
CO5.	Get the opportunities to study the concepts Induction stove and Lightning conductor	Analyze (Level K4)
UGERH All Under-graduation Programmes / Semester – V / Extra-credit Course – III / Energy Harvesting - II		
CO1.	Acquire knowledge of the working different thermal devices Understand how solar energy can be used in day today appliances..	Understand (Level K1) & Knowledge (Level K2)
CO2.	Get the concept of power in the wind types of wind energy systems horizontal axis wind Turbine – Vertical axis wind Turbine.	Understand (Level K1) & Knowledge (Level K2)
CO3.	Provide with useful educational experiences to them in the concept of Tidal Energy, Ocean Thermal Energy Conversion.	Analyze (Level K4)
CO4.	Appreciate the use of Energy from Biomass.	Analyze (Level K4)
CO5.	Able to estimates of Geothermal power understand the nature of Geothermal fields and Geothermal sources.	Analyze (Level K4) Application (Level K3)
VALUE-ADDED COURSES		
All Under-graduation Programmes / Semester – II / Value-added Course – I / Laboratory Equipment		
CO1.	Gaining knowledge of the basic concepts of measurement of physical quantities.	Knowledge (Level K2)
CO2.	Gaining knowledge of the basic principles of transformers	Knowledge (Level K2)
CO3.	Applying the principles of power supplies in various circuits.	Application (Level K3)
CO4.	Designing and analyzing electrical and electronic instruments	Analyze (Level K4)
CO5.	Analyzing the frequency responses in various circuits using oscillators	Analyze (Level K4)

All Under-graduation Programmes / Semester – IV / Value-added Course – II / Designing & Fabrication of PCB		
CO1.	Gaining knowledge of the basics of PCB	Knowledge (Level K2)
CO2.	Comprehending the different types of PCB	Knowledge (Level K2)
CO3.	Applying the gained knowledge to develop Layout	Application (Level K3)
CO4.	Applying the gained knowledge and developing Etching and Soldering	Analyze (Level K4)
CO5.	Analyzing the concept of laminates and printing	Analyze (Level K4)
All Under-graduation Programmes / Semester – VI/ Value-added Course – III / Optoelectronic Devices		
CO1.	To understand LEDs their working, advantages and applications	Knowledge (Level K2)
CO2.	To know about LCD, their working and uses	Application (Level K3)
CO3.	Understand the function of different semiconductor opto devices	Knowledge (Level K2)
CO4.	To discuss the concept of different photo detecting devices	Knowledge (Level K2)
CO5.	To learn about the working of CRO	Application (Level K3)
M.Sc PHYSICS		
M.Sc., Physics/ PROGRAMMES OUTCOMES		
POs	Description of POs	
PO1	Knowing the concepts of advanced physics and applying in real time problems to find appropriate solution.	
PO2	Gaining practical skills and the techniques to tackle a broad range of problems in physics.	
PO3	Enhancing comprehension capabilities through understanding of electronic devices.	
PO4	Developing software tools by applying the learned concepts to mathematical physics, quantum mechanics and computational physics.	
PO5	Making to learn the structures, properties, characterization and applications of nanomaterials.	
	Description of PSOs	
PSO1	Students gain knowledge in the conceptual understanding in the development of scene with appropriate theoretical background.	
PSO2	Know about scientific and technological applications as well as their social, economic and environmental implications.	
PSO3	Various properties of materials thereby equip students to pursue higher learning and research confidently.	
PSO4	Gain experience with measurement technique and equipment, and develop the ability to assess uncertainties and assumptions.	
PSO5	Create several self-employment opportunities in renewable energy and energy efficiency sectors for modestly- trained and self- trained humans.	

M.Sc., Physics / COURSE OUTCOMES		
	Description of COs	Bloom's Taxonomy / Cognitive Domain
APPC1 Electromagnetic Theory		
CO1.	Understanding the concepts of Electric charge, Coulombs law, Electric field, Electrostatic potential and Gauss's law	Understanding (Level K2)
CO2.	Understanding the concepts of magneto statistics	Understanding (Level K2)
CO3.	Becoming familiar with the concepts of Electromagnetic induction, Faraday's law and Maxwell's equation	Understanding (Level K2)
CO4.	Knowing the reflection, transmission, absorption and dispersion of electromagnetic waves in vacuum and matter.	Understanding (Level K2)
CO5.	Applying the knowledge of electric potentials and fields	Applying (Level K3)
APPC2 Applied Electronics		
CO1.	Understanding the concepts of various semiconductor devices and amplifier systems	Understanding (Level K2)
CO2.	Understanding the concepts of various semiconductor amplifier systems.	Applying (Level K3)
CO3.	Applying the concepts various counters and converters	Applying (Level K3)
CO4.	Applying the concepts many wave generators and wave shaping circuits	Applying (Level K3)
CO5.	Becoming familiar with the knowledge of integrated circuits	Understanding (Level K2)
APPC3 Classical Mechanics		
CO1.	Applying the concepts of – Mechanics of a particle and Mechanics of systems of particles	Applying (Level K3)
CO2.	Understanding the concepts Generalized coordinates and constraints –D'Alembert's principle and Lagrange's equation for a conservative system.	Understanding (Level K2)
CO3.	Applying the concepts Hamilton's Equation and Canonical Transformations.	Applying (Level K3)
CO4.	Applying the knowledge of Hamilton-Jacobi equations	Applying (Level K3)
CO5.	Becoming familiar with the theory of small oscillations	Understanding (Level K2)
APPE1 Computer Programming in C++		
CO1.	Knowing the basic knowledge of fundamental concepts of C++ programming language.	Understanding (Level K2)
CO2.	Becoming able to write algorithm and draw flow charts.	Applying (Level K3)
CO3.	Understanding the concepts of classes, objects and Inheritance	Understanding (Level K2)
CO4.	Applying the knowledge to write simple programmes in C++	Applying (Level K3)
CO5.	Gaining knowledge to write programs with arrays, structure, union and pointers.	Applying (Level K3)

APPE1		Numerical Methods
CO1.	Deriving numerical methods for various mathematical operations.	Understanding (Level K2)
CO2.	Solving a system of linear equations	Applying (Level K3)
CO3.	Understanding Trapezoidal and Simpson's 1/3 and 3/8 rules for numerical integrations.	Understanding (Level K2)
CO4.	Applying Euler and Runge - Kutta methods for solving first and second order equations	Applying (Level K3)
CO5.	Applying numerical methods to real life applications	Applying (Level K3)
APPP1		Electronics Praticals
CO1.	Understanding the characteristics of diodes and transistors	Understanding (Level K2)
CO2.	Applying the knowledge to measure frequency of oscillators	Applying (Level K3)
CO3.	Designing and implement feedback amplifier circuits	Applying (Level K3)
CO4.	Designing dual power supply using ICs	Applying (Level K3)
CO5.	Applying the skills to design simple electronic circuits and mini projects	Applying (Level K3)
APPC4		Mathematical Physics
CO1.	Applying basics of vector calculus and matrices to solve higher level problems in quantum mechanics.	Applying (Level K3)
CO2.	Solving ordinary and partial differential equations in physical sciences.	Applying (Level K3)
CO3.	Evaluating problems using Green Functions	Understanding (Level K2)
CO4.	Applying Fourier series and Fourier transforms	Applying (Level K3)
CO5.	Gaining knowledge about special functions for solving problems in theoretical physics.	Understanding (Level K2)
APPC5		Materials Science
CO1.	Understanding the behaviour of semiconductors.	Understanding (Level K2)
CO2.	Acquiring knowledge about the behaviour of different types of Magnetic and dielectric materials	Understanding (Level K2)
CO3.	Applying the knowledge about the optical devices like LED, LCD and Photoconductor in practical applications.	Applying (Level K3)
CO4.	Applying the skills about the characteristics and synthesis of nanomaterials in research field.	Applying (Level K3)
CO5.	Analyzing the behaviour of various modern engineering materials like Polymers, ceramic materials, Biomaterials, and Non-linear materials in recent development.	Analyzing (Level K4)
APPC6		Quantum Mechanics
CO1.	Identifying and relate the eigenvalue problems for energy, momentum and angular momentum.	Understanding (Level K2)
CO2.	Understanding the one and three dimensional energy Eigen value problems.	Understanding (Level K2)
CO3.	Applying the concepts of Angular momenta, their properties commutation relations of total angular	Applying (Level K3)

	momentum with components.	
CO4.	Apply the Stationary perturbation theory, time independent quantum approximation methods and application of WKB method.	Applying (Level K3)
CO5.	Becoming familiar with the time dependent perturbation theory and the semi-classical treatment of radiation.	Understanding (Level K2)
APPE2 Non-Conventional Energy Sources		
CO1.	Acquiring knowledge on energy sources available in the world.	Understanding (Level K2)
CO2.	Understanding solar energy collection and storage process.	Understanding (Level K2)
CO3.	Learning wind energy programme in India.	Applying (Level K3)
CO4.	Knowing the recent development in biomass conversion technologies.	Analyzing (Level K4)
CO5.	Knowing the applications of geothermal energy, tidal energy and ocean thermal energy.	Evaluating (Level K5)
APPE2 Thin Film Technology		
CO1.	Gaining knowledge on the mechanism, process for the synthesis and evolution of thin films.	Understanding (Level K2)
CO2.	Understanding principles, advantages and drawbacks of different thin film deposition methods.	Understanding (Level K2)
CO3.	Familiarizing basics of defects and dislocations, and learn how it can be identified and removed.	Applying (Level K3)
CO4.	Learning characterization techniques to analyze sample.	Analyzing (Level K4)
CO5.	Applying the knowledge of thin film in research level applications.	Applying (Level K3)
APPP2 Digital Electronics Praticals		
CO1.	Designing half adder and full adder circuits and verify their truth tables.	Applying (Level K3)
CO2.	Analyzing and verify Demorgan's theorem.	Analyzing (Level K4)
CO3.	Applying the skills to solve different problems by developing different programs using micro processor 8085 kit.	Applying (Level K3)
CO4.	Applying the procedures to design adder and subtractor using Op – amps.	Applying (Level K3)
CO5.	Designing Flip flops and multivibrators using ICs.	Applying (Level K3)
APPC7 Communication Electronics		
CO1.	Acquiring knowledge on recent developments in the scientific and technological fields based on electronic principles	Understanding (Level K2)
CO2.	Applying different modulation and demodulation techniques in advanced electronic communications	Applying (Level K3)
CO3.	Analyzing generation and detection of AM and FM signals and comparison between them	Applying (Level K3)
CO4.	Identifying different radio receiver circuits and role of AGC.	Applying (Level K3)

CO5.	Applying the recent developments in the field of information technology and internet	Applying (Level K3)
APPC8 Condensed Matter Physics		
CO1.	Understanding the basis of the Crystal Structure, Diffraction of waves by crystals, Bragg law, Reciprocal an Lattice Vectors.	Understanding (Level K2)
CO2.	Understanding the concepts of Crystal Binding And Elastic Constants.	Understanding (Level K2)
CO3.	Getting familiar with the knowledge of phonons.	Understanding (Level K2)
CO4.	Applying the knowledge of free electron Fermi gas.	Applying (Level K3)
CO5.	Applying the concepts of semi Conductors and Fermi Surfaces of Metals.	Applying (Level K3)
APPC9 Nuclear and Particle Physics		
CO1.	Understanding the concepts of nuclear forces, nucleon scattering and nuclear magnetic moment.	Understanding (Level K2)
CO2.	Applying the concepts nuclear models.	Applying (Level K3)
CO3.	Applying the concepts and laws of nuclear reactions.	Applying (Level K3)
CO4.	Understanding the various radioactive decays.	Understanding (Level K2)
CO5.	Becoming familiarized with the types and properties of elementary particle.	Understanding (Level K2)
APPE3 Microprocessor - 8085		
CO1.	Understanding the Microcomputer arrangement and the Intel processors 8085, its Pin functions and its architecture.	Understanding (Level K2)
CO2.	Knowing the assembly language instruction set of 8085.	Understanding (Level K2)
CO3.	Applying the assembly level language instructions for writing various programs.	Applying (Level K3)
CO4.	Understand instruction timings.	Understanding (Level K2)
CO5.	Apply the knowledge of 8085 in understanding the memory interfaces and to study microprocessor applications.	Applying (Level K3)
APPE3 Crystal Growth and Characterization		
CO1.	Understanding the process of crystal nucleation and growth .	Understanding (Level K2)
CO2.	Knowing about various crystal growing techniques.	Applying (Level K3)
CO3.	Understanding the methodologies of solution and gel growth techniques.	Understanding (Level K2) Applying (Level K3)
CO4.	Understanding the concepts behind the melt and vapour growth techniques.	Understanding (Level K2) Applying (Level K3)
CO5.	Knowing about different characterization techniques.	Analyzing (Level K4) Evaluating (Level K5)
APPP3 General Physics		

CO1.	Using different AC bridges, self inductance of a coil L is determined.	Applying (Level K3)
CO2.	Using B.G., mutual inductance of two coils are compared	Applying (Level K3)
CO3.	Using Spectrometer the Fraunhofer lines are observed and wavelengths are determined from Solar Spectrum.	Applying (Level K3)
CO4.	Using Biprism, wavelength of Monochromatic light is determined with Spectrometer and with Optic bench.	Analyzing (Level K4)
CO5.	Determining of Refractive index of liquid by Newton's rings. Determination of Young's modulus by forming Hyperbolic fringes.	Evaluating (Level K5)
APPC10 Fibre Optic Communication		
CO1.	Getting the knowledge of properties and types of fibers.	Understanding (Level K2)
CO2.	Understanding optical fiber structure, wave guiding and fabrication	Understanding (Level K2)
CO3.	Acquiring the knowledge of optical fiber transmission link and advantages of optical fiber communication.	Applying (Level K3)
CO4.	Gaining the knowledge of different kinds of losses, signal distortion in optical wave guides and other signal degradation factors.	Applying (Level K3)
CO5.	Analyzing various coupling losses.	Analyzing (Level K4)
APPC11 Molecular Spectroscopy		
CO1.	Understanding the concepts of rotation of molecules.	Understanding (Level K2)
CO2.	Understanding the concepts of microwave spectroscopy.	Understanding (Level K2)
CO3.	Knowing about Infrared spectroscopy.	Understanding (Level K2)
CO4.	Applying the knowledge of Raman spectroscopy.	Applying (Level K3)
CO5.	Applying the knowledge of the principles of electronic spectra of diatomic molecules.	Applying (Level K3)
APPE4 Statistical Mechanics and Thermodynamics		
CO1.	Knowing about statistical nature of concepts and laws in thermodynamics	Understanding (Level K2)
CO2.	Getting knowledge about basic concepts and relations including phase space, ensemble, statistical, thermal and mechanical equilibrium.	Understanding (Level K2)
CO3.	Getting knowledge about using the statistical Physics method such as Boltzmann and Gibb's distributions.	Understanding (Level K2)
CO4.	Getting knowledge about quantum statistics.	Understanding (Level K2)
CO5.	Applying quantum statistics to Ideal Bose Einstein gas and Fermi- Dirac gas.	Applying (Level K3)

APPE4		Atmospheric Physics
CO1.	Understanding the Physical Meteorology: Structure of Earth's Atmosphere and Composition- Law of Thermodynamics of the Atmosphere	Understanding (Level K2)
CO2.	Understanding the Fundamental Forces and Structure of Static Atmosphere. Momentum, Continuity & Energy Equations and Thermodynamics	Understanding (Level K2)
CO3.	Understanding the various Climatic Classifications and Monsoon Seasons	Understanding (Level K2)
CO4.	Getting the knowledge of Role of Meteorology in Atmospheric Pollution	Understanding (Level K2)
CO5.	Applying the concepts of Radar Principles and Technology & Radar Signal Processing & Display of Weather in Radar	Applying (Level K3)
APPP4		Computer programming in C++
CO1.	Writing simple programme in 'C++'.	Applying (Level K3)
CO2.	Using control statements and simple if else statements in writing programmes.	Applying (Level K3)
CO3.	Writing programs using switch case.	Applying (Level K3)
CO4.	Writing programme using for loop.	Analyzing (Level K4)
CO5.	Writing programme using functions.	Evaluating (Level K5)

