

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 |
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| 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 |
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| 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 |
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| AUPC1 | Mechanics and Properties of Matter | |
| CO1. | Understanding the significance of longitudinal and transverse waves | Remembering (Level K1) Understanding (Level K2) |

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| 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) |

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| | 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) |

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| | | 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) |

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| 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 |
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| 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 programme using for loop. | Applying (Level K3) |
| CO5. | Writing programme 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) |

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| 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 | | |

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| 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 | | |
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| 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 | | |
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| | 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 |
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| 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) |

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| | 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) |

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| 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 | | |

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| 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) |

