SRI PADMAVATI MAHILA VISVAVIDYALAYAM, TIRUPATI
DEPARTMENT OF PHYSICS

OUTCOMES

Programme outcome:

After the completion of the M.Sc. Physics program, the students will be able to:
PO1: Work in the field of teaching, research and scientific as well as industrial applications.
PO2: Develop written and oral communication skills in communicating physics-relatedtopics.
PO3: Develop the proficiency in the acquisition of data using a variety of laboratoryinstruments and in the analysis and interpretation of such data.
PO4: Learn the applications of numerical techniques for modelling Physical systems for whichanalytical methods are inappropriate or of limited utility.
PO5: Apply conceptual understanding of the physics to general real-world situations.
PO6: Discover of physics concepts in other disciplines such as mathematics, Computer science, engineering, and chemistry.

Programme specific outcome:

After studying the theoretical Physics such as Classical Mechanics, Electromagnetic theory, Quantum Mechanics and other Physics Subjects; Condensed Matter Physics, Analog and Digital Electronics, Communications electronics and their related experiments from I to IV Semester M.Sc. Physics

PSO1: Gain complete knowledge about all fundamental/basic aspects of material physics, Condensed matter physics and solid-state physics
PSO2: Describe the methodology of science and the relationship between observation and theory.
PSO3: Acquire skills to minimize contributing variables and recognize the limitations of equipment.
PSO4: Analyse physical problems and develop correct solutions using natural laws.
PSO5: Design and develop the new application oriented circulate and electronic devices.
PSO6: Apply the knowledge to other descriptions for expel data and analysis.

COURSE OUTCOME:

Principles of Physics

PHY101T: CLASSICAL MECHANICS AND THEORY OF RELATIVITY

CO1.	To acquire knowledge in concept of Newton's Laws, Lagrangian and Hamiltonian formulations and apply for problem solving.
CO2.	To understand the importance of Canonical Transformations and its properties, Lagrange- Brackets and their properties, derivation of Lagrange's equation from Hamilton's principle
CO3.	To analyze essential features of a problem (like motion under central force, rigid body dynamics, and periodic motions), use them to set up and solve the appropriate mathematical equations, and make quick and easy checks on the answer to catch simple mistakes
CO4.	To gain the knowledge in the concept of Special Theory of Relativity and Relativistic Mechanics. Gain an understanding of the postulates of special theory of relativity for analysing the motion of the Object with respect to time.

PHY102T: ATOMIC AND MOLECULAR PHYSICS

CO1.	Describe the concept of Hydrogen atom (one electron atom) and the three quantum numbers - Spectra of hydrogen atom- Spectra of alkali elements- Fine structures..
CO2.	Deals the importance of Zeeman effect, Normal and anomalous Zeeman effect, Experimental details, Magnetic moment of the atom and Lande's 'g'-factor. Paschen-Backeffect, Stark effect
CO3.	Analyse essential features of Rotational, vibrational, electronic spectra– Rotational spectra of a diatomic molecule as rigid rotator – Energy levels and spectra of non -rigid rotor – Rotational spectra of polyatomic molecule –electronic spectra- Evaluation of rotational constants - Effect of isotopic substitution on rotational levels –Applications of rotational spectroscopy.
CO4.	Understanding the concept of Diatomic molecule as simple harmonic oscillator– anharmonic oscillator – Energy levels and spectrum .To analyse electronic spectra - Deslander's table and Evaluation of vibrational constants

PHY103T: MATHEMATICAL METHODS OF PHYSICS

CO1.	Acquire the skills in concept of Beta and Gamma Functions Definitions and properties
CO2.	Evaluate integrals, Legendre, Bessel and Hermite differential equations –Bessel and Hermite Functions (Proof not necessary) – Recurrence relations. To understand the Properties of Fourier transforms – Fourier sine and cosine transforms- Power in Fourier series**,** Modulation theorem, Fourier transform of impulse function, Constants, Unit step function and Periodic functions.
CO3.	Gain the knowledge in Properties of Laplace transforms, Dirac delta function and periodic functions Inverse Laplace transforms, properties, Solution of linear differential equations with constant coefficients, Applications to LCR circuits and resonance of simple pendulum.
CO4.	Understand the different ways of solving partial differential equations and familiarize with Tensors. To understand Complex differentiation, Cauchy – Reimann equations. Complex Integration, Cauchy's theorem. Integrals of special functions, Cauchy's integral formula Taylor's and Lorentz theorem (statements only) – Residues, calculations of residues, Residue theorem, evaluation of definite integrals.

PHY104T: ANALOG, DIGITAL ELECTRONICS & MICROCONTROLLERS

CO1.	Gain the knowledge about fabrication of IC's like OP-Amp and FETS and its characteristics.
CO2.	To understand the different types of IC's and their basic concepts. Expertize to connect new circuits leads to development of new instrument
CO3.	To make different logic gates and gain more knowledge on flip flops, shift registers, counters and analog to digital converters
CO4.	To understand the basics of 8051 microcontroller and apply technological devices

PHY201T: STATISTICAL MECHANICS

CO1.	To understand the connection between statics and thermodynamics. To learn Concept and importance of ensembles to explain the behavior of the system, Derivation of Plank's law
CO2.	To analyse the difference between classical statics and quantum statistics. To understand and analyze the variation of specific heat with respect to temperature
CO3.	To deals the concept of phase space and its volume. They can easily distinguish between different types of particles and statistics and they can easily distribute bosons, fermions and classical particles among energy levels.
CO4.	To acquire knowledge about Fermi dirac statistics, students have learnt to deal with many electron systems in real life.

PHY202T: ELECTROMAGNETIC THEORY AND MODERN OPTICS

CO1.	To analyse – Derivation of Maxwell's equations and their physical significance – Poynting theorem – Poynting vector – Propagation of EM waves in a medium (wave equation)
CO2.	To understand Reflection and refraction of EM waves at interface of two non-conducting media
CO3.	To find Brewster's angle – Degree of polarization – Total internal reflection – Reflection for conducting plane
CO4.	To know properties of EM waves between parallel and planes, rectangular waveguides, scattering by free electrons – resonance scattering and Rayleigh scattering. To understand Potentials, Fields and EM Radiation. To learn the Basic theory of Holography – Recording and reconstruction of Hologram and applications of Holography.

PHY203 T: QUANTUM MECHANICS – I

CO1.	To explore the importance of quantum mechanics and compared to classical mechanics at microscopic level.
CO2.	To know Theory of angular momentum and spin matrices, orbital angular momentumAndClebshGordan Coefficient
CO3.	To apply Approximation methods for time-independent problems like the WKB Approximation.
CO4.	solvevariational equation and its application to ground state of the hydrogen and Heliumatom. Perturbation theory and Interaction of an atom with the electromagnetic field.Toanalyze the concept of scattering theory and its types for solving problems.

PHY204T: ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

CO1.	To Acquire the knowledge about principles of different electronic instruments which are used in lab:
CO2.	To gain the knowledge about transducers and signal generators
CO3.	To know about principles of ADC, seven segment and LED display
CO4.	To learn about the medical instruments used in the hospitals

PHY207T: Human Values and Professional Ethics – I

CO1.	To explore the importance of Ethics and goals for human life
CO2.	To know the difference between good and bad and what are morals to follow in the life
CO3.	To gain the knowledge about dharma, artha, kaama and moksha . How they are essential for life.
CO4.	To learn the concept of Nishkama Karma, Buddhism and Gandhian Ethics

PHY301T- QUANTUM MECHANICS-II

CO1.	To Understand the basics of Both schrodinger and Heisenberg formulations of time development and their applications, system of fermions and bosons.
CO2.	To explore the In distinguishability of Identical particles (Bosons and fermions), symmetric and asymmetric wave functions.
CO3.	To know the difference between Relativistic and Non-Relativistic Equations and apply for problem solving.
CO4.	To understand the concept of Quantization of Wave Fields and the importance of Creation and Annihilation

PHY302T: ANALYTICAL TECHNIQUES

CO1.	It explains naomaterials, and its properties and different synthesis techniques. By using this we can develop the different types of compound for different applications
CO2.	To Acqire skills int crystal systems and symmetry elements and Reciprocal lattice. To understand Methods of X- ray diffraction, , Powder X-ray Diffractometer, Single crystal X-ray Diffractometer-To gain the knowledge the Basic principles and applications of Electron diffraction and Neutron diffraction
CO3.	To know about Electron Spin Resonance and Mossbauer Spectroscopy, To understand and apply NMR and NQR Techniques. Describe Basic concepts of NQR spectra: Half integral and integral spins, Instrumentation.
CO4.	To gain the knowledge about the Basic principles, Instrumentation and applications of X ray fluorescence spectroscopy, Photoelectron spectroscopy, Photoemission spectroscopy and X-ray photoelectron spectroscopy. Scanning electron microscopy, Transmission electron microscopy

PHY 303T: DIGITAL COMMUNICATIONS

CO1.	To gain the knowledge of different types of communications,
CO2.	To describes analog modulations, digital modulations techniques DM, CVSD, PCM, BPSK, QPSK, FSK, BFSK, MSK and their applications
CO3.	To learn the deep knowledge on error probability calculations in BPSK and BFSK
CO4.	To give deep understanding of Internet, Types of Network LAN, ISDN, TDMA, FDMA, Protocol and satellites

PHY 304T: PHYSICS OF SEMICONDUCTOR DEVICES

1.	To understand the Description of p-n Junction action –Zener and Avalanche breakdown in p-n junctions, Distinction between the Zener and Avalanche breakdown, applications of breakdown diodes. Metal-Semiconductor interfaces, Ohmic and Schottky contacts.
2.	To learn the deep knowledge on various diodes like IMPATT diode, TRAPATT diode, BARITT diode
3.	To construct equivalent circuits as an oscillator and amplifier. To make use of Optoelectronic Devices such as Photo conductor, Photo diode, Avalanche Photo diode – Photo transistor, Charged Coupled Devices (CCD)
4.	To gain the knowledge on thyristor , crystal wafer evaporation and lithography

PHY401T: NUCLEAR AND PARTICLE PHYSICS

CO1.	To study the general properties of nucleus To understand Nuclear Forces and Models
CO2.	To determine size of the nucleus using scattering methods. To study the deuterium properties,nuclear Shell model is very important and useful to know the nuclear structure.
CO3.	Liquid drop model: the nucleons imagined to interact strongly with each other in the nucleaus like molecule in a drop of liquid. To study the Nuclear fission and fusion reactions.
CO4.	Equivalence of the mass and energy is described by Einstein's famous formula $\mathbf{E= mc^2}$. To learn types of nuclear reactions and Resonance theory – Briet Wigner formula. To understand the functioning of Nuclear Accelerators and Reactors. To know the Discovery and classification of elementary particles. To find Elementary particle symmetries (SU_2 and SU_3 symmetries) – Quark model and search for Higg's particles.

PHY402T: SOLID STATE PHYSICS

CO1.	Find out the Origin of chemical binding in ionic and van der Waals crystals To understand Lattice vibrations: Vibrational spectra, Infrared absorption in ionic crystals Vibrational spectra of finite lattice Quantisation of lattice vibrations, Phonons Properties
CO2.	Understand the Concept of electrical and thermal resistivity To understand Different scattering mechanisms – Distribution function.To learn the Sommerfeld model – Bloch function- Kroning-Penny model and Formation ofenergy bands in solids .Distinction between metals, insulators and semiconductors
CO3.	know about Intrinsic and extrinsic semiconductors, Hall effect
CO4.	Acquire the Concept of zero resistance – Magnetic behavior, Meissner effect Isotope effect – Specific heat behavior. To inderstand SQUIDS and its applications, Applications of superconductors, High T_C superconductors – Preparation – Properties.

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