DEPARTMENT OF PHYSICS

M.Sc. PHYSICS SYLLABUS(2021-2022)

PPHT11 MATHEMATICAL PHYSICS – I

Course Outcomes (CO):
CO1: Expose to solve vector analysis and vector space K2
CO2: Acquire sound knowledge on matrices and tensors K4
CO3: Evaluate complex variables K3
CO4: Grasp problem solving skills in group theory K4
CO5: Understand the physics concepts using mathematics K2

PPHT12 CLASSICAL MECHANICS

Course Outcomes (CO):
CO1: Learn about the dynamics of system of particlesusing Hamiltonian, Lagrangian and Jacobi K1
CO2: Understand the planetary motion using Kepler's law K2
CO3: Get great exposure about kinematics of rigid motion K4
CO4: Solve small oscillations using Legendre transformations and Hamiltonian K3
CO5: Solve harmonic oscillator problem using canonical transformation and Hamiltonian Jacobi K5

PPHT13 ELECTRONICS

Course Outcomes (CO):
CO1: To acquire basic knowledge of semiconductor diodes K1
CO2: Imbibe deep insight in fabrication and operation of optoelectronic K3
CO3: Understand the concept of OPAMP applications K2
CO4: Able to carry out experiments based on applications of OPAMP: K3
CO5: Know about theory and operation of Semiconductor memories: K2

PPHT14 LASER PHYSICS AND NON-LINEAR OPTICS

COURSE OUTCOMES (CO)

CO1 : Know about laser fundamentals [K2]
CO2 : Understand the laser operation [K3]
CO3 : Infer the knowledge about laser characteristics. [K4]
CO4 : Develop a skill in laser focusing [K5]
CO5 : Understand non-linear optics [K5]

PPHP11 **ELECTRONICS PRACTICAL**I

Course Outcomes (CO):
CO1: Grasp basic knowledge about celestial mechanics [K1]
CO2: Understand the usage of various astronomical instruments [K2]
CO3: Know the physical processes involved in solar systems [K3]
CO4: Gain deep insight on cosmology and Cosmic radiation[K3]
CO5: Acquire the fundamental concepts of Stellar Evolution, White dwarfs, Neutron Stars and Black Holes[K2]

PPHE11 NUMERICAL METHODS
COURSE OUTCOMES:
CO1: Estimating the data through interpolation method [K5]
CO2: Understand numerical differentiation and integration [K2]
CO3: Apply numerical methods of integration and differentiation to mathematical problems [K3]
CO4: Analyze ordinary differential equation and find numerical solution [K4]
CO5: Understanding numerical methods and their application [K3]

PPHE11 MODERNOPTICS AND IMAGING

Course Outcomes (CO):

CO1: Learn the fundamentals of wave nature and Light PropagationsK1
CO2: Clear knowledge about Optical Engineering and Fourier Optics K2
CO3: Gain knowledge about the Nonlinear Optics K2
CO4: Learnthe fundamentals of Holography K3
CO5: Get the Knowledge about different microscopy and image techniques K2

PPHT21 **MATHEMATICAL PHYSICS – II**

Course Outcomes (CO):
CO1: Understand about differential equation K2
CO2: Solve physics problem using partial differential equations K3
CO3: Knowledge with special functions such as Gamma and Beta function, Legendre's differential equation and Bessel's differential equation K4
CO4: Evaluate physical problem using Laguerre and Hermite polynomials K4
CO5: Identify right transforms to solve problem in Physics. K5

PPHT22 **QUANTUM MECHANICS –I**

COURSE OUTCOME:
CO1: Gain the knowledge about the fundamentals of wave mechanics [K1]
CO2: Apply wave mechanics in three dimensions [K3]
CO3: Understand quantization of angular momentum[K2]
CO4: Evaluate the addition of two spin angular momenta [K5}
CO5: Understand scattering theory and the approximation methods employed in solving quantum mechanical problems [K3]

PPHT23 **THERMODYNAMICSAND STATISTICAL MECHANICS**
Course Outcomes (CO):

CO1: Learn basic concept of ensembles K2
CO2: Explore the different theories and functions related to properties of gases K3
CO3: To distinguish between Bose –Einstein and Fermi- Dirac statistics K4
CO4: Exposure about kinetic theory of gases K2
CO5: Get knowledge about the different fluctuations and noise problems in thermodynamics K2

PPHT24 **CONDENSEDMATTER PHYSICS – I**

Course Outcomes

On completion of this course, the learners are able to
CO1: understandabout crystal structure and crystal binding [K1, K2]
CO2: calculate structure parameters of crystal and analyze reciprocal lattice of crystal [K2, K4]
CO3: analyze the defects in crystals [K4]
CO4: Understand the thermal parameters of crystal [K1, K2]
CO5: Calculate Hall coefficient and band gap for given Semiconductor. [K5]

PPHP22 **GENERAL PRACTICAL II**

Course Outcomes:

On successful completion of this course the students will

- Understand the concept and get hands on training on instruments
- Give acquaintance to measure and determine various physics constant using various physics instruments
- Apply different physics concept to analyze the data

- Analysis the data obtain from Indian Institute of Astrophysics, Kodaikanal and get information about different astronomical objects

PPHT31 **ELECTROMAGNETIC THEORY**

Course Outcomes (CO):

CO1: Learn the fundamentals of electrostatics K1
CO2: Acquire the knowledge about magnetostatics K2
CO3: Gain knowledge about the Maxwell equation K2
CO4: Apply Maxwell equation and its application to wave propogation K3
CO5: Learn about electric dipoles and its theory K2

PPHT32 **QUANTUM MECHANICS –II**

COURSE OUTCOMES:
CO1: Able to demonstrate the advanced knowledge in quantum mechanics [K1]
CO2: Understand the effect of magnetic and electric field on quantum particles.[K1]
CO3: Analyze Approximation methods for time independent problems and fortime dependent perturbation theory[K4]
CO4:Apply fundamental quantum mechanical methods such as variation method, WKB approximation to quantum particles[K3]
CO5: Discuss and analyze the theory of relativistic quantum mechanics [K4]

PPHT33 CONDENSEDMATTER PHYSICS – II

Course Outcomes (CO)

On completion of this course, the learners are able to
CO1: understandabout dipole moment, polarization, dielectric breakdown, dielectric loss, frequency and temperature effects on Polarization [K1]
CO2: Knowledge about ferroelectrics and piezoelectricsmaterials [K2]
CO3: analyze the different types of magnetic materials [K3]
CO4: evaluate different types of superconductors [K1]
CO5: understand about physics behind different nanosolids. [K6]

PPHT34 NUCLEAR PHYSICS AND PARTICLE PHYSICS

Course Outcomes (CO):
CO1: Learn about nuclear forces K1
CO2: Acquire knowledge about different nuclear models K2
CO3: Understand what happen when charged particles and radiation passed through matter by various experimental procedure K2

CO4: Gain knowledge about Q-value and theories of nuclear reactions K4
CO5: Learn about different classification and properties of elementary particles.K4

PPHP33 **PRACTICAL III**

Course Outcomes (CO):

Uponsuccessful completion of this course the students will able to write C program for different mathematical problems.

PPHE33 **INSTRUMENTALMETHODS OFANALYSIS**

Course Outcomes

On completion of this course, the learners are able to
CO1: understandabout error analysis technique in instrument [K1]
CO2: analyze different thermal parameters of the sample [K2]
CO3: analyze structural parameters and composition of the sample[K3]
CO4: analyze surface morphology and composition of the materials [K1]
CO5: analyze the electronic properties of the sample [K6]

PPHE33 **PHYSICSOFNON-CONVENTIONALENERGY RESOURCES**

Course Outcomes (CO):
CO1: Importance of nonconventional energy will be registered (K2)
CO2: various fields of nonconventional energy like solar, wind power and biomass introduced in detail (K3)
CO3: Gain important insight in the materials used to fabricate solar panels (k2)
CO4: Carry out productive research in these fields to serve mankind (K4)
CO5: Help in creating innovative devices using these principles (K5)

PPHE33 **PHYSICS OF NANOMATERIALS**

Course Outcomes (CO):
CO1: Introducing the history and evolution of nanotechnology (K2)
CO2: Important features and unique properties of nanomaterials learnt along with emphasis on significant nanomaterials (K2)
CO3: Learn various synthesis techniques to prepare nanostructures for hi tech research applications
CO4:Expertise gained in handling characterization tools to analyze nanomaterials (K3)
CO5: Fabrication of novel nanomaterials for interdisciplinary applications (K3)

PPHT41 **SPECTROSCOPY**

Course Outcomes (CO):

CO1: Understand about principle and concept of different spectroscopic techniques K2
CO2: Understand deeply about different instrumentation and working procedure of spectroscopictechnique. K2
CO3: Identity the spectroscopic techniques to analyze different mechanism and properties of the Materials K3
CO4: Identify and analyze which spectroscopic tool is used for their research work K3
CO5: Can seek employability in industries K4
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