

COURSE OUTCOMES

2019 ONWARDS

DEPARTMENT : PHYSICS

PROGRAMME : M.Sc. PHYSICS

SEMESTER I

COURSECODE : PH010101

COURSENAME : MATHEMATICAL METHODS IN PHYSICS-I

Sl. No.	DESCRIPTION
C101.1	Understand the fundamentals of vector and their algebra and different kinds of theorems involving vectors like gauss theorem and stokes theorem
C101.2	Represent vectors in three different coordinates and calculate grad, div, curl of vectors.
C101.3	Get basic idea of linear vector space and of inner products and related theorems. Understand fundamentals of probability theory and of different kinds of distributions.
C101.4	Get ideas on Matrices and their properties, eigen value problems and on diagonalisation of matrices.
C101.5	Fundamental idea of tensors and algebra using tensors.

COURSECODE : PH010102

COURSE NAME : CLASSICALMECHANICS

Sl. No.	DESCRIPTION
C102.1	Understand the fundamental concepts of the Lagrangian and the Hamiltonian method and apply them to various problems
C102.2	Understand the physics of small oscillations and the concepts of canonical transformations and Poisson brackets

C102.3	Understand and Illustrate the basic ideas of central forces and rigid body dynamics
C102.4	Understand the Hamilton-Jacobi method and the concept of action-angle variables.
C102.5	Understand the Hamilton-Jacobi method and the concept of action-angle variables.

COURSECODE : PH010103

COURSENAME : ELECTRODYNAMICS

SI. No.	DESCRIPTION
C103.1	Understand and apply the basics of electricity, magnetism and electrodynamics
C103.2	Understand wave nature of electromagnetic field and its properties in different media
C103.3	Explain electromagnetic field radiating out of accelerated charges
C103.4	Understand the impact of relativity in electromagnetism along with confined propagation of electromagnetic wave

COURSECODE : PH010104

COURSENAME : ELECTRONICS

SI. No.	DESCRIPTION
C104.1	Understand the flow of charge (electron) through various materials and devices such as semiconductors, resistors, inductors, capacitors, nanostructures etc.
C104.2	Getting adapted with basic integrated circuit components, its designing & packaging
C104.3	Understand various operating modes of Op-amp and its linear/non-linear Applications
C104.4	Understand applications of electronics which involve the transmission of power and information

SEMESTER II

COURSECODE : PH010201

COURSENAME : MATHEMATICAL METHODS IN PHYSICS-II

SI. No.	DESCRIPTION
C201.1	Infer Fundamental ideas of complex function and properties, Integration involving complex function and Series expansions (Taylor expansion & Laurent expansion)
C201.2	Illustrate conversion of a function into series using Fourier series and Fourier integrals and different kinds of transformations and applications.
C201.3	Understand Special functions involved in different problems of physics and different kinds of differential equations
C201.4	Able to solve partial differential equations with different methods like variable separable method in three different coordinates, using greens functions and find their applications.

COURSECODE : PH010202

COURSENAME : QUANTUM MECHANICS - I

SI. No.	DESCRIPTION
C202.1	Understand the fundamental concepts of the Dirac formalism.
C202.2	Examine how quantum systems evolve in time
C202.3	Understand the basics of the quantum theory of angular momentum.
C202.4	Solve the hydrogen atom problem and illustrate the method to apply to more complicated problems in quantum mechanics

COURSECODE : PH010203

COURSENAME : STATISTICALMECHANICS

Sl. No.	DESCRIPTION
C203.1	Understand quantum and classical statistical mechanics for ideal systems.
C203.2	Understand the concepts of phase space, microstate, macrostate.
C203.3	Perform quantitative calculations on ideal systems
C203.4	Construct appropriate models to analyze simple systems in the microcanonical, canonical and grand canonical ensembles.
C203.5	Identify and solve problems in statistical mechanics using ensemble theory
C203.6	Analyze phase diagrams, phase transitions and explain the concept of latent heat

COURSECODE : PH010204

COURSENAME : CONDENSED MATTERPHYSICS

Sl. No.	DESCRIPTION
C204.1	Examine how condensed matter theory is characterized on atomic scale.
C204.2	Illustrate how condensed matter physics integrates into the discipline of physics
C204.3	Understand the systems and the range of physical Phenomena in condensed matter systems.
C204.4	Understand the phenomenon of superconductivity and their relation with the magnetic properties of materials.

COURSECODE : PH010205

COURSENAME : GENERAL PHYSICSPRACTICALS

Sl. No.	DESCRIPTION
C205.1	Apply the experimental methods to correlate with the Physics theory
C205.2	Illustrate hands on experience in using electrical, mechanical and optical systems for various measurements
C205.3	Analyze the observed data and evaluate the results in terms of the expected outcome, the difficulties faced, possible errors etc.

COURSECODE : PH010206

COURSENAME : ELECTRONICSPRACTICAL

Sl. No.	DESCRIPTION
C206.1	Design and test various basic linear application circuits using Opamps
C206.2	Design and test various Opamp based Active Filter Circuits
C206.3	Design and test various waveform generation circuits using Opamps, Comparators and IC packages
C206.4	Understand how the 555 IC acting as a voltage controlled oscillator.

SEMESTER III

COURSECODE : PH010301

COURSENAME : QUANTUM MECHANICS-II

Sl. No.	DESCRIPTION
C301.1	Understand the different stationary state approximation methods and apply them to various quantum systems
C301.2	Understand the basics of time-dependent perturbation theory and apply to semi-classical theory of atom-radiation interaction
C301.3	Understand the theory of identical particles and its application to helium
C301.4	Understand the idea of Born approximation and the method of partial waves
C301.5	Illustrate the basic concepts of relativistic quantum mechanics

COURSECODE : PH010302

COURSENAME : COMPUTATIONALPHYSICS

Sl. No.	DESCRIPTION
C302.1	Identify different kinds of numerical methods for curve fitting and interpolation including Newtons forward and backward interpolation formula.
C302.2	Understand and Apply Numerical differentiation in different problems, find Errors in numerical differentiation and Apply Trapezoidal Rule, Simpson's 1/3, and Simpson's 3/8 Rule to integrate various functions
C302.3	Examine Numerical Solutions of Ordinary Differential Equations with Euler method, R-K method and Illustrate the Gauss elimination method , Gauss-Jordan method to find inverse of a matrix
C302.4	Find Numerical solutions of partial differential equations, Understand Elementary ideas and basic concepts of finite difference method, Schmidt Method, Crank - Nicholson method and Weighted average implicit method

COURSE CODE : PH010303

COURSE NAME: ATOMIC AND MOLECULAR PHYSICS

Sl. No.	DESCRIPTION
C303.1	Understand Atomic structure and spectra of typical one- electron and two-electron systems.
C303.2	Examine the theory of microwave and infra-red spectroscopies as well as the electronic spectroscopy to understand vibrational and rotational spectroscopy and hence to find the structure of various molecules
C303.3	Illustrate the basics of Raman spectroscopy and the nonlinear Raman effects
C303.4	Study the Electron spin and Nuclear Magnetic spin resonances
C303.5	Examine and analyse Mossbauer spectrum for gamma ray emissions from nucleus

COURSECODE : PH800301

COURSENAME : DIGITAL SIGNAL PROCESSING

Sl. No.	DESCRIPTION
C304.1	Describe the characteristics and transformations of discrete time signals mathematically
C304.2	Classify systems based on their properties and determine the response of LTI system using convolution.
C304.3	Construct time, frequency and Z -transform analysis on signals and systems.
C304.4	Describe the significance of various filter structures.
C304.5	Design FIR and IIR type digital filters.

SEMESTER IV

COURSECODE : PH010401

COURSENAME : NUCLEAR AND PARTICLEPHYSICS

Sl. No.	DESCRIPTION
C401.1	Understand the basic properties of the nucleus and the nuclear forces.
C401.2	Understand the major models of the nucleus and the theory behind the nuclear decay process
C401.3	Understand the physics of nuclear reactions
C401.4	Illustrate the interaction between elementary particles and the conservation laws in particle physics.
C401.5	Develop some idea about nuclear astrophysics and the practical applications of nuclear physics

COURSE CODE : PH800402

COURSENAME : MICROELECTRONICS AND SEMICONDUCTOR DEVICES

Sl. No.	DESCRIPTION
C402.1	Understand the fundamentals of microelectronic semiconductor devices and their processing steps in detail.
C402.2	Knowledge of the architecture and instruction set of basic microprocessors and microcontrollers.
C402.3	Understand the fundamentals and properties of semiconductor junctions such as metal-semiconductor and semiconductor hetero-junctions.
C402.4	Knowledge of semiconductor fabrication processes enabling the students to work in industry in the area of semiconductor devices.

COURSECODE : PH800403

COURSENAME : COMMUNICATION SYSTEMS

Sl. No.	DESCRIPTION
C403.1	Understand and analyze the properties of various modulation techniques and apply them to Digital Communication
C403.2	Understand the principles of wireless transmission, cellular Systems and the different cellular or mobile systems.
C403.3	Compare different technologies used for wireless communication systems.
C403.4	Understand the basic concept in the field of Satellite Communication and also understand how to place a satellite in an orbit.
C403.5	Identify the optical fiber for different applications
C403.6	Understand the concepts of Radar Systems and Antennas.

COURSECODE : PH800404

COURSENAME : ADVANCED PRACTICALS IN ELECTRONICS

Sl. No.	DESCRIPTION
C404.1	Design and Construct various electronic devices and hence interpret the results by testing those devices
C404.2	Understand the basic principles of transducers by constructing a temperature transducer
C404.3	Design and implement programs on 8086 microprocessor

COURSECODE : PH010402

COURSENAME : COMPUTATIONAL PHYSICS PRACTICALS

Sl. No.	DESCRIPTION
C405.1	Develop algorithm / Flowchart for numerical problems
C405.2	Use graphical interface to examine the evolutions of systems
C405.3	Use numerical methods to solve real problems in physics
C405.4	Illustrate writing data to a file and reading data from a file.

COURSECODE : PH010403

COURSENAME : PROJECT /DISSERTATION

Sl. No.	DESCRIPTION
C406.1	Students become equipped to do literature survey in the relevant topic and plan the investigations
C406.2	Students become able to do project on their own
C406.3	Students can characterize/analyse and interpret results of investigations and data themselves
C406.4	Students can identify problems related to needs of society
C406.5	Able to use of modern software for data analysis/experiments (Origin, LAB View, MATLAB, ...etc)