

COURSE OUTCOMES

2016 ONWARDS

DEPARTMENT : PHYSICS

PROGRAMME : M.Sc PHYSICS

SEMESTER I

COURSE CODE : PH1C01

COURSE NAME : MATHEMATICAL METHODS IN PHYSICS –I

Sl. No.	DESCRIPTION
C101.1	Apply the concepts of Gradient, Divergence and Curl in orthogonal curvilinear coordinates in physics
C101.2	Illustrate the role of matrices and tensors in writing equations that are relevant in physics
C101.3	Examine basic classical variation problems in the context of physical situations

COURSE CODE : PH1C02

COURSE NAME : CLASSICAL MECHANICS

Sl. No.	DESCRIPTION
C102.1	Analyse physical systems through the classical equations of motions in Lagrangian and Hamiltonian formalism
C102.2	Relate small oscillations to vibrations of subatomic world
C102.3	Examine Poisson brackets and canonical transformations
C102.4	Illustrate Rigid body Dynamics
C102.5	Explore General theory of relativity and nonlinear dynamics

COURSE CODE : PH1C03

COURSE NAME : ELECTRODYNAMICS

Sl. No.	DESCRIPTION
C103.1	Calculate the electric and magnetic fields of various charge and current distributions using Maxwell's equations
C103.2	Describe the propagation of electromagnetic waves through different media and interfaces
C103.3	Express Maxwell's equations using tensor notation
C103.4	Analyse Electricity and Magnetism as a relativistic phenomenon
C103.5	Understand the concept of retarded time for charges
C103.6	Understand wave guide propagation

COURSE CODE : PH1C04

COURSE NAME : ELECTRONICS

Sl. No.	DESCRIPTION
C104.1	Infer the DC and AC characteristics of operational amplifiers and its effect on output and their compensation techniques.
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	Students will be able to design the circuit like signal generators, amplifiers and different order filter circuit
C104.5	Understand the function of application specific ICs such as voltage regulators, 555timer and PLL

COURSE CODE : PH1P01

COURSE NAME : GENERAL PHYSICS PRACTICALS

Sl. No.	DESCRIPTION
C105.1	Apply the experimental methods to correlate with the Physics theory
C105.2	Illustrate hands on experience in using electrical, mechanical and optical systems for various measurements
C105.3	Analyse the experimental data using graphical method
C105.4	Evaluate the results with respect to the expected outcome

SEMESTER II

COURSE CODE : PH2C05

COURSE NAME : MATHEMATICAL METHODS IN PHYSICS -II

Sl. No.	DESCRIPTION
C201.1	Infer the basic elements of complex analysis, residues of a complex function and the residue theorem to compute certain types of integrals in solving equations related to Physics
C201.2	Find solutions to physical problems in terms of Special functions like Gamma function, Beta function, Delta function, Dirac delta function, Bessel functions and their recurrence relations.
C201.3	Familiarize different ways of solving second order differential equations and singular points and Frobenius method.
C201.4	Apply the Techniques of Fourier series, Fourier and Laplace transforms, their inverse transforms in relevant problems
C201.5	Able to solve ordinary second order differential equations related to physical sciences; solve physically relevant partial differential equations using standard methods like separation of variables, series expansion (Fourier-type series) and integral transforms.

COURSE CODE : PH2C06

COURSE NAME : QUANTUM MECHANICS I

Sl. No.	DESCRIPTION
C202.1	Understand basics of quantum mechanics
C202.2	Examine Quantum Mechanical formulations in dynamical situations
C202.3	Apply approximation methods in quantum mechanics to find the solutions of physical problems
C202.4	Apply techniques and algebra of angular momentum to rotations

COURSE CODE : PH2C07

COURSE NAME : THERMODYNAMICS AND STATISTICAL MECHANICS

Sl. No.	DESCRIPTION
C203.1	Apply the knowledge of mathematics and science fundamentals to the effective energy conversion process.
C203.2	Relate the concepts of fundamental laws of thermodynamics to sustain in energy crisis.
C203.3	Master the basic statistical methods and concepts of probability, random variables, expectation value, variance and common probability distributions.
C203.4	Construct appropriate models so as to analyze simple systems in the micro canonical, canonical and grand canonical ensembles.
C203.5	Establish the relation between microscopic and macroscopic description and apply the laws of thermodynamics and principles of free energy to describe thermodynamic processes, heat engines, phase equilibrium and chemical processes.
C203.6	Understand the Fermi- and Bose- statistics for electron-, photon- and phonon- gases and use the density of states to find particle number and energy analytically and numerically.
C203.7	Apply distribution function to quantum and classical systems.
C203.8	Evaluate thermal properties of solids using statistical approach

COURSE CODE : PH2C08

COURSE NAME : CONDENSED MATTER PHYSICS

Sl. No.	DESCRIPTION
C204.1	Students will be familiar with most fundamental principles, concepts, physical quantities, laws, and characteristic of condensed matter physics.
C204.2	Students will be able to apply the following to the solution of condensed matter physics problems: basic crystal structures, reciprocal and diffraction lattice structures, phonons and thermo/acoustic/optical properties.
C204.3	Students will be able to find the energy band structures in metals and semiconductors.
C204.4	Students will be able to explain various types of phenomena like electro-magnetic properties, super-conductivity and super fluidity.

COURSE CODE : PH2P02

COURSE NAME : ELECTRONICS PRACTICAL

Sl. No.	DESCRIPTION
C205.1	Design and test various basic linear application circuits using Opamps
C205.2	Design and test various Opamp based Active Filter Circuits
C205.3	Design and test various waveform generation circuits using Opamps, Comparators and IC packages
C205.4	Understand how the 555 IC acting as a voltage controlled oscillator.

SEMESTER III

COURSE CODE : PH3C09

COURSE NAME : QUANTUM MECHANICS II

Sl. No.	DESCRIPTION
C301.1	Apply the methods of time dependent theory for perturbations to study evolutions of systems
C301.2	Find the consequences of scattering in quantum world
C301.3	Translate the relativistic world into quantum mechanical scenario
C301.4	Apply the methods of field theory in relativistic and non relativistic problems

COURSE CODE : PH3C10

COURSE NAME : COMPUTATIONAL PHYSICS

Sl. No.	DESCRIPTION
C302.1	Identify modern programming methods and describe the extent and limitations of computational methods in physics.
C302.2	Formulate and computationally solve a selection of problems in physics.
C302.3	Critically select different numerical methods to solve different types of physical and technical problems.
C302.4	Describe the basis of stochastic simulation methods such as the Monte Carlo method and use them

COURSE CODE : PH3EA1

**COURSE NAME : INTEGRATED ELECTRONICS AND DIGITAL SIGNAL
PROCESSING**

Sl. No.	DESCRIPTION
C303.1	Understand different types of signals- continuous and discrete, odd and even, periodic and aperiodic signals
C303.2	Classify systems based on their properties and determine the response of LTI system using convolution.
C303.3	Apply transform techniques (Fourier Transform, Z transform etc.) to analyze

	continuous-time and discrete-time signals and systems
C303.4	Understand the theory of different filters and algorithms
C303.5	Design FIR and IIR type digital filters.

COURSE CODE : PH3EA2

COURSE NAME : MICROELECTRONICS AND SEMICONDUCTOR DEVICES

Sl. No.	DESCRIPTION
C304.1	Explain the architecture of 8085 microprocessor
C304.2	Explain the architecture of 8086 microprocessor
C304.3	Basic 8086 programming skills
C304.4	Explain the architecture of 8087 coprocessor
C304.5	Explain the architecture of 8051 microcontroller
C304.6	Understand the working of various semiconductor devices using energy band diagrams

COURSE CODE : PH3P03

COURSE NAME : COMPUTATIONAL PHYSICS PRACTICALS

Sl. No.	DESCRIPTION
C305.1	Identify modern programming methods and describe the extent and limitations of computational methods in physics.
C305.2	Formulate and computationally solve a selection of problems in physics.
C305.3	Critically select different numerical methods to solve different types of physical and technical problems.
C305.4	Describe the basis of stochastic simulation methods such as the Monte Carlo method and use them.

SEMESTER IV

COURSE CODE : PH4C11

COURSE NAME : ATOMIC AND MOLECULAR PHYSICS

Sl. No.	DESCRIPTION
C401.1	Relate Atomic spectra to find the orientations and energy levels in an atom
C401.2	Examine the infrared and micro wave spectrum to understand vibrational and rotational spectroscopy and hence to find the structure of various molecules
C401.3	Illustrate Raman and Electronic spectroscopy in relevant molecules
C401.4	Study the Electron spin and Nuclear Magnetic spin resonances for the emission of possible energy emissions
C401.5	Examine and analyse Mossbauer spectrum for gamma ray emissions from nucleus

COURSE CODE : PH4C12

COURSE NAME : NUCLEAR AND PARTICLE PHYSICS

Sl. No.	DESCRIPTION
C402.1	Explore the nucleus and analyse the structure of nucleus and nucleon interactions
C402.2	Understand the decay process and nuclear reaction.
C402.3	Illustrate the structure of nucleus using Shell model.
C402.4	Familiarize with the basics of elementary particle physics. Understand building blocks of matter and their interactions via different forces of Nature.

COURSE CODE : PH4EA3
COURSE NAME : INSTRUMENTATION AND COMMUNICATION
ELECTRONICS

Sl. No.	DESCRIPTION
C403.1	Classify and explain the working of various transducers
C403.2	Understand the basic principles of digital instruments
C403.3	Explain the basic principles and working of instruments used for measurement of basic parameters such as current, voltage, resistance
C403.4	Explain the importance of Ionosphere in communication
C403.5	Explain the fundamentals of monochrome and colour TV transmission
C403.6	Differentiate various pulse modulation techniques and multiplexing techniques

COURSE CODE : PH4OE1
COURSE NAME : OPTOELECTRONICS

Sl. No.	DESCRIPTION
C404.1	Understand the essential requirements needed for laser action in a material and students will be able to distinguish different types of laser
C404.2	Describe an Optical Modulator
C404.3	Describe light detectors such as the photodiode, avalanche photodiode and photomultiplier and students will be able to compare the relative merits
C404.4	Explain optical fibres and discuss the important parameters of these in an optical communications system.

COURSE CODE : PH4PA4

COURSE NAME : ADVANCED ELECTRONICS PRACTICALS

Sl. No.	DESCRIPTION
C405.1	Design and Construct various electronic devices and hence interpret the results by testing those devices
C405.2	Understand the basic principles of transducers by constructing a temperature transducer
C405.3	Design and implement programs on 8086 microprocessor
C405.4	Design and verify the theory of optoelectronic devices through experiments

COURSE CODE : PH4D05

COURSE NAME : PROJECT / DISSERTATION

Sl. No.	DESCRIPTION
C406.1	Students become equipped to plan the investigations
C406.2	Students become able to do project on their own
C406.3	Students can analyse and interpret results of investigations and data themselves
C406.4	Students can identify problems related to needs of society