PROGRAMME OUTCOME

MSc Physics (2020 Admission onwards)

Theory Papers

SEMESTER 1

PH 211: CLASSICAL MECHANICS (6L, 1T)

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1.	CO1	Students are able to understand the concepts of Lagrangian and Hamiltonian mechanics and use them to solve problems in mechanics. Able to identify concepts of generating functions, Poisson brackets Hamilton Jacobi equations and action angle variables.	Un, Re
2.	CO2	To equip the students to deal with central force problem and analyzing Kepler's laws.	Ev
3.	CO3	To inculcate the students the concepts of special and general theory of relativity and related problems.	Re, Un, Ap
4.	CO4	To acquaint the students about the theory of small oscillations and Euler's equations of motions of rigid bodies	Re, Un, Ap
5.	CO5	To analyze nonlinear dynamical systems and to explain the concepts of classical chaos.	Re, An

PH 212: Mathematical Physics (6L, 1T)

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	To apply and analyze the various vector and matrix operations and to perform complex analysis for solving physical problems.	Un, Re,An
2	CO2	To demonstrate and utilize the concepts of Fourier series and its transforms.	Un, Re,An
3	CO3	To explain and differentiate different probabilistic distributions.	Re, Un, Ap
4	CO4	To apply partial differential equations and special functions for solving mathematical problems.	Re, Un, Ap
5	CO5	To illustrate and apply concepts of group theoretical operations and tensors.	Re, Un,Ap

PH 213: BASIC ELECTRONICS (6L,1T)

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	To equip the students design and analyze different analogue and digital circuits.	Un, Re
2	CO2	To summarize the knowledge of basic arithmetic and data processing circuits and memory devices.	Un, Re
3	CO3	To equip the students to explain various components in optical communications systems and microwave devices.	Re, Un, Ap
4	CO4	To measure and analyze the different electronic signals.	Re, Un, Ap,An

SEMESTER 2

PH 221: MODERN OPTICS AND ELECTROMAGNETIC THEORY (6L, 1T)

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	To demonstrate the linear and nonlinear optical phenomena.	Un, Re
2	CO2	To explain and discuss propagation of electromagnetic waves through different media.	Un, Re
3	CO3	To restate formulations and relativistic effects in electrodynamics.	Re, Un, Ap
4	CO4	To analyse the propagation of electromagnetic waves through waveguides.	Re, Un, Ap, An
5	CO 5	To use radiation theory in developing different antennas.	Re, Un, Ap

PH 222: THERMODYNAMICS, STATISTICAL PHYSICS AND BASIC QUANTUM MECHANICS (6L, 1T)

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	To explain the basic thermodynamic relations, Maxwell's equations and its consequences.	Un, Re
2	CO2	To equip the students to demonstrate and apply classical and quantum statistics in different physical phenomena.	Un, Re, Ap
3	CO3	To distinguish the different phase transitions using Ising model.	Re, Un, An
4	CO4	Outline and apply foundations of quantum mechanics	Re, Un, Ap, An

PH 223: COMPUTER SCIENCE AND NUMERICAL TECHNIQUES (6L, 1T)

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	To summarize computer hardware and its operating systems	Un, Re
2	CO2	Explain internal architecture of microprocessors 8085 and create assembly language programing.	Un, Re, Ap
3	CO3	To develop and compile programs in python and C++.	Re, Un, An
4	CO4	Apply numerical methods to solve physical problems.	Re, Un, Ap, An

SEMESTER 3

PH231: ADVANCED QUANTUM MECHANICS (6 L, 1 T)

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	To extend the use of approximation methods viz variation, WKB, time dependent and time independent perturbations.	Un, Re
2	CO2	To summarize different types of symmetry, conservation laws and quantum theory of scattering.	Un, Re, Ap
3	CO3	To distinguish different approximation methods, to study the structure and properties of many electron systems.	Re, Un, An
4	CO4	To compute eigen values of angular momentum and evaluation of CG coefficients.	Re, Un, Ap, An
5	CO5	Infer the requirements of relativistic quantum mechanics.	Re, An, Ap

PH 232: ATOMIC AND MOLECULAR SPECTROSCOPY (6L, 1T)

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	Explain different symmetry operations and deduction of molecular structure.	Un, Re
2	CO2	Distinguish and classify the different spectra shown by atoms and molecules	Un, Re, Ap
3	CO3	Illustrate the various spectroscopic experimental techniques.	Re, Un, An

PH 233: CONDENSED MATTER PHYSICS (6L, 1T)

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	Discuss crystal physics, lattice vibrations, models of thermal properties and band theory of solids.	Un, Re
2	CO2	Explain the theoretical concepts of semiconductors, dielectric, magnetic and	Un, Re, Ap
3	CO3	superconducting materials.	Re, Un, An
4	CO4	To describe the synthesis and characterization techniques of nanomaterials.	Un, An, Ap

PHS 234: PHYSICS OF THE ATMOSPHERE (7L,1T)

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	To make students aware about the structure of Earths atmosphere	Un, Re
2	CO2	Discuss various atmospgheric Phenomenon	Un, Re,
3	CO3	Explain the Atmospheric Dynamics	Re, Un, An
4	CO4	Infer various atmospheric paramenters and their influence on weather/climate	Un, An, Ap

SEMESTER 4

PH 241: NUCLEAR AND PARTICLE PHYSICS (6L, 1T)

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	To describe and analyze nuclear structure, models and reactions.	Un, Re, Ap
2	CO2	To illustrate the mechanisms of nuclear fission and fusion reactions.	Un, Re, Ap
3	CO3	Discuss various nuclear detectors and particle accelerators.	Re, Un, An
4	CO4	To classify elementary particles and discuss their interactions.	Un, An, Ap

PHS 242 SPACE PHYSICS (5L,1T)

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	Calculate fundamental properties of a plasma with given appropriate information.	Un, Re
2	CO2	Apply basic electromagnetism to derive the kinetic theory of plasmas	Un, Re, Ap
3	CO3	Explain Sun's interior structure, physics of solar wind and origin of cosmic rays.	Un, An
4	CO4	Explain the main consequences of magnetic reconnection for Earth's magnetosphere.	Un, An, Ap
5	CO5	Demonstrate the experimental technique for ionospheric studies.	Ap, Cr

PHS 243: INTRODUCTION TO ASTROPHYSICS (5L,1T)

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	Discuss different celestial coordinate systems.	Un, Re
2	CO2	Apply Stefan – Boltzmann equation to get stellar luminosity.	Un, Re, Ap
3	CO3	Explain different phases of interstellar medium.	Un, An
4	CO4	Discuss energy generation in stars.	Un, An, Ap
5	CO5	Classify different types of galaxies and discuss evolution of Universe	Un, Ap,An

Practical

PH 251: GENERAL PHYSICS PRACTICALS

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	To measure and analyze various physical quantities.	Un, Re, Ap
2	CO2	To calculate error in various general physics experiments.	Un, Re, Ap
3	CO3	To develop experimental skills	Un, Ap

PH 252 Electronics and Computer Science Practicals

At the end of the course, the student will be able to:

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	To design and construct various electronic circuits and its validation.	Un, Re, Cr
2	CO2	To calculate error in various electronics experiments.	Un, Re, Ap
3	CO3	To develop experimental and programming skills	Un, Ap, Cr

PHS 244 Lab: Space Physics

S No.	Course Outcome No.	Course Outcome	Taxonomic Level
1	CO1	Ability to use reasoning and logic to define a problem in terms of principles of physics.	Un, Re, Ap
2	CO2	Data handling skills such as making measurements with specialized equipment and computer applications.	Un, Re, Ap
3	CO3	Ability to handle and interpret satellite data.	Un, Ap
4	CO4	Knowledge on methods and techniques of astronomical imaging using charged coupled device (CCD) detectors and computer controlled telescopes to obtain images of the moon, planets, stars and nebulae	Un, Ap