PROGRAM AND COURSE OUTCOMES

DEPARTMENT OF PHYSICS

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MSc PHYSICS

Course Outcomes

Semester	Course	Course Outcome
1	Classical Mechanics	• Describe and understand the motion of a mechanical system using Lagrange- Hamilton formalism. • Enable the students to understand the kinematic and dynamics of rigid body in detail and idea regarding Euler's equation of motion and theory of small oscillation with basis of free vibration.
	Mathematical Physics l	• Develop the mathematical methods and techniques widely used to describe various physical phenomena.
	Electrodynamics & Plasma Physics	• Students should get better comprehension of how electromagnetic waves consist of an electric field and magnetic field. • Describe the foundations of electrodynamics, the multipole expansion of the electromagnetic field, the study of the energy balance, and explain Maxwell's equations in vacuum and inside matter after this advanced course. • Examine the methods of vector calculus to solve problems in electromagnetism, concepts and properties of electromagnetic wave propagation and introduce the concept of relativistic electrodynamics and plasma physics.
	Electronics	• Use analytical techniques in resistive circuits energized by direct voltage and current sources and evaluate lecture circuit laboratory bench

		experiments such as FET, OP- AMPS etc. • explain concepts of the basic memory elements using flip flops and various applications in registers, counters etc. • explain the basic logic operations to interpret logic functions, circuits, truth tables, • and Boolean algebra expressions and apply the laws of Boolean algebra to simplify circuits.
	General PhysicsPractical I	• Performs Practical systematically
	Electronics Practical I	• Performs Practical systematically
2	Quantum Mechanics I	• Examine concepts in quantum mechanics such that the behaviour of the physical • universe, postulates of quantum mechanics. • Review of the Schrodinger equation, operators, eigen functions, compatible • observables, infinite well in one and three dimensions, degeneracy; harmonic oscillator • in one and three dimensions; hydrogen atom, spin.
	Mathematical PhysicsII	• Develops an understanding of special mathematical techniques like group theory, calculus of variations, Greens functions etc which find applications certain special types of physical systems
	Statistical Mechanics	• Develops an understanding of various natural phenomena like Bose-Einstein condensates, fermionic systems etc. in terms of ensemble theory

	Computational Physics with Lab	• Students should have basic knowledge of different data types used in python such as lists, tuples, dictionary etc. • Understand different modules like NumPy, Matplotlib etc. Get an idea about numerical methods in computational physics that can be used to solve many problems. • Formulate and computationally solve a section of problems in physics.
	General PhysicsPractical II	• Performs Practical systematically
	Electronics PhysicsPractical II	• Performs Practical systematically
3	Quantum Mechanics II	• Solve quantum mechanical systems using time dependent and independent perturbation methods
	Nuclear and ParticlePhysics	• The student gathers advanced knowledge in Nuclear physics. The different nuclear interactions and corresponding nuclear potentials and its dependence on the coupling are learned. • Students should be able to account for the fission and fusion processes. • Student gain knowledge about various nuclear models and classify elementary particles based on forces of interaction involved and study in detail conversation laws and quark models.
	Solid State Physics	• Develop knowledge of solid state systems including reciprocal lattices, band structure, magnetic and electric behaviour of solids

	Experimental techniques	• Develop a knowledge on different types of pumps using for creating vacuum. Identify the difference between thick and thin films. • Getting an awareness about production and measurement of thin films. • Knowledge on different methods for accelerating the particle and nuclear techniques for material analysis.
4	Project	• Students should get out of textbook and should learn from different resources and more deeply with advanced developments in specific topic and give an extension in the topic.
	Atomic and Molecular Spectroscopy	• Student get an idea about atomic spectra and describe spectra of one and two electron atoms. • Explain change in behaviour of atoms in external applied electric and magnetic field.
	Material science	• To get the knowledge of different kinds imperfections in crystals, to get the idea of phases and its diagrams with rules to get the parameters from phase diagram. • To learn the deformation and fracture of materials. • To introduce Engineering materials and students should be able to aware of current development in the field of nanomaterials.
	Microprocessor and its applications	• Performs machine language programming using the microprocessor programming in • 8085 microprocessors for further research in machine language programming. Awareness about AVR family of microcontroller and basic

		programs in that.
	Practical: Modern Physic	• Perform modern physics experiments and analyze the data.
	Practical: Computational Physics	• Learn coding in python language and use it to solve physics problems