

## **CORE COURSE: Physics**

### **PHYSICS SEM1 PAPER 1: (101) Properties of Matter and Mechanics**

	<b>Course Outcome</b>
<b>CO1</b>	Understanding Elasticity; Hooke's Law of Elasticity, Numerical based on topics.
<b>CO2</b>	Understand Kinematics of moving fluids; Variation of viscosity with temperature. Surface tension, Numerical
<b>CO3</b>	Understanding concept of surface tension, Newton's laws of motion and Co-ordinate systems
<b>CO4</b>	Understand Motion of a Rigid body; rotational motion, Numerical based on topics.

### **PHYSICS SEM1 PAPER 2: (102) Electrostatics, Time varying fields & Electric Currents**

	<b>Course Outcome</b>
<b>CO1</b>	The concept of charge should be known along with the properties of electrical forces. Understand familiar forces such as gravitation, Coulomb's Law, along with the principle of superposition, calculation of electrostatic forces from a given charge distribution.
<b>CO2</b>	Understand the concept of dielectric constant and polarization in dielectric materials. Summarizing various types of polarization of dielectrics. Interpreting Lorentz field and Claussius- Mosotti relation in dielectrics. To understand the basic concept of Capacitor.
<b>CO3</b>	To distinguish between static and time -varying fields. Gain knowledge of fundamental laws and principles of electromagnetic induction. To explain electrical current, circuits, construction and their use and network theorems.
<b>CO4</b>	Knowing and Analyzing the Concepts of Alternating Currents and theory of transformer, its losses and uses. Numericals based on topic.

**PHYSICS SEM2 PAPER 1: (201) Oscillations, Kinetic theory of gases and Thermodynamics**

	<b>Course Outcome</b>
<b>CO1</b>	Understand concept of Waves and Oscillation, Linear S.H.M, Angular S.H.M, Differential equations and solutions. Numerical based on topics. Superposition of two SHM of same frequency, Numerical based on topics.
<b>CO2</b>	Understand the concept of forced oscillation and topic based numericals. To build a strong foundation of knowledge in different areas of basics of Ideal Gas - Kinetic theory of Gases
<b>CO3</b>	Students understand the basics laws of thermodynamics laws. Numerical based on topics
<b>CO4</b>	Understand the Liquefaction of Gases Joule coefficient, Boyle, thermodynamic system

**PHYSICS SEM 2 PAPER 2: (202) Gravitation, Astrophysics, Magnetism and Magnetostatics**

	<b>Course Outcome</b>
<b>CO1</b>	To study the Newton's law of gravitation. To study the gravitational field and potential. To know the concept of gravitation.
<b>CO2</b>	Acquire knowledge of the Physical universe and its evolution. Define and use fundamental principles and techniques of astronomy and astrophysics. Understand and apply basic physics and computational techniques to solve problems in astrophysics, and interpret the results.
<b>CO3</b>	To understand basic concept of magnetism, classification of different types of magnetic materials and its application.
<b>CO4</b>	To understand the concept and study Biot-Savart's law and its application.

	To study the divergence and curl of magnetic field.
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**PHYSICS SEM 3 PAPER 1: (301) Sound waves, Applied acoustic, Ultrasonic and Power supply**

	<b>Course Outcome</b>
<b>CO1</b>	Gain knowledge about superposition two waves, concept of phase velocity and group velocity etc.
<b>CO2</b>	Understand acoustic waves, noise and intensity of loudness, to gain the knowledge of design of acoustic hall and auditorium.
<b>CO3</b>	To gain the knowledge of ultrasonics, ultrasonic waves and its effect and applications
<b>CO4</b>	Understand the concept of power supply. To apply the knowledge of rectifier and diode in application.

**PHYSICS SEM3 PAPER 2: (302) Physical optics and Electromagnetic waves Practical**

	<b>Course Outcome</b>
<b>CO1</b>	To understand the light phenomenon such as Interference of light. To study Newton's rings and Michelson's Interferometer.
<b>CO2</b>	To know the concept and study of diffraction. To study types of diffraction such as Fresnel's and Fraunhofer diffraction and its application. Understand the concept of resolving power of grating,
<b>CO3</b>	To know the concept and study of polarization and its application like double prism and Nicol's prism.
<b>CO4</b>	Understand Maxwell's relation for electromagnetic waves, their propagation in vacuum and other medium.

**PHYSICS SEM 4 PAPER 1: (401) Solid State Physics, X-ray and Laser**

	<b>Course Outcome</b>
<b>CO1</b>	Understanding basics of Crystallography, its type single, polycrystalline, Miller indices, X-rays diffraction, determination of lattice parameters, Understanding defects and dislocations in crystals.
<b>CO2</b>	To Interpret and understand X-rays and their properties. Describe and detect diffracted x-rays as well as the geometry of diffractions.
<b>CO3</b>	To understand the concept of reciprocal lattice, Bragg's law and X-ray diffraction methods.
<b>CO4</b>	Understand the concepts of Laser Optics, basic principle of Laser, its production, types and application and uses. Numerical based on topics

**PHYSICS SEM 4 PAPER 2: (402) Solid State Electronics, and Molecular Physics****Practical**

	<b>Course Outcome</b>
<b>CO1</b>	To understand fundamentals of semiconductor and applications to the electronic devices. Brief understanding of Solid-State Electronics and bipolar transistor.
<b>CO2</b>	To understand the working and principle of different type of Field effect transistors and their applications.
<b>CO3</b>	To develop basics of molecular physics and to generate the idea of all possible reasons of spectra and thus the thinking ability regarding empirical modelling. The problem-solving skill is developed by studying the mathematical concept of the rotational spectra.
<b>CO4</b>	To understand the fundamental theory behind Raman Spectra, various types of Raman Spectra, their selection rule. To understand the use of

	Spectroscopy and its Applications. To know the Principle of NMR, ESR etc and its applications.
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**PHYSICS SEM 5 PAPER 1: (501) Atomic Physics, Free Electron Theory and Statistical Physics**

	<b>Course Outcome</b>
<b>CO1</b>	Understanding Spectra of Single and Multi-Electron Atoms, Fundamentals of atom and its structure.
<b>CO2</b>	Explain the theory and applications of Free Electron Theory and Band Theory of Solids.
<b>CO3</b>	Students develop the understanding of the concept of Probability, microstates and macrostates and how the particles are distributed in the system in different states.
<b>CO4</b>	To understand the Distribution of distinguishable and indistinguishable, to understand the methods of statistical mechanics used to develop statistics for Bose-Einstein Statistics. Photon gases and Fermi-Dirac statistics and Energy distribution law for electron gas in metal.

**PHYSICS SEM 5 PAPER 2: (502) Quantum mechanics, Nanomaterials and Nanotechnology**

	<b>Course Outcome</b>
<b>CO1</b>	Understand the general formulation of quantum mechanics using the phenomenon like photoelectric effect, Compton effect, Heisenberg uncertainty principle, wave and particle duality. Numerical based on topics.
<b>CO2</b>	Understanding the concept of wave function and wave packet is introduced. Study of probability, expectation value and Ehrenfest's theorem assist students to be enriched with mathematical calculation. Understanding and analyzing the Schrodinger Equations for time and time independent equations, its numericals.

<b>CO3</b>	To understand basic concept of Nanoscience and History of nano materials, quantum size effect, properties of nano materials.
<b>CO4</b>	To find different methods for synthesis of nanomaterials and characterization of nanomaterials. Its application.

**PHYSICS SEM 6 PAPER 1: (601) Relativity, Nuclear physics and Bio Physics**

	<b>Course Outcome</b>
<b>CO1</b>	Would be able to understand the inertial and non-inertial frame of references and describe how fictitious forces arise in a non-inertial frame. Understand the importance of Michelson Morley's experiment in reference to special theory of relativity
<b>CO2</b>	To Develop concepts in fission, neutron cycle and also explore ideas in fields of particle accelerators. To develop concepts of liquid drop model and shell model.
<b>CO3</b>	Ability to understand fundamental concepts in nuclear physics and physics involved in alpha beta and gamma decay. Gaining knowledge on nuclear detectors.
<b>CO4</b>	An understanding of physics in biosensor, electrode. An understanding of biomedical instrumentation principles in aspects of device design and applications.

**PHYSICS SEM 6 PAPER 2: (602) Electronics, Fiber optics, Communication and Digital Electronics**

	<b>Course Outcome</b>
<b>CO1</b>	Students would learn about electronic circuits such as Amplifiers and Oscillators. Various types of Amplifier and Oscillator circuits their working and applications in domestic, industrial and scientific devices/equipments.

<b>CO2</b>	To understand the optical fiber. Its principle, operation and application.
<b>CO3</b>	To understand various modulation and demodulation techniques used for communication. The paper needs a basic knowledge in electronics and mathematics and the learners are expected to come out with the ability to choose proper modulation techniques.
<b>CO4</b>	To develop basic understanding of Boolean algebra and digital circuits. Topics in course need to have a basic knowledge in Solid State Electronics and are expected to gain knowledge to design electronic circuits.