**Course-11 Title: Physics –I I**

**Course Code: PHY 121 Credit: 3.0 Contact Hour: 3 per week Total marks: 100**

**11.1 Rationale:**

Student needs to know the basic theories and principles of physics to generate problem solving such as analytical, mathematical and solution of finding skills to develop their career as a computer engineer; this course will equip them with the concepts of Properties of matter, Atomic physics, Nuclear physics and Optics.

**11.2 Objectives:**

Students will be able to:

1. Apply the concepts, ideas and methods of Physics to solve problems in engineering studies.
2. Acquire knowledge in different laws and models of Physics will develop analytical capabilities in students.
3. Apply the laws of physics will help in higher or research studies in the field of engineering.
4. Understand the origins in Properties of matter, Atomic physics, Nuclear physics and Optics.
5. Apply physics to explain everyday things that happening around us.

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| **11.3**  **Learning Outcomes** | **11.4**  **Course Content** | **11.5**  **Teaching / Learning Strategy** | **11.6 Assessment Strategy** |
| 1. Generalize the characteristics of atoms, ions and molecules. 2. Define Inter-particle forces. 3. Classify the types of elastic constants. 4. Find the coefficient of viscosity. 5. Explain the significance of Critical velocity and Reynold’s number. 6. Construct the design of wings of an aeroplane by using Bernoulli’s theorem. 7. Determine the surface tension of a liquid. | | **1.Properties of matter:**  Atoms, Ions and molecules, States of matter, Solid, Liquids and gases, Inter-particle forces, Elasticity: Stress strain, Elastic constants, Viscosity: Critical velocity and Reynold’s number, Poiseulli’s equation, Stoke’s law, Hydrodynamics: Equation of continuity, Bernoulli’s equation and its application, Surface Tension. | 1. Lecture 2. Assignment 3. Case Studies 4. Exercise | 1. Short answer 2. Essay 3. Practical exam 4. Discussion | |
| 1. Determine the arrangement of atoms in a crystalline solids.   2. Explain bragg’s law for x-ray diffraction and achieve the problems of this law.  3. Characterize the various crystal defects in a solid.  4. Illustrate the nature of plasma in terms of superconductors. | | **2.Crystallography:**  Types of bonds, Types of crystals, X-ray diffraction and Bragg’s law, Plasticity and crystal defects, Metal, Insulators and Semiconductor, Elementary band theory, Superconductors and plasma. | 1. Lecture 2. Exercise | 1. Short answer 2. Essay 3. Practical exam 4. Assignment | |
| 1. Describe the Rutherford-Bohr model of a atom. 2. Draw the Energy levels and spectra of a Hydrogen atom. 3. Produce Zeeman effect in a magnetic field. 4. Demonstrate exclusion principle in practice. | | **3.Atomic Physics:**  The Rutherford-Bohr model of the atom, Energy levels and spectra, Atomic excitation, the Laser, Quantum theory of hydrogen atom, the Zeeman effect, electron spin, many electron atoms and the exclusion principle. | 1. Lecture 2. Assignment 3. Exercise | 1. Short answer 2. Practical exam | |
| 1. Draw nuclear structure and illustrate its various   Constituent parts.   1. Define radioactivity and half life. 2. Differentiate nuclear fission and fusion reactions with respective examples. | | **4.Nuclear Physics:**  Nuclear constituents, nuclear binding and nuclear structure, nuclear stability and radioactivity, decay rates and half life, nuclear fission and fusion. | 1. Lecture 2. Demonstration 3. Exercise | 1. Short answer  2. Essay  3. Assignment | |
| 1. Distinguish between interference and diffraction of a light. 2. Analyze the formation of polarization in electromagnetic waves. 3. Write a short note on fiber optics. | | **5.Optics:**  Interference of light, Diffraction of waves, Polarization of electromagnetic waves, Optical effects in crystals, Elementary discussion on fiber optics. | 1. Lecture 2. Exercise | 1. Short answer 2. Essay 3. Practical exam 4. Assignment | |

**RECOMMENDED BOOKS AND PERIODICALS**

**Text Books**: