



# **Daffodil International University**

## **General Educational Development**

### **Course Outline with Lecture Plan of Basic Physics**

**Course Code: PHY 113**

**Credit: 3**

**Course contents:** i) Mechanics

ii) Waves and oscillations

iii) Optics

iv) Heat and thermodynamics

v) Electricity and magnetism

vi) Modern Physics

**Text Book:**

Fundamental of Physics: R. Resnick and Halliday

**Reference Book:**

University physics with modern physics: Sears and Zemansky

**Marks Distribution:**

Class Attendance	07
Class Test	15
Assignment	05
Presentation	08
Mid exam	25
Final Exam	40

## **Detail Course Outline**

**Mechanics:** Basic Concept of Mechanics: Classification of Mechanics, Motion in One Dimension: Equations of motion; Motion in Two Dimension: Projectile motion; Particle Dynamics: Force and momentum; Frictional Forces: Laws of Friction, Co-efficient of Friction, Angle of Friction, Equilibrium of a body on an inclined surface, advantage due to friction. Work and Energy: Work done by variable force, Work Energy Theorem.

**Waves & Oscillation:** Wave motion and propagation: Different types of waves, Simple Harmonic Oscillator: Characteristics of SHM, Differential Equation for SHM; Doppler Effect; Stationary Waves & Progressive waves, Lissajous figure.

**Heat & Thermodynamics:** Concept of Temperature & Zeroth Law; Kinetic theory of Gases: General postulates, Mean Square Velocity and RMS Velocity, Pressure of gas according to Kinetic Theory, Mean free path; Brownian Motion; Laws of Thermodynamics & Their Applications: First Law of Thermodynamics, Internal Energy, Isothermal and Adiabatic relations; Second law of Thermodynamics, Reversible and Irreversible Processes, PV Diagram, Carnot's Cycle, Carnot Theorem, Concept of Entropy.

**Electricity & Magnetism:** Basic Concepts of Charges and Electricity: What is Charge? Explanation of Charge, Duality of Charges, Conservation of Charge, Quantization of Charge, Coulombs Law, Limitations of Coulomb's law, Electric Field: What is Electric Field? Electric Field Strength, Electric Lines of Force, Electric Flux, Gauss's Law, Coulomb's law from Gauss's Law, Important Example on Gauss's Law, Electric Potential: Potential and Potential Difference, Potential and Field Strength, Potential due to a Point Charge, Potential due to a Group of Point Charge, Potential due to a Dipole, Electric Potential Energy.

Current, Current Density, Resistance, Resistance in Series and Parallel Combination, Resistivity and Conductivity, Temperature Dependence of Resistivity, Ohm's Law, Resistivity-an atomic view, Laws of resistance, Magnetic field, Magnetic field Strength, magnetic Lines of Induction, Magnetic Force, Electromagnetic Force, Biot-Savart Law, Application of Biot-Savart's law, Ampere's Law, Magnetic Properties of Material, Magnetic Field Strength for a solenoid, Electromagnetic Induction, Self-Inductance and

Mutual Inductance, Calculation of Inductance, Electromagnetic Waves, Concepts of (Motor, Generator, Transformer, Transistor)

**Modern Physics:** Atomic nucleus (Nuclear Physics), Structure and Bonding, Rutherford and Bohr atomic model, Basic of Quantum mechanics, Photoelectric effect, Compton effect and Pair production , Photoelectric effect, Einstein's photoelectric equation, Work function, threshold frequency ,Radioactivity, Half-Life Period, Mean Life Period, Radioactive Decay, Explanation of Alpha, Beta and Gamma Decay, Energy level & energy band, Theory of relativity, Black Hole, Big bang theory.