

FUNDAMENTAL APPLICATION OF PHYSICS (GENERAL 1)

(3+0 Cr. Hr)

COURSE OBJECTIVES

To equip students with basic knowledge of Physics which will help them for better understanding of upcoming subjects and games and to do biomechanical analysis of different games and sport.

COURSE CONTENTS:

i. Introduction to Physics

- a. Basic definitions of general terms of Physics like mechanics, electro mechanics, thermodynamics, electromagnetism, Optimum, Hydrodynamics, Quantum Physics, Nuclear Physics, Solid state Physics, Superconductivity, Space Physics etc.
- b. Historical background of Physics
- c. Internal system of units

ii. Vectors and Equilibrium

- a. Concept of Scalars and Vectors
- b. Types of Vectors
- c. Addition of Vectors
- d. Concept of Equilibrium
- e. Equilibrium forces
- f. First condition of Equilibrium
- g. Second condition of Equilibrium
- h. Concept of Torque

iii. Linear Motion

- a. Basic Concept of Distance, Displacement, Speed, Velocity, Acceleration, momentum, force etc.
- b. Equations of Motion
- c. Newton's Laws of Motion

iv. Angular Motion

- a. Basic Concept of angular displacement, angular velocity, angular acceleration, Orbital Velocity, Centripetal force, Centrifugal force, Moment of inertia.
- b. Relationship between linear and angular velocities.
- c. Relationship between linear and angular acceleration
- d. Angular momentum, its types and law of conservation of angular momentum

v. Fluid Dynamics

- a. Viscous Drag and Stokes' Law
- b. Terminal Velocity
- c. Fluid Flow

- d. Equation of Continuity
- e. Bernoulli's Equation
- f. Applications of Bernoulli's Equation
- g. Torricelli's Theorem
- h. Relation between Speed and Pressure of the Fluid
- g. Venturi Relation
- h. Blood Flow

vi. Work and Energy

- a. Work done by a constant Force
- b. Work done by a variable Force
- c. Work done by gravitational
- d. Power
- e. Energy
- f. Work Energy Principle
- g. Absolute Potential Energy
- h. Escape Velocity
- i. Interconversion of Potential Energy and Kinetic Energy
- j. Conservation of Energy
- k. Non-Conventional Energy Sources
- l. Energy from Tides
- m. Energy from Waves
- n. Solar Energy
- o. Energy from Biomass
- p. Energy from Waste Products
- q. Geothermal Energy

BOOKS RECOMMENDED

1. Feshbach, H., Michio, M., & Morse, P. M. (2019). *Methods of theoretical physics: part ii: (dover books on physics)*.
2. Landsberg, P. T. (2014). *Thermodynamics and statistical mechanics*. Courier Corporation.
3. Schwinger, J. (2018). *Particles, Sources, And Fields, Volume 3*. CRC Press.
4. Özkaya, N., Leger, D., Goldsheyder, D., & Nordin, M. (2016). *Fundamentals of biomechanics: equilibrium, motion, and deformation*. Springer.
5. Strogatz, S. H. (2018). *Nonlinear dynamics and chaos: with applications to physics, biology, chemistry, and engineering*. CRC Press.