Module: Physics

Overview:

This module is especially suited for students taking one semester of basic concepts and principles of physics courses that can be applied later into the study of the field in engineering.

Faculty / Programme Group:

- Civil
- Electrical and Biomedical
- Chemical and Energy
- Mechanical
- Science
- Architecture and Landscape
- Real Estate
- Land and Quantity Surveying
- Urban and Regional Planning
- Geoinformation
- Industrial Design

Topics Covered:

- *Physical Quantities & Measurement*
  Physical Quantities & Symbols, Measurement Units, Symbols, SI (MKS) System, Prefixes, Unit Conversion, Significant Figures, Scientific Notation.

- *Vector Algebra*
  Vector Quantities, Graphical Representation & Components, Unit Vector, Vector Addition, Subtraction, Vector Multiplication – Dot Product, Cross Product.

- *Kinematics*
  Displacement, Average & Instantaneous Velocity, Acceleration, Motion with Constant Acceleration, Free Falling Objects, Projectile Motion.

- *Dynamics*
  Mass & Force, Newton's First, Second and Third Law of Motion, Force of Gravity, Normal Force, Free Body Diagram.

- *Work & Energy*
  Work, Kinetic & Potential Energy, Conservative, Non-conservative Forces, Work-Energy Theorem, Mechanical Energy and Conservation of Energy, Power.

- *Static Equilibrium*
  Particle, Rigid Body and Centre of Mass, Moment of Force (Torque), Conditions for Equilibrium, Stability and Balance, Hooke's Law, Stress and Strain.

- *Fluids*
  Density and Specific Gravity, Pressure in Fluids, Atmospheric and Gauge Pressures, Pascal's and Archimedes' Principles.

- *Oscillations & Waves*
  Oscillation of Spring, Simple Harmonic Motion, Simple Pendulum, Wave Motion, Type of Waves.

- *Electric Charge, Field & Potential*
  Charge, Insulators & Conductors, Coulomb's Law, Electric Field & Field Lines, Electric Potential, Capacitor & Capacitance, Energy Storage.

- *DC Circuits*
  Current & Resistance, Ohm's Law, Electric Power, EMF & Terminal Voltage, Resistors in Series and Parallel, Kirchhoff's Rules, RC Circuits.

- *Magnetic Field*
  Field from Magnet and Electric Current, Force on Moving Charge, Force on Electric Current, Force on Parallel Wires.

- *Optics*
  The Ray Model of Light, Reflection & Image Formation by a Plane Mirror & Spherical Mirrors, Index of Refraction, Snell's Law, Ray Tracing & Thin Lens Equation, Magnification

Module Test Contents:

Format:

- Subjective Questions (100 marks).
- Computational – All calculations must be shown clearly.

Duration:
3 hours

References:

1. Giancoli, D.C., PHYSICS for Scientists & Engineers (4th Edition), Prentice Hall International.
2. F.W Sears, M. W. Zemansky and H.D Young, College Physics 7th edition, Addison-Wesley.
3. Physics for Science and Engineers, Serwey Jewett 7th edition Thomson brooks/cole