



## University of Asia Pacific

### Department of Basic Sciences & Humanities

**Courses Title: Physics I (ARCH/CE/CSE)**

**Course Code: Phy 101**

**Credit: 03 (Three)**

#### **Course Outline:**

Mechanics: Measurements Motion in One Dimension Motion in a Plane Particle Dynamics Work and Energy Circular Motion Simple Harmonic Motion Rotation of Rigid Bodies Central Force Structure of Matter Mechanical Properties of Materials.

Properties of Matter: Elasticity Stresses and Strains Young's Modulus Bulk Modulus Rigidity Modulus Elastic Limit Poisson's Ratio Relation Between Elastic Constants Bending of Beams Fluid Motion Equation of Continuity Bernoulli's Theorem Viscosity Stoke's Law Surface Energy and Surface Tension Capillarity Determination of Surface Tension by Different Methods.

Waves: Wave Motion and Propagation Simple Harmonic Motion Vibration Modes Forced Vibrations Vibration in Strings and Columns Sound Wave and its Velocity Doppler Effect Elastic Waves Ultrasonic Practical Applications.

Optics: Theories of Light Huygen's Principle Electromagnetic Waves Velocity of Light Reflection Refraction Lenses Interference Diffraction Polarization.

Heat and Thermodynamics: Temperature and Zeroth Law of Thermodynamics Calorimetry Thermal Equilibrium and Thermal Expansion First Law of Thermodynamics Specific Heat Heat Capacities Equation of State Change of Phase Heat Transfer Second Law of Thermodynamics Carnot Cycle Efficiency Entropy Kinetic Theory of Gases.



## University of Asia Pacific

### Department of Basic Sciences & Humanities

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**Course Code: Phy 101**

**Credit: 03 (Three)**

#### **Course Outline:**

Heat and thermodynamics: Temperature, Zeroth law of thermodynamics. Thermometers: constant volume, platinum resistance, thermocouple. First law of thermodynamics and its application, molar specific heats of gases, isothermal and adiabatic relations, work done by a gas. Kinetic theory of gases: explanation of gas laws, kinetic interpretation of temperature, equipartition of energy and calculation of ratio of specific heats, mean free path, Van der Waals equation of state, second law of thermodynamics: reversible and irreversible processes, Carnot cycle, efficiency, Carnot's theorem, entropy.

Structure of Matter, States of matter: solid, liquid and gas. Classification of solids: amorphous, crystalline, ceramics and polymers, atomic arrangement in solids. Different type of bonds in solids: metallic, Van der Waals, covalent and ionic bond, packing in solids, inter atomic distances and forces of equilibrium. X-ray diffraction: Bragg's law, plasticity and elasticity, distinction between metal, insulator and semiconductor.

Waves and oscillations: Simple harmonic motion, damped simple harmonic oscillation, forced oscillation, resonance, vibrations of membranes and columns, combination and composition of simple harmonic motions, Lissajous' figure. Transverse and longitudinal nature of waves, traveling and standing waves, intensity of waves, energy calculation of progressive and stationary waves. Phase velocity, group velocity, Sound waves: velocity of longitudinal waves in a gaseous medium, Doppler effect. Architectural acoustic: Sabine's formula, requisites of a good auditorium.

Physical optics: Theories of light: Huygens' Principle and construction. Interference of light: Young's double slit experiment, Fresnel bi-prism, Newton's rings, interferometers, Diffraction of light: Fresnel and Fraunhofer diffraction, diffraction by single slit, diffraction by double slit, diffraction gratings. Polarization, production and analysis of polarized light, optical activity, optics of crystals.