THE UNIVERSITY OF ZAMBIA

SCHOOL OF NATURAL SCIENCES

PHYSCIS 1010 COURSE OUTLINE

FIRST SEMESTER

TOPIC	SUB-TOPICS
Vectors	• Vectors and scalars, vector addition and subtraction, vector components, Addition of vectors by components
Description of motion	• Speed and velocity, instaneous velocity, Displacement, acceleration, uniform accelerated motion, time and acceleration, acceleration and gravity, projectile motion.
Newton's laws of motion	• First law, inertia and mass, force, second law, Action and reaction, third law, Mass and weight, Frictional forces, coefficients of inertia, weightlessness
Work and energy	• Work, power, energy • Work/ energy theorem: kinetic and potential energy, conservation of energy, and non-conservative forces
Linear momentum	• Linear momentum • Conservation of linear momentum • Elastic and inelastic collisions • Impulse • Rocket propulsion
Rotation motion	• Angular measure, Angular speed and acceleration • Centripetal acceleration and force • Equations of motion • Law of gravitational • Gravitation and weight • Orbital motion
Rotation motion, energy and momentum	• Rotational work and kinetic energy • Moment of inertia • Torque • Angular momentum • Combined rotation and translation.

SECOND SEMESTER

TOPIC	**SUB-TOPICS**
Equilibrium	• Translation equilibrium, Rotational equilibrium center of gravity, toppling over of objects, mechanical advantage.
Mechanical properties of matter	• Density, Hooke's law, young's modulus, shear and bulk modulus, pressure and depth, Archimedes' principal, buoyancy.
Pressure and temperature	• Atmospheric pressure, barometers, m\thermometers, temperature scales, ideal gas law.
Thermal properties of matter	• Heat and heat units, thermal energy, specific heat capacities, heat of fusion and melting, calorimetry, thermal expansion, heat conduction, convection and radiation.
Thermodynamics 1 and 2	• Kelvin scale, state variable, first law of thermodynamics, work done by and a gas, specific heat of an ideal gas, isothermal, Adiabatic and isobaric process, second law, entropy, Carnot engine, refrigerators and heat pumps.
Harmonic motion	• Period motion, Hooke's law spring , Harmonic motion, sinusoidal motion, simple pendulum, forced vibrations
Waves and oscillation	• Description of a wave, Reflection of a wave, standing waves, wave resonance, Transverse and longtidution waves, compression waves.