C A M O S U N   C O L L E G E

PHYSICS DEPARTMENT

PHYS 154 TECHNICAL PHYSICS 3

A Physics course with applications relevant to Electronics Technology. Topics:
measurement, vectors, kinematics, dynamics, uniform circular motion, rotary motion,
vibrations, waves, sound, light. (T)

OFFERED:	Q1
CREDIT:	4
IN-CLASS WORKLOAD:	5 lecture, 1 tutorial, 3 lab (alt. weeks)
OUT-OF-CLASS WORKLOAD:	5
PREREQUISITES:	PHYS 151 or Phys 11 and MATH 060
	Restricted to students in the Electronics
	Engineering Technology program

OUTLINE

1. **Vectors**
    1.1   Components of Vectors
    1.2   Vector addition and subtraction
    1.3   Kinematic Examples
           1.3.1   Displacement, velocity, acceleration
           1.3.2   Relative motion

2. **Dynamics - Newton's Laws**
    2.1   Newton's Second Law
           2.1.1   Forces – Tension, springs, friction, gravity
           2.1.2   Free body diagrams
           2.1.3   2-D problems

3. **Equilibrium**
    3.1   Concurrent coplanar forces - algebraic 2-D problems
    3.2   Nonconcurrent forces

4. **Work and Energy**
    4.1   Work
    4.2   Energy
           4.2.1   Kinetic energy
           4.2.2   Potential energy - gravitational and elastic
           4.2.3   Conservation of energy
    4.3   Power

5. **Uniform Circular Motion**
    5.2   Centripetal acceleration and centripetal force

6. **Rotary Motion**
    6.1   Equations of uniform rotary motion
    6.2   Torque
    6.3   Moment of inertia
    6.4   Rotational Dynamics
    6.5   Rotational energy
    6.6   Rotational power

_____

7. **Vibrations**
    7.1   Periodic motion
            7.1.1   Period, frequency and amplitude
    7.2   Simple harmonic motion
            7.2.1   Definition,
            7.2.1   Circular motion and SHM,
            7.2.3   Angular velocity and frequency
            7.2.4   Acceleration
    7.3   Vibratory energy

8. **Waves**
    8.1   Types
            8.1.1   Longitudinal
            8.1.2   Transverse
    8.2   Characteristics
            8.2.1   Speed, wavelength, and frequency
            8.2.2   Phase
    8.3   Transmission between media
    8.4   Wave equation
            8.4.1   Phase difference
    8.5   Wave energy
            8.5.1   Intensity, intensity ratio and inverse square law
    8.6   Interference
            8.6.1   Superposition theorem
            8.6.2   Beats,
    8.7   Standing waves and Resonance
            8.7.1   Vibrating strings
            8.7.2   Vibrating air columns
    8.8   Vibrating rods
    8.9   Speed of sound
            8.9.1   Temperature effects
    8.10   Doppler effect (optional)

9. **Light**
    9.1   Reflection
    9.2   Refraction
    9.3   Total internal reflection
    9.4   Optical Fibres
            14.9.1 Modes of propagation and dispersion
            14.9.2 FOTS (Optional)

TUTORIAL TOPICS

1. **Measurement and Units - the International System**
    1.1   SI Base units and Derived units
    1.2   British Engineering System and conversions
    1.3   Dimensional algebra

2. **Kinematics**
    2.1   Linear Kinematics - Review

_____

Text: Physics – J. Cutnell & K. Johnson, 5th ed.