

ST. MARY'S COLLEGE

FORM 6

SUBJECT- PHYSICS UNIT 1

Course Outline 2014-2015

Term 1

Proposed Date/Week	Unit/Section	Topic	Modules
Wk 1 - 2	01	Physical Quantities	:01 - physical quantities as a numerical magnitude and unit
			:02 - base quantities including their symbols and S.I. units
			:03 - base quantities / units, derived quantities / units: homogeneity of physical equations.
			:04 - the Avogadro constant as a numerical entity
			:05 - the concept of the mole re Avogadro constant
			:06 - prefixes and their symbols (up to 10^9) and sub-multiples (down to 10^{-12}) of units
			:07 - Writing up IA reports
			:08 - constructing and using calibration curves
			:09 - rearrange relationships to plot linear graphs
			LAB - I.A. (MM) Simple pendulum. (Linear equation covert)
			:10 - precision and accuracy
			:11 - estimating uncertainty, fractional or percentage
			:12 - Scalars & vectors, combine and resolve vectors
LAB - I.A. (AI) Forces in Equilibrium			
Wk 3 - 4	02	Linear Motion	:01 - Concepts: displacement, speed, velocity, acceleration
			:02 - Graphs to represent above in a single dimension
			:03 - motion graphs to solve problems
			:04 - derive equations representing uniformly accelerated motion in a single dimension
			:05 - equations of motion to solve problems on uniformly accelerated motion
			:06 - Projectile motion is parabolic
			:07 - solve problems involving bodies projectile motion
			LAB - I.A. (ORR) Projectile Motion
			:08 - Newton's Laws of motion / Solve problems
			:09 - explain 'linear momentum', state Principle of Conservation of Momentum
			:10 - Totally Elastic vs Inelastic collisions
			:11 - concept of the impulse of a force
			:12 - draw and interpret F-t graphs
LAB: - I.A. (PD) Relationship between velocity of hammer and depth of nail.			

Proposed Date/Week	Unit/Section	Topic	Modules
Wk 5	02	Circular Motion	:01 - angular displacement in radians
			:02 - the concept of angular velocity re circular motion
			:03 - Solve problems involving circular motion $v = r\omega$
			:04 - use equations: $a = r\omega^2$; $F = mr\omega^2$
			:05 - horizontal / vertical circles; conical pendulum / banking
Wk 6	03	Gravitation	:01 - use Newton's law of Universal Gravitation
			:02 - The Concept of gravitational field strength
			:03 - Circular orbits
			:04 - Geostationary satellites and their applications
			LAB - I.A. (MM) Galileo's Experiment
Wk 7	04	Forces	:01 - Upthrust / Archimedes Principle
			:02 - Resistive forces; frictional / in fluids
			:03 - Concept of Terminal velocity
			:04 - Principle of Moments
			:05 - Concepts of Static and Dynamic equilibrium
			LAB - I.A. (ORR) Terminal Velocity
Wk 8	05	Energy	:01 - Concept of Work
			:02 - Kinetic and Potential energy
			:03 - Derive $E_k = \frac{1}{2}mv^2$; $\Delta E_p = mg \Delta h$
			:04 - Power
			:05 - Efficiency
			:06 - Forms of energy
			:07 - Energy conversion applied to the Caribbean
			LAB - I.A. (PD) Acceleration (elevator sim)
Wk 9 - 10	06	Harmonic Motion	:01 - Use formulae: $x = A\sin\omega t$ or $A\cos\omega t$ $a = -\omega^2 x$; $v_o = \omega A$; $v^2 = \omega^2(A^2 - x^2)$; $T = \frac{2\pi}{\omega}$
			:02 - Conditions and Graphs for SHM
			:03 - Derive equations: $T = 2\pi\sqrt{\frac{l}{g}}$; $T = 2\pi\sqrt{\frac{m}{k}}$
			:04 - Qualitative and graphical descriptions of KE and PE interchange during SHM
			:05 - Calculate energy of a body undergoing SHM
			:06 - Forced Oscillations and Resonance
			:07 - Dangers and Benefits of Resonance
			LAB: I.A. (AI) Resonance tube to find velocity of sound
			:08 - Qualitative and graphical descriptions of Damped Oscillations
			:09 - Applications of damped oscillations
			LAB: I.A. (PDE) Damped oscillations

Proposed Date/Week	Unit/Section	Topic	Modules
Wk 11 - 12	07	Properties of Sound Waves	:01 – Concepts of wave behaviour: period, amplitude etc.
			:02 - Transverse vs Longitudinal waves
			:03 - Polarisation
			:04 – Derive and use $v = f\lambda$
			:05 - Use the equation Intensity \propto (amplitude)²
			:06 - Stationary vs Progressive waves
			:07 - Properties of waves in Strings and Pipes
			:08 – Practical applications of sound waves in industry
			:09 - Application of sound waves to musical instruments
WK 13 - 14	08	Properties of Light Waves	:01 – Laws of Reflection and Refraction
			:02 – Diffraction: Ripple tank experiment
			:03 - Coherence, Superposition and Interference
			:04 - Young's double-slit experiment
			:05 - Derive and apply $y = \frac{\lambda D}{a}$
			:06 - The Diffraction Grating
			:07 - Use $d \sin \theta = n\lambda$
			:08 - The nature of light (EM radiation)
			:09 - Refractive index / Snell's law $n_1 \sin \theta_1 = n_2 \sin \theta_2$
			:10 - Total internal reflection
Wk 15	09	Bio - Physics	:01 - Physics of the Eye
			:02 - Phys of the Ear