# ST. MARY'S COLLEGE

## FORM 6

## SUBJECT- PHYSICS UNIT 1

## Course Outline 2022-2023

## 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. (MM) Galileo's Experiment** |
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|---|---|---|---|
| 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 $\boldsymbol{v = r\omega}$ |
| | | | :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) Density OF Water** |
| | | | |
| 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 $\boldsymbol{E_k = ½\ mv^2}$; $\boldsymbol{\Delta E_p = \text{mg}\ \Delta\text{h}}$ |
| | | | :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: $x = Asik\omega t$ or $Acos\omega t$ $a = -\omega^2 x$; $v_o = \omega A$; $v^2 = \omega^2(A^2 - x^2)$; $T = \frac{2h}{\omega}$ |
| | | | :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** |
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|---|---|---|---|
| Wk 11 | 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 α (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 |
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