

Commecs College

Macro Plan (2025-2026)

Subject: PHYSICS

Teacher: For All Physics Teachers

Class: HSC I

Start Date	End Date	No. of Periods	Topics	Contents	Objectives By the end of the unit S.W.A.T:
1 st Aug 2025	18 th Aug, 2025	12 Periods	Foundation Course and Chapter#1 Scope of physics	<ul style="list-style-type: none"> ● Describe scope of Physics ● Describe the scope of Physics in science, technology and society ● Units, SI units and representation ● Dimensionality ● Errors, types and uncertainty ● Graphs ● Significant figures ● Precision and accuracy 	<ul style="list-style-type: none"> ● Describe scope of physics in science and technology ● State SI base units derived units and supplementary units ● Derive formulae in simple cases using dimensions. ● Distinguish between systematic errors (including zero errors) and random errors ● Identify dependent and independent variable ● Draw line of best fit and error bar ● Write answers with correct scientific notation, number of significant figures ● Differentiate between precision and accuracy ● Interpret the information from linear or nonlinear graphs/curves by measuring slopes and intercept.
19 th Aug, 2025	01 st Aug, 2025	10 Periods	Chapter#2 Kinematics	<ul style="list-style-type: none"> ● Scalars and vectors ● Addition by rectangular components system ● Displacement / Distance with graphical representation ● Speed and velocity with graphical representation ● Acceleration, equations of uniformly accelerated motion ● Projectile Motion 	<ul style="list-style-type: none"> ● Define scalar & vectors ● Describe a vector and its representation ● Describe the Cartesian coordinate system ● Resolve a vector into two perpendicular components. ● Analyse and interpret patterns of motion of objects ● Instantaneous velocity of an object moving along the same straight line by measuring the slope of displacement time graph ● Derive equation of uniformly accelerated motion ● Projectile motion and height, range and time of flight using equations of projectile motion

<p>2nd Aug, 2025</p>	<p>10th September, 2025</p>	<p>07 Periods</p>	<p>Chapter #3 Dynamics</p>	<ul style="list-style-type: none"> ● Displacement, velocity and acceleration ● Newton's laws of motion ● Momentum and Impulse ● Law of Conservation of Momentum 	<ul style="list-style-type: none"> ● Newton's laws to explain motion of objects ● Define inertia and use of the concept of weight as the effect of a gravitational field on a mass. ● Newton's laws of motion as the rate of change of momentum ● law of conservation of Momentum ● elastic and inelastic collision with examples and cases ● Describe that momentum is conserved in all situations. (Rocket Situation)
<p>11th September, 2025</p>	<p>18th September, 2025</p>	<p>06 Periods</p>	<p>Chapter # 4 Rotational and Circular Motion</p>	<ul style="list-style-type: none"> ● Kinematics of Angular Motion ● Centripetal Force and Centripetal Acceleration ● Orbital velocity ● Moment of Inertia ● Angular Momentum ● Torque 	<ul style="list-style-type: none"> ● angular displacement, angular velocity and angular acceleration ● Solve problems by using $S = r \theta$ and $v = r \omega$ ● Derive and use centripetal acceleration $a = r\omega^2$, $a = v^2 / r$. ● Centripetal force $F = mr\omega^2$, $F = mv^2 / r$ ● Define the term orbital velocity and derive relationship between orbital velocity, the gravitational constant, mass and the radius of the orbit. ● Define moment of inertia ● Define angular momentum ● derive a relation between torque, moment of inertia and angular acceleration

<p>19th September, 2025</p>	<p>2nd October, 2025</p>	<p>Periods 10</p>	<p>Chapter # 5 Work Energy and Power</p>	<ul style="list-style-type: none"> ● Work as Scalar Product of Force and Displacement ● Work done by a variable force graphical method ● Kinetic Energy ● Potential Energy ● Work done against Gravitational Field ● Absolute Potential energy ● Escape Velocity ● Power ● Work Energy Theorem ● Transformation of Energy. 	<ul style="list-style-type: none"> ● Describe the concept of work in terms of the product of force F and displacement d in the direction of force ● Calculate the work done from the force displacement graph. ● Derive the equation of K.E by using $W = F.d$ ● show that the work done in gravitational field is independent of path ● Explain the concept of escape velocity in term of gravitational constant G, mass m and radius of planet r. ● Explain that work done against friction is dissipated as heat in the environment. ● State Work Energy theorem
<p>3rd oct, 2025</p>	<p>13th oct, 2025</p>	<p>Periods 07</p>	<p>Chapter#6 Fluid Statics</p>	<ul style="list-style-type: none"> ● Pascal's Law ● Archimedes' Principal ● Buoyancy and Law of Floatation ● Surface Tension 	<ul style="list-style-type: none"> ● Describe Pascal's Law ● Describe applications of Pascal's law ● State Archimedes' principal ● Derive the equation of up thrust acting on a body in fluid ● Describe the basic concepts of buoyancy ● State law of floatation ● Describe surface tension along with suitable examples

<p>14th Oct, 2025</p>	<p>24th oct, 2025</p>	<p>Periods 10</p>	<p>Chapter # 7 Fluid Dynamics</p>	<ul style="list-style-type: none"> ● Fluid Friction ● Terminal Velocity ● Streamline and Turbulent Flow ● Equation of Continuity ● Bernoulli's Equation and its Application 	<ul style="list-style-type: none"> ● Describe that real fluids are viscous fluids. ● Describe that viscous forces in a fluid cause a retarding force on an object moving through it. ● Explain how does the Magnitude of the viscous force on an object moving in fluid depend on the size and velocity of the object. ● Apply Stokes' law to derive an expression for terminal velocity of spherical body falling through a viscous fluid. ● Use the equation of terminal velocity to solve problems ● . Define the terms: steady (streamline or laminar) flow, incompressible flow and non-viscous flow as applied to the motion of an ideal fluid. ● Explain that at a sufficiently high velocity, the flow of viscous fluid undergoes a transition from laminar to turbulence conditions. ● Describe that the majority of practical examples of fluid flow and resistance to motion in fluids involve turbulent rather than laminar conditions. ● Velocity, the flow of viscous fluid undergoes a transition from laminar to turbulence conditions. ● Describe that the majority of practical examples of fluid flow and resistance to motion in fluids involve turbulent rather than laminar conditions. ● Describe that the pressure difference can arise from different rates of flow of a fluid (Bernoulli Effect). ● Interpret and apply Bernoulli Effect in the: filter pump, Venturi meter, in, atomizers, flow of air over an aerofoil and in blood physics
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27 th oct, 2025	12 th nov, 2025	Periods 14	Chapter # 8 Electric Fields	<ul style="list-style-type: none"> ● Force between Two Charges ● Electric Field ● Electric Field due to Dipole ● Electric Flux ● Electric Potential ● Force between Two Charges ● Electric Field ● Electric Field due to Dipole ● Electric Flux ● Electric Potential 	<ul style="list-style-type: none"> ● Define Electrostatic force ● Explain Coulomb's law ● Describe the coulombs force in different mediums ● Solve problems using Columbus Law ● Describe the concept of an electric field as an example of a field of force. ● Derive the expression $E = 1/4\pi\epsilon_0 q/r^2$ for the magnitude of the electric field at a distance 'r' from a point charge 'q'. ● Define electric field strength as force per unit positive charge. ● Solve problems and analyze information using $E = F/q$. ● Solve problems involving the use of the expression. $E = 1/4\pi\epsilon_0 q/r$ ● Describe the concept of electric dipole. ● Calculate the magnitude and direction of the electric field at a point due to two charges with the same or opposite signs. ● Sketch the electric field lines for two-point charges of equal magnitude with same or opposite signs. ● 1 Describe electric flux. ● Explain electric flux through a surface enclosing a charge. ● Define absolute electric potential and the unit of electric potential. ● Define potential difference and its unit ● Solve problems by using the expression $V =W/q$. ● Calculate the potential in the field of a point charge using the equation $V = 1/4\pi\epsilon_0 q/r$. ● Show that the electric field at a point is given by the negative of potential gradient at that point. ● Solve problems by using the expression $E = - V/d$. ● Define electron volt.
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13 th Nov, 2025	24 th nov,2025	Periods 08	Chapter # 9 Capacitors	<ul style="list-style-type: none"> • Capacitor • Energy stored in a Capacitor. 	<ul style="list-style-type: none"> • Explain capacitors as Charge storing Devices • Identify types of capacitors used in different field • Identify factors affecting the capacitance of a parallel plate capacitor and use equations $\epsilon_r = C/C_0$; $C = \epsilon_0 \epsilon_r A/d$. 9.1.4 Calculate combined capacitance of capacitors in series and in parallel. • Demonstrate charging and discharging of a capacitor through a resistance. • Prove that energy stored in a capacitor is $W = \frac{1}{2} QV$ and hence $E = \frac{1}{2} CV^2$
25 th Nov 2025	28 th Nov 2025	Periods 04	Revision /Synchronization		
1st Dec, 2025	16 th Dec, 2025	Total 84	Mid Term Examination (Units 84, 62.2%)		

1st Jan, 2026	12th Jan, 2026	Periods 07	Chapter # 10 DC Circuits	<ul style="list-style-type: none"> ● Resistors and its Types ● Resistivity, and its Dependence upon Temperature ● Internal Resistance ● Power Dissipation in Resistors ● Thermoelectricity ● Kirchhoff's Laws ● Balanced Potential 	<ul style="list-style-type: none"> ● Recall concept of resistance ● Indicate the value of resistance by reading color code on it. ● Define resistivity and explain its dependence upon temperature and also derive the mathematical relationship between them. ● Define conductance and conductivity of conductor. ● Solve problems using the equations of resistivity ● Understand the effects of the internal resistance of a source of e.m.f. on the terminal potential difference ● Distinguish between e.m.f. and p.d. using the energy considerations. ● Explain the internal resistance of sources and its consequences for external circuits. ● Describe some sources of e.m.f ● Describe thermocouple and its function. ● Explain variation of thermoelectric e.m.f. with temperature. ● Identify the function of thermistor in fire alarms and thermostats that control temperature. ● State Kirchhoff's first law and appropriate the link to conservation of charge ● State Kirchhoff's second law and appropriate the link to conservation of energy ● Derive equations by using Kirchhoff's laws, a formula for the combined resistance of two or more resistors connected in series and parallel ● Solve problems by using Kirchhoff's laws for the combined resistance of two or more resistors in series and parallel ● Describe Wheatstone bridge and how it is used to find unknown resistance. ● Describe the working of rheostat as a potential divider in circuit. ● Describe the function of potentiometer to measure and compare potentials without drawing any current from the circuit.
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<p>13 Jan, 2026</p>	<p>30th Jan, 2025</p>	<p>Periods 14</p>	<p>Chapter # 11 Oscillations</p>	<ul style="list-style-type: none"> ● Simple harmonic Motion (SHM) ● Uniform Circular Motion and SHM ● Practical SHM Systems Mass Spring & Simple Pendulum ● Energy Conservation in SHM ● Free and Forced Oscillation 	<ul style="list-style-type: none"> ● Describe necessary conditions for execution of simple harmonic motion. ● Investigate the motion of an oscillator using experimental and graphical method ● Describe necessary conditions for execution of simple harmonic motions. ● Describe that when an object moves in a circle, the motion of its projection on the diameter of the circles is SHM. ● Define the terms amplitude, period, frequency, angular frequency and phase ● Identify and use the equation; $a = -\omega^2 x$ as the defining equation of SHM. ● Prove that the motion of mass attached to a spring is SHM. ● Analyse the motion of a simple pendulum is SHM and calculate its time period. ● Interpret time period of the simple pendulum varies with its length ● Describe the interchanging between kinetic energy and potential energy during SHM ● Describe practical examples of free and forced oscillations (resonance). ● Describe graphically how the amplitude of a forced oscillation changes with frequency near to the natural frequency of the system. ● Describe practical examples of damped oscillations with particular reference to the effects of the degree of damping and the importance of critical damping in cases such as a car suspension system. ● Describe qualitatively the factors which determine the frequency response and sharpness of the resonance.
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<p>2nd Feb, 2026</p>	<p>19th Feb, 2026</p>	<p>Periods 12</p>	<p>Chapter 12 Acoustics</p>	<ul style="list-style-type: none"> ● Speed of Sound in Air ● Superposition of Sound Waves ● Doppler Effect of Sound 	<ul style="list-style-type: none"> ● Explain that speed of sound depends on the properties of medium in which it propagates and describe Newton's formula of speed of waves. ● Describe the Laplace correction in Newton's formula for speed of sound in air. ● Identify the factors on which speed of sound in air depends. ● Solve problems using the formula $V = \sqrt{T / 273}$ ● Describe the principle of superposition of two waves from coherent sources. ● Describe the phenomenon of interference of sound waves. ● Describe the phenomenon of formation of beats due to interference of non-coherent sources. ● Explain the tuning of musical instruments by beats. ● Explain the formation of stationary waves using graphical method ● Define the terms, node and antinodes. ● Describe modes of vibration of strings. ● Describe formation of stationary waves in vibrating air columns ● Explain the observed change in frequency of a mechanical wave coming from a moving object as it approaches and moves away ● Recall the applications of Doppler Effect such as radar, sonar, astronomy, satellite, and radar speed traps. ● Outline some cardiac problems that can be detected through the use of the Doppler's effect.
<p>20th Feb, 2026</p>	<p>6th Mar, 2025</p>	<p>Periods 14</p>	<p>Chapter 13 Physical Optics</p>	<ul style="list-style-type: none"> ● Nature of Light ● Wave Fronts ● Huygen's Principle ● Interference of Light ● Diffraction 	<ul style="list-style-type: none"> ● Understand electromagnetic spectrum (ranging from radio waves to γ-rays). ● Recall that light is a part of a continuous spectrum of electromagnetic waves ● State Huygens's Principle and use it to construct wave front after a time interval ● State the necessary conditions to observe

					<p>interference of light.</p> <ul style="list-style-type: none"> • Describe Young's double slit experiment and the evidence it provides to support the wave theory of light. • Use the equations of constructive and destructive interference to determine the position of bright and dark fringes also determine the fringe spacing. • Explain colour pattern due to interference in thin films. • Describe interference pattern produced by Newton rings • Describe the parts and working of Michelson Interferometer and its uses. • Explain diffraction and identify that interference occurs between waves that have been diffracted. • Describe that diffraction of light is evidence that light behaves like waves. • Describe and explain diffraction at a narrow slit. • Describe the use of a diffraction grating to determine the wavelength of light and carry out calculations using $d \sin\theta = n\lambda$. • Describe the phenomena of diffraction of X-rays through crystals. • Measure the slit separation/ grating element 'd' of a diffraction grating by using the known wavelength of laser light.
9 th Mar, 2026	13 th Mar, 2025	Periods 04	Chapter 14 Communication	<ul style="list-style-type: none"> • Communication Channels • Modulation • Digital Communication 	<ul style="list-style-type: none"> • Describe how the information may be carried by a number of different channels, including wire-pairs, coaxial cables, radio and microwave links, optic fibres and Satellites • Describe relative merits of channels of communication. • Describe that the information can be transmitted by radio waves • Understand the term modulation and be able to distinguish between amplitude modulation (AM) and frequency modulation (FM) • Define the term bandwidth

					<ul style="list-style-type: none"> • Demonstrate an awareness of the relative advantages of AM and FM transmissions • Understand the advantages of the transmission of data in digital form, compared with the transmission of data in analogue form • Understand that the digital transmission of speech or music involves analogue-to digital conversion (ADC) before transmission and digital-to-analogue conversion (DAC) after reception A
16th Mar, 2026	24th Mar, 2026	11 Periods	Revision / Synchronization.		
25th March, 2026	10th April, 2026	Total Units 51	100% Course Complete Preliminary Examination		

Checked By HOD: _____