

# KOTHARI INTERNATIONAL SCHOOL, NOIDA

## ANNUAL ACADEMIC PLAN

### GRADE 11

**SUBJECT: PHYSICSSESSION: 2020-21**

**SUBJECT TEACHER: Ms. SAMTA SHARMA**

**MAXIMUM MARKS: 100 (THEORY:70,PRACTICAL: 30)**

<b>MONTH</b>	<b>TOPIC</b>	<b>SUB TOPICS</b>	<b>BLOCK PERIODS</b>
<b>APRIL</b>	<b>Unit I: Physical World and Measurement</b>	<p><i>Chapter – 1: Physical World</i></p> <p>Physics - scope and excitement; nature of physical laws; Physics, technology and society.(To be discussed as a part of introduction and integrated with other topics)</p> <p><i>Chapter – 2: Units and Measurements</i></p> <p>Need for measurement: Units of measurement; systems of units; SI units, fundamental and derived units. Dimensions of physical quantities. Dimensional analysis and its applications.</p>	<b>3 BLOCKS</b>
<b>MAY</b>	<b>SUMMER VACATION</b>		

<p><b>JUNE</b></p>	<p><b>Unit II: Kinematics</b></p>	<p><i>Chapter – 2: Units and Measurements</i></p> <p>Length, mass and time measurements. Accuracy and precision of measuring instruments; errors in measurement; significant figures.</p> <p><i>Chapter – 3: Motion in a Straight Line</i></p> <p>Elementary concepts of differentiation and integration for describing motion.</p> <p>Uniform and non-uniform motion, average speed and instantaneous velocity, uniformly accelerated motion, velocity - time and position – time graphs. Relations for uniformly accelerated motion (graphical treatment).</p>	<p><b>10 BLOCKS</b></p>
<p><b>JULY</b></p>	<p><b>Unit II: Kinematics</b></p>	<p><i>Chapter – 4: Motion in a Plane</i></p> <p>Scalar and vector quantities; Position and displacement vectors; general vectors and their notations; equality of vectors, multiplication of vectors by a real number; addition and subtraction of vectors; relative velocity; Unit vector; resolution of a vector in a plane - rectangular components. Scalar and Vector product of vectors.</p> <p>Motion in a plane, cases of uniform velocity and uniform acceleration-projectile motion, uniform circular motion.</p>	

	<b>Unit III: Laws of Motion</b>	<p><i>Chapter–5: Laws of Motion</i></p> <p>Intuitive concept of force; Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion. (Recaptulation only)</p> <p>Law of conservation of linear momentum and its applications.</p> <p>Equilibrium of concurrent forces; Static and kinetic friction, laws of friction; rolling friction; lubrication.</p> <p>Dynamics of uniform circular motion: centripetal force, examples of circular motion (vehicle on a level circular road, vehicle on banked road).</p>	<b>5 BLOCKS</b>
<b>AUGUST</b>	<b>Unit IV: Work, Energy and Power</b>	<p><i>Chapter–5 : Work, Energy and Power</i></p> <p>Work done by a constant force and a variable force; kinetic energy; work-energy theorem; power.</p> <p>Notion of potential energy; potential energy of a spring; conservative forces: conservation of mechanical energy (kinetic and potential energies); non-conservative forces: motion in a vertical circle; elastic and inelastic collisions in one and two dimensions.</p>	<b>4 BLOCKS</b>
	<b>Unit V: Motion of System of Particles and Rigid Body</b>	<p><i>Chapter–7: System of Particles and Rotational Motion</i></p>	<b>8 BLOCKS</b>

	<p><b>Unit VI: Gravitation</b></p>	<p>Centre of mass of a two-particle system; momentum conservation and centre of mass motion.</p> <p>Centre of mass of a rigid body; centre of mass of a uniform rod.</p> <p>Moment of a force; torque; angular momentum; laws of conservation of angular momentum and its applications.</p> <p>Equilibrium of rigid bodies; rigid body rotation and equations of rotational motion; comparison of linear and rotational motions.</p> <p>Moment of inertia; radius of gyration; values of moments of inertia for simple geometrical objects (no derivation).</p> <p><b>Chapter–8: Gravitation</b></p> <p>Universal law of gravitation.</p> <p>Acceleration due to gravity (Recaptulation) and its variation with altitude and depth.</p> <p>Gravitational potential energy and gravitational potential; escape velocity; orbital velocity of a satellite; Geo-stationary satellites</p>	<p><b>4 BLOCKS</b></p>
<p><b>SEPTEMBER- OCTOBER</b></p>	<p><b>Unit VII: Properties of Bulk Matter</b></p>	<p><b>Chapter–9: Mechanical Properties of Solids</b></p> <p>Stress-strain relationship; Hooke's law; Young's modulus; bulk modulus</p> <p><b>Chapter–10: Mechanical Properties of Fluids</b></p> <p>Pressure due to a fluid column; Pascal's law and its</p>	<p><b>9 BLOCKS</b></p>

		<p>applications (hydraulic lift and hydraulic brakes); effect of gravity on fluid pressure.</p> <p>Viscosity; Stokes' law; terminal velocity; streamline and turbulent flow; critical velocity; Bernoulli's theorem and its applications.</p> <p>Surface energy and surface tension; angle of contact; excess of pressure across a curved surface; application of surface tension ideas to drops, bubbles and capillary rise.</p> <p><b>Chapter–11: Thermal Properties of Matter</b></p> <p>Heat; temperature(Recaptulation); thermal expansion; thermal expansion of solids, liquids and gases; anomalous expansion of water; specific heat capacity; Cp, Cv - calorimetry; change of state - latent heat capacity.</p> <p>Heat transfer-conduction, convection and radiation(Recaptulation), thermal conductivity, Qualitative ideas of Blackbody radiation; Wein's displacement Law, Stefan's law, Green house effect.</p>	
NOVEMBER	Unit VIII: Thermodynamics	<p><b>Chapter–12: Thermodynamics</b></p> <p>Thermal equilibrium and definition of temperature (zeroth law of thermodynamics).Heat, work and internal energy. First law of thermodynamics. Isothermal and adiabatic processes.</p>	4 BLOCKS

	<p><b>Unit IX: Behaviour of Perfect Gases and Kinetic Theory of Gases</b></p>	<p>Second law of thermodynamics: reversible and irreversible processes</p> <p><i>Chapter–13: Kinetic Theory</i></p> <p>Equation of state of a perfect gas, work done in compressing a gas.</p> <p>Kinetic theory of gases - assumptions, concept of pressure. Kinetic interpretation of temperature; rms speed of gas molecules; degrees of freedom, law of equi-partition of energy (statement only) and application to specific heat capacities of gases; concept of mean free path, Avogadro's number.</p>	<p><b>2.5 BLOCKS</b></p>
<p><b>DECEMBER</b></p>	<p><b>Unit X: Oscillations and Waves</b></p>	<p><i>Chapter–14: Oscillations</i></p> <p><b>Periodic motion</b> -time period, frequency, displacement as a function of time, periodic functions.</p> <p>Simple harmonic motion (S.H.M) and its equation; phase; oscillations of a loaded spring- restoring force and force constant; energy in S.H.M. Kinetic and potential energies; simple pendulum derivation of expression for its time period. Free, forced and damped oscillations (qualitative ideas only), resonance.</p> <p><i>Chapter–15: Waves</i></p>	<p><b>9 BLOCKS</b></p>

**Wave motion:** Transverse and longitudinal waves, speed of wave motion, displacement relation for a progressive wave, principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, Beats.

**JANUARY**

**REVISION**

- **BRIEF EXPLANATION OF ALL TOPICS**
- **ONE TO ONE DOUBT SOLVING CLASSES**
- **SAMPLE PAPERS PREPARATION**
- **PREPARATION OF PRACTICALS**
- **LEARNING OF FORMULAE AND EQUATIONS.**