

## FYJC Physics Syllabus

Sr. No.	Chapter Name	Syllabus
1	Units and Measurements	<ol style="list-style-type: none"> <li>1. System of units and their uses.</li> <li>2. Fundamental quantities, derived quantities, supplementary quantities &amp; their units</li> <li>3. Methods for measurement of length, mass &amp; time.</li> <li>4. Dimensional analysis, uses of dimensional analysis, Limitations of Dimensional Analysis</li> <li>5. Accuracy, precision and uncertainty in measurements, combination of errors</li> <li>6. Identify different types of errors in measurement of physical quantities and estimate them.</li> <li>7. Significant figures &amp; order of magnitude</li> </ol>
2	Mathematical Methods	<ol style="list-style-type: none"> <li>1. Distinguish between scalar and vector quantities.</li> <li>2. Perform addition, subtraction and multiplication (scalar and vector product) of vectors.</li> <li>3. Determine the relative velocity between two objects.</li> <li>4. Obtain derivatives and integrals of simple functions.</li> <li>5. Obtain components of vectors.</li> <li>6. Apply mathematical tools to analyze physics problems.</li> </ol>
3	Motion in a Plane	<ol style="list-style-type: none"> <li>1. Rectilinear motion</li> <li>2. Graphical study of motion</li> <li>3. Equations of motion for uniform acceleration</li> <li>4. Relative velocity</li> <li>5. Motion in two dimensions (motion in a plane)</li> <li>6. Projectile motion</li> <li>7. Uniform circular motion</li> <li>8. Conical pendulum</li> </ol>
4	Laws of Motion	<ol style="list-style-type: none"> <li>1. Aristotle's Fallacy</li> <li>2. Newton's laws of motion, their importance and limitations</li> <li>3. Inertial and non-inertial frames of references</li> <li>4. Fundamental Forces in Nature</li> <li>5. State various conservation principles and use these in daily life situations.</li> <li>6. Contact and Non-Contact Forces, Real and Pseudo Forces</li> <li>7. Conservative and Non-Conservative Forces and Concept of Potential Energy</li> <li>8. Work done by constant and variable force, Work energy theorem</li> <li>9. Principle of Conservation of Linear Momentum</li> <li>10. Systems and Free body diagrams (FBD)</li> <li>11. Elastic and inelastic collision, Coefficient of restitution</li> <li>12. Organize the common principles between collisions and explosions</li> <li>13. Impulse of a force, Explain the necessity of defining impulse and apply it to collisions</li> <li>14. Collision in 2- dimensions i.e. a non-head-on collision</li> <li>15. Rotational analogue of a force (moment of a force or torque)</li> <li>16. Couple and its torque</li> <li>17. Stable, unstable and neutral equilibrium</li> <li>18. Center of mass, Centre of gravity</li> </ol>

5	Gravitation	<ol style="list-style-type: none"> <li>1. Apply the Kepler's laws of planetary motion to solar system.</li> <li>2. Elaborate Newton's law of gravitation, measurement of gravitational constant.</li> <li>3. Calculate the values of acceleration due to gravity at any height above and depth below the earth's surface. Variation in g with latitude.</li> <li>4. Gravitational potential and potential energy.</li> <li>5. Projection of satellite, Distinguish between different orbits of earth's satellite.</li> <li>6. Explain how escape velocity varies from planet.</li> <li>7. Explain weightlessness in a satellite.</li> <li>8. Time period of satellite, Binding energy of satellite.</li> </ol>
6	Mechanical Properties of Solids	<ol style="list-style-type: none"> <li>1. Explain the difference between elasticity and plasticity</li> <li>2. Elastic behavior of solids</li> <li>3. Stress and strain and their types.</li> <li>4. Identify elastic limit for a given material.</li> <li>5. Differentiate between different types of elasticity modules.</li> <li>6. Poisson's ratio.</li> <li>7. Stress strain curve.</li> <li>8. Strain energy</li> <li>9. Hardness and toughness of materials.</li> <li>10. Judge the suitability of materials for specific applications in daily life appliances.</li> <li>11. Identify the role of force of friction in daily life.</li> <li>12. Origin of friction, types of friction, advantages and disadvantages of friction.</li> </ol>
7	Thermal Properties of Matter	<ol style="list-style-type: none"> <li>1. Temperature and heat, Measurement of temperature</li> <li>2. Absolute temperature and Ideal gas equation</li> <li>3. Thermal expansion</li> <li>4. Specific heat capacity of gas, calorimeter</li> <li>5. Change of state, phase diagram, gas and vapours</li> <li>6. Different modes of heat transfer.</li> <li>7. Newton's law of cooling.</li> <li>8. Thermal conductivity, thermal resistance</li> <li>9. Differentiate between good and bad conductors of heat.</li> <li>10. Relate underlying physics for use of specific materials for use in thermometers for specific applications.</li> </ol>
8	Sound	<ol style="list-style-type: none"> <li>1. Types of waves, common properties of all waves.</li> <li>2. Speed of travelling wave</li> <li>3. Newton's formula for velocity of sound and Laplace's correction.</li> <li>4. Factors affecting speed of sound</li> <li>5. Principle of superposition of waves</li> <li>6. Echo, reverberation and acoustic</li> <li>7. Qualities of sound</li> <li>8. Doppler's effect</li> </ol>
9	Optics	<ol style="list-style-type: none"> <li>1. Nature of light</li> <li>2. Ray optics or geometrical optics, Laws of reflection, Laws of refraction</li> <li>3. Cartesian sign conventions</li> <li>4. Reflection from plane surface, Images formed by two plane mirrors inclined to each other</li> <li>5. Reflection from curved mirrors</li> <li>6. Defects or aberration of images</li> </ol>

		<ol style="list-style-type: none"> <li>7. Identify the defects in images obtained by mirrors and lenses, with their cause and ways of reducing or eliminating them.</li> <li>8. Refraction, Dispersion of light and prisms, deviation curve, minimum deviation, prism formula, lateral dispersion due to plane parallel slab, thin prism</li> <li>9. Angular dispersion and dispersive power</li> <li>10. Relate dispersion of light with colour and apply it analytically with the help of prisms.</li> <li>11. Total internal reflection, Applications of total internal reflection</li> <li>12. Apply the laws of refraction to common phenomena in daily life like, a mirage or a rainbow.</li> <li>13. Refraction at a spherical surface and lenses</li> <li>14. Refraction at a single spherical surface</li> <li>15. Lens maker equation</li> <li>16. Optical instruments, simple microscope, compound microscope, telescope and their magnifying power.</li> </ol>
10	Electrostatics	<ol style="list-style-type: none"> <li>1. Electric charges and their properties, Quantization of Charge, Conservation of charges</li> <li>2. Coulomb's law in scalar and vector form, Definition of unit charge, Dielectric constant or relative permittivity</li> <li>3. The principle of superposition of forces</li> <li>4. Electric field, electric field intensity due to a point charge, Practical way of calculating electric field</li> <li>5. Properties of electric lines of force</li> <li>6. Electric Flux and Flux density</li> <li>7. Gauss's law in electrostatics</li> <li>8. Electric dipole and electric dipole moment, couple acting on an electric dipole in uniform electric field</li> <li>9. Electric Intensity at a Point due to an Electric Dipole</li> <li>10. Continuous distribution of charge</li> </ol>
11	Electric Current Through Conductors	<ol style="list-style-type: none"> <li>1. Electric current, drift velocity, Current density</li> <li>2. Ohm's law, Physical origin of Ohm's law, Limitations of Ohm's law</li> <li>3. Electric energy and power</li> <li>4. Resistors, colour code for resistors, Rheostat, Combination of resistors (Series &amp; Parallel), Specific resistance</li> <li>5. Variation of resistance with temperature</li> <li>6. Superconductivity</li> <li>7. Electro motive force and potential difference</li> <li>8. Cells in series and parallel, types of cells</li> </ol>
12	Magnetism	<ol style="list-style-type: none"> <li>1. Magnetic lines of force and their Properties, magnetic field</li> <li>2. Bar magnet</li> <li>3. Magnetic field due to a bar magnet along the axis, along the equator and at arbitrary point</li> <li>4. Gauss' Law of Magnetism</li> <li>5. Earth's magnetic field</li> </ol>
13	Electromagnetic Waves and Communication System	<ol style="list-style-type: none"> <li>1. EM wave, Sources of EM waves, Characteristics of EM waves, Electromagnetic Spectrum</li> <li>2. Explain the properties of an electromagnetic wave.</li> <li>3. Distinguish between mechanical waves and electromagnetic waves.</li> <li>4. Identify different types of electromagnetic radiations from gamma rays to radio waves.</li> <li>5. Propagation of EM Waves</li> <li>6. Distinguish between different modes of propagation of EM waves through earth's atmosphere.</li> </ol>

		<ol style="list-style-type: none"> <li>7. Identify different elements of a communication system.</li> <li>8. Explain different types of modulation and identify the types of modulation needed in given situation.</li> </ol>
14	Semiconductors	<ol style="list-style-type: none"> <li>1. Electrical conduction in solids</li> <li>2. Band theory of solids</li> <li>3. Distinguish between conductors, insulators and semiconductors based on band structure.</li> <li>4. Intrinsic and extrinsic semi-conductor</li> <li>5. Differentiate between p type and n type semiconductors and their uses.</li> <li>6. P-N junction</li> <li>7. Concept of Depletion region and potential barrier, Features of the depletion region</li> <li>8. Zero Biased Junction Diode</li> <li>9. Explain working of forward and reverse biased junction.</li> <li>10. Explain the working of semiconductor diode</li> <li>11. Characteristics of P-N junction diode, Static and dynamic resistance of a diode</li> <li>12. Semiconductor devices</li> <li>13. Semiconductor devices, Advantages, Disadvantages, Applications of semiconductors and p-n junction diode</li> <li>14. Thermistor</li> <li>15. Electric and electronic devices</li> </ol>