NEET Syllabus 2025
Physics

UNIT 1: PHYSICS AND MEASUREMENT

> Units of measurements

> System of Units (SI Units)

> Fundamental and derived units

> Least count

> Significant figures

> Errors in measurements

> Dimensions of Physics quantities

> Dimensional analysis and its applications

UNIT 2: KINEMATICS

> Frame of reference

> Motion in a straight line:
- Position-time graph
- Speed and velocity
- Uniform and non-uniform motion
- Average speed and instantaneous velocity
- Uniformly accelerated motion
- Velocity-time, position-time graphs
- Relations for uniformly accelerated motion

> Scalars and Vectors:
- Vector Addition and subtraction
- Scalar and vector products
- Unit Vector
- Resolution of a Vector

> Relative Velocity

> Motion in a plane:
- Projectile Motion
- Uniform Circular Motion

UNIT 3: LAWS OF MOTION

> Force and inertia

> Newton's First law of motion

> Momentum, Newton's Second Law of motion

> Impulses

> Newton's Third Law of motion

> Law of conservation of linear momentum and its applications

> Equilibrium of concurrent forces

> Static and Kinetic friction, laws of friction, rolling friction

> Dynamics of uniform circular motion:
- Centripetal force and its applications:
  - vehicle on a level circular road
  - vehicle on a banked road

UNIT 4: WORK, ENERGY, AND POWER

> Work done by a constant force and a variable force
> Kinetic and potential energies
> Work-energy theorem
> Power
> The potential energy of spring
> Conservation of mechanical energy
> Conservative and non-conservative forces
> Motion in a vertical circle
> Elastic and inelastic collisions in one and two dimensions

UNIT 5: ROTATIONAL MOTION
> Centre of the mass of a two-particle system
> Centre of the mass of a rigid body
> Basic concepts of rotational motion
> Moment of a force; torque
> Angular momentum, conservation of angular momentum and its applications
> Moment of inertia
> Radius of gyration
> Values of moments of inertia for simple geometrical objects
> Parallel and perpendicular axes theorems and their applications
> Equilibrium of rigid bodies
> Rigid body rotation and equations of rotational motion
> Comparison of linear and rotational motions

UNIT 6: GRAVITATION
> The universal law of gravitation
> Acceleration due to gravity and its variation with altitude and depth
> Kepler's law of planetary motion
> Gravitational potential energy
> Gravitational potential
> Escape velocity
> Motion of a satellite, orbital velocity, time period and energy of satellite

UNIT 7: PROPERTIES OF SOLIDS AND LIQUIDS
> Elastic behaviour, Stress-strain relationship, Hooke's Law
> Young's modulus, bulk modulus, modulus of rigidity
> Pressure due to a fluid column
> Pascal's law and its applications
> Effect of gravity on fluid pressure
> Viscosity. Stokes' law. terminal velocity, streamline, and turbulent flow.
> Critical velocity
> Bernoulli's principle and its applications
> Surface energy and surface tension, angle of contact, excess of pressure across a curved surface
> Application of surface tension – drops, bubbles, and capillary rise
> Heat, temperature, thermal expansion
> Specific heat capacity, calorimetry
> Change of state, latent heat
> Heat transfer- conduction, convection, and radiation

UNIT 8: THERMODYNAMICS

> Thermal equilibrium, zeroth law of thermodynamics, the concept of temperature
> Heat, work, and internal energy
> The first law of thermodynamics, isothermal and adiabatic processes
> The second law of thermodynamics: reversible and irreversible processes

UNIT 9: KINETIC THEORY OF GASES

> Equation of state of a perfect gas
> Work done on compressing a gas
> Kinetic theory of gases – assumptions, the concept of pressure
> Kinetic interpretation of temperature: RMS speed of gas molecules
> Degrees of freedom
> Law of equipartition of energy and applications to specific heat capacities of gases
> Mean free path
> Avogadro's number

UNIT 10: OSCILLATIONS AND WAVES

> Oscillations and periodic motion – time period, frequency, displacement as a function of time
> Periodic functions
> Simple harmonic motion (S.H.M.) and its equation; phase
> Oscillations of a spring – restoring force and force constant
> Energy in S.H.M. – Kinetic and potential energies
> Simple pendulum – derivation of expression for its time period
> Wave motion. Longitudinal and transverse waves, speed of travelling wave
> Displacement relation for a progressive wave
> Principle of superposition of waves, reflection of waves
> Standing waves in strings and organ pipes, fundamental mode and harmonics
> Beats

UNIT 11: ELECTROSTATICS

> Electric charges: Conservation of charge
> Coulomb's law forces between two point charges, forces between multiple charges: superposition principle and continuous charge distribution
> Electric field: Electric field due to a point charge, Electric field lines
> Electric dipole, Electric field due to a dipole
> Torque on a dipole in a uniform electric field
> Electric flux. Gauss's law and its applications to find field due to infinitely long uniformly charged straight wire, uniformly charged infinite plane sheet, and uniformly charged thin spherical shell.
> Electric potential and its calculation for a point charge, electric dipole and system of charges
> Potential difference, Equipotential surfaces
> Electrical potential energy of a system of two point charges and of electric dipole in an electrostatic field
> Conductors and insulators. Dielectrics and electric polarization, capacitors and capacitances,

- The combination of capacitors in series and parallel
- Capacitance of a parallel plate capacitor with and without dielectric medium between the plates.
- Energy stored in a capacitor

UNIT 12: CURRENT ELECTRICITY

- Electric current. Drift velocity, mobility and their relation with electric current.. Ohm's law.
- Electrical resistance.. V-I characteristics of Ohmic and non-ohmic conductors. Electrical energy and power.
- Electrical resistivity and conductivity. Series and parallel combinations of resistors;
- Temperature dependence of resistance.
- Internal resistance, potential difference and emf of a cell, a combination of cells in series and parallel.
- Kirchhoff's laws and their applications.
- Wheatstone bridge. Metre Bridge.

UNIT 13: MAGNETIC EFFECTS OF CURRENT AND MAGNETISM

- Biot – Savart law and its application to current carrying circular loop.
- Ampere's law and its applications to infinitely long current carrying straight wire and solenoid.
- Force on a moving charge in uniform magnetic and electric fields.
- Force on a current-carrying conductor in a uniform magnetic field.
- The force between two parallel currents carrying conductors–definition of ampere.
- Torque experienced by a current loop in a uniform magnetic field: Moving coil galvanometer, its sensitivity, and conversion to ammeter and voltmeter.
- Current loop as a magnetic dipole and its magnetic dipole moment.
- Bar magnet as an equivalent solenoid, magnetic field lines;
- Magnetic field due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis.
- Torque on a magnetic dipole in a uniform magnetic field.
- Para-, dia- and ferromagnetic substances with examples, effect of temperature on magnetic properties.

UNIT 14: ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENTS

- Electromagnetic induction: Faraday's law. Induced emf and current: Lenz's Law, Eddy currents.
- Self and mutual inductance.
- Alternating currents, peak and RMS value of alternating current/voltage: reactance and impedance: LCR series circuit, resonance: power in AC circuits, wattless current.
- AC generator and transformer.

UNIT 15: ELECTROMAGNETIC WAVES

- Displacement current.
- Electromagnetic waves and their characteristics, Transverse nature of electromagnetic waves,

> Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet. X-rays. Gamma rays),
> Applications of e.m. waves.

UNIT 16: OPTICS

> Reflection of light, spherical mirrors, mirror formula
> Refraction of light at plane and spherical surfaces, thin lens formula and lens maker formula
> Total internal reflection and its applications
> Magnification. Power of a Lens. Combination of thin lenses in contact
> Refraction of light through a prism
> Microscope and Astronomical Telescope (reflecting and refracting) and their magnifying powers
> Wave optics:
  - Wavefront and Huygens' principle
  - Laws of reflection and refraction using Huygens principle
  - Interference, Young's double-slit experiment and expression for fringe width, coherent sources, and sustained interference of light
  - Diffraction due to a single slit, width of central maximum
  - Polarization, plane-polarized light: Brewster's law, uses of plane-polarized light and Polaroid

UNIT 17: DUAL NATURE OF MATTER AND RADIATION

> Dual nature of radiation
> Photoelectric effect
> Hertz and Lenard's observations; Einstein's photoelectric equation: particle nature of light
> Matter waves-wave nature of particle, de Broglie relation

UNIT 18: ATOMS AND NUCLEI

> Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum
> Composition and size of nucleus, atomic masses, Mass-energy relation, mass defect
> Binding energy per nucleon and its variation with mass number, nuclear fission, and fusion

UNIT 19: ELECTRONIC DEVICES

> Semiconductors
> Semiconductor diode: I-V characteristics in forward and reverse bias; diode as a rectifier
> I-V characteristics of LED. the photodiode, solar cell, and Zener diode
> Zener diode as a voltage regulator
> Logic gates (OR, AND, NOT, NAND and NOR)

UNIT 20: EXPERIMENTAL SKILLS

> Familiarity with the basic approach and observations of the experiments and activities:
  1. Vernier calipers-its use to measure the internal and external diameter and depth of a vessel.

2. Screw gauge-its use to determine thickness/ diameter of thin sheet/wire.
3. Simple Pendulum-dissipation of energy by plotting a graph between the square of amplitude and time.
4. Metre Scale – the mass of a given object by the principle of moments.
5. Young's modulus of elasticity of the material of a metallic wire.
6. Surface tension of water by capillary rise and effect of detergents
7. Co-efficient of Viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body.
8. Speed of sound in air at room temperature using a resonance tube.
9. Specific heat capacity of a given (i) solid and (ii) liquid by method of mixtures.
10. The resistivity of the material of a given wire using a metre bridge.
11. The resistance of a given wire using Ohm's law.
12. Resistance and figure of merit of a galvanometer by half deflection method.
13. The focal length of:
    - Convex mirror
    - Concave mirror, and
    - Convex lens, using the parallax method.
14. The plot of the angle of deviation vs angle of incidence for a triangular prism.
15. Refractive index of a glass slab using a travelling microscope.
16. Characteristic curves of a p-n junction diode in forward and reverse bias.
17. Characteristic curves of a Zener diode and finding reverse break down voltage.
18. Identification of Diode. LED,. Resistor. A capacitor from a mixed collection of such items.