

## Physics 12 Topics

### Unit 1 Kinematics: Chapters 1-3

1. Measurement and uncertainty
2. Precision and accuracy
3. Significant figures
4. Reference frames
5. Position, distance, displacement
6. Speed, average velocity, instantaneous velocity
7. Acceleration, motion at constant acceleration
8. Falling objects
9. Graphical analysis of linear motion
10. Vector addition: tip to tail, components, cosine law
11. Projectile motion
12. Problem solving format
13. Laboratory format

### Unit 2 Dynamics: Chapters 4-6

1. Force
2. Newton's laws of motion
3. Weight, mass, normal force
4. Box train problems
5. Atwood's machine
6. Static and kinetic friction
7. Uniform circular motion
8. Centripetal acceleration
9. Car rounding a curve
10. Newton's law of universal gravitation
11. Satellites and weightlessness
12. Types of forces
13. Work
14. Kinetic energy and work-energy principle
15. Potential energy
16. Conservative and non-conservative forces
17. Mechanical energy conservation
18. Law of conservation of energy
19. Energy conservation with dissipative forces
20. Power

### Unit 3 Momentum and Statics: Chapters 7, section 8-4, 9

1. Momentum and force
2. Conservation of momentum
3. Collisions and impulse
4. Conservation of energy and momentum in collisions
5. Elastic and inelastic collisions
6. Collisions in two dimensions
7. Equilibrium: translational and rotational
8.  $\Sigma F = 0$ , and  $\Sigma \tau = 0$
9. Solving problems: see-saw, chandelier, stop light, hanging sign, ladder, fishing rod

### Unit 4 Electricity and Magnetism: Chapters 16-21

1. Electric charge, charge in an atom
2. Insulators and conductors
3. Induced charge and the electroscope
4. Coulomb's law
5. Electric fields
6. Electric field lines, electric field lines and conductors
7. Electric potential and potential difference
8. Electric potential and field lines, equipotential lines
9. Electron volt
10. Electric potential due to point charges
11. Cathode ray tube
12. Electric batteries
13. Electric current
14. Ohm's law
15. Electric power, household circuits
16. Resistors in series and parallel
17. EMF
18. Kirchhoff's rules
19. Ammeters and voltmeters
20. Magnetic poles and fields
21. Ferromagnetic
22. Electric current producing magnetism
23. Force on a current carrying wire
24. Force on an electric charge moving in a B field
25. Tow right-hand rules
26. Magnetic field around a straight wire
27. Force between two parallel wires, definition of ampere, ampere's law
28. Solenoids, field strength in a solenoid
29. Torque on a current loop
30. Electric motor
31. Mass spectrometer
32. Induced EMF, Faraday's law of induction
33. EMF induced in a moving conductor
34. Changing magnetic flux producing an electric field
35. Electric generators
36. Back EMF
37. Transformers